

FM 4473

TEST REPORT

Rendered to:

VTECH INDUSTRIES, LLP

SERIES/MODEL: 4 x 4 CMC Hurricane

PRODUCT TYPE: Skylight

Report No.: 92240.01-801-75

Revision 1: 09/09/09

Test Date: 08/27/09

Report Date: 08/31/09

Expiration Date: 08/27/13

FM 4473 TEST REPORT

Rendered to:

VTECH INDUSTRIES, LLP
5534 Harvey Wilson Drive
Houston, Texas 77020

Report No.: 92240.01-801-75
Revision 1: 09/09/09
Test Dates: 08/27/09
Report Date: 08/31/09
Expiration Date: 08/27/13

Project Summary: Architectural Testing, Inc. was contracted by Vtech Industries to perform testing on 4 x 4 CMC Hurricane Skylights. The sample tested met the Class 4 performance requirements set forth in the referenced test procedures. Test specimen description and results are reported herein. The sample was provided by the client.

Test Procedures: The test specimens were evaluated in accordance with the following:

Specification Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls, Class No. 4473, FM Approvals (2005)

Test Specimen Description:

Product Type: Skylight

Overall Size: 1302 mm (51-1/4") wide by 1302 mm (51-1/4") high

Rough Opening Size (curb): 1283 mm (50-1/2") wide by 1283 mm (50-1/2") high

Fixed Daylight Opening Size: 1140 mm (44-7/8") wide by 1140 mm (44-7/8") high

Overall Area: 1.69 m² (18.24 ft²)

Finish: Black Polyurethane

Frame Construction: One piece molded polyurethane.

Test Specimen Description: (Continued)

Deck Construction: The wood test deck was 8' wide x 4' high and constructed with 2x4 pine lumber at the perimeter with one stud located at the midspan. The test deck was covered with 15/32" thick plywood decking secured to the test deck with #6 x 1-5/8" screws located 2" from each end and on 6" centers.

Glazing Details: The unit was glazed using insulating glass with an overall thickness of 3/4". At the exterior of the unit was 5/32" tempered glass. An aluminum spacer system measuring 1/4" was used. At the interior was .120" Dupont Butacite PVB interlayer with one piece of 3/32" heat strengthened glass on each side. The insulating glass unit was integrally molded to the frame.

Installation: The test unit was secured to a 2 x 10 spf curb using both screws and sealant. Screws used were #10 x 1-1/2" flat head Phillips located at 6" from each corner and 12" on center spacing thereafter and were located along the sides of the curb mount. The curbing was secured to the test deck with one #8 x 2" screw at each corner.

Test Results: The following results have been recorded:

FM 4473, Ice Ball Impact Resistance

Sample Conditioning Temperature: 26°C (78°F) 4 hours

Sample Conditioning Relative Humidity: 50% 4 hours

Ice Ball Conditioning Temperature: -22°C (-7°F) 48 hours

Muzzle Distance from Test Specimen: 914 mm (36")

Impact #1: Missile Velocity: 35.23 m/s (115.6 fps); orientation 15° of vertical

Missile Weight: 63.4 g (0.1398 lbs)

Missile Diameter: 50.8 mm (2")

Kinetic Energy: 29.03 ft-lb

Impact Area: Bottom right corner 6" from bottom

Observations: No visible cracking or breakage

Results: Pass

Impact #2: Missile Velocity: 34.44 m/s (113.0 fps); orientation 15° of vertical

Missile Weight: 64.7 g (0.1426 lbs)

Missile Diameter: 50.8 mm (2")

Kinetic Energy: 28.31 ft-lb

Impact Area: Bottom right corner 2" from bottom

Observations: No visible cracking or breakage

Results: Pass

Test Results: (Continued)

Impact #3: Missile Velocity: 34.05 m/s (111.7 fps); orientation 15° of vertical

Missile Weight: 64.1 g (0.1413 lbs)

Missile Diameter: 50.8 mm (2")

Kinetic Energy: 27.40 ft-lb

Impact Area: Bottom left corner 2" from corner

Observations: No visible cracking or breakage

Results: Pass

Impact #4: Missile Velocity: 35.02 m/s (114.9 fps); orientation 15° of vertical

Missile Weight: 65.7 g (0.1448 lbs)

Missile Diameter: 50.8 mm (2")

Kinetic Energy: 29.72 ft-lb

Impact Area: Bottom left corner 2" from corner

Observations: No visible cracking or breakage

Results: Pass

Impact #5: Missile Velocity: 34.84 m/s (114.3 fps); orientation 15° of vertical

Missile Weight: 63.2 g (0.1393 lbs)

Missile Diameter: 50.8 mm (2")

Kinetic Energy: 28.29 ft-lb

Impact Area: Top left corner 2" from corner

Observations: No visible cracking or breakage

Results: Pass

Impact #6: Missile Velocity: 34.44 m/s (113.0 fps); orientation 15° of vertical

Missile Weight: 65.4 g (0.1442 lbs)

Missile Diameter: 50.8 mm (2")

Kinetic Energy: 32861 ft-lb

Impact Area: Top left corner 2" from corner

Observations: No visible cracking or breakage

Results: Pass

Test Equipment:

Cannon: Constructed from steel piping utilizing compressed air to propel the missile

Missile: 50.8 mm (2") diameter ice balls

Timing Device: Electronic Beam Type

Timing Device Calibration Date: 08/12/09

List of Official Observers:

<u>Name</u>	<u>Company</u>
Arthur Valenz	Vtech Industries
Andy Cost	Architectural Testing, Inc.

Data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire.

Results obtained are tested values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.



Digitally Signed by: Andy Cost

Andy Cost
Laboratory Manager



Digitally Signed by: John H. Waskow

John Waskow
Director of Regional Operations

AC:hd

Attachments (pages): This report is complete only when all attachments listed are included.

Appendix-A: Drawings (4)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	09/01/09	N/A	Original report issue
1	09/09/09	4	Corrected measurement of the diameter of the ice ball

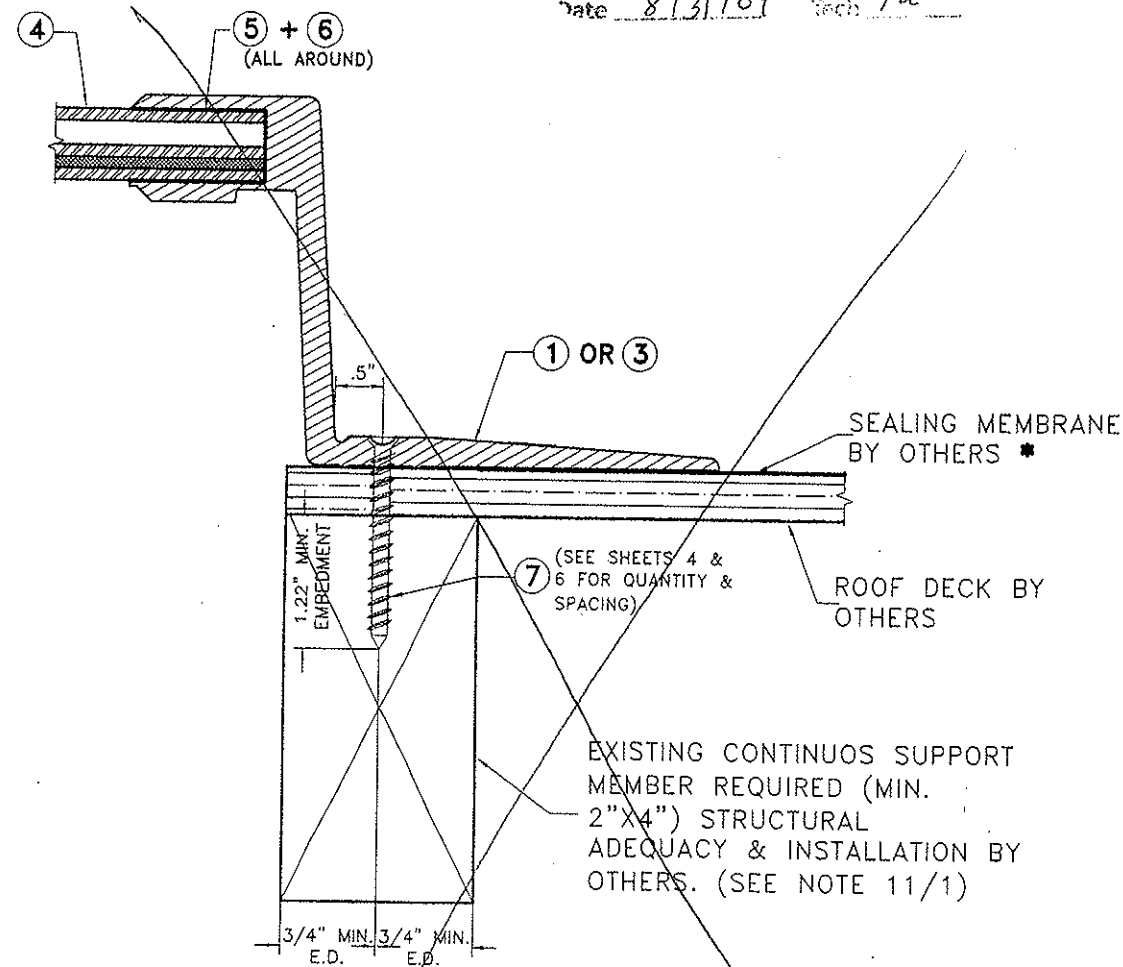
Appendix A

Drawings

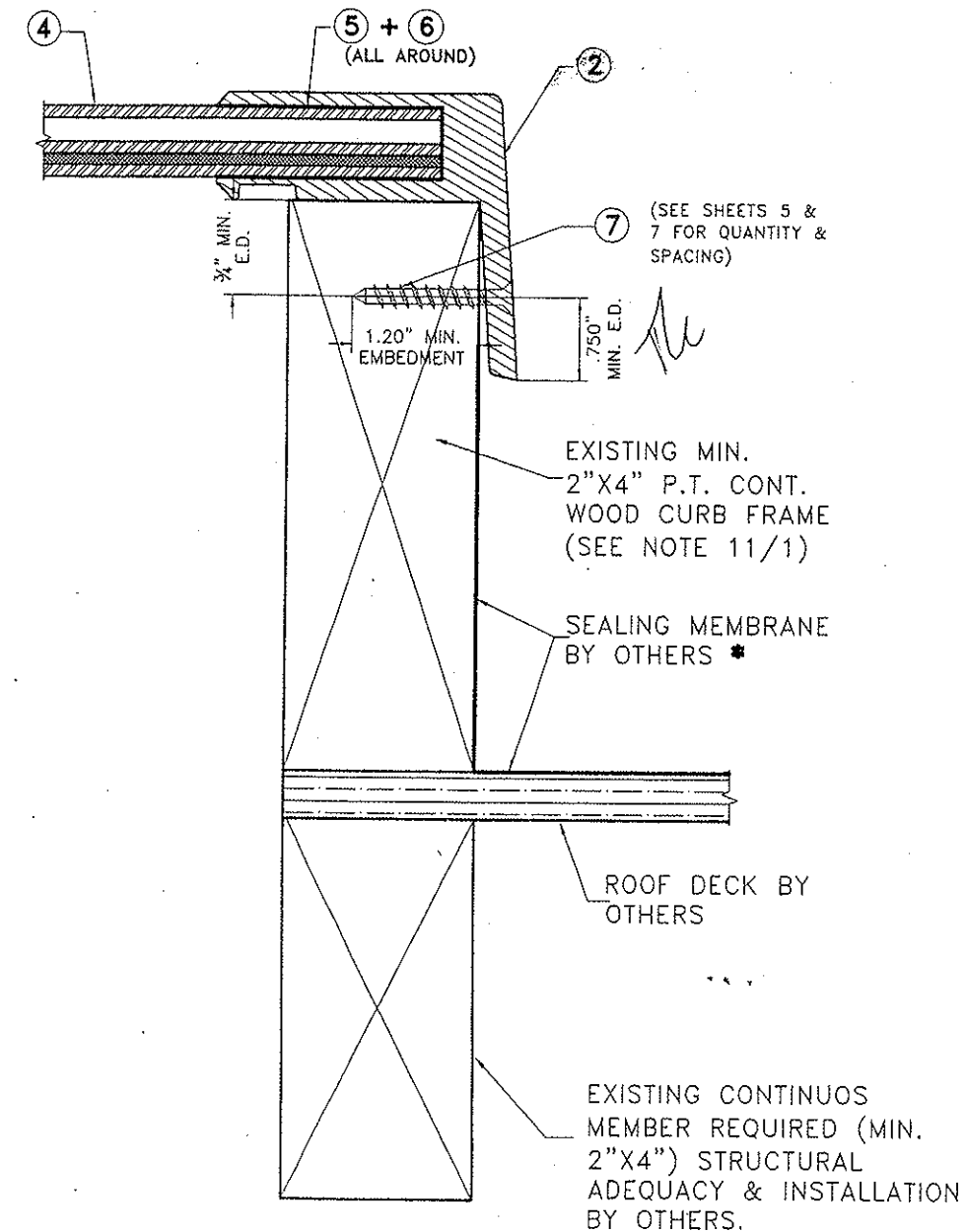


Test sample complies with these details
Deviations are noted.

Report# 92239.01/03-80-18 -92240.01
Date 8/31/09 Tech TH



CONNECTION DETAIL FOR FRAME
CASES 1 & 3 (SSF)



CONNECTION DETAIL FOR FRAME
CASES 2 & 4 (CAP)

* NOTES:

1. ALL ROOFING DETAILS SHALL COMPLY WITH SECTIONS 1512 THRU 1525 OF THE FLORIDA BUILDING CODE.

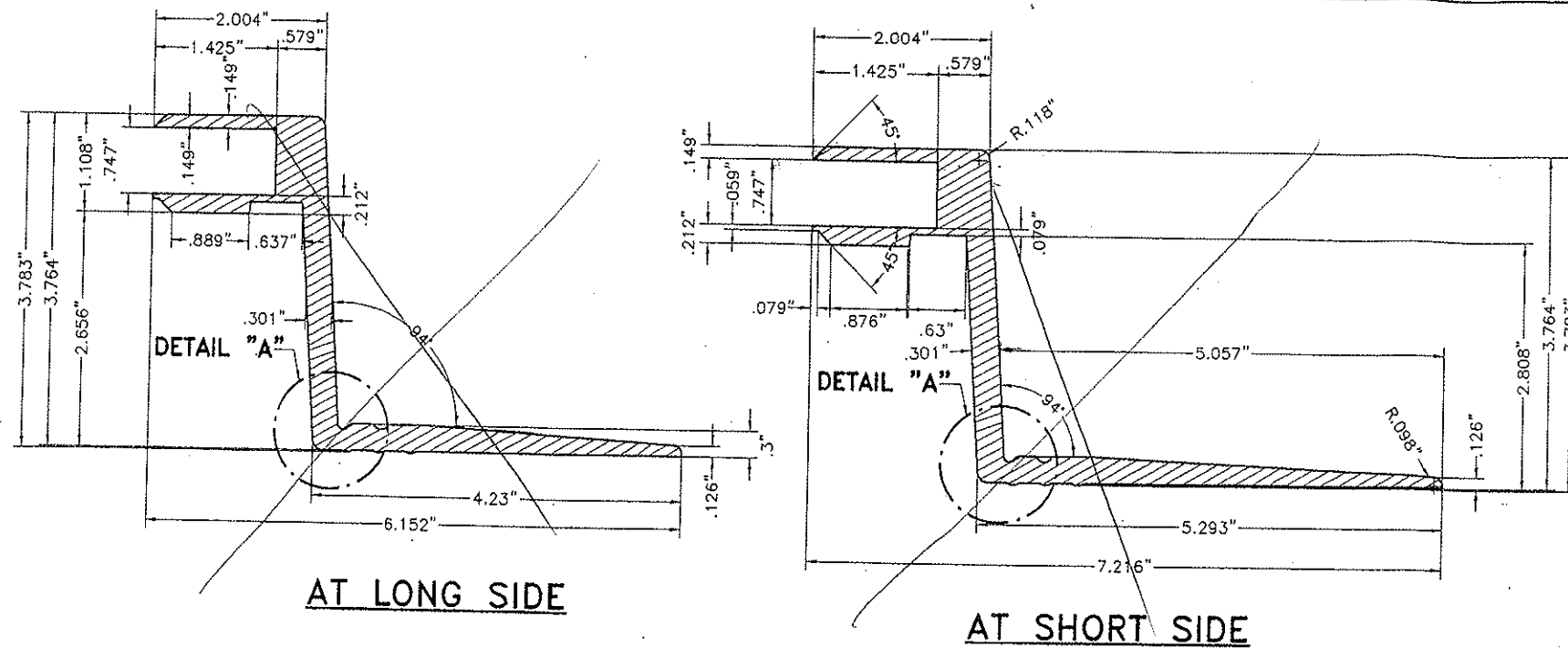
CONNECTION DETAILS

N.T.S.

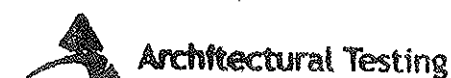
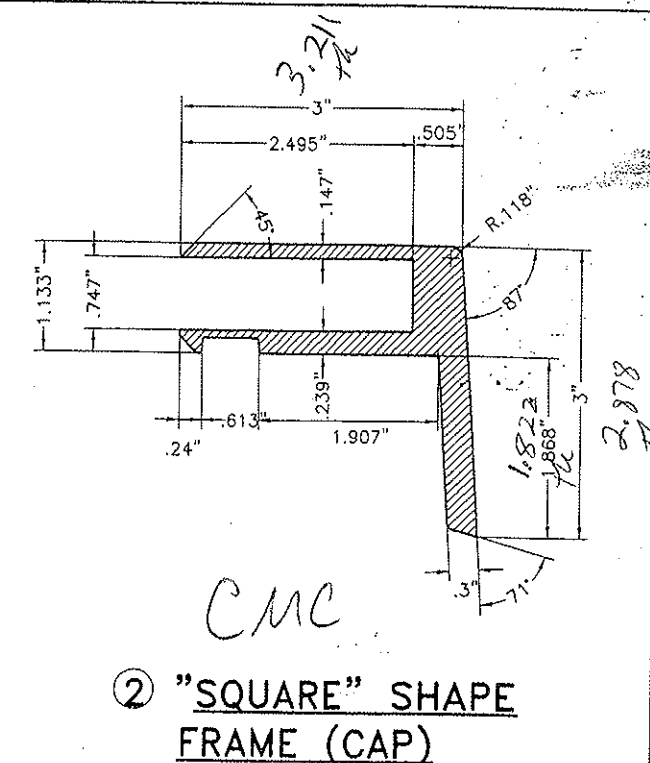
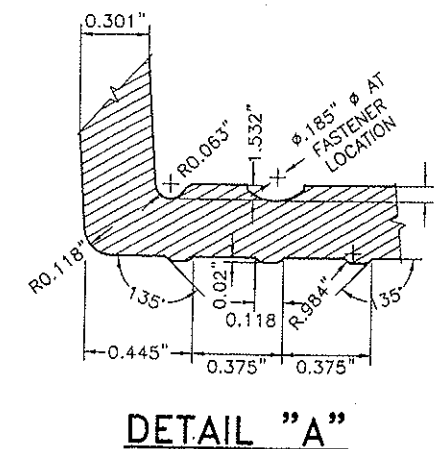
CMC

F.B.C. (HIGH VELOCITY HURRICANE ZONE)

 MAY 11 2009 P.E. SEAL/SIGNATURE/DATE	 © 2008 TILTECO INC. TILLIT TESTING & ENGINEERING COMPANY 6355 N.W. 36th St., Ste. 305, VIRGINIA GARDENS, FL 33166 Phone: (305)871-1530 Fax: (305)871-1531 e-mail: tilteco@aol.com EB-0006719 WALTER A. TILLIT Jr., P.E. FLORIDA Lic. # 44167	SERIES SEAMLESS SELF-FLASHING GLAZED SKYLIGHT (SSF) AND SERIES CURB-MOUNTED GLAZED SKYLIGHT (CAP) LARGE MISSILE IMPACT RESISTANT-INSULATED GLASS		DRAWN BY M.C.V.	
		V-TECH INDUSTRIES 5534 HARVEY WILSON DRIVE HOUSTON, TEXAS 77020 PHONE: (866) 491-0843		02/16/09 DATE	
		08-116 DRAWING No		SHEET 8 OF 8	
		REV. No		DATE	
		1		3	
		2		4	



① "SQUARE" SHAPE FRAME (SSF)

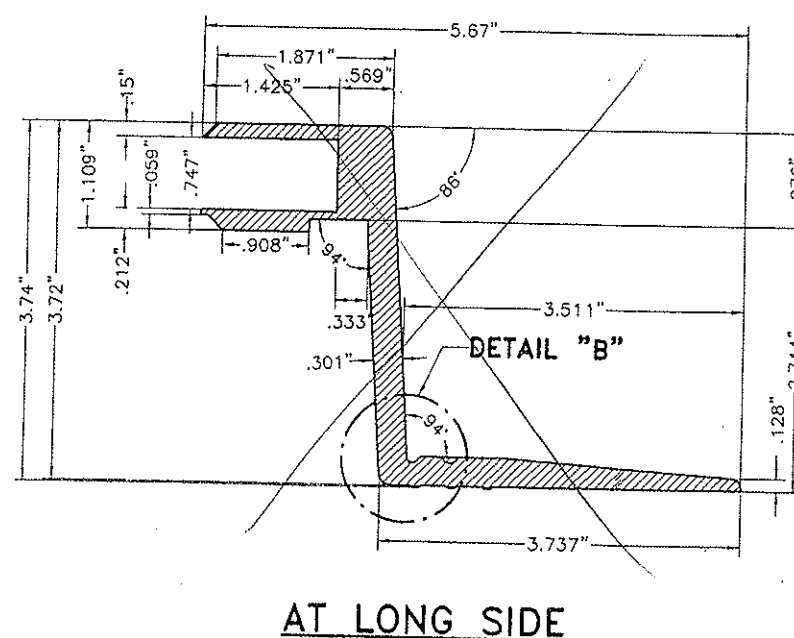


Test sample complies with these details
Deviations are noted. 92240.01 5/32"
Report# 92239.01/103-801-18 1/8"
Date 8/31/09 Tech *th*

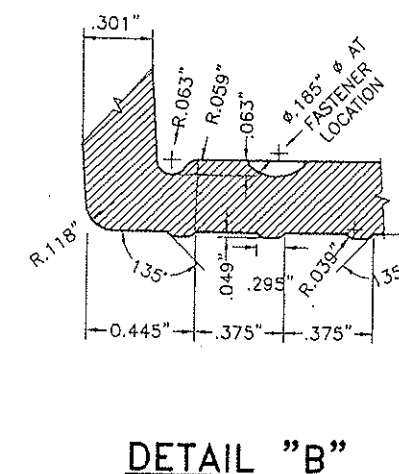
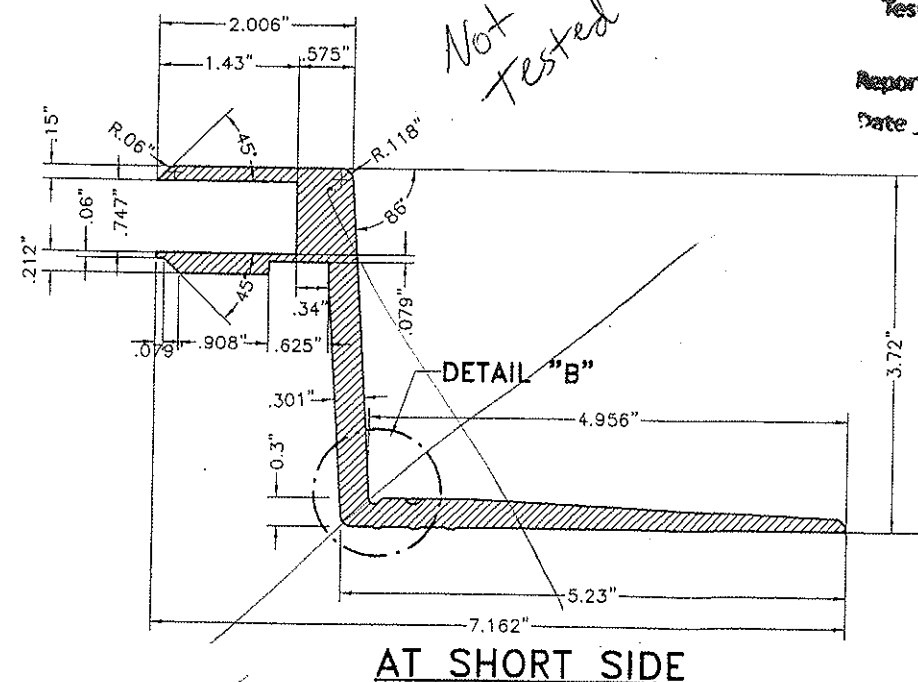
EXTERIOR

TEMPERED GLASS
1/4" AIR
Min. .747"
0.120" PER NOA#
05-1208.02 INTER LAYER
FILM DUPONT BUTACITE PVB
BY, EI DUPONT DE NEMOURS
(2) 1/2" HEAT STRENGTHENED GLASS 3/32"
OVERALL GLASS THICKNESS

④ GLASS

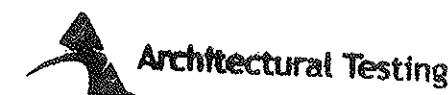
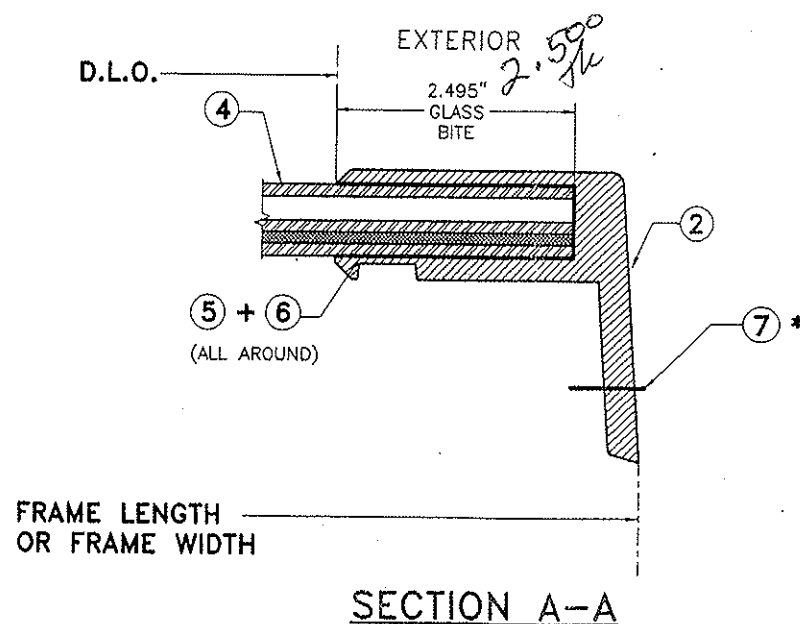
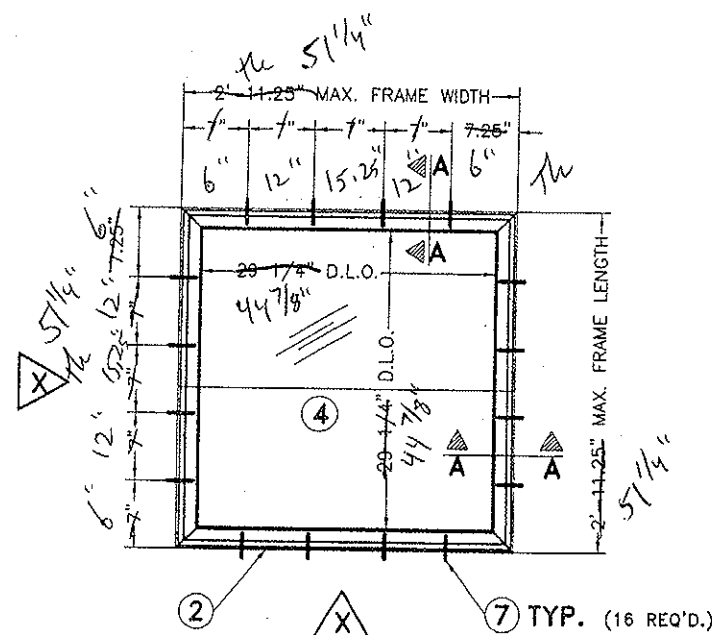
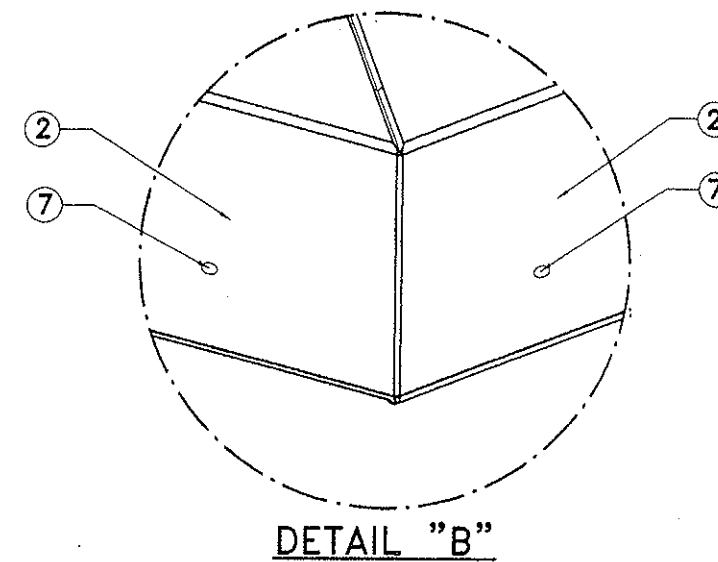
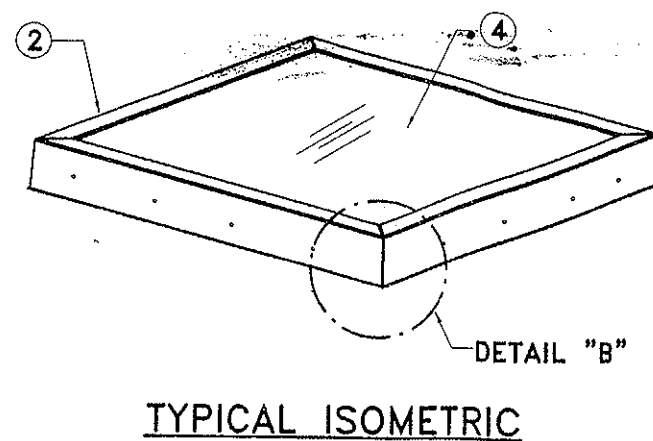
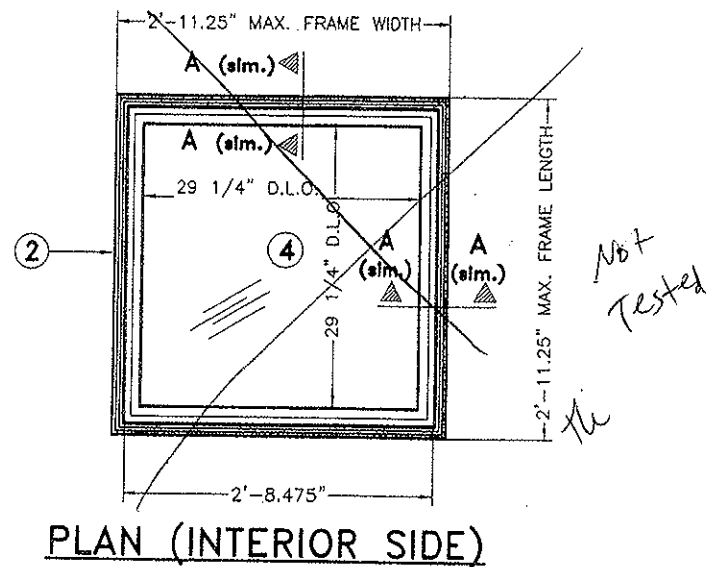


③ "RECTANGULAR" SHAPE FRAME (SSF)

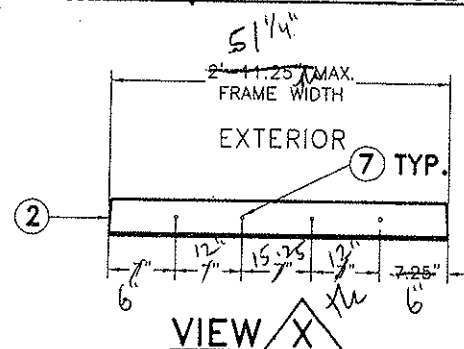


COMPONENTS
N.T.S.

 MAY 11 2009 P.E. SEAL/SIGNATURE/DATE		© 2008 TILTECO INC. TILTECO INC. TILLY TESTING & ENGINEERING COMPANY 6335 N.W. 36th St., Ste. 305, VIRGINIA GARDENS, FL 33166 Phone: (305)871-1530 Fax: (305)871-1531 e-mail: tilteco@aol.com EB-0006719 WALTER A. TILLIT JR. P.E. FLORIDA Lic. # 44167		SERIES SEAMLESS SELF-FLASHING GLAZED SKYLIGHT (SSF) AND SERIES CURB-MOUNTED GLAZED SKYLIGHT (CAP) LARGE MISSILE IMPACT RESISTANT-INSULATED GLASS		DRAWN BY M.C.V.	
				V-TECH INDUSTRIES 5534 HARVEY WILSON DRIVE HOUSTON, TEXAS 77020 PHONE: (866) 491-0843		02/16/09 DATE	
REV. No. 1 DESCRIPTION DATE		REV. No. 3 DESCRIPTION DATE		08-116 DRAWING No.		SHEET 3 OF 8	



Test sample complies with these details
Deviations are noted.
Report# 92239.01/03-801-18-92240.01
Date 8/31/09 Tech *lu*



* SEE CONNECTION DETAIL ON SHEET 8/8

CASE 2: 2'-11 1/4" x 2'-11 1/4" SERIES CURB-MOUNTED
GLAZED SKYLIGHT (CAP)
N.T.S.

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		F.B.C. (HIGH VELOCITY HURRICANE ZONE)		SHEET 5 OF 8		

AS PER EFTEC MATERIAL SAFETY DATA SHEET PHYSICAL AND CHEMICAL PROPERTIES FOR "EFBOND DV 930" ⑤	
- GENERAL INFORMATION	
FORM:	LIQUID
COLOUR:	BLACK
ODOUR:	CHARACTERISTIC
- CHANGE UN CONDITION	
MELTING POINT/MELTING RANGE:	UNDETERMINED
BOILING POINT/BOILING RANGE:	79°C
- FLASH POINT:	-4°C
- IGNITION TEMPERATURE:	370.0°C
- SELF-IGNITION:	PRODUCT IS NOT SELFIGNITING
- DANGER OF EXPLOSION:	PRODUCT IS NOT EXPLOSIVE. HOWEVER, FORMATION OF EXPLOSIVE AIR/ VAPOUR MIXTURES ARE POSSIBLE.
- EXPLOSION LIMITS:	
LOWER:	1.8 VOL%
UPPER:	11.5 VOL%
- VAPOUR PRESSURE AT 20°C:	105.0 hPa
- DENSITY AT 20°C:	0.950 g/cm³
- SOLUBILITY IN / MISCIBILITY	
WITH WATER:	NOT MISCIBLE OR DIFFICULT TO MIX
- SOLVENT CONTENT:	
ORGANIC SOLVENTS:	69.00%
- SOLIDS CONTENT:	31.00%

AS PER EFTEC MATERIAL SAFETY DATA SHEET PHYSICAL AND CHEMICAL PROPERTIES FOR "EFBOND DW 646" ⑥	
- GENERAL INFORMATION	
FORM:	LIQUID
COLOUR:	CLEAR
ODOUR:	ALCOHOL-LIKE
- CHANGE UN CONDITION	
MELTING POINT/MELTING RANGE:	-114.5°C
BOILING POINT/BOILING RANGE:	78°C
- FLASH POINT:	13°C
- IGNITION TEMPERATURE:	425.0°C
- SELF-IGNITION:	PRODUCT IS NOT SELFIGNITING
- DANGER OF EXPLOSION:	PRODUCT IS NOT EXPLOSIVE. HOWEVER, FORMATION OF EXPLOSIVE AIR/ VAPOUR MIXTURES ARE POSSIBLE.
- EXPLOSION LIMITS:	
LOWER:	3.5 VOL%
UPPER:	15.0 VOL%
- VAPOUR PRESSURE AT 20°C:	59.0 hPa
- DENSITY AT 20°C:	0.797 g/cm³
- SOLUBILITY IN / MISCIBILITY	
WITH WATER:	1.000 g/l
- SOLVENT CONTENT:	
ORGANIC SOLVENTS:	96.50%
- SOLIDS CONTENT:	3.50%

BILL OF MATERIALS			
# ITEM	PART	DESCRIPTION	MATERIAL
1	FRAME	APPLICABLE ONLY FOR "SQUARE" SHAPE FRAME SERIES: SEAMLESS SELF-FLASHING GLAZED SKYLIGHT (SSF), CORRESPOND TO COLO-FAST® LM150/100 ARCH SYSTEM (SEE NOTE 7/1, AND DETAIL ON SHEET 3)	ALIPAHTIC POLYURETHANE
2	FRAME	APPLICABLE FOR "SQUARE" AND "RECTANGULAR" SHAPES FRAME SERIES: CURB-MOUNTED GLAZED SKYLIGHT (CAP), CORRESPOND TO COLO-FAST® LM150/100 ARCH SYSTEM (SEE NOTE 7/1, AND DETAIL ON SHEET 3)	ALIPAHTIC POLYURETHANE
3	FRAME	APPLICABLE ONLY FOR "RECTANGULAR" SHAPE FRAME SERIES: SEAMLESS SELF-FLASHING (SSF) SKYLIGHT, GLASS GLAZED SKYLIGHT, CORRESPOND TO COLO-FAST® LM150/100 ARCH SYSTEM (SEE NOTE 7/1, AND DETAIL ON SHEET 3)	ALIPAHTIC POLYURETHANE
4	GLASS	0.747" OVERALL THICKNESS 1/8" TEMPERED GLASS (EXTERIOR LITE) + 1/4" AIR SPACE + 1/8" H.S. GLASS (INTERIOR LITE) WITH A 0.120" INTERLAYER FILM, DUPONT BUTACITE PVB. MANUFACTURED BY EI DUPONT DE NEMOURS & CO, INC NOA# 05-1208.02, LAMINATED BY CARDINAL GLASS + 1/8" H.S. GLASS (INTERIOR LITE). on each side of laminate	IMPACT RESISTANT INSULATED GLASS
5	GLAZING SEALANT	EDBOND DV 930, SEE PHYSICAL AND CHEMICAL PROPERTIES ON THIS SHEET.	PRIMER
6	GLAZING SEALANT	EDBOND DW 646, SEE PHYSICAL AND CHEMICAL PROPERTIES ON THIS SHEET.	ADHESIVE
7	ANCHORS TO WOOD	#10 x 1 1/2" PHILLIPS SHEET METAL SCREW TO WOOD FRAME W/ 1.22" MIN. THREADED PENETRATION FOR TENSION CAPACITY (AT SSF) AND 1.20" MIN. THREADED PENETRATION FOR SHEAR CAPACITY (AT CAP).	NON CORROSIVE STEEL



Test sample complies with these details
Deviations are noted

Report 92239.01/03-801-18-92240.01
Date 8/31/09 Tech PL

F.B.C. (HIGH VELOCITY HURRICANE ZONE)

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		V-TECH INDUSTRIES 5534 HARVEY WILSON DRIVE HOUSTON, TEXAS 77020 PHONE: (866) 491-0843						02/16/09 DATE			
								08-116 DRAWING No			
								SHEET 2 OF 8			
REV. No		DESCRIPTION		DATE		REV. No		DESCRIPTION		DATE	
1						3					
2						4					