



NATIONAL CERTIFIED TESTING LABORATORIES

FIVE LEIGH DRIVE • YORK, PENNSYLVANIA 17406 • TELEPHONE (717) 846-1200
FAX (717) 767-4100
www.nctlinc.com

Florida Building Code TAS 201-94
Florida Building Code TAS 202-94
Florida Building Code TAS 203-94

STRUCTURAL, IMPACT & CYCLING TEST REPORT SUMMARY

RENDERED TO:

Acurlite Structural Skylights
1017 North Vine Street
Berwick, PA 18603

PRODUCT TYPE: Fixed Skylight Assembly

SERIES/ MODEL: "Secure Series"

Summary of Results				
Specimen 1	TAS 202	+ 120	psf	- 120 psf
Specimens 2, 3, 4	TAS 201/203	+ 120	psf	- 120 psf
Air Infiltration per ASTM E283 in accordance with TAS 202-94				
Infiltration: 0.03 cfm/ft ²				
Water Penetration Resistance per ASTM E331 in accordance with TAS 202-94				
18 psf - Passed/No water penetration				
Static Air Pressure per ASTM E330 in accordance with TAS 202-94				
Design Load Pressure		+ 120	psf	- 120 psf
Overload/ Structural Load Pressure		+ 240	psf	- 240 psf
Forced Entry Resistance per ASTM F588 in accordance with TAS 202-94				
Passed – Grade 10				
Specimens 2,3,4				
Small Missile Impact/ Pressure Loading in accordance with TAS 201-94 and TAS 203-94				
Impacts rejected without allowing penetration and the product shows no resultant failure or distress				

Test Completed: 08/19/21

Reference must be made to Report No. NCTL-110-24316-2-R1 dated 09/14/21 for complete test specimen description and data.

For National Certified Testing Laboratories


DIGITAL SIGNATURE

Justin L. Bupp
Laboratory Manager



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Florida Building Code TAS 201-94
Florida Building Code TAS 202-94
Florida Building Code TAS 203-94

STRUCTURAL, IMPACT & CYCLING PERFORMANCE TEST REPORT

NCTL-110-24316-2-R1

REPORT TO:

ACURLITE STRUCTURAL SKYLIGHTS
1017 NORTH VINE STREET
BERWICK, PA 18603

REPORT NUMBER: NCTL-110-24316-2-R1
REPORT DATE: 09/14/21
REVISION 1 DATE: 01/03/22

PRODUCT TYPE: FIXED SKYLIGHT ASSEMBLY

SERIES/ MODEL: "SECURE SERIES"



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Report Number NCTL-110-24316-2-R1

Report Date 09/14/21 (Revision 1: 01/03/22)

Report To Acurlite Structural Skylights
1017 North Vine Street
Berwick, PA 18603

Date Testing Started 08/04/21
Date Testing Completed 08/19/21

Specification: Florida Building Code TAS 201-94
Impact Test Procedures

Florida Building Code TAS 202-94
Criteria for Testing Impact and Non-Impact Resistant Building Envelope
Components using Uniform Static Air Pressure

Florida Building Code TAS 203-94
Criteria for Testing Products Subjected to Cyclic Pressure Loading

Description of Specimen Tested

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

Model/ Series "Secure Series"

Configuration Fixed Skylight

Frame Size Overall
Specimen 1 (sloped)
4331 mm x 3324 mm (170.5" x 130.875") high by 2235 mm (88") deep
Specimens 2-4
4331 mm x 3324 mm (170.5" x 130.875")

Viewing Area All Specimens
Large Fixed
1324 mm x 2457 mm (52.125" x 96.75")
Small Fixed
1324 mm x 1194 mm (52.125" x 47")
Specimen 1
Gable End
2032 mm x 851 mm (80" x 33.5")

Frame Type Extruded aluminum

Joint Construction Frame
The verticals were fastened to the horizontals with (2) screws. The purlins were fastened to the verticals with (6) screws and a metal mounting lug that was fastened with (3) 3/8" bolts.

Glazing Components

Overall	33 mm (1.317") nominal
Glass Thickness	(1) Lite of 6 mm (0.225") nominal tempered glass to the exterior and (1) lite of laminated glass to the interior
Laminated Glass	(2) Lites of 6 mm (0.220") nominal heat strengthened glass separated by a 1.52 mm (0.060") "Solutia Saflex PVB" interlayer
Spacer Type/Size	14.27 mm (0.562") Aluminum spacer (Type A1-D)
Glazing System	Exterior glazed with a multi-fin gasket and Dow 995 silicone back-bedding. The exterior glazing perimeters were sealed with a Dow 795 silicone

Weatherstrip

No weatherseals employed

Operating Hardware

No operating hardware employed

Auxiliary

Type	Extruded aluminum flashing
Location	Exterior perimeter of the sample
Type	Extruded aluminum/ plywood panel fillers
Location	Back side/ close off of mock up to chamber
Type	Extruded aluminum structural seal flange
Location	All members fastened with evenly spaced screws

Reinforcement

No reinforcement employed

Weep Description

Size	19.05 mm (0.75") Gap in sill pan sponge gasket
Location	Sill/ rafter intersection

Interior/ Exterior Surface Finish

Painted aluminum

Sealant

Location	Exterior perimeter of the glazing, horizontal member back-bedding flashing to frame
Material	Silicone

Insect Screen

No screen employed

Installation Method

The assembly was installed in a steel/ plywood test chamber. The assembly was fastened to the chamber with aluminum angles at each end of the rafters. The angles were fastened to the chamber with (2) 1/2 – 13 x 1 – 1/2 grade 5 Hex Hd per angle. The rafter was fastened to the angles with 2 1/2 – 13 x 4 1/2" long Hex Hd cap screw with lock washers and nuts. The gable end was fastened with aluminum angles at the sill and (2) 1/4 bolts and nuts.

Test Results - TAS 202

<u>Test Method</u>	<u>Test</u>
ASTM E283	Air Leakage Resistance

Information at 1.6 psf:

Maximum Allowable	=	0.30 cfm/ft ²
Infiltration Rate/ Area	=	0.03 cfm/ft ²

<u>Test Method</u>	<u>Test</u>
ASTM E547	Water Resistance Test
ASTM E331	

The test specimen complies with the requirements of TAS 202 at 5.0 gph/ft²

No Leakage after 1 cycle of 15 minutes at 18 psf

<u>Test Method</u>	<u>Test</u>
ASTM E330	Static Air Pressure Tests

Half Test Load - ± 90 psf

Positive	=	No damage
Negative	=	No damage

Design Loads - ± 120 psf

Vertical

Measured Deflection Positive	=	0.108 inches
Measured Deflection Negative	=	0.011 inches
Measured Permanent Set Positive	=	0.061 inches
Measured Permanent Set Negative	=	0.008 inches

Horizontal

Measured Deflection Positive	=	0.078 inches
Measured Deflection Negative	=	0.036 inches
Measured Permanent Set Positive	=	0.052 inches
Measured Permanent Set Negative	=	0.011 inches

Purlin

Measured Deflection Positive	=	0.007 inches
Measured Deflection Negative	=	0.001 inches
Measured Permanent Set Positive	=	0.001 inches
Measured Permanent Set Negative	=	0.001 inches

Test Loads - ± 240 psf

Vertical

Measured Deflection Positive	=	0.211 inches
Measured Deflection Negative	=	0.070 inches
Measured Permanent Set Positive	=	0.059 inches
Measured Permanent Set Negative	=	0.019 inches

Horizontal

Measured Deflection Positive	=	0.152 inches
Measured Deflection Negative	=	0.052 inches
Measured Permanent Set Positive	=	0.109 inches
Measured Permanent Set Negative	=	0.032 inches

Purlin

Measured Deflection Positive	=	0.039 inches
Measured Deflection Negative	=	0.016 inches
Measured Permanent Set Positive	=	0.009 inches
Measured Permanent Set Negative	=	0.008 inches

NOTE: Deflection and Permanent Set measurements taken on the vertical, horizontal and purlin with a 0.4%/ 10.06 mm (0.396") for the vertical, 5.48 mm (0.216") for the purlin and 17.27 mm (0.680") for the horizontal permanent set limit.

NOTE: Upon completion of testing there was no structural distress indicative of failure

Test Results - TAS 201

Test

Large Missile Impact

Type and weight of missile

2 g steel ball, 10 per location Speed 130.0 ft/ sec.

Location**Specimen 2**

Impact

Upper Left Corner of Left Lite Glazing

Impact

Midspan of Right Vertical of Left Lite Glazing

Impact

Lower Right Corner of Left Lite of Glazing

Specimen 3

Impact

Upper Right Corner of Center Lite Glazing

Impact

Midspan of Left Vertical of Left Lite of Glazing

Impact

Lower Right Corner of Left Glazing

Specimen 4

Impact

Midspan Top of Left Lite Glazing

Impact

Center of Left Lite Glazing

Impact

Midspan Bottom of Left Lite Glazing

NOTE: All missile impacts were rejected without penetration, tearing, or separation of the laminate. Shattered sacrificial and laminated glass. No visible damage to the frame was observed.

Test Results - TAS 203

Test

Cyclic Wind Pressure Loading

After completion of the impact tests, the test specimens were pressure cycled in accordance with Table 1626 of 2020 Florida Building Code Building.

Maximum Cyclic Load Test Pressure: +120 psf & -120 psf

Specimens 2, 3, 4Positive Load

Range of Test	Actual				# of Cycles	
+0.2 to +0.5 DP	24.0	psf	to	60.0	psf	3,500
+0.0 to +0.6 DP	00.0	psf	to	72.0	psf	300
+0.5 to +0.8 DP	60.0	psf	to	96.0	psf	600
+0.3 to +1.0 DP	36.0	psf	to	120.0	psf	100

Test

Cyclic Wind Pressure Loading

Negative Loads

Range of Test	Actual				# of Cycles	
-0.3 to -1.0 DP	36.0	psf	to	120.0	psf	50
-0.5 to -0.8 DP	60.0	psf	to	96.0	psf	1,050
-0.0 to -0.6 DP	00.0	psf	to	72.0	psf	50
-0.2 to -0.5 DP	24.0	psf	to	60.0	psf	3,350

NOTE: Specimens showed no resultant failure distress or permanent deformation with a recovery of at least 90% over maximum deflection after cycle test. No failure of fasteners or separation of glass from the frame.

<u>Test Method</u>	<u>Test</u>
ASTM F588	Forced Entry Resistance
<u>Type D Window Assembly/ Grade 10:</u> = Pass	
Specimen 1	

<u>Test</u>	
Disassembly	= No Entry
Sash Manipulation	= No Entry

NOTE: 1. T1 = 5 minutes, L1 = 667 N (150 lbf), L2 = 333 N (75 lbf), L3 = 111 N (25 lbf)
2. Loads were held for 60 seconds.

<u>Test Observers</u>	
Justin Bupp	NCTL, Inc.
Kyle Mayleth	Acurlite Structural Skylights

Where required, plastic film (2-mil) was used to seal against air leakage. The film did not affect the performance of the specimens or influence the results of the tests. All tests were conducted in accordance with the TAS 201, TAS 202 and TAS 203 test methods. Upon completion of all testing, the specimens meet the requirements of Sections 1606, 1620 and 1626 of the "Florida Building Code, Building" and the TAS 201, 202 and 203 protocols.

This test report was prepared by National Certified Testing Laboratory (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. All testing was performed in compliance with the referenced test method or specification and any deviations are noted. Ambient conditions during the referenced testing are available upon request. Any film employed during testing had no effect upon test results.

The test specimen was supplied to NCTL by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330-02(10) test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F588-07 test method. NCTL is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained by NCTL. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. This report may not be reproduced, except in full, without the written consent of NCTL.

National Certified Testing Laboratories



DIGITAL SIGNATURE

Justin L. Bupp
Laboratory Manager

JLB/bnr

Attachments

Appendix A – Revision Summary
Appendix B – Drawings



NCTL Digital Signature

Joseph A. Reed, PE
Engineering Services

Appendix A

Revision Log

<u>Identification</u>	<u>Date</u>	<u>Page & Revision</u>
Original Issue	09/14/21	Not Applicable
Revision 1	01/03/22	Review and seal by Florida PE

Appendix B

Drawings

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were reviewed (as submitted) for Product Verification. Detailed assembly drawings showing wall thicknesses of all members, corner construction and hardware application are on file and have been compared to the test sample submitted.

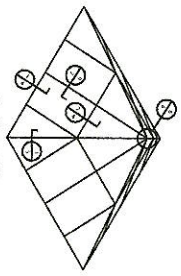
(Reference: NCTL-110-24316-2-R1)

See Attached Documentation;
any deviations noted.

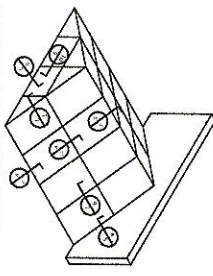
Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained by NCTL per applicable retention requirements. This testing facility assumes that all information provided by the client is accurate.

SMALL MISSILE

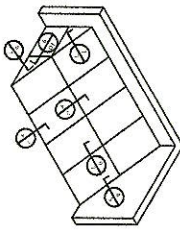
- Notes:
1. The skylight system indicated on these shop drawings has been verified for compliance in accordance with the 2020 (7th Edition) Florida Building Code. Maximum design pressure +120psf and -120psf.
 2. The skylight system may be installed in High Velocity Hurricane Zone.
 3. These shop drawings are generic and do not provide information for site specific projects.
 4. Structural adequacy of the supporting structure is not part of this product approval. Design of the supporting structure is the responsibility of the engineer of record for the project.
 5. Design of the supporting structure shall take into account the loads being transferred from the skylight system (reactions) to the supporting structure.
 6. The skylight system indicated on these shop drawings tested for small missile impact in accordance with TAS 201/202/203.
 7. Aluminum in contact with dissimilar materials shall be protected in accordance with section 2003.8.4.2 of the Florida Building Code.



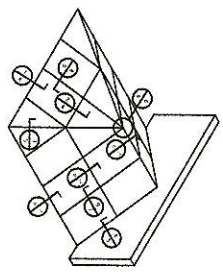
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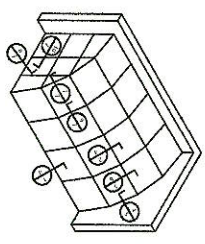
DOUBLE PITCH WITH CABLE



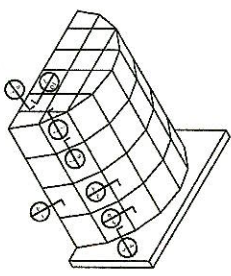
SINGLE PITCH WITH CABLE



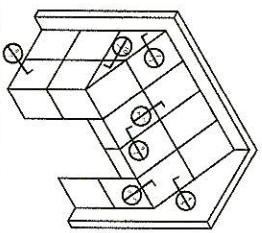
DOUBLE PITCH WITH HIP



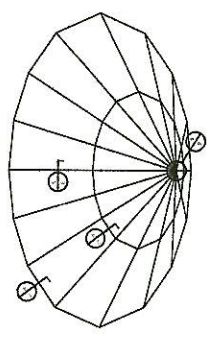
SEGMENTED BARREL QUATER VAULT WITH CABLE



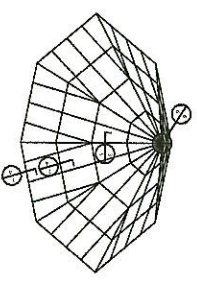
SEGMENTED BARREL HALF VAULT WITH CABLE



STRAIGHT EAVE LEAN-TO WITH CABLE



POLYGON



POLYGON WITH JACK RAFTERS

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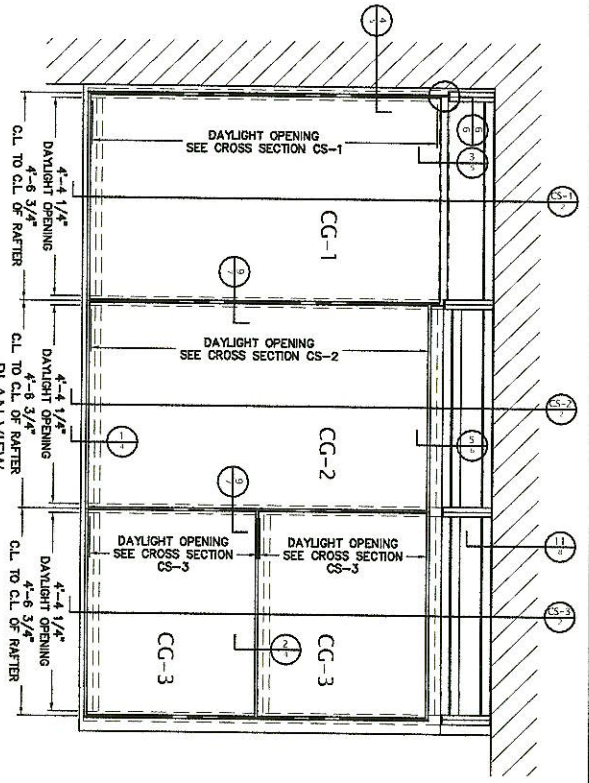
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Structural Skylights, Inc.

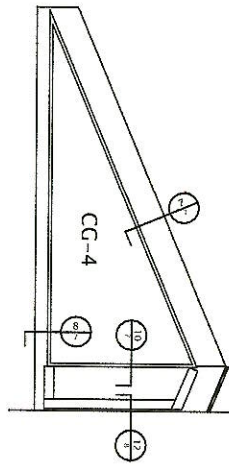
570.739.6882 www.acurlite.com sales@acurlite.com

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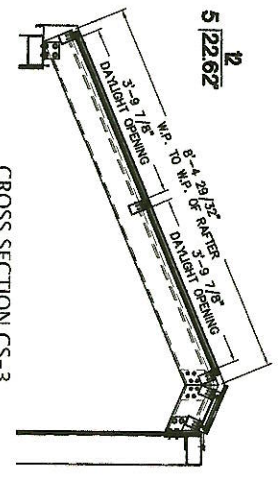
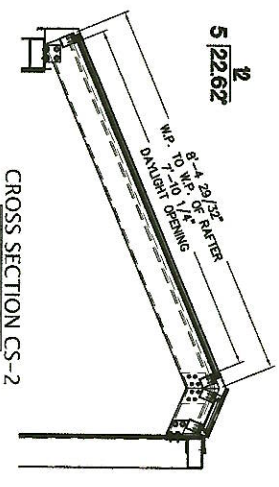
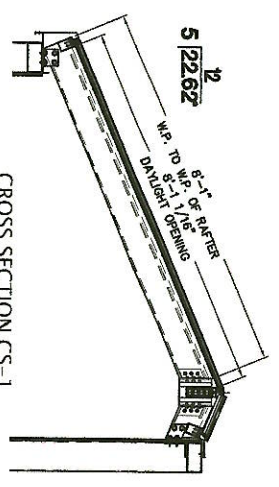
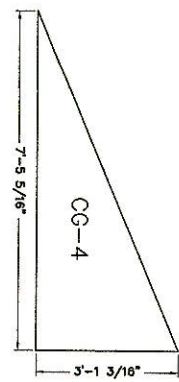
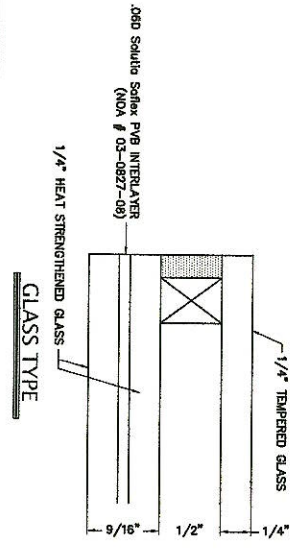
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NCTL-110-24316-2 By: JLB
Test Date: 08/19/21



(1) UNIT REQUIRED AS SHOWN



CG-1	54 x 99
CG-2	54 x 96
CG-3	54 x 49 5/8
CG-4	SEE PATTERN



CROSS SECTION CS-3

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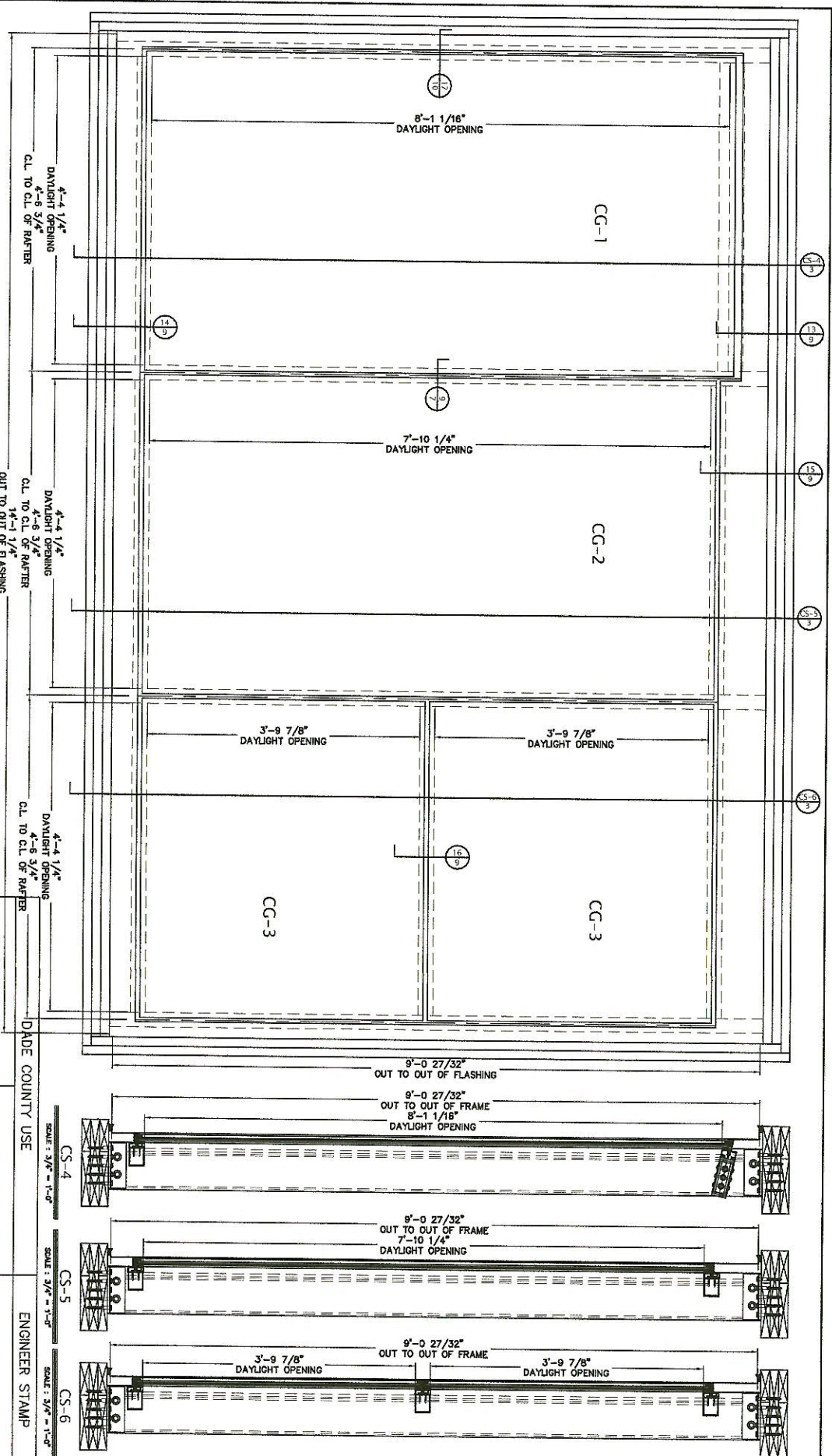
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PRODUCT TYPE SMALL MISSILE FLUSH GLAZED	
DRAWING TITLE PLANS AND ELEVATIONS	
DATE 1/27/21	DRAWN BY JLB
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© 1/27/21
acurlite
 Structural Skylights, Inc.
 570.739.6882 www.acurlite.com sales@acurlite.com

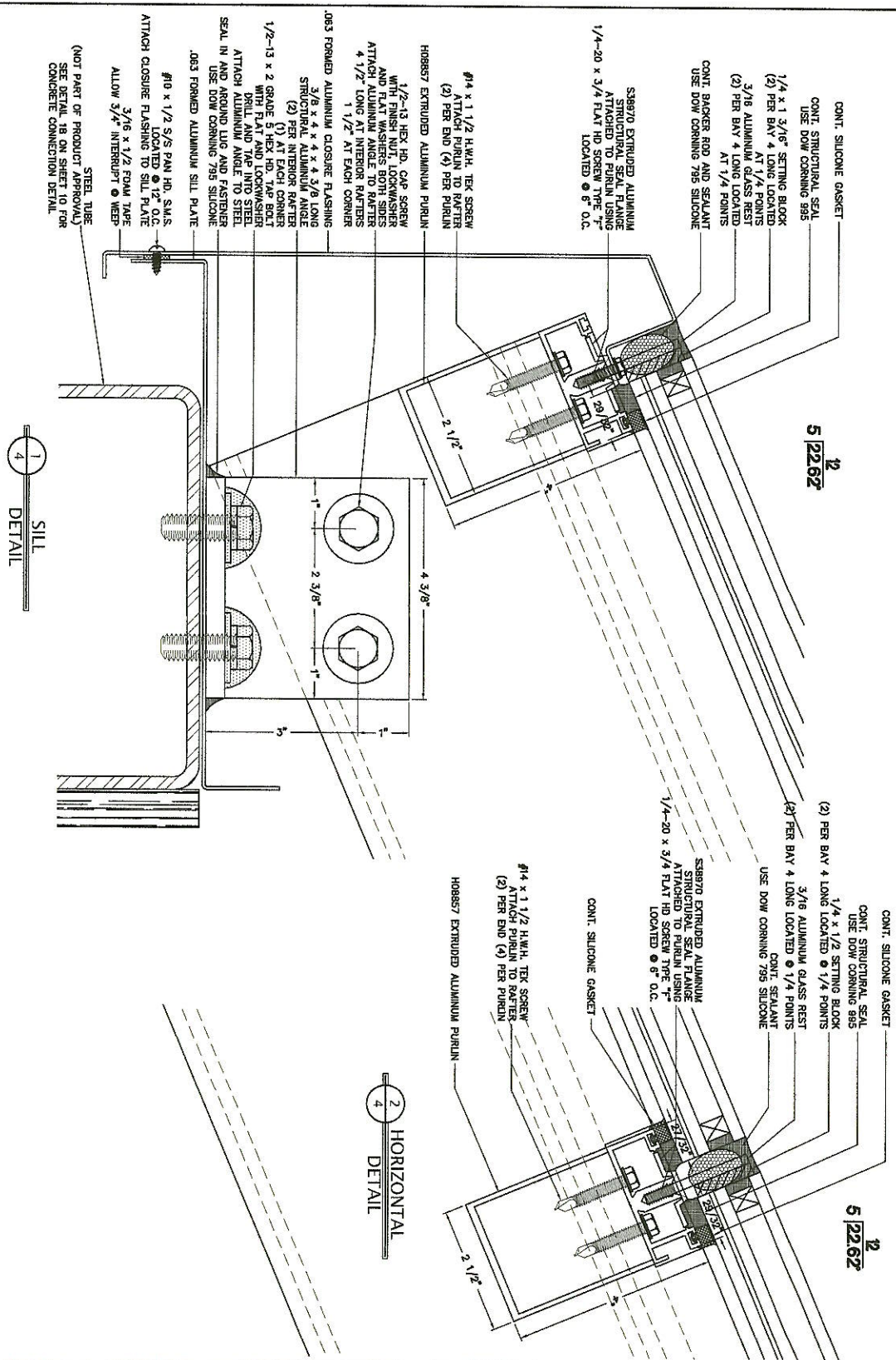
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 Test Date: 08/19/21

TEST SPECIMEN ELEVATION
 SCALE: 3/8" = 1'-0"
 (3) UNITS REQUIRED AS SHOWN



Test Specimen Complies With
 These Details. Any Deviation Is Noted.
 NCTL-110-24316-2 By: JLB
 Test Date: 08/19/21

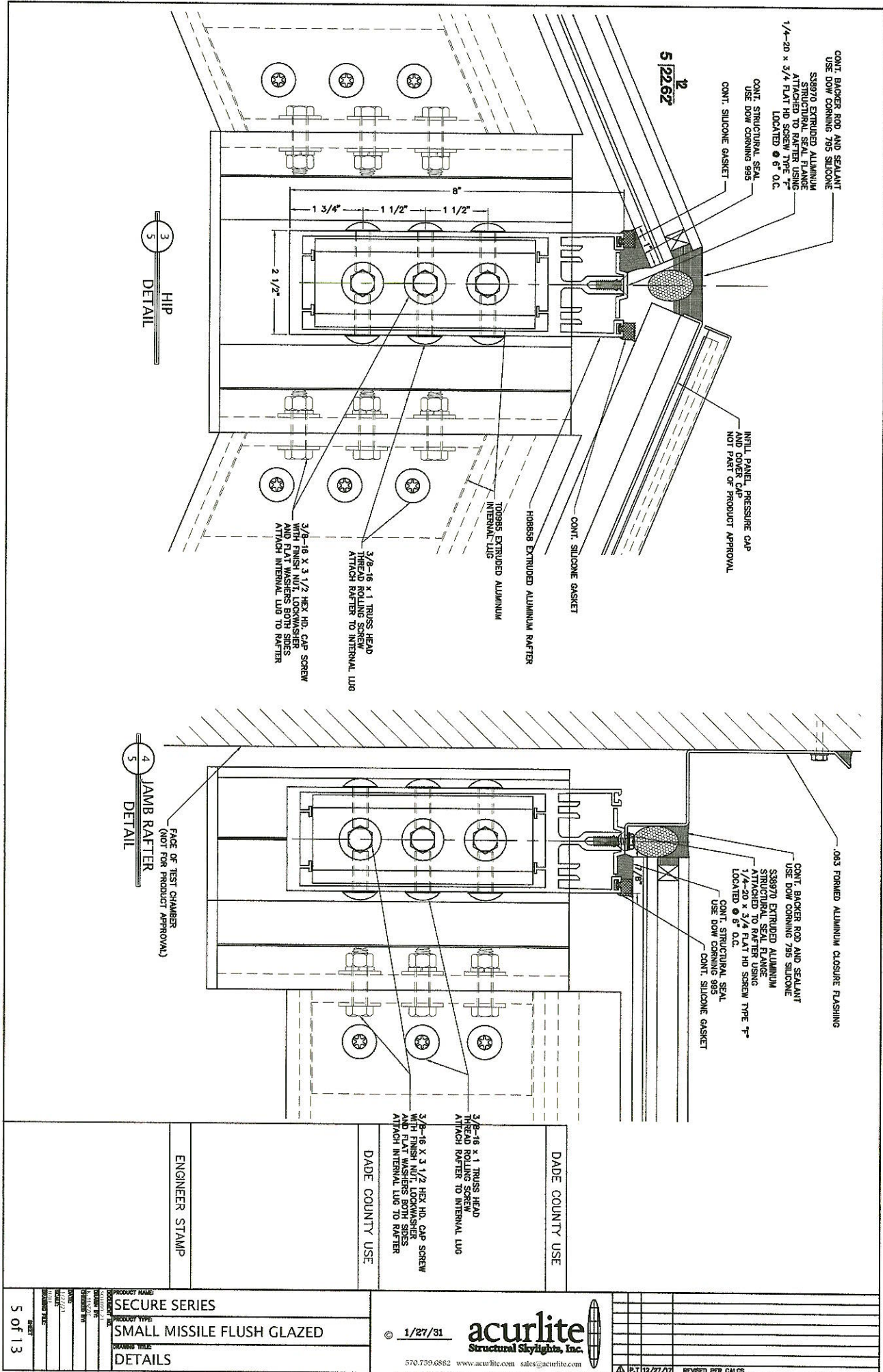


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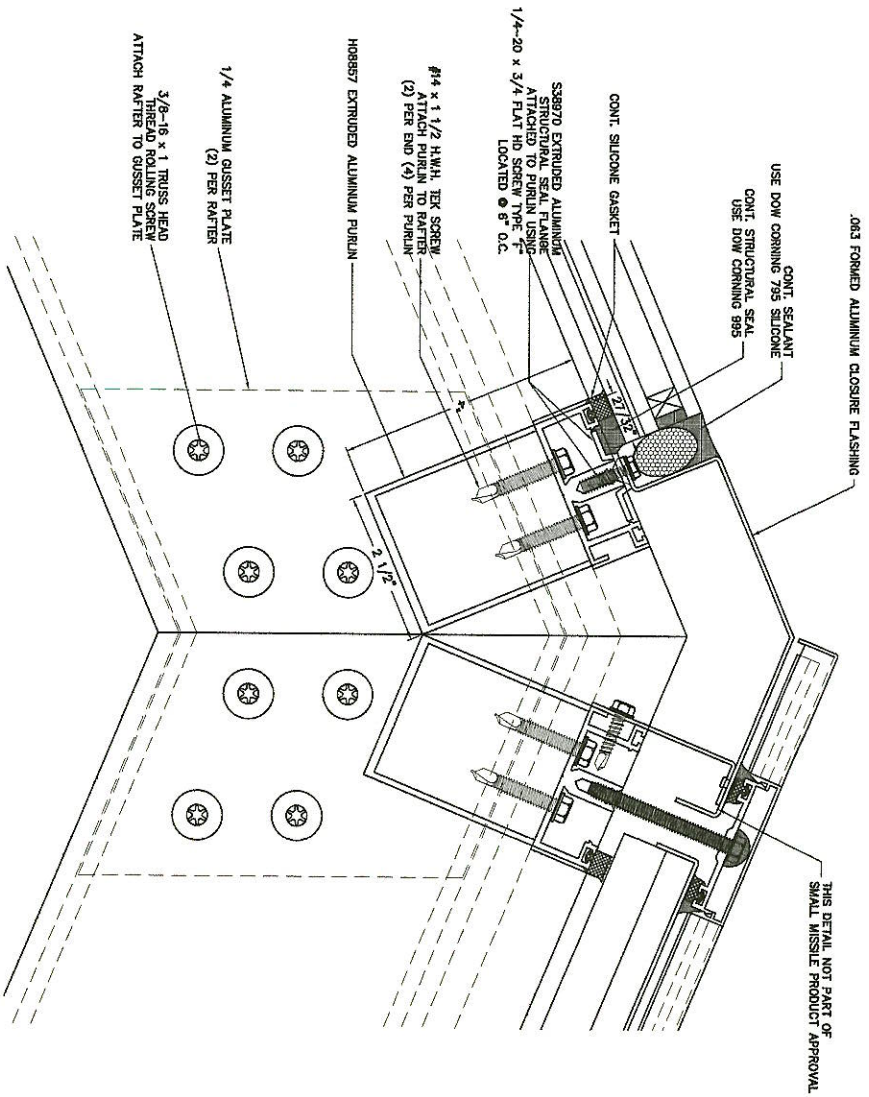
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4 of 13		P-1 12/27/17 REVISED PER CALCS	

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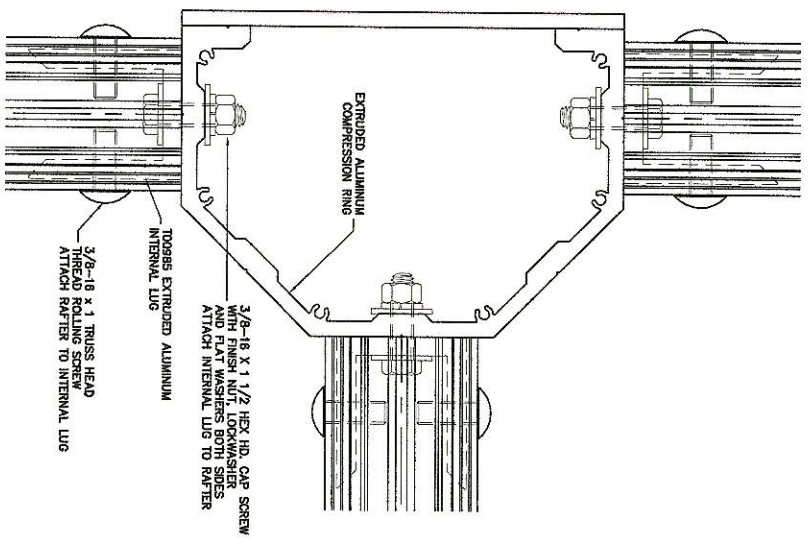
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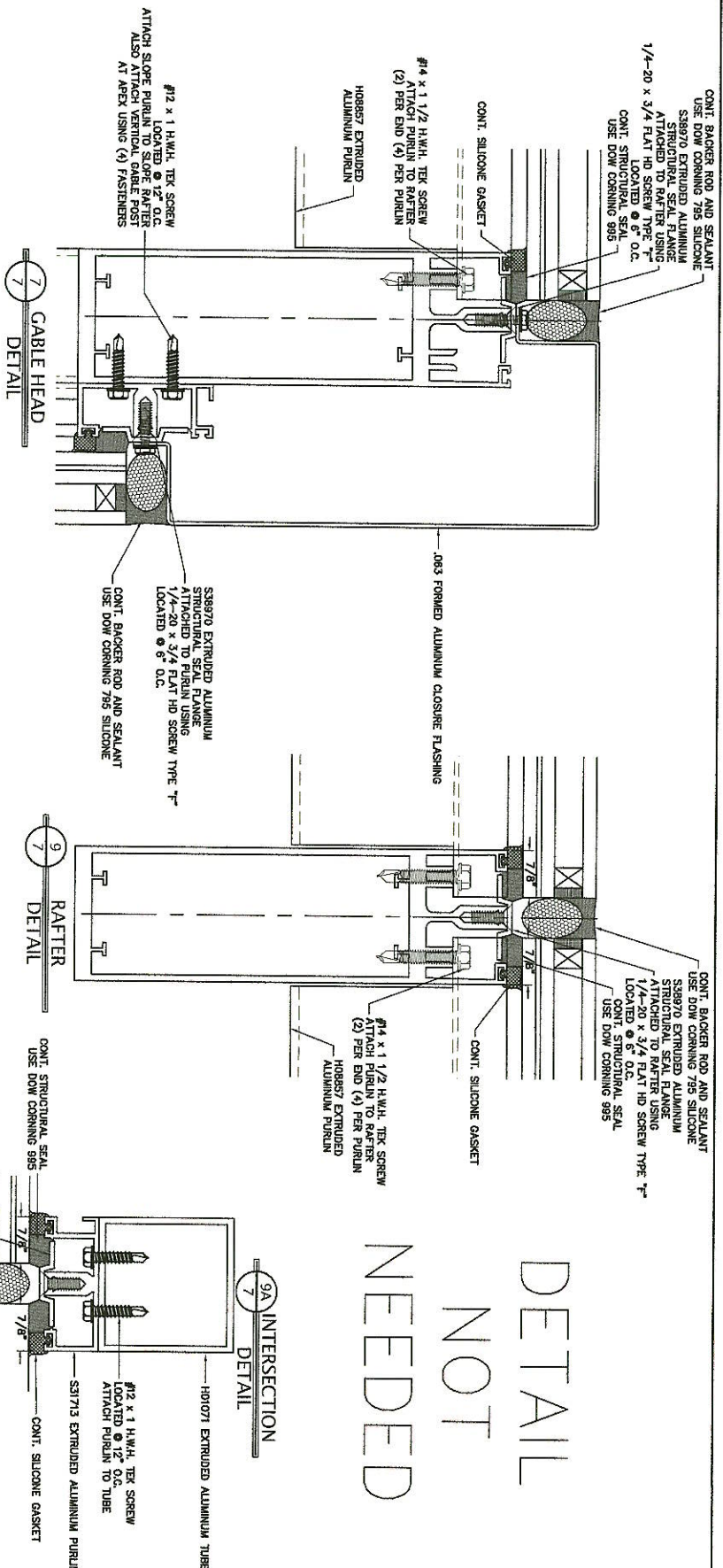
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6 COMP. RING
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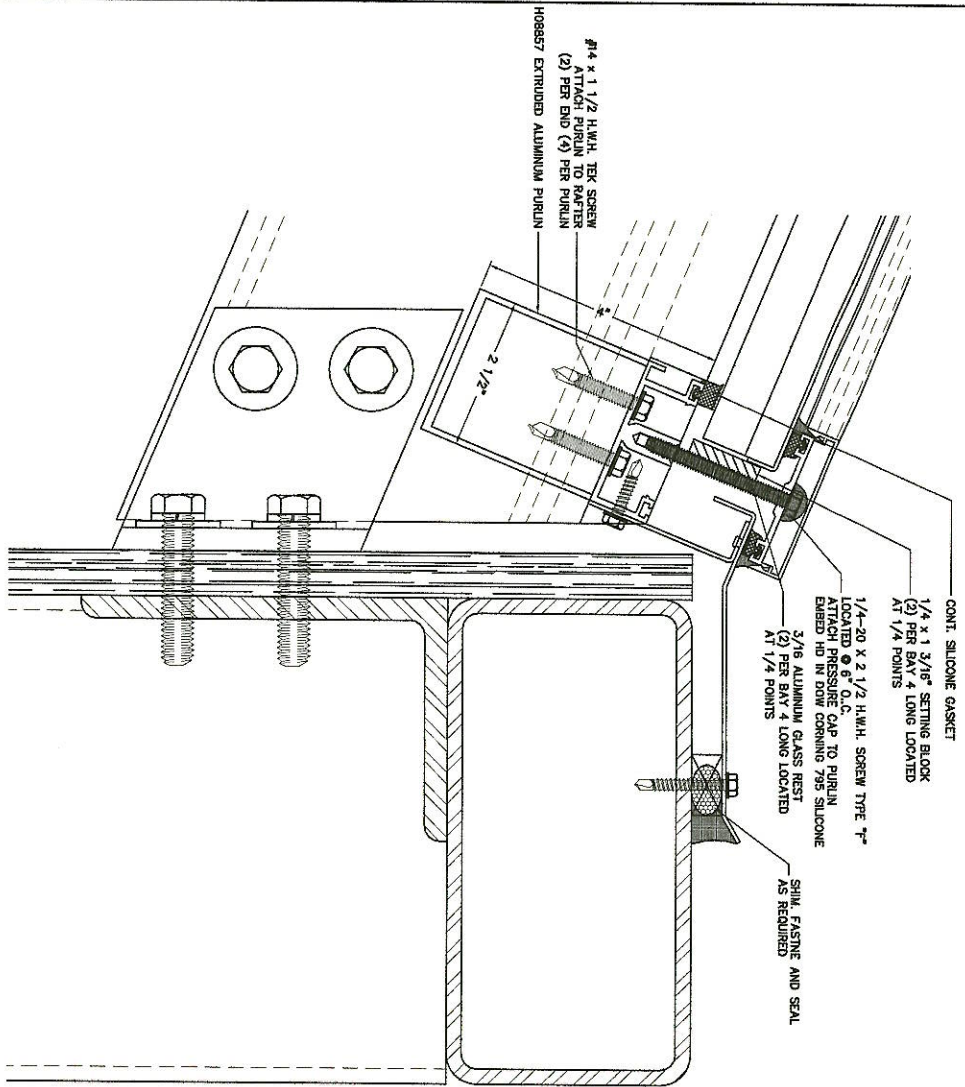
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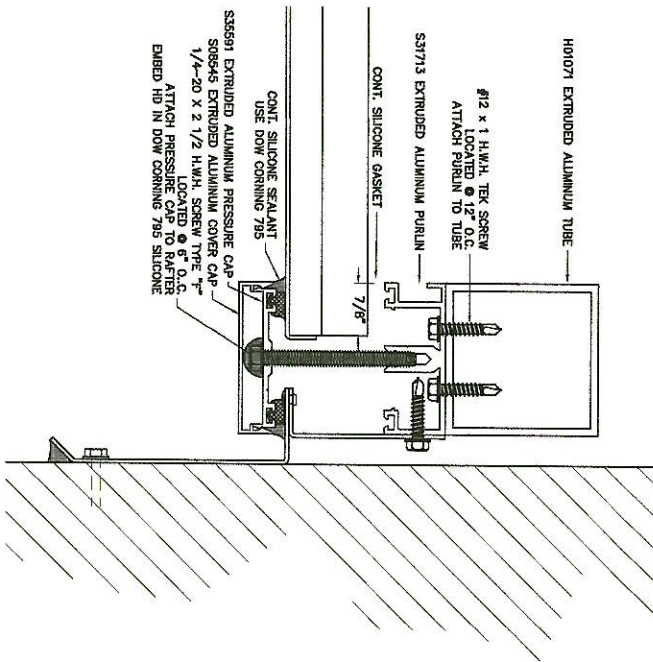
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Test Date: 08/19/21



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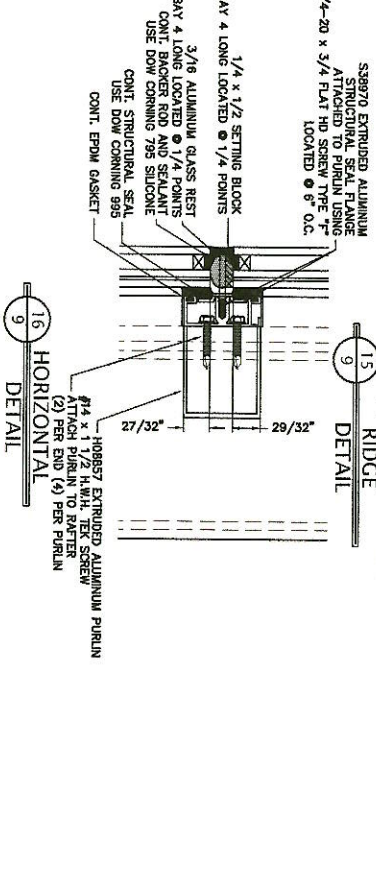
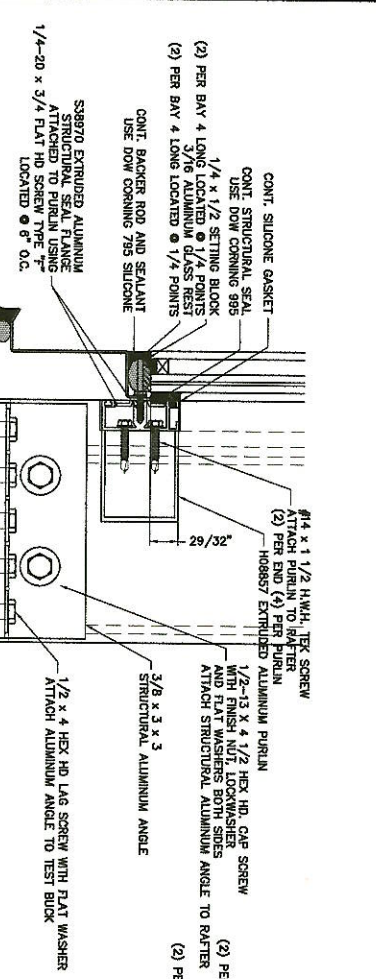
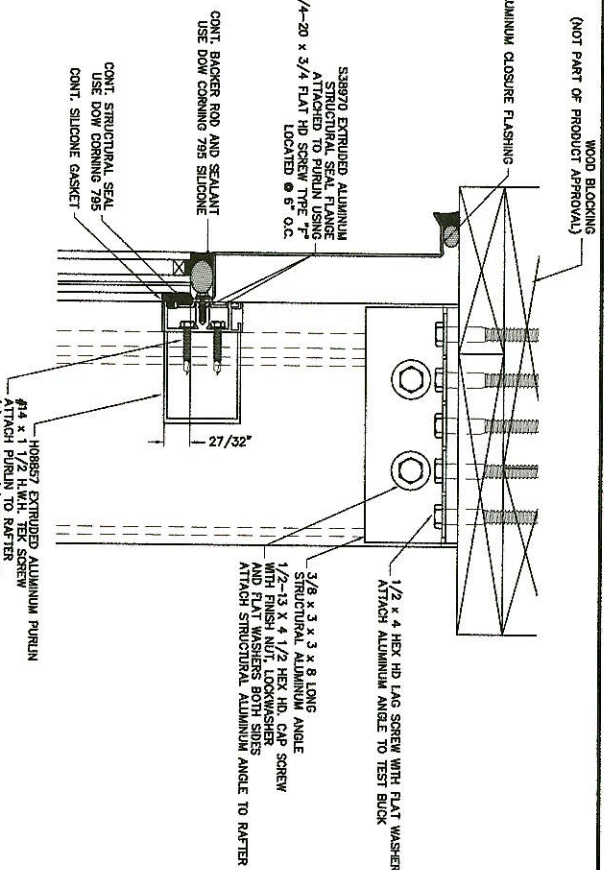
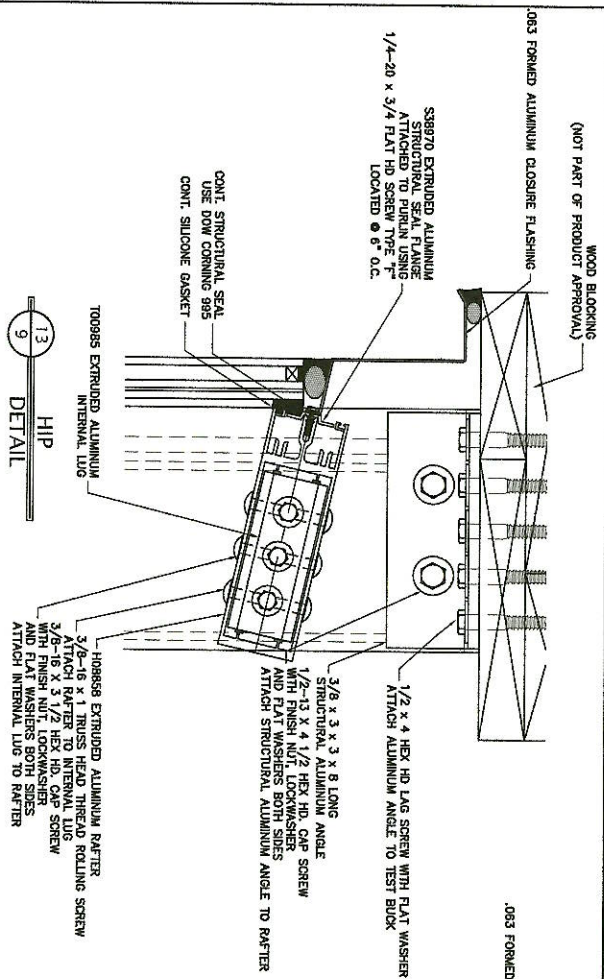
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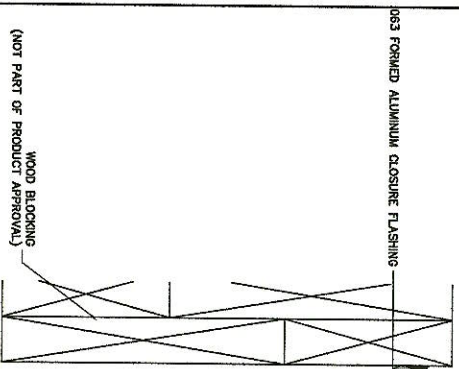
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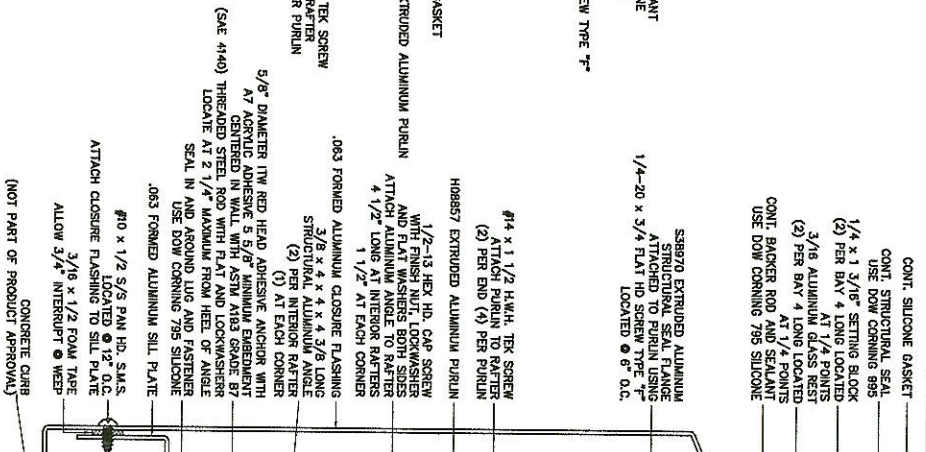
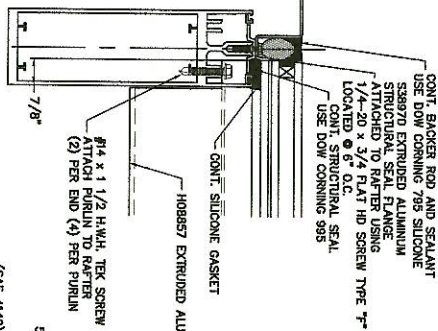
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BY	JLB
CHECKED BY	
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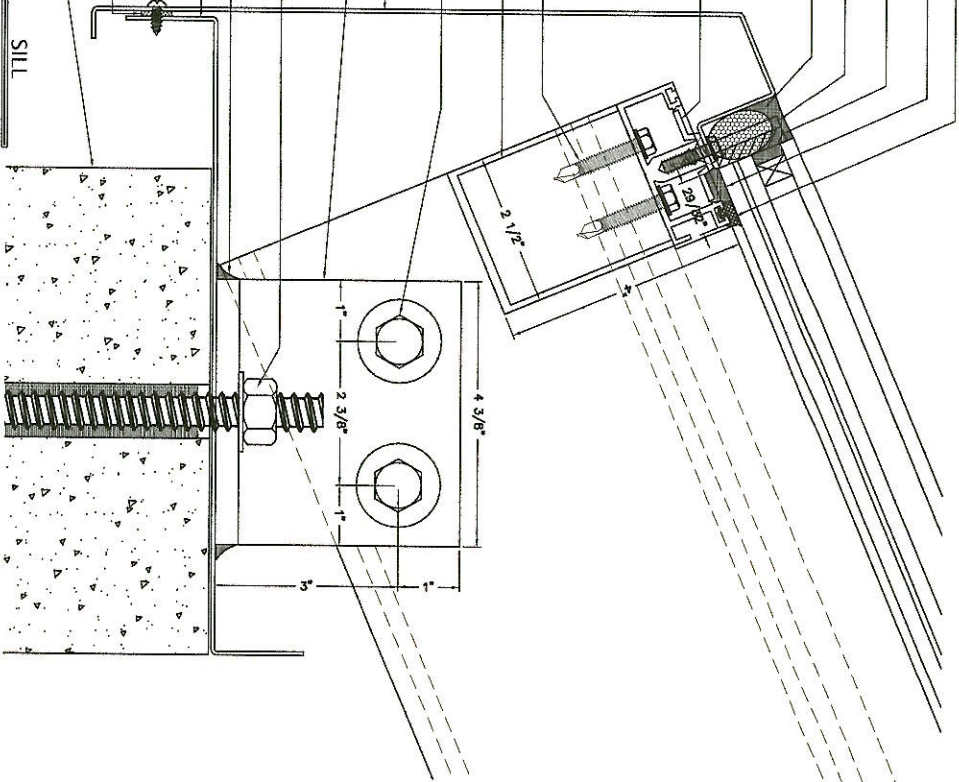
DADE COUNTY USE		ENGINEER STAMP	
<p>PRODUCT NAME: SECURE SERIES</p> <p>PRODUCT TYPE: SMALL MISSILE FLUSH GLAZED</p> <p>DRAWING TITLE: DETAILS</p>			
<p>DATE: 1/27/21</p> <p>BY: JLB</p> <p>CHECKED: JLB</p> <p>DESIGNED: JLB</p> <p>SCALE: 1/2" = 1'-0"</p> <p>PROJECT: 110-24316-2</p> <p>REVISIONS:</p>			



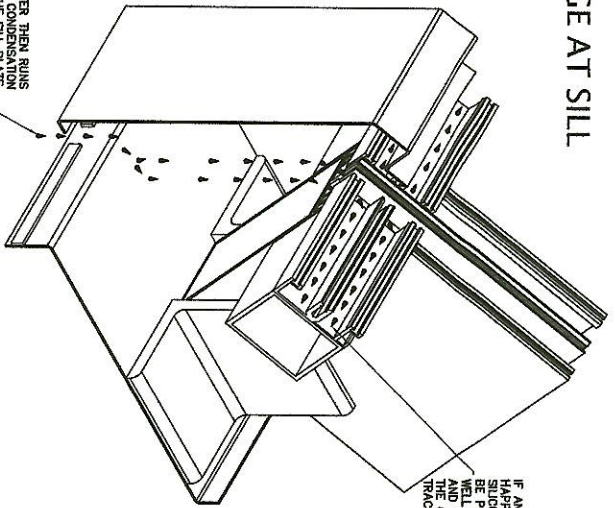
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10
JAMB
DETAIL
QUARTER SCALE



18
10
SILL
DETAIL
HALF SCALE

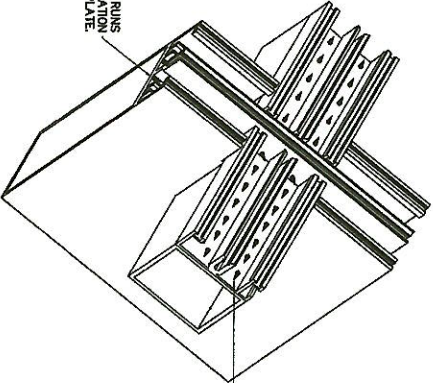


WEEPAGE AT SILL



THE WATER THEN RUNS DOWN THE CONDENSATION TRACK ONTO THE SILL PLATE FROM HERE IT WILL WORK ITS WAY FORWARD TO THE EDGE OF THE SILL PLATE AND AT THE SILL JAWED IN THE SPOKE GASKET VOID FILLED WITH 30 PSI WEEP BAFFLE.

WEEPAGE AT INTERMEDIATE



THE WATER THEN RUNS DOWN THE CONDENSATION TRACK TO THE SILL PLATE.

IF ANY WATER WOULD HAPPEN TO PENETRATE THE SILL JOINT IT WOULD BE PICKED UP IN THE WELL OF THE PURLIN AND TRANSFERRED TO THE CONDENSATION TRACK OF THE RAFTER.

DADE COUNTY USE

ENGINEER STAMP

PRODUCT NAME SECURE SERIES	
PRODUCT TYPE SMALL MISSILE FLUSH GLAZED	
DRAWING TITLE DETAILS	
DATE 1/27/21	DESIGNED BY JLB
CHECKED BY JLB	DATE 1/27/21
DRAWING TITLE 11 of 13	

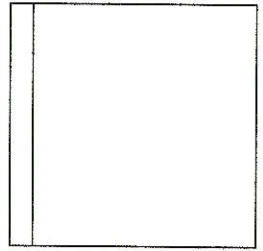
acurlite
Structural Skylights, Inc.

1/27/21

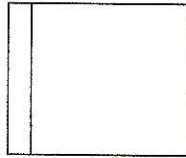
570.759.6882 www.acurlite.com sales@acurlite.com

PT 12/22/17	REVISED PER CALCS
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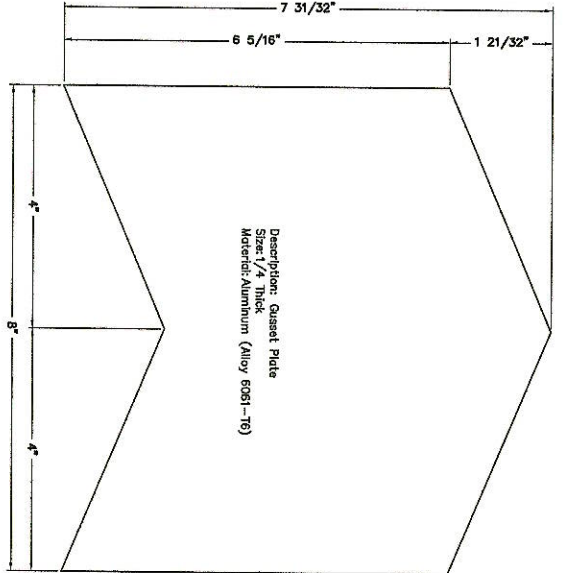
Test Specimen Complies With
These Details. Any Deviation Is Noted.
NCTL-110-24316-2 By: JLB
Test Date: 08/19/21



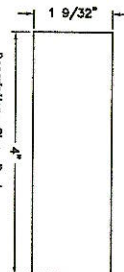
Description: Structural Aluminum Angle
Size: 3/8 x 4 x 4
Material: Aluminum (Alloy 6061-T6)



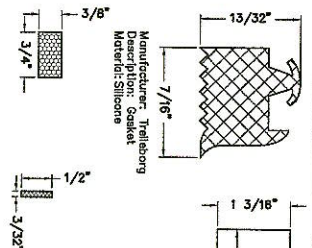
Description: Structural Aluminum Angle
Size: 3/8 x 3 x 3
Material: Aluminum (Alloy 6061-T6)



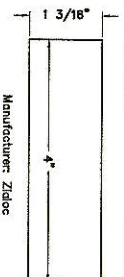
Description: Guest Plate
Size: 1/4 Thick
Material: Aluminum (Alloy 6061-T6)



Description: Glass Rest
Size: 3/16 Thick
Material: Aluminum (Alloy 6061-T6)



Manufacturer: Trailseal
Description: Trailing Seal
Material: Silicone



Manufacturer: Zirconium Dioxide
Description: Sealing Block
Material: Silicone



Description: Pop Rivet
Size: 1/8 x 1/4
Material: Aluminum



Description: Pan Head Sheet Metal Screw (Pan Hd. S.M.S.)
Size: #10 x 1 1/2
Material: Stainless Steel



Description: Hex Washer Head Tek Screw (H.W.H. Tek Screw)
Size: #10 x 1 1/2
Material: SAE Grade 2 Steel



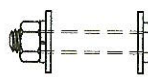
Description: Truss Head Thread Rolling Screw
Size: 3/8-16 x 1 1/2
Material: SAE Grade 2 Steel



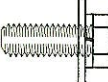
Description: Hex Washer Head Tek Screw (H.W.H. Tek Screw)
Size: #14 x 1 1/2
Material: SAE Grade 2 Steel



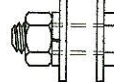
Description: Hex Washer Head Screw Type "F" (H.W.H. Screw Type "F")
Size: #14 x 1 1/2
Material: SAE Grade 2 Steel



Description: Hex Head Cap Screw with Finish Nut, Flat Washers and Lockwasher
Size: 1/2-13 x 2
Material: ASTM Grade 2 Steel



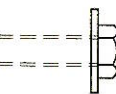
Description: Hex Head Top Bolt with Flat Washer and Lockwasher
Size: 1/2-13 x 2
Material: ASTM A449 Grade 5



Description: Hex Head Top Bolt with Finish Nut, Flat Washers and Lockwasher
Size: 1/2-13 x 1 1/2
Material: ASTM Grade 2 Steel



Description: Hex Head Cap Screw with Finish Nut, Flat Washers and Lockwasher
Size: 5/8-11 x 4 1/2
Material: SAE Grade 2 Steel



Description: Hex Head Cap Screw with Finish Nut, Flat Washers and Lockwasher
Size: 5/8-11 x 4 1/2
Material: ASTM A507 Steel

DADE COUNTY USE

ENGINEER STAMP

PROJECT	13 of 13
DATE	
BY	
CHECKED BY	
DESIGNED BY	
PRODUCT NAME	SECURE SERIES
PRODUCT TYPE	SMALL MISSILE FLUSH GLAZED
DRAWING TITLE	BILL OF MATERIALS

1/27/81	acurlite
370.759.6882	Structural Skylights, Inc.
www.acurlite.com	sales@acurlite.com

P.T. 12/27/17	REVISED PER CALCS
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