



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	+ 80.0	psf	- 80.0	psf
Specimens 2, 3, 4	TAS 201/203	+ 80.0	psf	- 80.0	psf
Air Infiltration per ASTM E283 in accordance with TAS 202-94					
Infiltration: 0.08 cfm/ft ²					
Water Penetration Resistance per ASTM E331 in accordance with TAS 202-94					
12 psf - Passed/No water penetration					
Static Air Pressure per ASTM E330 in accordance with TAS 202-94					
Design Load Pressure		+ 80.0	psf	- 80.0	psf
Overload/ Structural Load Pressure		+ 160.0	psf	- 160.0	psf
Forced Entry Resistance per ASTM F588 in accordance with TAS 202-94					
Passed – Grade 10					
Specimens 2,3,4					
Large Missile Impact/ Pressure Loading in accordance with TAS 201-94					
Impacts rejected without allowing penetration and the product shows no resultant failure or distress					

Test Completed: 11/19/19

Revision Date: 01/05/22

Reference must be made to Report No. NCTL-110-20884-1 dated 12/17/19 for complete test specimen description and data.

For National Certified Testing Laboratories


DIGITAL SIGNATURE

Justin 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-110-20884-1

REPORT TO:

ACURLITE STRUCTURAL SKYLIGHTS
1017 NORTH VINE STREET
BERWICK, PA 18603

REPORT NUMBER: NCTL-110-20884-1
REPORT DATE: 12/17/19
REVISION DATE: 01/05/22

PRODUCT TYPE: FIXED SKYLIGHT ASSEMBLY

SERIES/ MODEL: "SECURE SERIES"



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Report Number NCTL-110-20884-1

Report Date 12/17/19
Revision Date 01/05/22

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

Date Testing Started 10/14/19
Date Testing Completed 11/19/19

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	33.02 mm (1.300") nominal
Glass Thickness	(1) Lite of 6 mm (0.220") 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 2.29 mm (0.090") "SentryGlas Plus" interlayer
Spacer Type/Size	14.73 mm (0.580") Aluminum spacer (Type A1-D)
Glazing System	Exterior glazed with a multi-fin gasket back-bedding and a screw applied pressure plate with (2) strips multi-fin gasket. The 1/4 - 20 x 2 1/2 HWH type F and 1/4 - 20 x 3 HWH screws were located 64 mm and 70 mm (2.5" and 2.75") on center at the rafter and left purlin. The horizontal sections were sealed with structural silicone at the exterior

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 glazing adaptor
Location	Horizontal members fastened with (9) screws
Type	Extruded aluminum "purlin" pressure plate screw adaptor
Location	Gable end fastened to the frame 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

Test Method

ASTM E283

Test

Air Leakage Resistance

Information at 1.6 psf:Maximum Allowable = 0.30 cfm/ft²Infiltration Rate/ Area = 0.08 cfm/ft²

Test Method

ASTM E547

ASTM E331

Test

Water Resistance Test

The test specimen complies with the requirements of TAS 202 at 5.0 gph/ft²No Leakage after 1 cycle of 15 minutes at 12 psf

Test Method

ASTM E330

Test

Static Air Pressure Tests

Half Test Load - ± 60 psf

Positive = No damage

Negative = No damage

Design Loads - ± 80 psfVertical

Measured Deflection Positive = 0.088 inches

Measured Deflection Negative = 0.097 inches

Measured Permanent Set Positive = 0.003 inches

Measured Permanent Set Negative = 0.011 inches

Horizontal

Measured Deflection Positive = 0.011 inches

Measured Deflection Negative = 0.027 inches

Measured Permanent Set Positive = 0.012 inches

Measured Permanent Set Negative = 0.028 inches

Purlin

Measured Deflection Positive = 0.261 inches

Measured Deflection Negative = 0.018 inches

Measured Permanent Set Positive = 0.011 inches

Measured Permanent Set Negative = 0.006 inches

Test Loads - ± 160 psfVertical

Measured Deflection Positive = 0.188 inches

Measured Deflection Negative = 0.019 inches

Measured Permanent Set Positive = 0.173 inches

Measured Permanent Set Negative = 0.112 inches

Horizontal

Measured Deflection Positive = 0.066 inches

Measured Deflection Negative = 0.019 inches

Measured Permanent Set Positive = 0.026 inches

Measured Permanent Set Negative = 0.011 inches

PurlinMeasured Deflection _{Positive} = 0.087 inchesMeasured Deflection _{Negative} = 0.112 inchesMeasured Permanent Set _{Positive} = 0.016 inchesMeasured Permanent Set _{Negative} = 0.009 inches

NOTE: Deflection and Permanent Set measurements taken on the vertical, horizontal and purlin with a 0.4% / 10.46 mm (0.412") for the vertical, 5.28 mm (0.208") for the horizontal and purlin permanent set limit.

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

Test Results - TAS 201Test

Large Missile Impact

Type and weight of missile

#2 Southern Yellow Pine 2x4, Length 102" & 9 lbs Speed 50.0 ft/ sec.

Location**Specimen 2**

Impact

Center of Left Lite Glazing

Impact

Lower Left Corner of Left Lite Glazing

Specimen 3

Impact

Upper Right Corner of Center Lite Glazing

Impact

Center of Center Lite Glazing

Impact

Midspan of Left Intermediate (Vertical) Glazing

Specimen 4

Impact

Bottom Left Corner of Left Lite Glazing

Impact

Left Lite Glazing

Impact

Midspan of Horizontal Intermediate

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 203Test

Cyclic Wind Pressure Loading

After completion of the impact tests, the test specimens were pressure cycled in accordance with Table 1626 of 2017 Florida Building Code Building.

Maximum Cyclic Load Test Pressure: +80 psf & -80 psf

Specimens 2, 3, 4Positive Load**Range of Test****Actual****# of Cycles**

+0.2 to +0.5 DP 16.0 psf to 40.0 psf 3,500

+0.0 to +0.6 DP 00.0 psf to 48.0 psf 300

+0.5 to +0.8 DP 40.0 psf to 64.0 psf 600

+0.3 to +1.0 DP 24.0 psf to 80.0 psf 100

Test Results - TAS 203 (continued)

Test
Cyclic Wind Pressure LoadingNegative Loads

<u>Range of Test</u>	<u>Actual</u>	<u># of Cycles</u>
-0.3 to -1.0 DP	24.0 psf to 80.0 psf	50
-0.5 to -0.8 DP	40.0 psf to 64.0 psf	1,050
-0.0 to -0.6 DP	00.0 psf to 48.0 psf	50
-0.2 to -0.5 DP	16.0 psf to 40.0 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.

Test Method
ASTM F588Test
Forced Entry Resistance

Type D Window Assembly/ Grade 10: = Pass
Specimen 1

Test
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.

Test Observers

Justin Bupp	NCTL, Inc.
Robert DeFayette	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

A stylized digital signature of Justin L. Bupp in black ink, with a small NCTL logo integrated into the signature.

Justin L. Bupp
Laboratory Manager

A stylized digital signature of Joseph A. Reed in black ink, with a small NCTL logo integrated into the signature.

Joseph A. Reed, PE
Engineering Services

JB/dro

Attachments

Appendix A – Revision Summary
Appendix B – Drawings

Appendix A

Revision Log

<u>Identification</u>	<u>Date</u>	<u>Page & Revision</u>
Original Issue	12/17/19	Not Applicable
Revision 01	03/31/21	Added PE stamped drawings and corrected missile type on page 1
Revision 02	01/05/22	Report reviewed and sealed 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-110-20884-1)

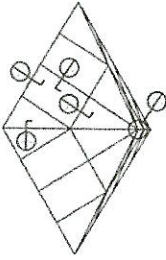
See Attached Documentation;
any deviations noted.

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.

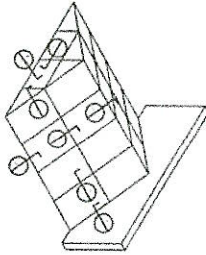
LARGE MISSILE

Notes:

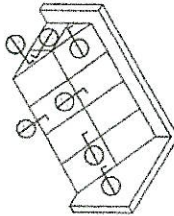
1. The skylight system indicated on these shop drawings has been verified for compliance in accordance with the 2020 (7th Edition) Florida Building Code. Maximum design pressure +80psf and -80psf.
2. The skylight system may be installed in High Velocity Hurricane Zone.
3. These shop drawings are generic 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.



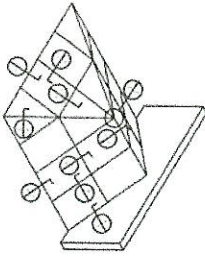
PYRAMID



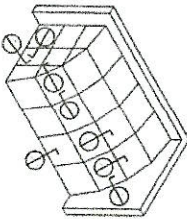
DOUBLE PITCH WITH CABLE



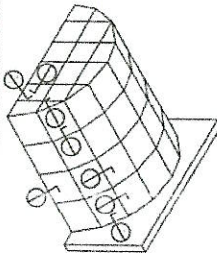
SINGLE PITCH WITH CABLE



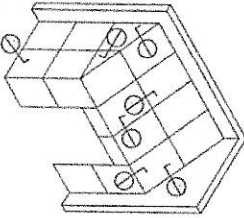
DOUBLE PITCH WITH HIP



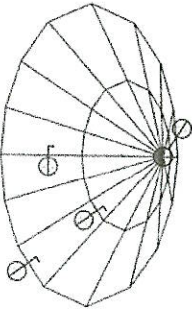
SEGMENTED BARRELL QUATER VAULT WITH CABLE



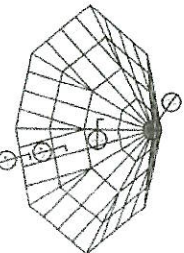
SEGMENTED BARRELL HALF VAULT WITH CABLE



STRAIGHT EAVE LEAN-TO WITH CABLE



POLYGON



POLYGON WITH JACK RAFTERS

DADE COUNTY USE

ENGINEER

Robert J. McElroy
4/24/2021



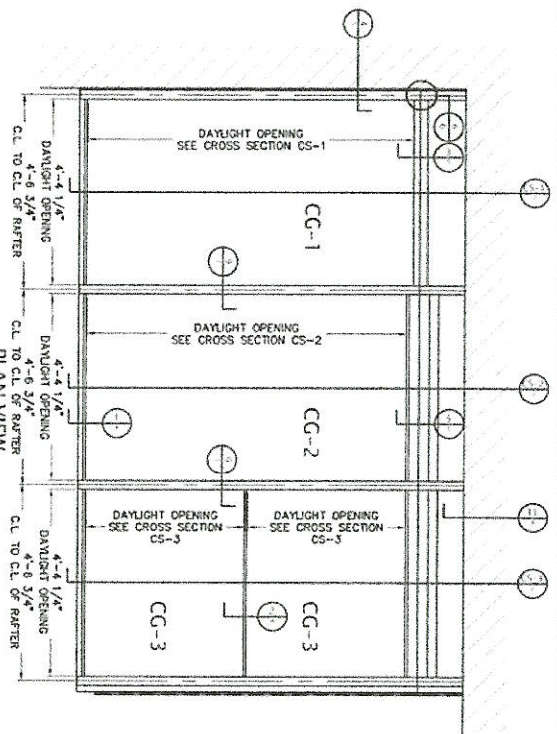
PRODUCT NAME
SECURE SERIES
PROJECT TYPE
LARGE MISSILE
DRAWING VIEW
COVERSHEET

9/8/17

acurlite
Structural Skylights, Inc.

510-279-6682 www.acurlite.com info@acurlite.com

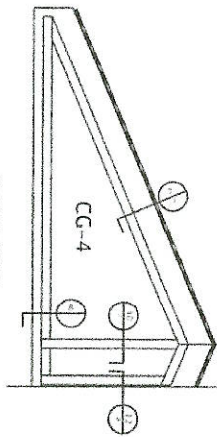
REVISED PER CALC



SCALE: 3/8" = 1'-0"

PLAN VIEW

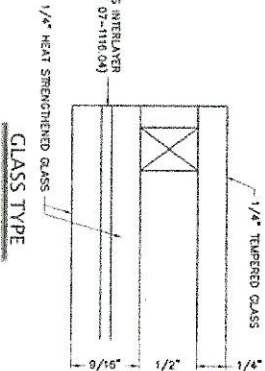
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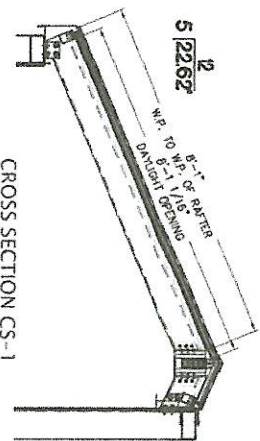
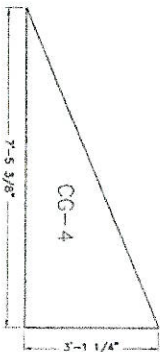
SCALE: 3/8" = 1'-0"

CABLE VIEW

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

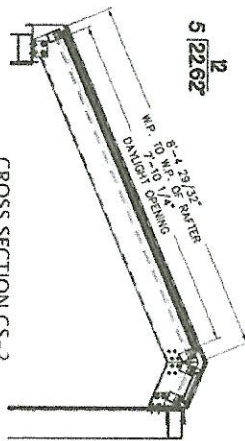


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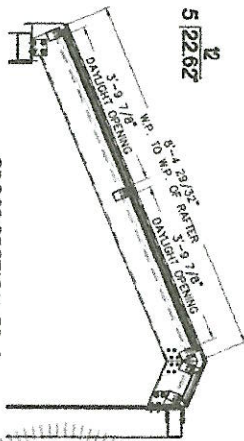
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CROSS SECTION CS-2

SCALE: 3/8" = 1'-0"



CROSS SECTION CS-3

SCALE: 3/8" = 1'-0"

DADE COUNTY USE
ENGINEER
STAMP

Robert J. McElroy
2/24/2017

PRODUCT NAME
SECURE SERIES
PRODUCT TYPE
LARGE MISSILE
BUILDING TYPE
PLANS AND ELEVATIONS

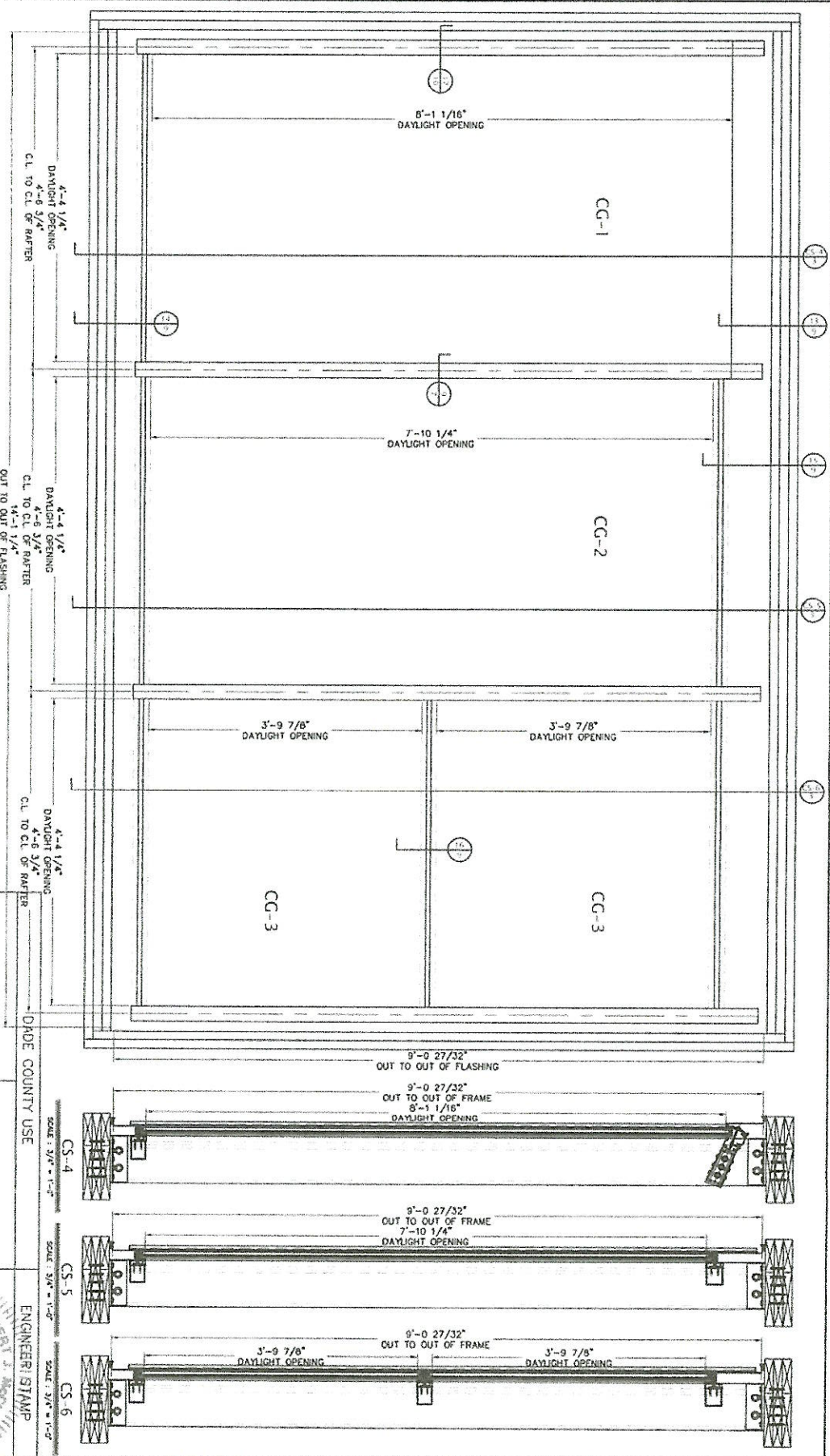
9/8/17

acurlite
Structural Skylights, Inc.

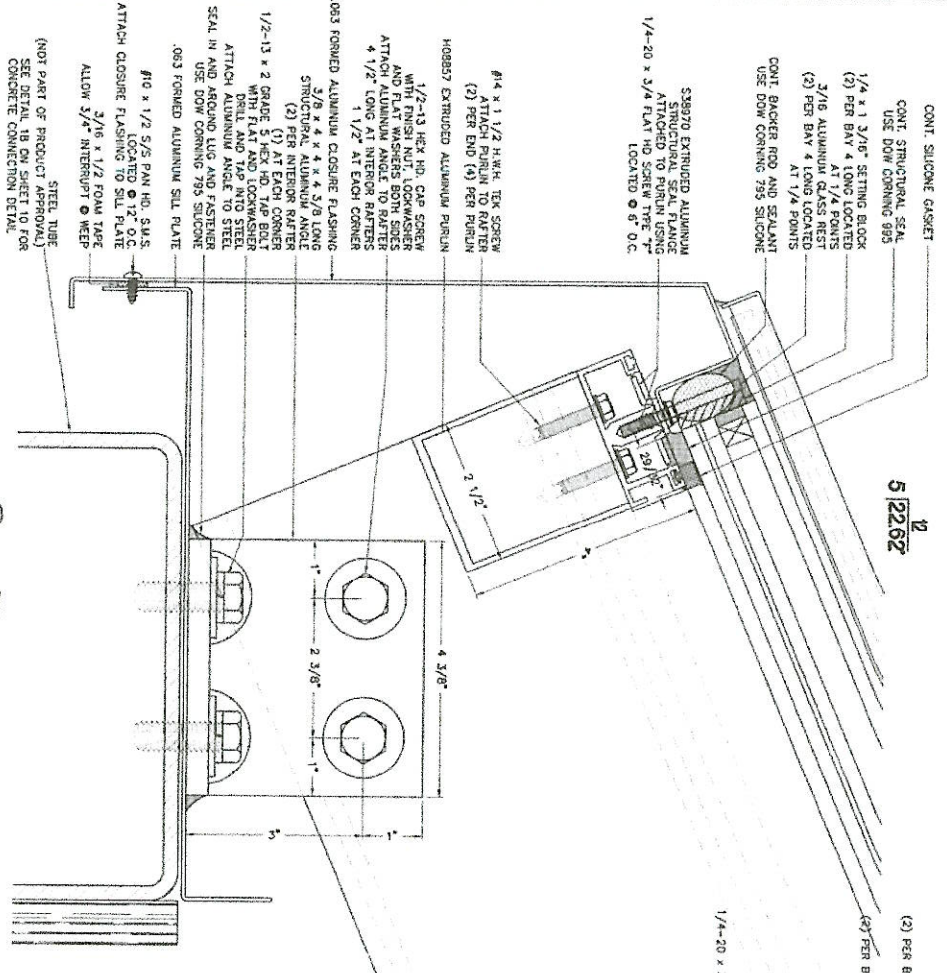
PT 12/27/17 REVISED PER CALCS

Robert M. Mc
2/24/2021

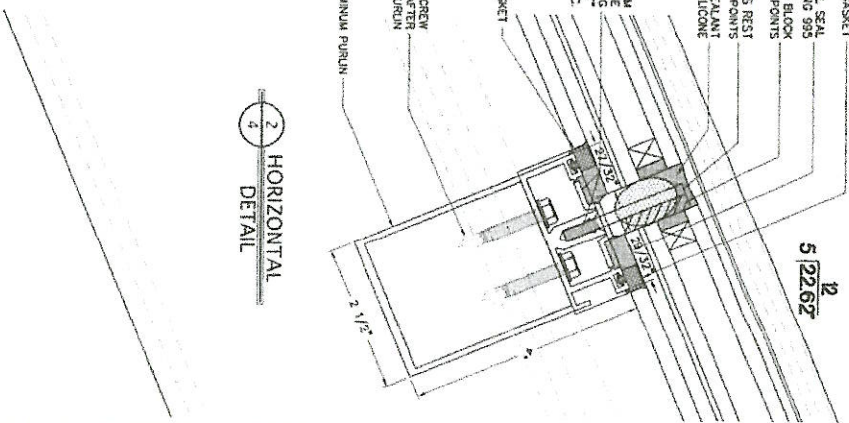
TEST SPECIMEN ELEVATION
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PROJECT NO. PLANS AND ELEVATIONS			
DATE 3/12/2017	070-750-6882	www.acurlite.com	info@acurlite.com



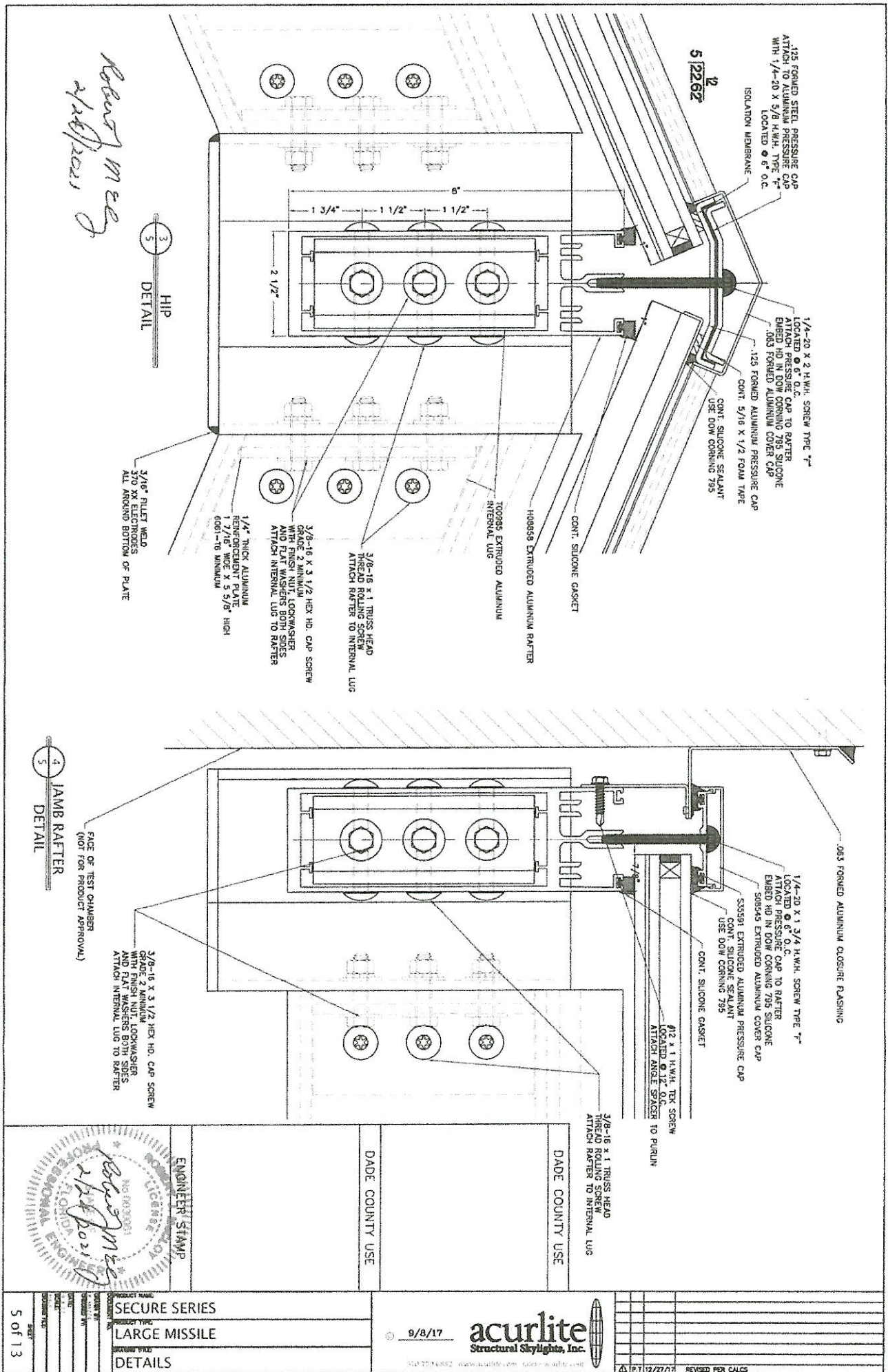
1 SILL
DETAIL



2 HORIZONTAL
DETAIL

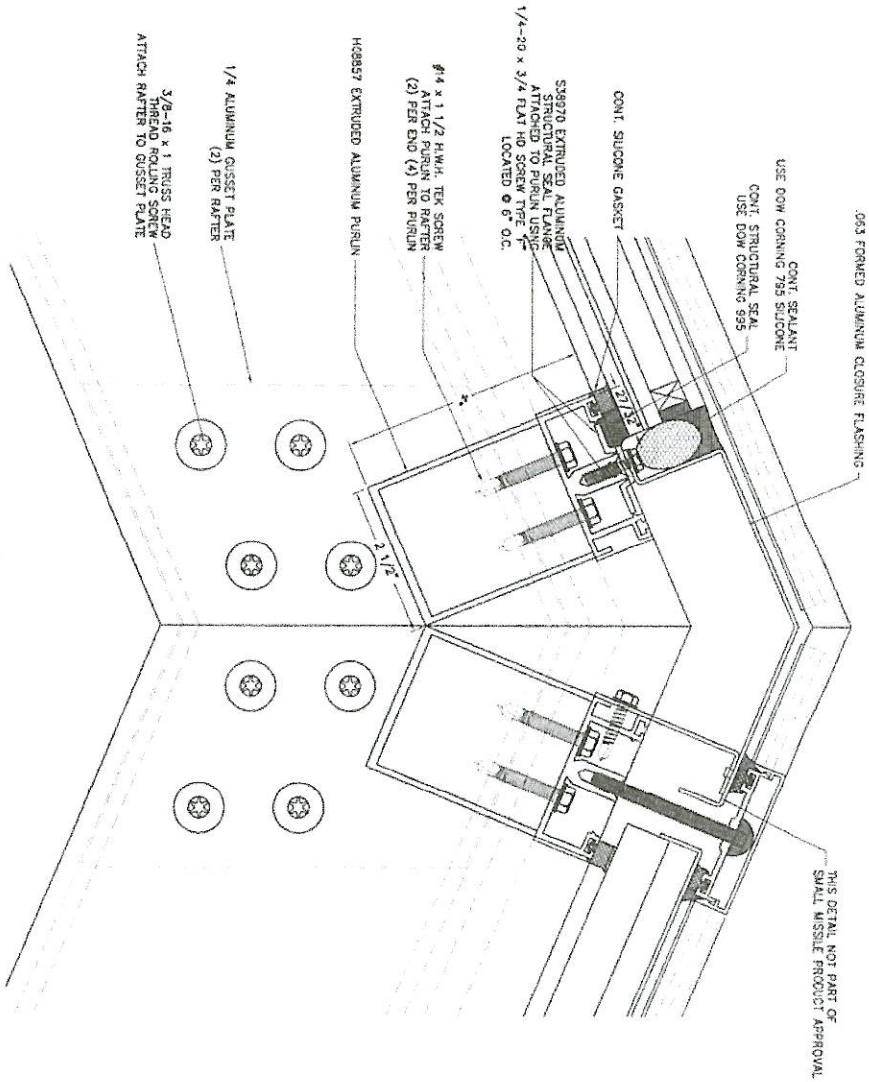
Robert M. Mc...
2/24/2021

DADE COUNTY USE		DADE COUNTY USE	
ENGINEER STAMP		ENGINEER STAMP	
NO. 00000001 ROBERT M. MC... 2/24/2021 PROFESSIONAL ENGINEER		NO. 00000001 ROBERT M. MC... 2/24/2021 PROFESSIONAL ENGINEER	
PRODUCT NAME SECURE SERIES LARGE MISSILE DETAILS		DATE 9/8/17 acurlite Structural Skylights, Inc. 570.731.6882 www.acurlite.com info@acurlite.com	
SHEET 4 OF 13		P.12/22/17 REVISED PER CALCS	

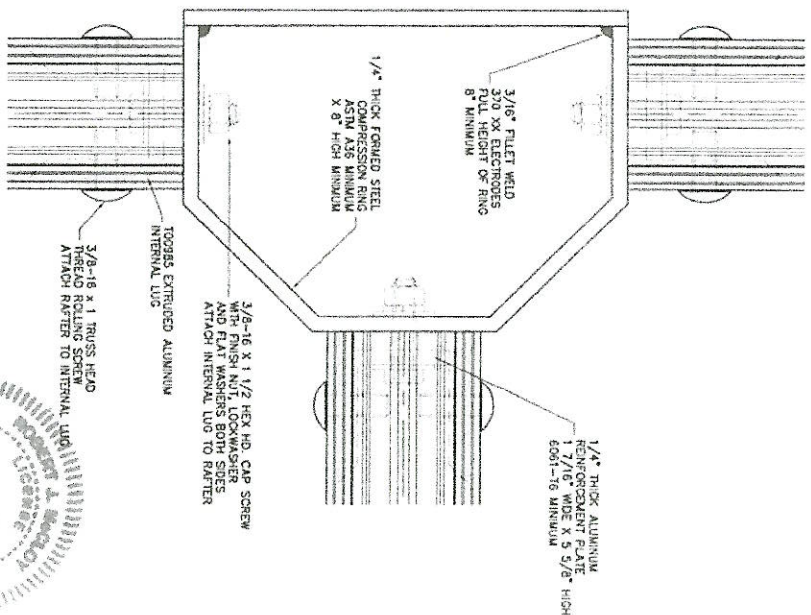


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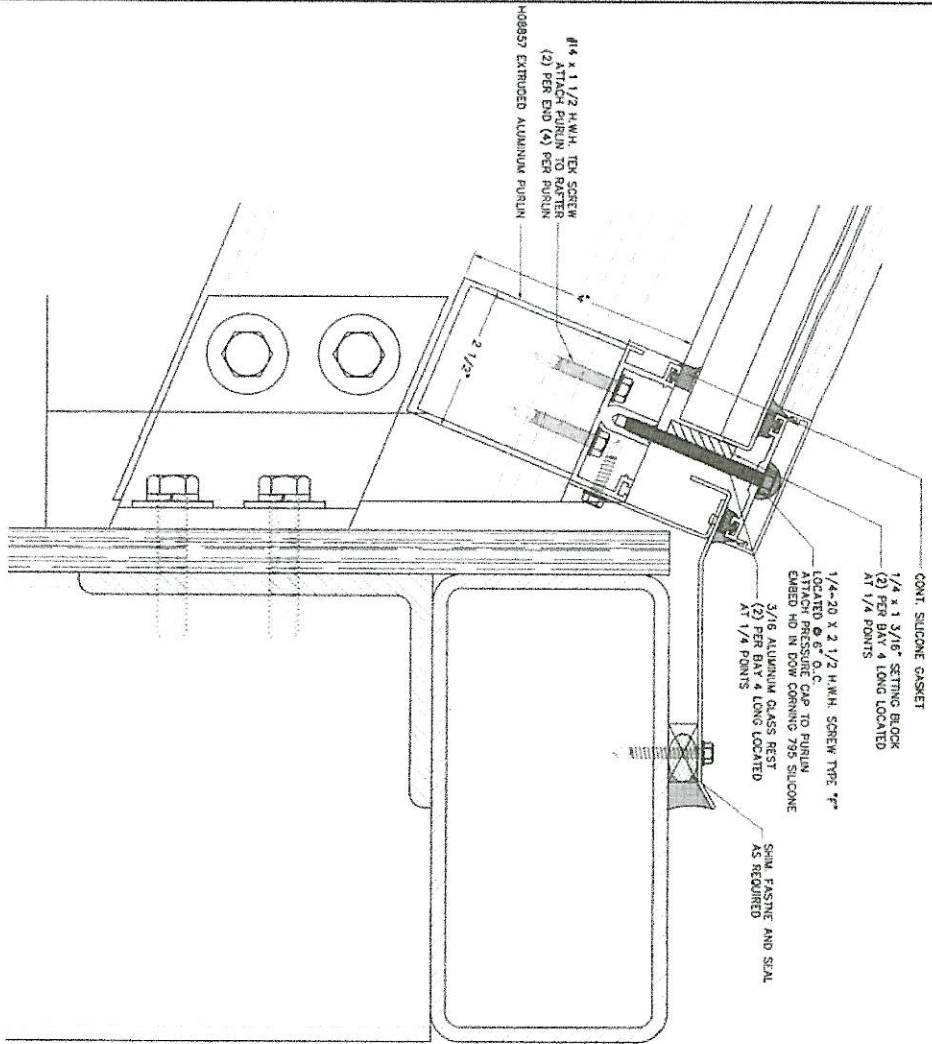
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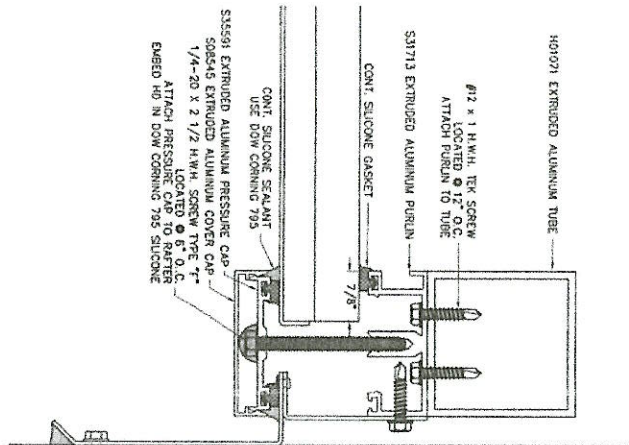
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ENGINEER STAMP

Robert M. Kelly
2/24/2021
Professional Engineer
No. 00000261
STATE OF FLORIDA



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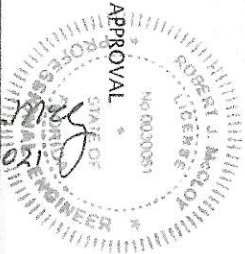
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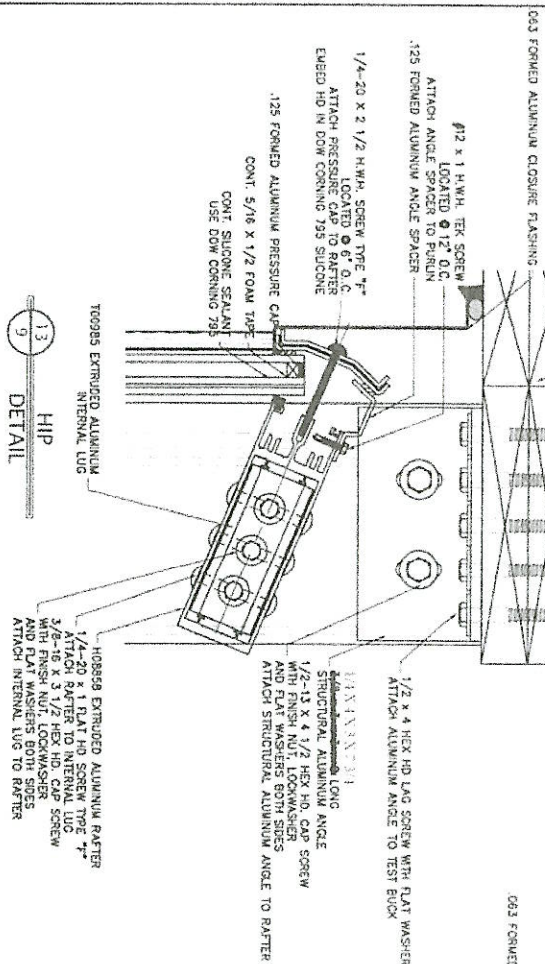
DADE COUNTY USE

ENGINEER'S STAMP

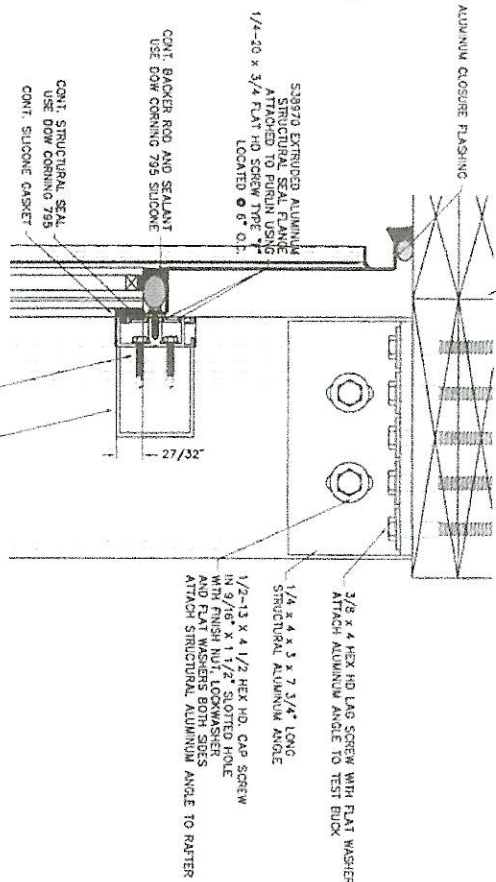
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2/24/2021



WOOD BLOCKING
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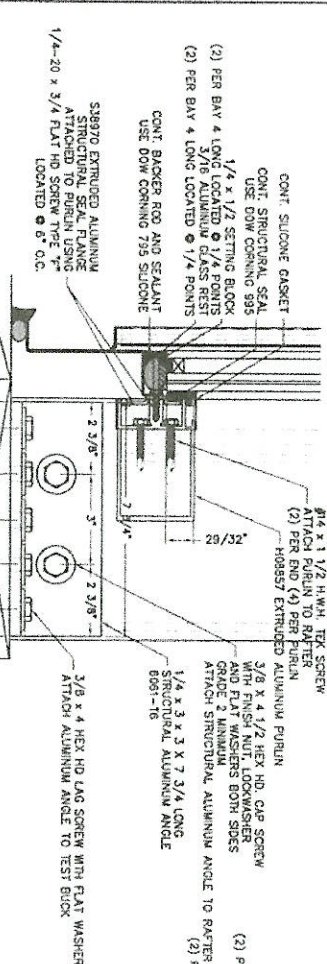


WOOD BLOCKING
(NOT PART OF PRODUCT APPROVAL)



13
9
HIP
DETAIL

15
9
RIDGE
DETAIL



14
9
SILL
DETAIL

16
9
HORIZONTAL
DETAIL

DADE COUNTY USE

ENGINEER'S STAMP

Robert J. Meyer
2/29/2002

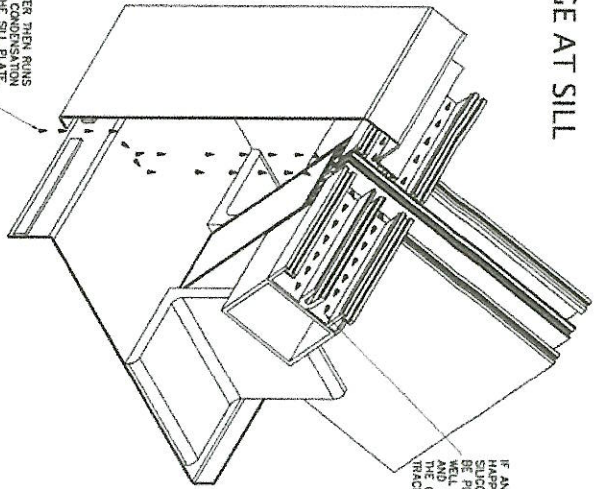


PRODUCT NAME	SECURE SERIES
PROJECT NAME	LARGE MISSILE
DATE	DETAILS
9 OF 13	

9/8/17
acur lite
Structural Skylights, Inc.
370 TYPICAL - www.acur-lite.com - secure@acur-lite.com

REVISED PER CALCS	12/27/17
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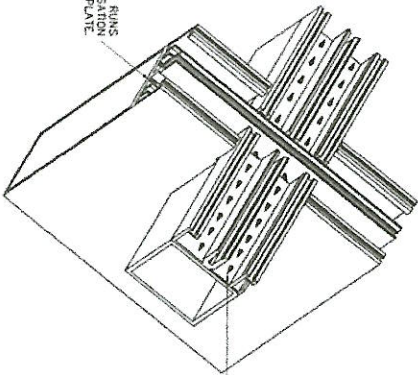
WEEPAGE AT SILL



IF ANY WATER WOULD
PENETRATE THE
SILLON, THE WATER
WOULD BE PICKED UP IN THE
WELL OF THE PURCH
AND TRANSFERRED TO
THE DRAINAGE
TRACK OF THE RAFTER.

THE WATER THEN RUNS
DOWN THE CONCRETE
FROM HERE IT WILL WORK
ITS WAY FORWARD TO THE
DRAINAGE TRACK OF THE
AND DRAIN AT THE 3/4" VOID
IN THE SPOKE CASSET.
VOID FILLED WITH 30 PSI WEEP BATTLE.

WEEPAGE AT INTERMEDIATE




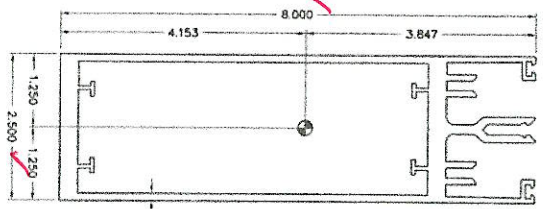
IF ANY WATER WOULD
HAPPEN TO PENETRATE THE
SILLON, JOINT IT WOULD
BE PICKED UP IN THE
WELL OF THE PURCH
AND TRANSFERRED TO
THE DRAINAGE
TRACK OF THE RAFTER.

DADE COUNTY USE	
ENGINEER	STAMP

Robert M. McElroy
2/26/2020

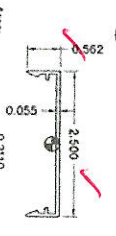


PROJECT NAME: SECURE SERIES	 acurlite Structural Skylights, Inc. 372-25-0682 www.acurlite.com sales@acurlite.com	9/8/17 11 of 13
PROJECT TYPE: LARGE MISSILE		
DETAILS		



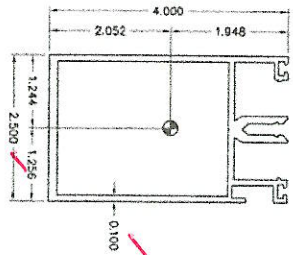
Area: 4.0771
Perimeter: 54.9115
Bounding box: X: -1.2500 -- 1.2500
Y: -3.8472 -- 3.8472
Moments of inertia: X: 31.3583
Y: 3.5664
Product of inertia: XY: 0.0000
Radii of gyration: X: 2.7743
Y: 0.9453
Principal moments and X-Y directions about centroid:
I: 3.6664 along [0.0000 1.0000]
J: 31.3583 along [-1.0000 0.0000]
Weight per lined foot: 4.77 lbs.
Aluminum Alloy: 6063-T6

H0858 RAFTER



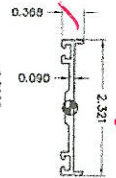
Area: 0.3110
Perimeter: 7.5289
Bounding box: X: -1.2500 -- 1.2500
Y: -0.1228 -- 0.1228
Moments of inertia: X: 0.1248
Y: 0.0000
Product of inertia: XY: 0.0000
Radii of gyration: X: 0.1527
Y: 0.0000
Principal moments and X-Y directions about centroid:
I: 0.0046 along [0.0000 1.0000]
J: 0.1248 along [0.0000 1.0000]
Weight per lined foot: 0.25 lbs.
Aluminum Alloy: 6063-T6

S08545 COVER GAP



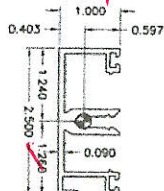
Area: 1.6983
Perimeter: 31.2652
Bounding box: X: -1.2436 -- 1.2436
Y: -1.9480 -- 1.9480
Moments of inertia: X: 3.5266
Y: 1.4491
Product of inertia: XY: -0.0162
Radii of gyration: X: 0.9337
Y: 0.6062
Principal moments and X-Y directions about centroid:
I: 1.4469 along [0.0082 -1.0000]
J: 3.5267 along [1.0000 0.0082]
Weight per lined foot: 0.93 lbs.
Aluminum Alloy: 6063-T6

H08857 PURLIN



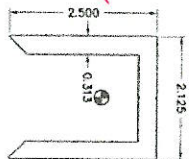
Area: 0.2855
Perimeter: 9.3651
Bounding box: X: -0.1469 -- 1.4656
Y: -0.1469 -- 0.2190
Moments of inertia: X: 0.0012
Y: 0.0000
Product of inertia: XY: 0.0000
Radii of gyration: X: 0.0534
Y: 0.0000
Principal moments and X-Y directions about centroid:
I: 0.0046 along [0.0000 1.0000]
J: 0.1469 along [0.0000 1.0000]
Weight per lined foot: 0.354 lbs.
Aluminum Alloy: 6063-T6

S35591 PRESSURE CAP



Area: 0.7307
Perimeter: 15.0209
Bounding box: X: -1.2403 -- 1.2403
Y: -0.4032 -- 0.5968
Moments of inertia: X: 0.0800
Y: 0.4177
Product of inertia: XY: -0.0027
Radii of gyration: X: 0.2561
Y: 0.7561
Principal moments and X-Y directions about centroid:
I: 0.0800 along [1.0000 -0.0086]
J: 0.4178 along [0.0086 1.0000]
Weight per lined foot: 0.88 lbs.
Aluminum Alloy: 6063-T6

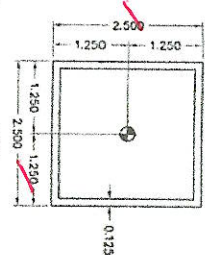
S31713 PURLIN



Area: 1.9456
Perimeter: 13.3066
Bounding box: X: -1.0624 -- 1.0626
Y: -1.0625 -- 0.9355
Moments of inertia: X: 1.3254
Y: 1.3254
Product of inertia: XY: -0.0001
Radii of gyration: X: 0.7427
Y: 0.7427
Principal moments and X-Y directions about centroid:
I: 1.0731 along [1.0000 0.0004]
J: 1.3224 along [0.0004 1.0000]
Weight per lined foot: 2.335 lbs.
Aluminum Alloy: 6063-T6

T00985 INTERNAL LUG

DADE COUNTY USE



Area: 11.8175
Perimeter: 19.0000
Bounding box: X: -1.2500 -- 1.2500
Y: -1.2500 -- 1.2500
Moments of inertia: X: 1.1185
Y: 1.1185
Product of inertia: XY: 0.0000
Radii of gyration: X: 0.9709
Y: 0.9709
Principal moments and X-Y directions about centroid:
I: 1.1185 along [0.7071 -0.7071]
J: 1.1185 along [0.7071 0.7071]
Weight per lined foot: 3.39 lbs.
Aluminum Alloy: 6063-T6

H01071 TUBE

Robert J. MacKay
2/20/2021
Professional Engineer
No. 0710071
State of Florida

