Test Method: **CAN/CGSB-82.1-M89**

Manufacturer/Client: Oasis Windows Ltd.	Manufacturer/Client Address: 109-12889 84th Street Surrey, British Columbia Canada
Job Number: W410-7	

Sample: Patio Sliding Door	Description/Model: Patio Sliding Door Width: 71 5/8", Height: 79 ½" 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 14 – 19, 2006

REPORT NUMBER W410-7

Edition 1: August 28, 2006
Contents: Pages 1-15, A1-A2

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Sampling Plan/Procedures:

One unused, glazed patio sliding door, complete with all hardware, was provided by the client and examined at the QAI laboratory, then tested on between June 14, 2006 and June 19, 2006 as being a representative sample of a typical production unit. A summary of test results for this test specimen is shown in Table 2. The manufacturer also submitted a separate roller/sliding assembly sample to be used for the roller test specified in Clause 6.9 of CAN/CGSB 82.1-M89.

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

Test Conditions:

Quality Auditing Institute Ltd. (QAI) was retained by Oasis Windows Ltd. to perform testing in accordance with the test requirements of CAN/CGSB-82.1-M89 "Sliding Doors".

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

The test specimen was then installed in a test buck according to the manufacturer's instructions. The test specimen was fastened to the wooden buck using 1" long screws at approximately 11" spacing. Sheathing tape was placed over the vinyl flange. ½" plywood strips were then fastened overtop of the vinyl flange using 1 ½" staples at 4" spacing. Another layer of sheathing tape was placed overtop of the plywood.

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 approximately ½" larger than the test specimen in width and height, 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. Tests were conducted in the following order:

Table 2: Test Sequence and Alterations

Test Number	Test Clause	Test	Alterations
1	6.2	Ease of Operation	None
2	6.3	Air Leakage	None
3	6.4	Water Penetration	None
4	6.5 / 6.6	Wind Load Resistance	None
5	6.7	Blocked Operation	None
6	6.10	Forced Entry	None
7	6.8	Parallel Load	None
8	6.9	Roller/Sliding Assembly Test	None

Summary of Results:

Table 3: Test Results (Sliding Door Ratings)

Clause	Test Name	Rating
6.2	Ease of Operation	E1
6.3	Air Leakage	A3
6.4	Water Leakage	B3
6.5	Wind Load Resistance	C3
6.7	Blocked Operation	PASS
6.8	Parallel Load	PASS
6.9	Roller/Sliding Assembly Test	PASS
6.10	Forced Entry	PASS
6.11	Condensation Resistance	-

Note: "-" indicates test was not performed

Window Components:

Patio Sliding Door		
Frame:	Size:	Width: 71 5/8" Height: 79 ½" Vinyl. Extrusion #5200. See appendix A for drawing.
	Joints:	Mitered. Thermally welded. Corners cleaned.
Sash:	Size:	Vinyl. Pull stile extrusion #5201. Meeting stile extrusion #5203. Rails extrusion #5201. See appendix A for drawing.
	Joints:	Mitered. Thermally welded. Corners cleaned.
	Reinforcement:	Steel U-Channel (0.125" thick x 1.20" wide x 1.08" high) fastened to vinyl members with 10 – ¾" self taping screws. Screws caulked in place. Part #52-S9
Mullion:	Material:	Vinyl. Extrusion #5202. See appendix A for drawing. Fastened with 2 - #8 x 3" long screws at each end
	Reinforcement:	Steel U-Channel (0.125" thick x 1.20" wide x 1.08" high) fastened to vinyl members with 10 – ¾" self taping screws. Screws caulked in place. Part #52-M7
Glazing Method:	Glazing Tape	Venture (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 sealant.
	Glazing Bead	Vinyl. Extrusion #2118T. See appendix A for drawing.
	Setting Blocks	Dimensions: 24mm x 24mm x 3mm 2 setting blocks located under each glass unit and located approximately 40mm from corner of glazing.
Glazing:	Overall Thickness	22mm (7/8") thick 2 glass lites – each 4mm clear tempered glass
	Spacer:	12.7mm (1/2") Bayform thermally broken, desiccant filled aluminum with polysulfide backing seal.
Weather-stripping	Frame:	Schlegel PB 8822-187
	Sash / Mullion:	Schlegel FS 7322-187
Drainage:	Frame:	See drawing in appendix A.
Hardware:	Rollers:	One pair of Delmar 1 ¼" tandem rollers. Model #D-4018
	Lock:	1 – Vangaurd locking handle set #101-318WH-SET with 1 ½" aluminum strike plate #101-116-WH
	Night Lock:	1 – Vangaurd night lock #101-307-WH located on the bottom of the meeting stile
	Insect Screen	Not supplied with test sample

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

Test Specifications:

Ease of Operation Test: CAN/CGSB 82.1-M89, Clause 6.2:

The window was mounted in the test frame. 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.

CAN/CGSB 82.1-M89, Table 1 – Ease of Operation Test Requirements:

Type	Point of Application Of Force	Direction of Force	Maximum Force to Initiate Motion (E1)	Maximum Force to Maintain Motion (E1)
Patio Sliding Door	Midpoint of operating handle	Horizontal, parallel to plane of glass	175 N (39 lb)	110 N (24 lb)

Test Results:

Opening Direction:
Force to Initiate Motion = 21.2 lb
Force to Maintain Motion = 17.0 lb

Closing Direction:
Force to Initiate Motion = 17.0 lb
Force to Maintain Motion = 23.1 lb

Alterations during Testing:

None

The test specimen obtained an E1 Rating for the Ease of Operation Test.

Air Tightness Test: CAN/CGSB 82.1-M89, Clause 6.3

	Laboratory Conditions	Standard Conditions
Temperature	19.0 C	20.8 C
Pressure	101.6 kPa	101.3 kPa
Air Density	1.213 kg/m^3	1.202 kg/m^3
Air Density Ratio = 1.004		

CL_{op} = Crack length of operable portion = 5.610m
CL_f = Crack length of fixed portion = 5.321m
CL_t = Cl_{op} + CL_f = 10.931m

$Q_{op/A3}$ = Maximum air leakage of operable portion for A3 rating = 1.0 (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

$$= \frac{Q_{op} \times Cl_{op} + Q_f \times CL_f}{CL_t} = 0.635 \text{ (m}^3\text{/h)/m}$$

Infiltration Results (positive pressure) @ 75 Pa

Adjusted Metered Air Flow @ 75 Pa[1]	2.816 m^3/h
Crack Length	10.931 m
Air Infiltration @ 75 Pa[1] (1.57 psf)	**0.258 (m^3/h)/m**

Exfiltration Results (negative pressure) @ -75 Pa

Adjusted Metered Air Flow @ 75 Pa[1]	2.304 m^3/h
Crack Length	10.931 m
Air Exfiltration @ 75 Pa[1] (1.57 psf)	**0.211 (m^3/h)/m**

Window Air Rating Average

Air Infiltration Rate	0.258 (m^3/h)/m
Air Exfiltration Rate	0.211 (m^3/h)/m
Average Rate	**0.234 (m^3/h)/m**
Rating	**A3**

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

Alterations during Testing:

None

Water Tightness Test: CAN/CGSB 82.1-M89, Clause 6.4

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
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	Approximately 2 minutes with pressure	Water leakage over sill	FAIL B4

Alterations during Testing:

None

The test specimen obtained a B3 rating.

Wind Load Resistance Test: CAN/CGSB 82.1-M89, Clause 6.5-6.6

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 19 degrees Celsius, 101.6 kPa. Deflection measurements were taken at the midpoint of the interlocking stile and at 37 ¼" to the top and bottom of the midpoint. All measurements are in inches.

Try for C3 Rating:
Deflection Test: 1000 Pa (inward direction)

Dial Position	Initial Reading	Pressurized Deflection	Final Reading	Deflection
Top	0.519	0.564	0.521	0.045
Middle	0.249	0.649	0.254	0.400
Bottom	0.246	0.358	0.249	0.112

Deflection = 0.322"

Deflection Test: -1000 Pa (outward direction)

Dial Position	Initial Reading	Pressurized Deflection	Final Reading	Deflection
Top	0.173	0.111	0.172	0.062
Middle	1.419	0.975	1.418	0.444
Bottom	0.210	0.064	0.203	0.146

Deflection = 0.340"

Maximum allowable deflection = L/175 = 0.425"

Blow-Out Test:

Pressure (Pa)	Time (s)
1250	60
0	60
2500	10
0	60
-1250	60
0	60
-2500	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 C3 Rating

Blocked Operation Test: CAN/CGSB 82.1-M89, Clause 6.7

With the test specimen mounted in a suitable 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, a force of 300 N (74 lb) was applied to the midpoint of the operating 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.

The operating handle remained firmly attached to the door stile member and showed no signs of failure or permanent deformation. The sash members were not pulled away from the glass. The test specimen showed no signs of failure or permanent deformation. The glazing did not break at any time during this test.

The test specimen PASSED the Blocked Operation Test

Parallel Load Test: CAN/CGSB 82.1-M89, Clause 6.8

This test was performed on an unglazed sash. A concentrated load of 88 N (20 lb) was placed at the midpoint of both vertical stiles of the operable sash. The load was applied horizontally and parallel to the plane of the door by means of a wire rope for less than 30 seconds.

Maximum allowed deflection = 5mm

The test specimen PASSED the Parallel Load Test

Roller/Sliding Assembly Operation: CAN/CGSB 82.1-M89, Clause 6.9

The manufacturer submitted a single Roller/Sliding assembly installed according to normal practices. A load of 450 N (100 lb) was used for this test (double glazing).

High Temperature Test:
The complete test assembly, including the load, was placed in a temperature controlled chamber at 50 +-2 degrees Celsius for 4 hours. Immediately following the test the assembly was inspected and the rollers showed no signs of stickiness or the development of flat spots.

Cycling Test:
The test assembly was subjected to 60,000 cycles of forward and return motion through a distance of 160mm at an average rate of 10 cycles per minute. The operating force of the roller/sliding assembly did not exceed 27 N and the wear of the track did not exceed 2 mm.

The test specimen PASSED the Roller/Sliding Assembly Operation Test

Resistance to Forced Entry: CAN/CGSB 82.1-M89, Clause 6.10:

With the test specimen mounted in a suitable test frame, the test was conducted in accordance with ASTM F842 with the exceptions specified in Clause 7.10.1 of CAN/CGSB 82.1-M89.

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) = 1334 N (300 lb)
Load (L2) = 778 N (175 lb)
Load (L3) = 445 N (100 lb)
Load (L4) = 133N (30 lb)

Procedure - Type A Sliding Door:
A2.1 Disassembly Test
A2.2 Hardware Manipulation Test = Pass
A2.3 Panel Manipulation Test = Pass
Test A1 = Pass
Test A2 = Pass
Test A3 = Pass
Test A4 = Pass
Test A5 = Pass
Test A6 = N/A
Test A7 = Pass
A2.2 Hardware Manipulation Test = Pass
A2.3 Panel Manipulation Test = Pass

Alterations during test:

Originally two screws fastened the mortise lock keeper to the jamb. The keeper was ripped away from the jamb during Test A1. The keeper was then fastened to the jamb using 4 screws.

The test specimen obtained a F1 Rating

Thermal Break - Condensation Resistance: CAN/CGSB 82.1-M89, Clause 6.11

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

Window Ratings – Tables of Minimum Requirements from CAN/CGSB 82.1-M89 Sliding Doors

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	1.00

Table 2: Water Tightness

For use in small buildings	Pressure Differential (Pa)
Storm	0
B1	137
B2	200
B3	300
B4	400

Table 3: Wind Load Resistance

Sliding Door Rating	Pressure Differential, Pa	
	Deflection Sash (L/175)	Blowout
Storm	--	750
C1	500	1500
C2	750	2000
C3	1000	2500

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 CAN/CGSB 82.1-M89 on a representative sample of Oasis Windows ltd. patio sliding door.

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

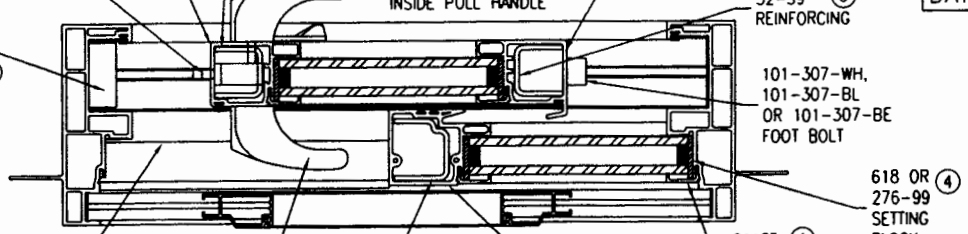
Component Specifications
Patio Sliding Door

Page	Title
A1	Assembly Drawing
A2	Drainage Detail

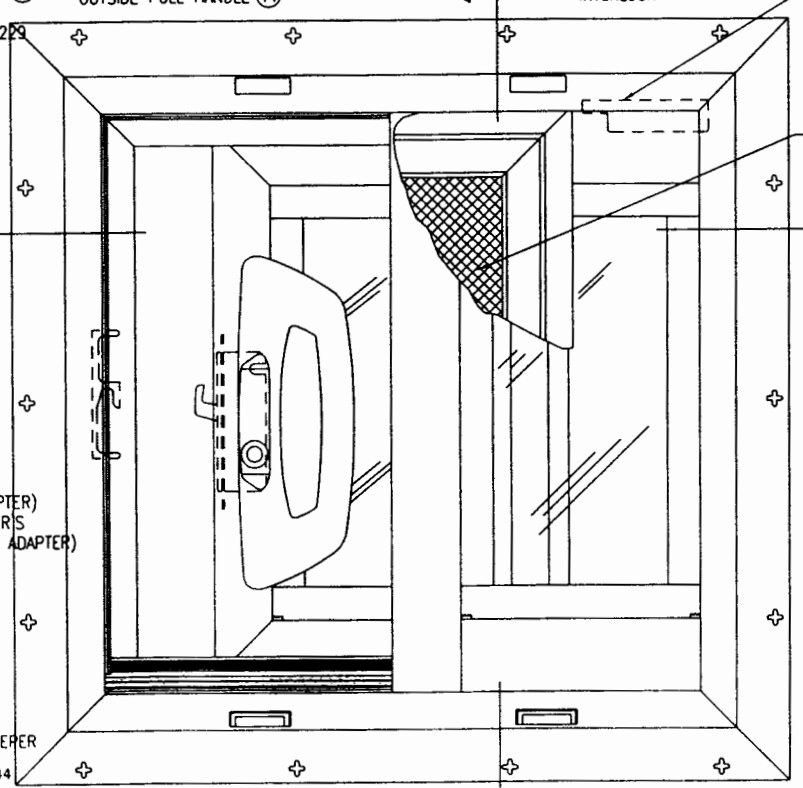
REF. NO. 52A-01		PAGE: 2
DATE: JUL31/03	BY: CG	REV: 2
		CHK'D:

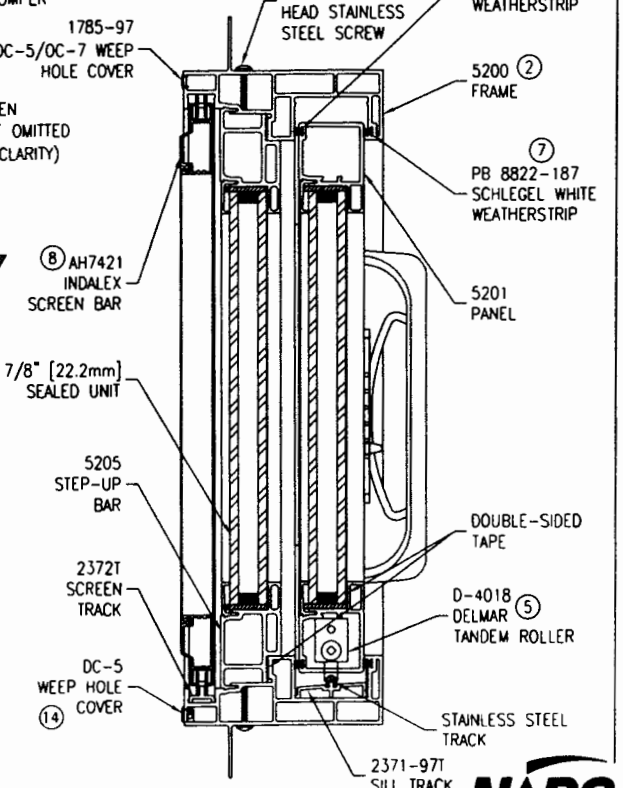
SERIES '5200' PATIO DOOR GENERAL ASSEMBLY - PROFILES & HARDWARE

SECTION B-B



SECTION A-A





NOTES:

1. 3/4" UNIT USE 2116T, 2397 OR 2395T; 1" UNIT USE 2119 OR 2380-99T
2. CAN USE 5250
3. REINFORCE AS REQUIRED
4. 3/4" UNIT USE 618 OR 2229; 1" UNIT USE 276-99
5. CAN USE 1951-2000-2 (1") REFLECTOLITE ROLLER OR 101-9001-YC (1") VANGUARD ROLLER
6. CAN USE 1823-61V1-3 SSI WHITE WEATHERSTRIP
7. CAN USE 8822-50V8-2 SSI WHITE WEATHERSTRIP
8. CAN USE PF280833 ALUMET SCREEN BAR, OR HRD/NRD/EDM 7 BAYFORM SCREEN BAR
9. CAN USE 2300-1061 BUILDER'S HARDWARE MORTISE LOCK (W/O ADAPTER) OR 2300-1061-3 BUILDER'S HARDWARE MORTISE (WITH ADAPTER)
10. CAN USE 2998-30SW BUILDER'S HARDWARE INSIDE PULL HANDLE
11. CAN USE 2957-10SW BUILDER'S HARDWARE OUTSIDE PULL HANDLE
12. CAN USE 2538-10SW BUILDER'S HARDWARE KEEPER
13. CAN USE PPAT.081.07.144 ALUMINUM THRESHOLD
14. CAN USE DC-7 WEEP HOLE COVER

NOTE: WEATHERSTRIP: IN THE FRAME USE PB 8822-187; IN ALL OTHER PARTS USE FS 7322-187

COMP REF: K:/MANUAL/5200/52A01.DWG

NORTH AMERICAN PROFILES GROUP

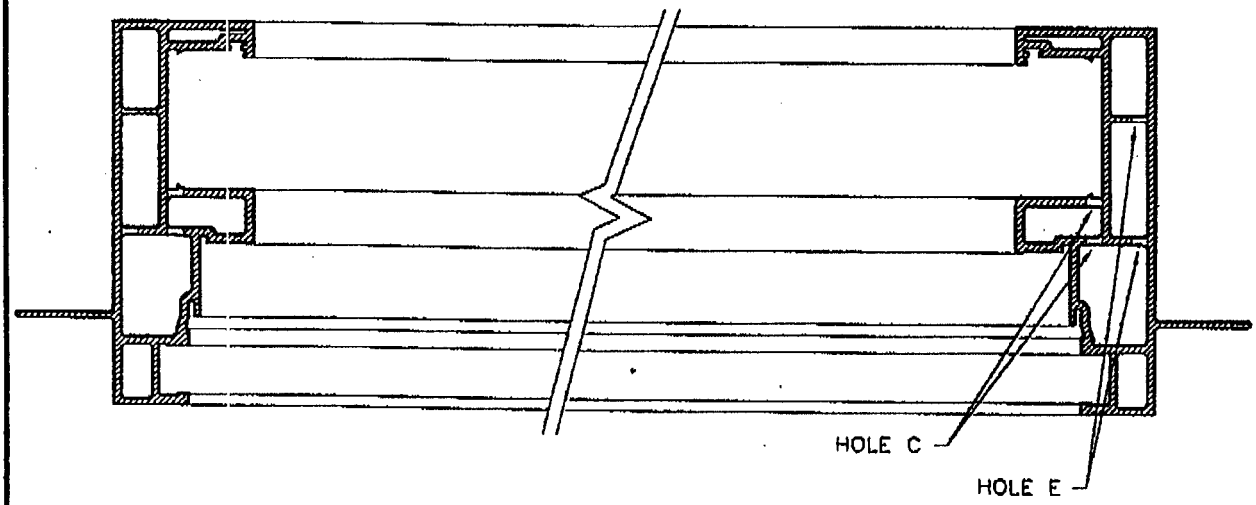
August 28, 2006

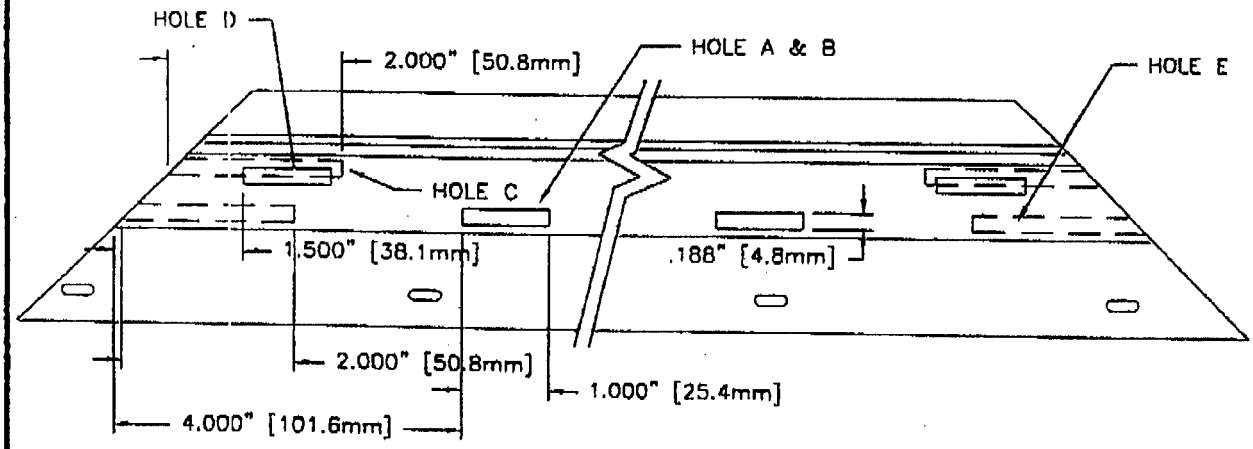
Job Number: W410-7
Revision 1

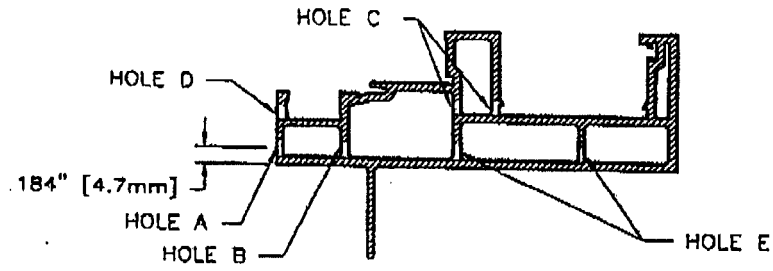
QAI

REF. NO. 52TEST-03		
DATE: MAR20/98	BY: BK	REV: 1
		CHK'D:

5200 PATIO DOOR: MAIN FRAME DRAINAGE DETAIL







CROSS-SECTION

PUNCH DETAIL:
PUNCHING IS DONE IN TWO STEPS & WILL DO ONE END OF TWO SILLS IN ONE STROKE

COMP REF : K:/MANUAL/TESTING/5200/52TEST03.fwm