



NATIONAL CERTIFIED TESTING LABORATORIES

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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	+ 120.0 psf	- 120.0 psf	
Specimens 2, 3, 4	TAS 201/203	+ 120.0 psf	-120.0 psf	
Air Infiltration per ASTM E283 in accordance with TAS 202-94				
Infiltration: 0.01 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		+ 120.0 psf	- 120.0 psf	
Overload/ Structural Load Pressure		+ 240.0 psf	- 240.0 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				
Impacts rejected without allowing penetration and the product shows no resultant failure or distress				

Test Completed: 07/25/19

Revision Date: 01/05/22

Reference must be made to Report No. NCTL-110-20884-2 dated 08/27/19 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
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Florida Building Code TAS 203-94

STRUCTURAL, IMPACT & CYCLING PERFORMANCE TEST REPORT

NCTL-110-20884-2

REPORT TO:

ACURLITE STRUCTURAL SKYLIGHTS
1017 NORTH VINE STREET
BERWICK, PA 18603

REPORT NUMBER: NCTL-110-20884-2
REPORT DATE: 08/27/19
REVISION DATE: 01/05/22

PRODUCT TYPE: FIXED SKYLIGHT ASSEMBLY

SERIES/ MODEL: "SECURE SERIES"



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Report Number NCTL-110-20884-2

Report Date 08/27/19
Revision Date 01/05/22

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

Date Testing Started 03/27/19
Date Testing Completed 07/25/19

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 1.52 mm (0.060") Solutia "Saflex" PVB 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 = 0.01 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 18 psf

Test Method

ASTM E330

Test

Static Air Pressure Tests

Half Test Load - ± 120 psf

Positive = No damage

Negative = No damage

Design Loads - ± 120 psfVertical

Measured Deflection Positive = 0.108 inches

Measured Deflection Negative = 0.104 inches

Measured Permanent Set Positive = 0.004 inches

Measured Permanent Set Negative = 0.002 inches

Horizontal

Measured Deflection Positive = 0.411 inches

Measured Deflection Negative = 0.002 inches

Measured Permanent Set Positive = 0.018 inches

Measured Permanent Set Negative = 0.008 inches

Purlin

Measured Deflection Positive = 0.451 inches

Measured Deflection Negative = 0.025 inches

Measured Permanent Set Positive = 0.033 inches

Measured Permanent Set Negative = 0.012 inches

Test Loads - ± 240 psfVertical

Measured Deflection Positive = 0.206 inches

Measured Deflection Negative = 0.192 inches

Measured Permanent Set Positive = 0.002 inches

Measured Permanent Set Negative = 0.002 inches

Horizontal

Measured Deflection Positive = 0.007 inches

Measured Deflection Negative = 0.029 inches

Measured Permanent Set Positive = 0.008 inches

Measured Permanent Set Negative = 0.020 inches

PurlinMeasured Deflection _{Positive} = 0.164 inchesMeasured Deflection _{Negative} = 0.267 inchesMeasured Permanent Set _{Positive} = 0.027 inchesMeasured Permanent Set _{Negative} = 0.028 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

Small Missile Impact

Type and weight of missile: (10) 2 g steel ball Speed 130.0 ft/ sec.

*All impacts were performed on the left lite of glass

	<u>Location</u>
Specimen 2	
Impact	Upper Left Corner of Glazing
Impact	Midspan of Right Side of Glazing
Impact	Lower Left Corner of Glazing
Specimen 3	
Impact	Upper Right Corner of Glazing
Impact	Midspan of Left Side of Glazing
Impact	Lower Right Corner of Glazing
Specimen 4	
Impact	Top Midspan of Glazing
Impact	Center Midspan of Glazing
Impact	Bottom Midspan of 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 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: +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 Results - TAS 203 (continued)

Test
Cyclic Wind Pressure LoadingNegative 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.

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.
Keith Mazzie	Acurlite Structural Skylights
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 cursive signature of Justin L. Bupp in black ink. Below the signature is a small circular logo with the letters 'NCTL' in orange and black. Underneath the logo, the words 'DIGITAL SIGNATURE' are printed in a small, black, sans-serif font.

Justin L. Bupp

A stylized cursive signature of Joseph A. Reed in black ink. Below the signature is a small circular logo with the letters 'NCTL' in orange and black. Underneath the logo, the words 'NCTL Digital Signature' are printed in a small, black, sans-serif font.

Joseph A. Reed, PE

JB/bas

Attachments

Appendix A – Revision Summary

Appendix B – Drawings

Appendix A

Revision Log

<u>Identification</u>	<u>Date</u>	<u>Page & Revision</u>
Original Issue	08/27/19	Not Applicable
Revision 01	03/31/21	Added PE stamped drawings
Revision 02	01/05/22	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-110-20884-2)

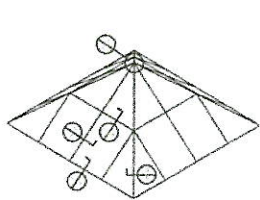
See Attached Documentation;
any deviations noted.

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.

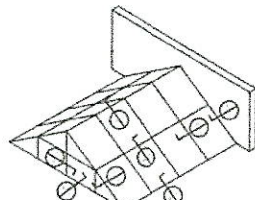
SMALL MISSILE

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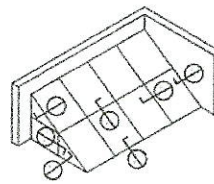
1. The skylight system indicated on these shop drawings has been verified for compliance in accordance with the 2020 (7th Edition) Florida Building Code. Maximum design pressure is +120psf and -120psf.
2. The skylight system may be installed in High Velocity Hurricane Zone.
3. These shop drawings are 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.



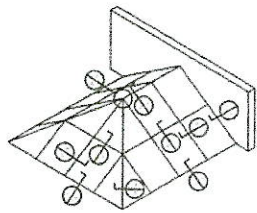
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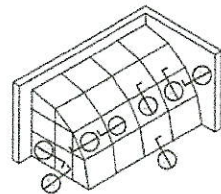
DOUBLE PITCH WITH CABLE



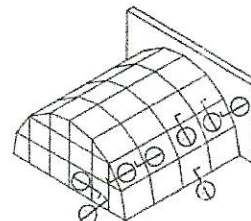
SINGLE PITCH WITH GABLE



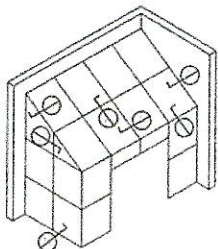
DOUBLE PITCH WITH HIP



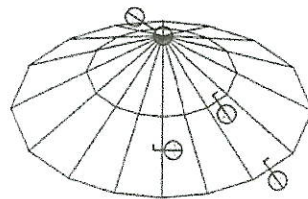
SEGMENTED BARRELL QUATER VAULT
WITH GABLE



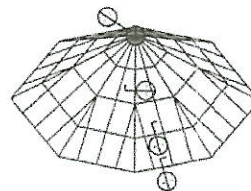
SEGMENTED BARRELL HALF VAULT
WITH GABLE



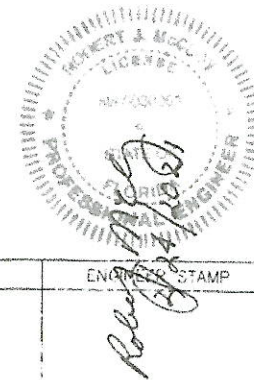
STRAIGHT EAVE LEAN-TO
WITH GABLE




POLYGON



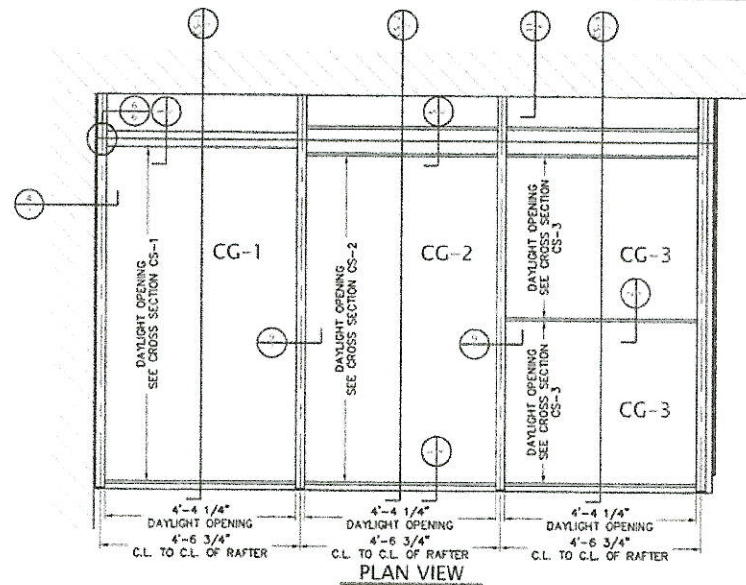
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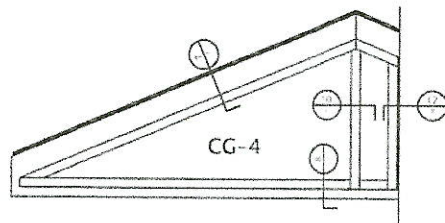
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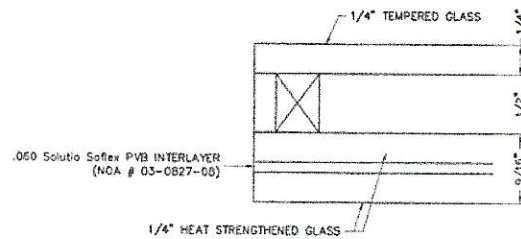
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PRODUCT TYPE	SMALL MISSILE
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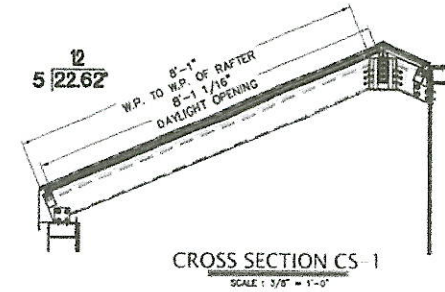
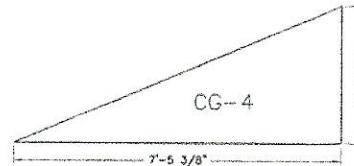


GABLE VIEW
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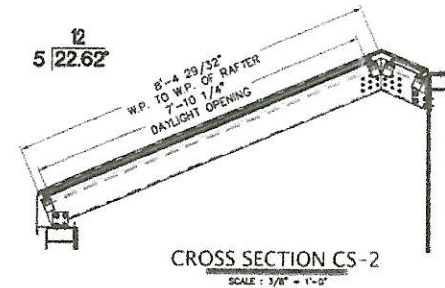


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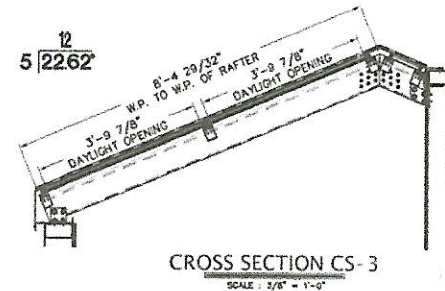
	SIZE
CG-1	54 x 99
CG-2	54 x 96
CG-3	54 x 49 5/8
CG-4	SEE PATTERN



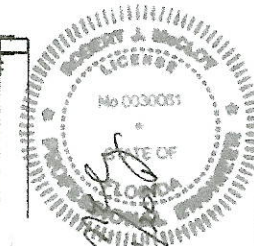
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CROSS SECTION CS-2
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CROSS SECTION CS-3
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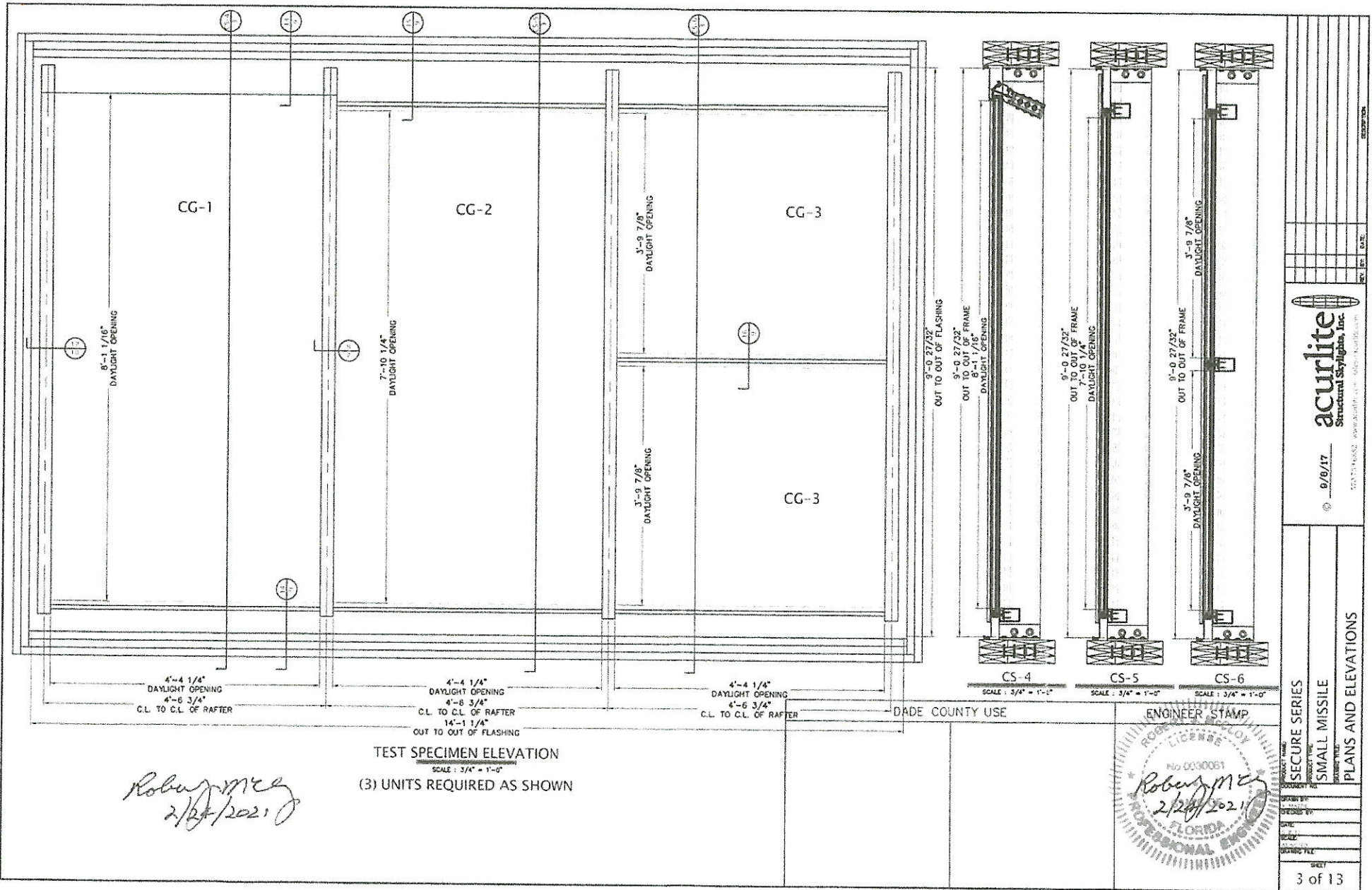
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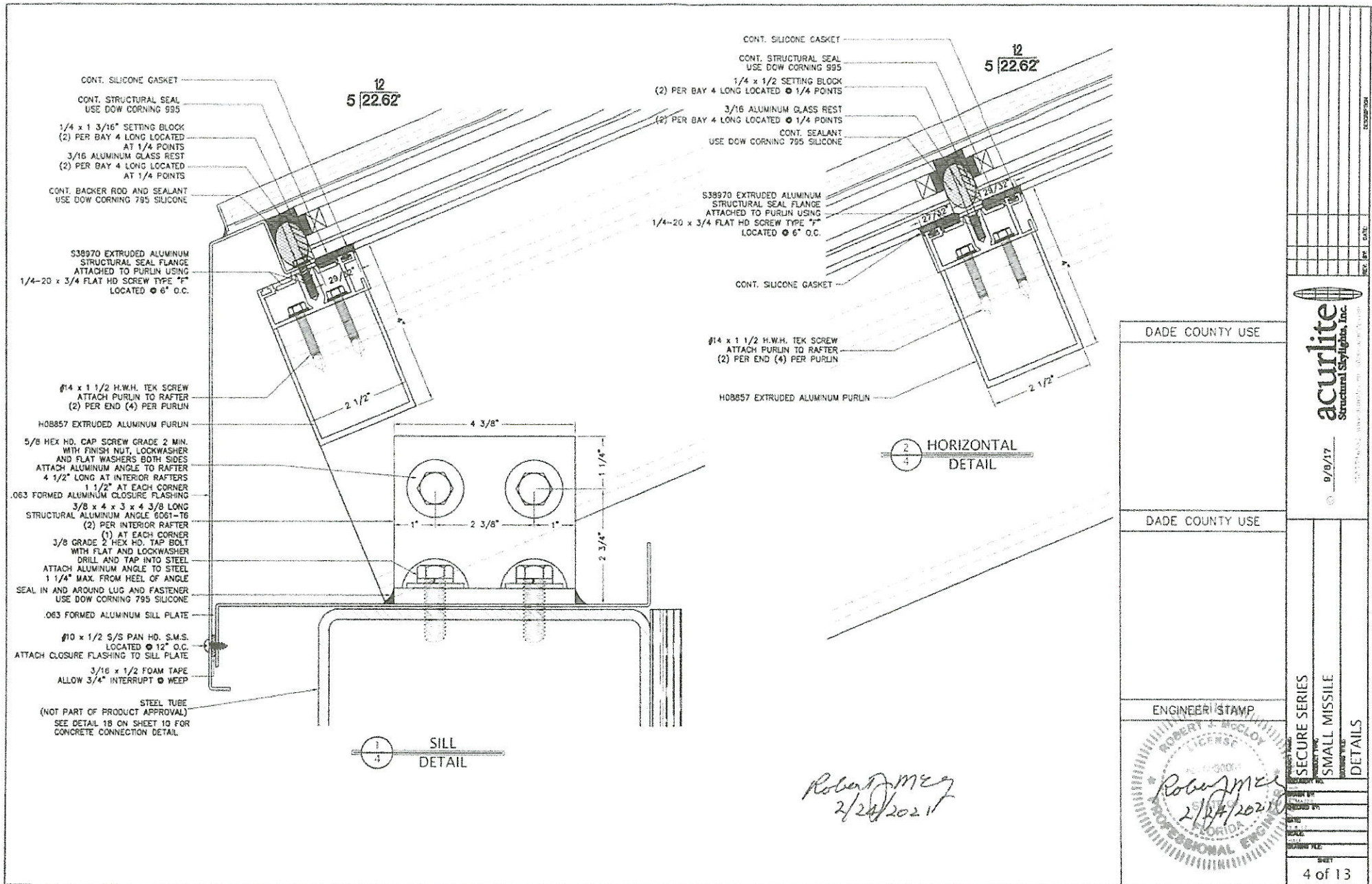
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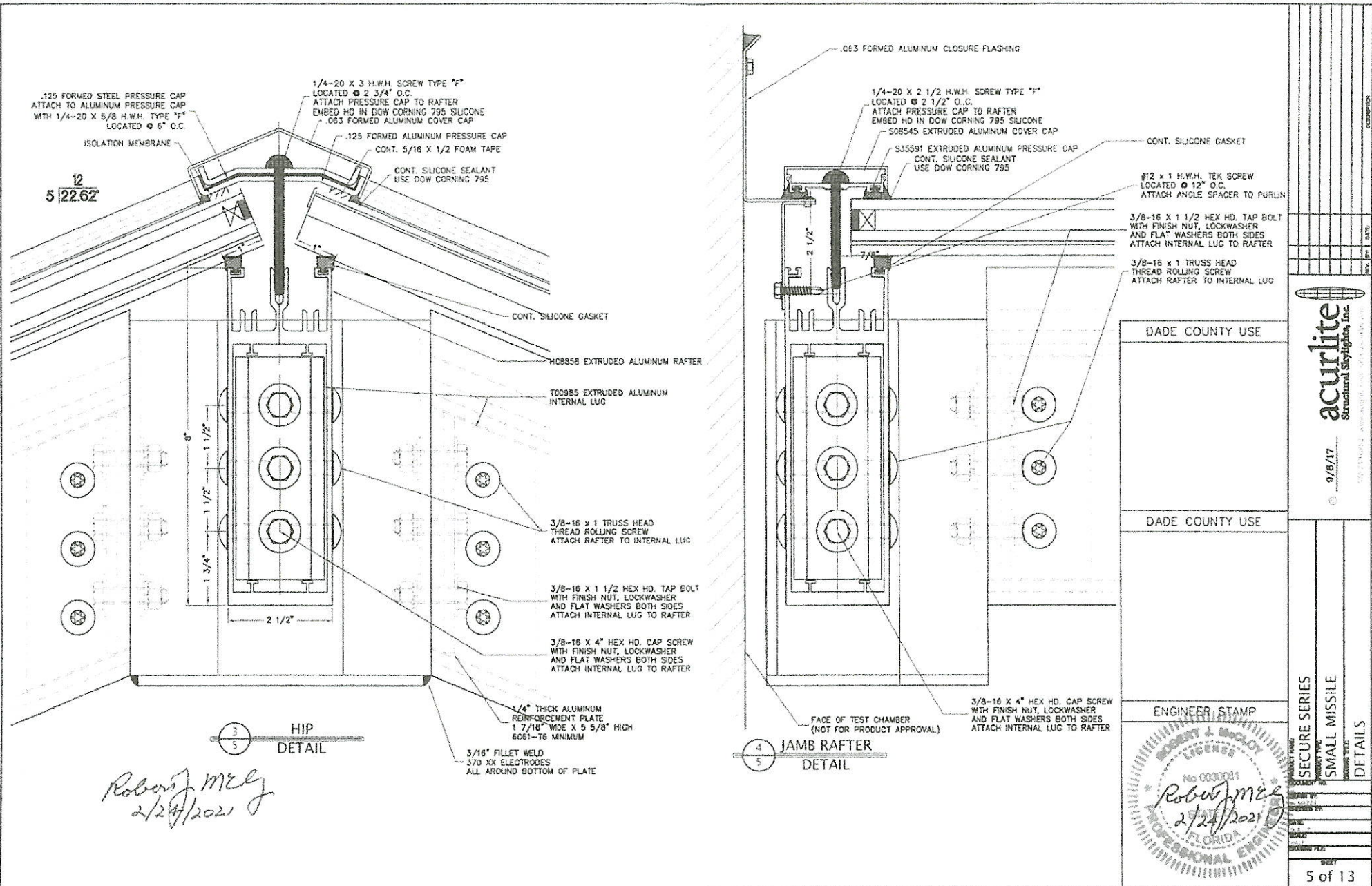
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SECURE SERIES
SMALL MISSILE
PLANS AND ELEVATIONS

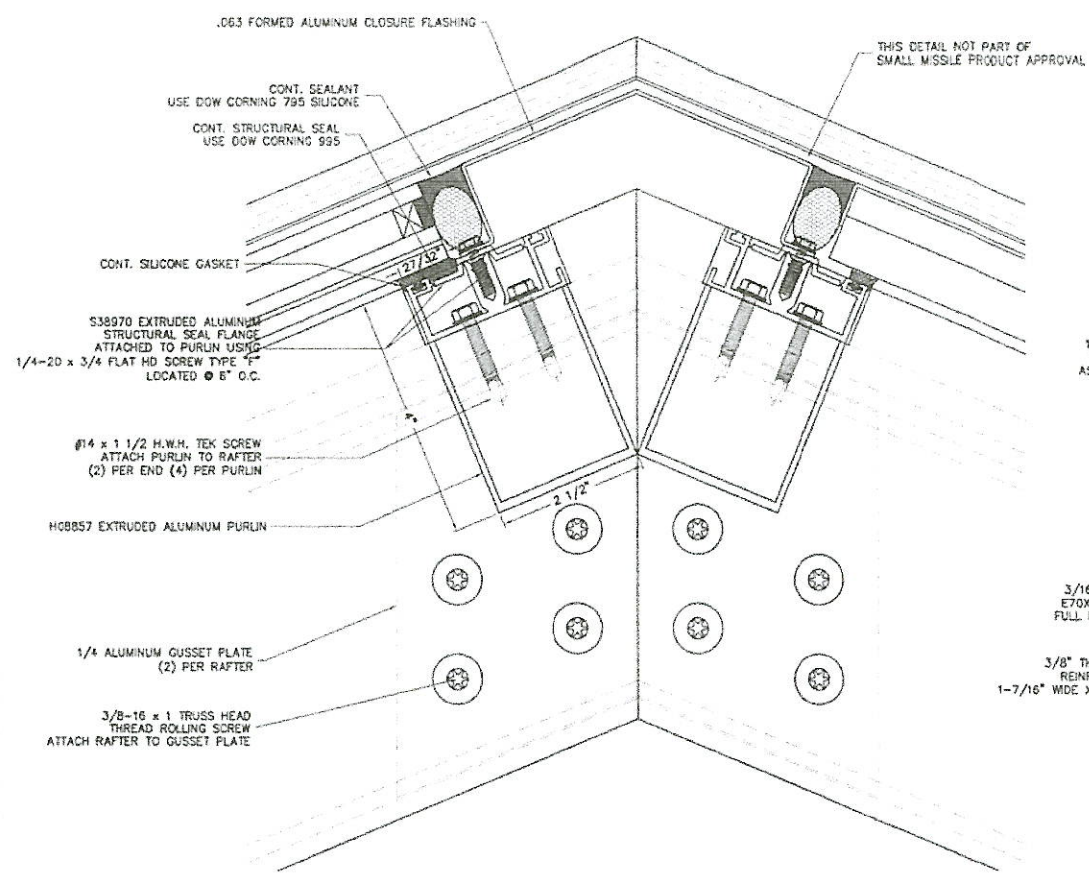
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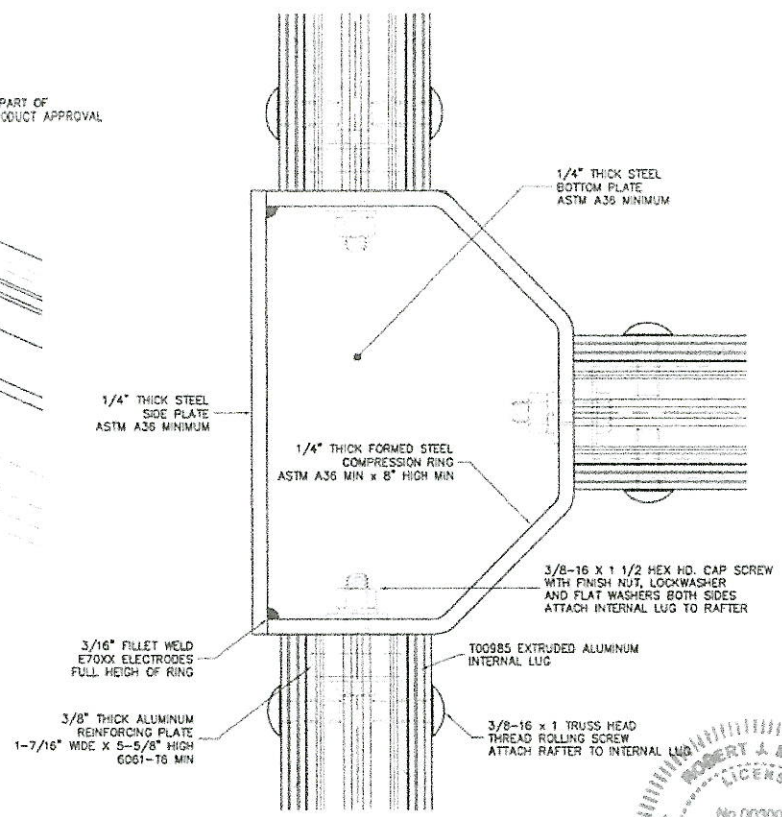


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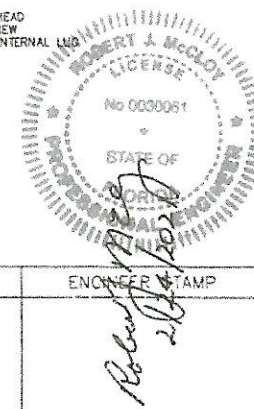


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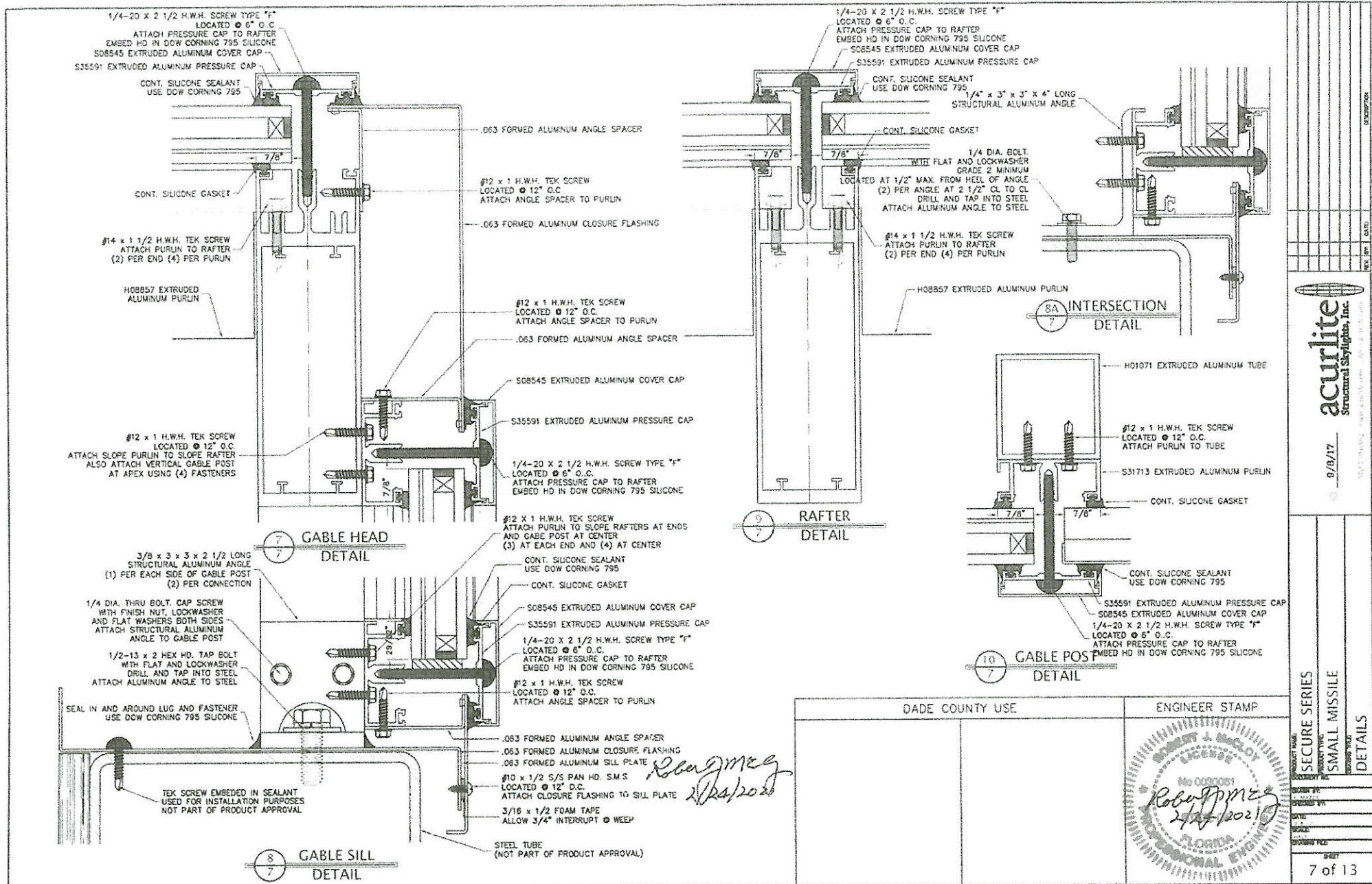


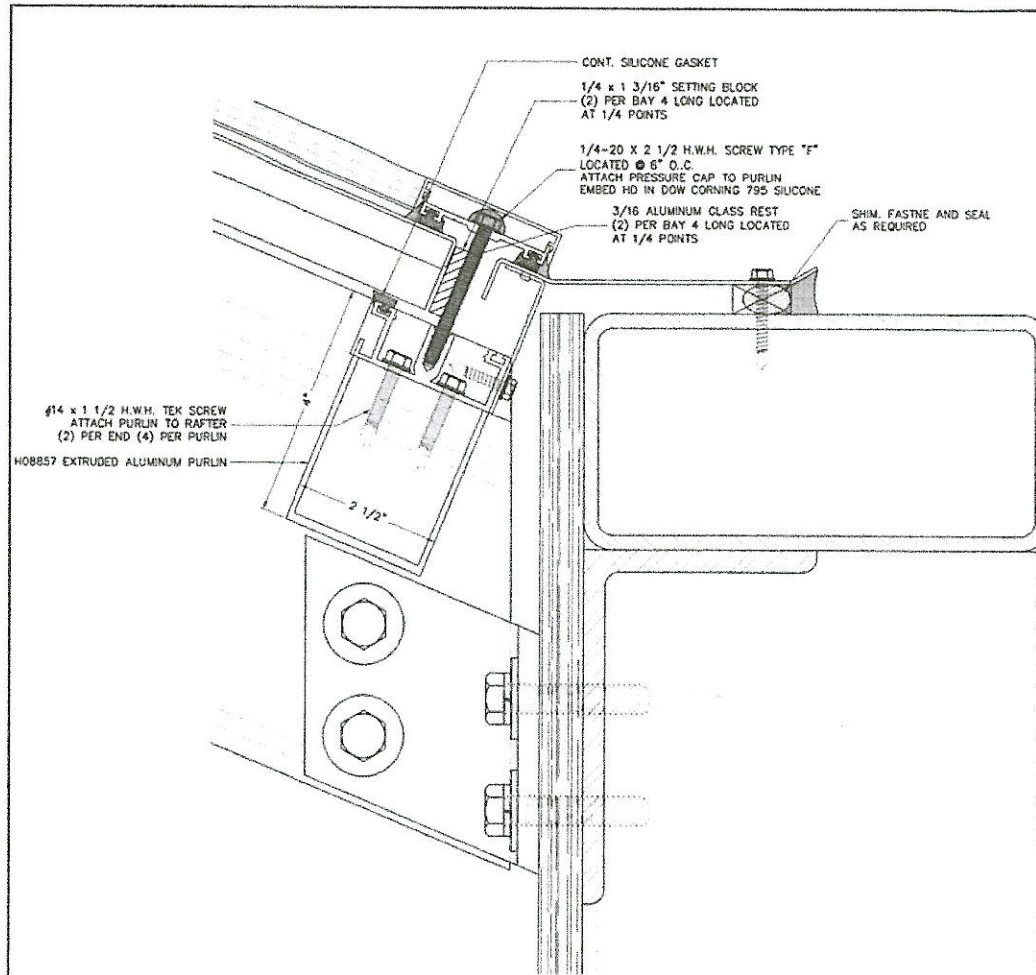
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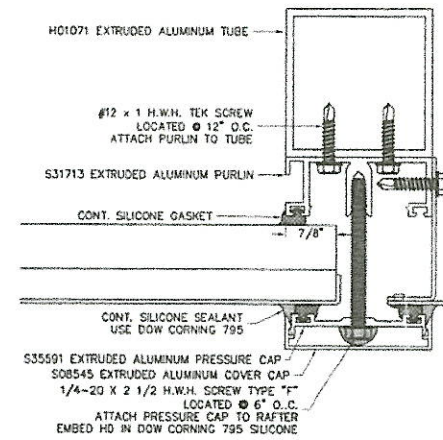
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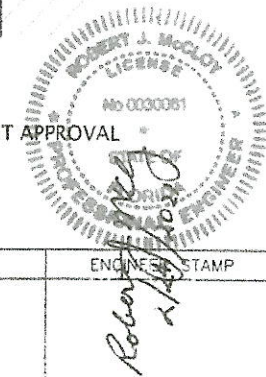




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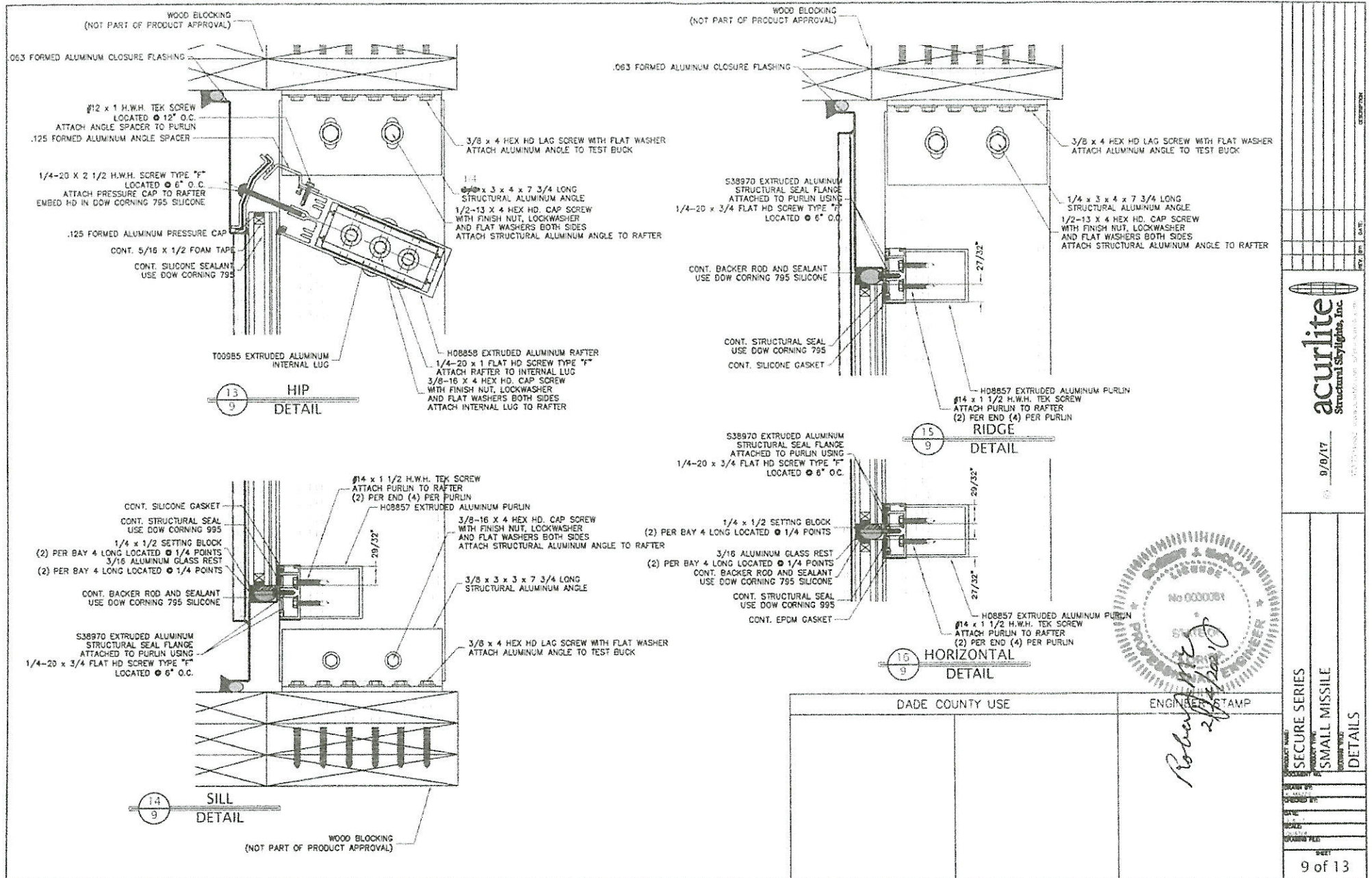


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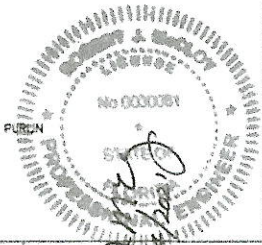
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Structural Stylights, Inc.

9/9/17



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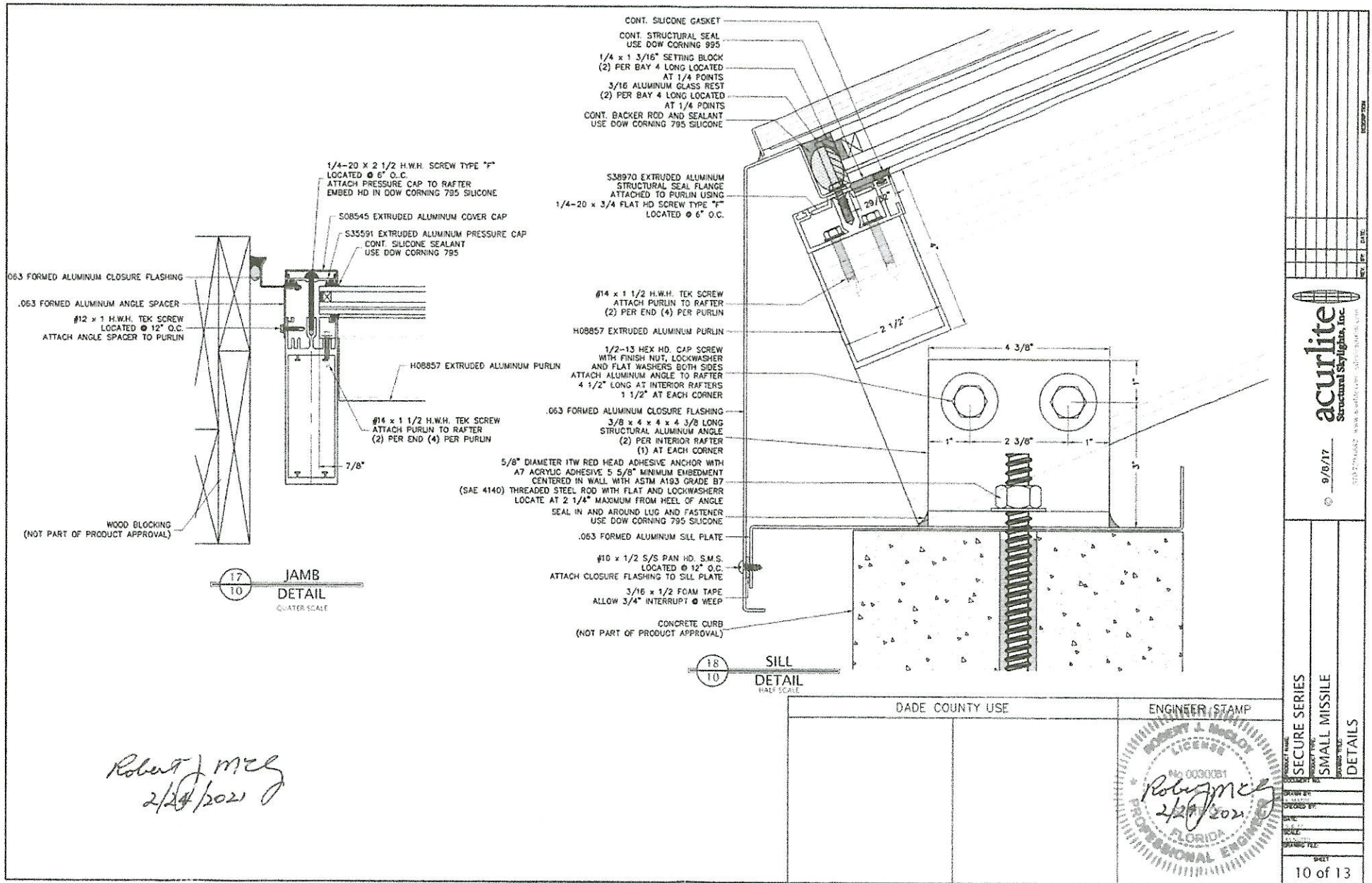
Robert M. J.

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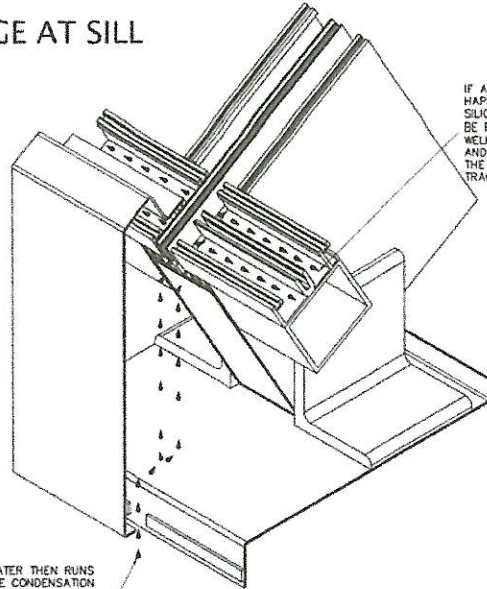
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9 of 13



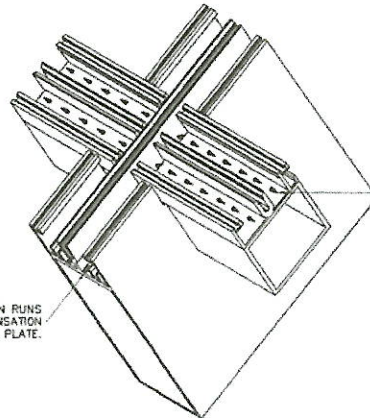
WEEPAGE AT SILL



IF ANY WATER WOULD
HAPPEN TO PENETRATE THE
SILICONE JOINT IT WOULD
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WELL OF THE PURLIN
AND TRANSFERRED TO
THE CONDENSATION
TRACK OF THE RAFTER.

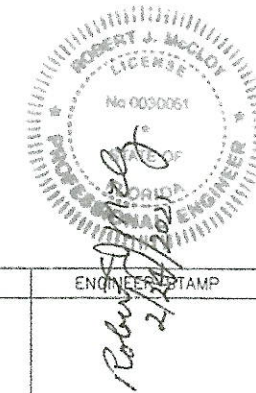
THE WATER THEN RUNS
DOWN THE CONDENSATION
TRACK ONTO THE SILL PLATE.
FROM HERE IT WILL WORK
ITS WAY FORWARD TO THE
EDGE OF THE SILL PLATE
AND DRAIN AT THE 3/4" VOID
IN THE SPONGE GASKET.
VOID FILLED WITH 30 PPI WEEP BAFFLE.

WEEPAGE AT INTERMEDIATE



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

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



DADE COUNTY USE		ENGINEER'S STAMP
		<i>Robert</i> <i>2/2/91</i>

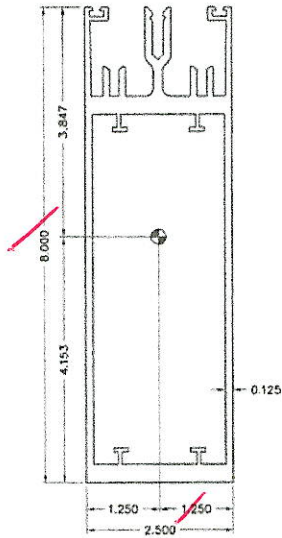


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Structural Skylights, Inc.
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PRODUCT NAME	SECURE SERIES
PRODUCT TYPE	SMALL MISSILE
DETAILS	

DOCUMENT NO.
SEARCHED BY
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INDEXED
FILED
FBI - MEMPHIS
MAY 1968
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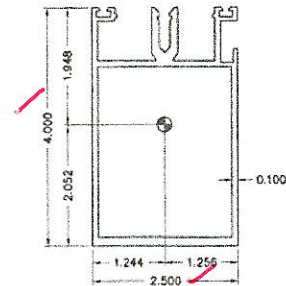
Area: 4.0777
Perimeter: 54.9115
Bounding box: X: -1.2500 -- 1.2500
Y: -4.1528 -- 3.8472
Moments of inertia: X: 31.3863
Y: 3.5864
Product of inertia: XY: 0.0000
Radii of gyration: X: 2.7743
Y: 0.9352
Principal moments and X-Y directions about centroid:
I: 3.5864 along [0.0000 1.0000]
J: 31.3863 along [-1.0000 0.0000]
Weight per linear foot: 4.77 lbs.
Aluminum Alloy: 6063-T6

H08858 RAFTER
FULL SCALE



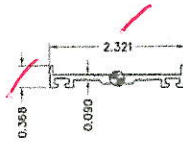
Area: 0.2110
Perimeter: 7.5289
Bounding box: X: -1.2500 -- 1.2500
Y: -0.4392 -- 0.1228
Moments of inertia: X: 0.0049
Y: 0.1783
Product of inertia: XY: 0.0000
Radii of gyration: X: 0.1527
Y: 0.9151
Principal moments and X-Y directions about centroid:
I: 0.0049 along [1.0000 0.0000]
J: 0.1783 along [0.0000 1.0000]
Weight per linear foot: 0.25 lbs.
Aluminum Alloy: 6063-T6

S08545 COVER GAP
FULL SCALE



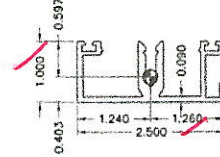
Area: 1.6983
Perimeter: 31.2602
Bounding box: X: -1.2438 -- 1.2562
Y: -2.0520 -- 1.9480
Moments of inertia: X: 3.4266
Y: 1.4491
Product of inertia: XY: -0.0162
Radii of gyration: X: 1.4204
Y: 0.9237
Principal moments and X-Y directions about centroid:
I: 1.4489 along [0.0082 -1.0000]
J: 3.4267 along [1.0000 0.0092]
Weight per linear foot: 1.99 lbs.
Aluminum Alloy: 6063-T6

H08857 PURLIN
FULL SCALE



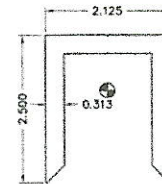
Area: 0.2955
Perimeter: 6.9688
Bounding box: X: -1.1634 -- 1.1628
Y: -0.1489 -- 0.2150
Moments of inertia: X: 0.0012
Y: 0.1486
Product of inertia: XY: 0.0000
Radii of gyration: X: 0.0534
Y: 0.7092
Principal moments and X-Y directions about centroid:
I: 0.0012 along [1.0000 0.0000]
J: 0.1486 along [0.0000 1.0000]
Weight per linear foot: 0.354 lbs.
Aluminum Alloy: 6063-T6

S35591 PRESSURE CAP
FULL SCALE



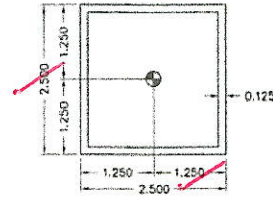
Area: 0.7307
Perimeter: 15.0209
Bounding box: X: -1.2403 -- 1.2597
Y: -0.4032 -- 0.5968
Moments of inertia: X: 0.0609
Y: 0.4177
Product of inertia: XY: -0.0027
Radii of gyration: X: 0.3309
Y: 0.7561
Principal moments and X-Y directions about centroid:
I: 0.0609 along [1.0000 -0.0080]
J: 0.4178 along [0.0080 1.0000]
Weight per linear foot: 0.85 lbs.
Aluminum Alloy: 6063-T6

S31713 PURLIN
FULL SCALE



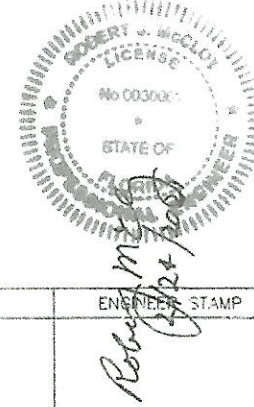
Area: 1.9456
Perimeter: 13.3068
Bounding box: X: -1.0624 -- 1.0626
Y: -1.5635 -- 0.9365
Moments of inertia: X: 1.0731
Y: 1.3224
Product of inertia: XY: -0.0001
Radii of gyration: X: 0.7427
Y: 0.8244
Principal moments and X-Y directions about centroid:
I: 1.0731 along [1.0000 -0.0004]
J: 1.3224 along [0.0004 1.0000]
Weight per linear foot: 2.335 lbs.
Aluminum Alloy: 6063-T6

T00985 INTERNAL LUG
FULL SCALE



Area: 1.1875
Perimeter: 19.0000
Bounding box: X: -1.2500 -- 1.2500
Y: -1.2500 -- 1.2500
Moments of inertia: X: 1.1195
Y: 1.1195
Product of inertia: XY: 0.0000
Radii of gyration: X: 0.9709
Y: 0.9709
Principal moments and X-Y directions about centroid:
I: 1.1195 along [0.7071 -0.7071]
J: 1.1195 along [0.7071 0.7071]
Weight per linear foot: 1.39 lbs.
Aluminum Alloy: 6063-T6

H01071 TUBE
FULL SCALE



DADE COUNTY USE		ENGINEER STAMP
		Robert J. McCloy

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SECURE SERIES
SMALL MISSILE
BILL OF MATERIALS
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