

SUN-TEK MANUFACTURING, INC.
10303 GENERAL DRIVE
ORLANDO, FLORIDA 32824

PROJECT:
ANCHOR CALCULATIONS FOR ATTACHMENT OF
SKYLIGHT TO CURBING AND CURBING TO
DECKING
CMA-D POLYCARBONATE ALUMINUM FIXED
SKYLIGHT

PREPARED ON JANUARY 14, 2026

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Engineer of Record

- James D. Wells, Jr., P.E.
J & L Wells Consulting LLC

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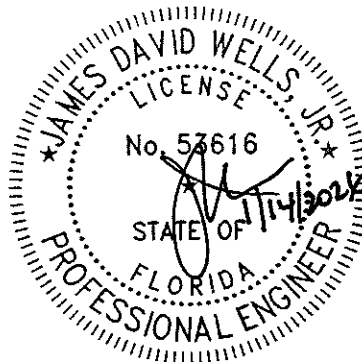
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PROJECT:
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Date

Design Standards / Test Reports / Product Identification:

The following design standards and test reports were used in the development of structural calculations.

Design Codes:

- The 8th Edition (2023) Florida Building Code
- ASCE 7-22
- National Design Specification (NDS) for Wood Construction
- APA The Engineered Wood Association Technical Note Plywood Screws

Design Pressure:

- +60.0 psf (positive) -60.0 psf (negative)

Test Reports:

- National Certified Testing Laboratories (NCTL) Report No. 210-3716-2

Product:

- Suntek Manufacturing, Inc. CMA-D Skylights

Scope of Work / Structural Calculations:

Scope:

The following analysis contains calculations for anchoring Sun Tek Manufacturing, Inc. CMA-D Skylights to curbing and curbing to building roof deck in accordance with the 8th Edition (2023) Florida Building Code. This analysis only includes anchoring skylights to wood curbing and the anchoring of wood curbing to wood roof deck.

Design Criteria:

Design Load: +/- 60.0 psf

Substrate:

 Anchors: #12 x 2 in. Pan Head Wood Screws
 Substrate: 2x Wood Curbing
 Material: Southern Yellow Pine (G = 0.55)
 Min. Anchor Embedment: 1.11 in.

Roof Deck:

 Anchors: #10 x 2-1/2" Phillips Pan Head Wood Screws
 Substrate: 5/8-inch thick plywood
 Material: Assumes Species Group 4
 Min. Anchor Embedment: 5/8 in.

Design Notes:

1. Anchors for the attachment of skylight to curbing must be #10 screws of sufficient length to achieve 1.11 in. minimum embedment.
2. Anchors to be made of non-corrosive material, compatible with aluminum.
3. Anchors for the attachment of curbing to roof decking must be #10 screws of sufficient length to provide 1/4 in. protrusion from the back of roof decking.
4. Should chipping or cracking of curbing or decking occur during installation, repair or replace as needed, to provide full strength of connection.
5. All roofing details shall comply with Chapter 15 of the Florida Building Code.

Project: Sun-Tek Manufacturing Inc. Skylight to Curb Attachment Detail
Job No. 2251081
Date: 11/28/2025
Designed By: James D. Wells, Jr., P.E.

Summary of Product / Anchor Schedule:

Sun Tek Manufacturing, Inc. CMA-D Skylights

Overall Dimension		Attachment of Skylight to Wood Curb			
Model	Long Side Dimension (in.)	Short Side Dimension (in.)	Qty per Long Side	Qty per Short Side	
4689	93.625	50.625	5	4	
4669	73.625	50.625	5	4	
4646	50.625	50.625	4	4	
3636	40.625	40.625	4	4	
3069	73.625	34.625	5	3	
3046	50.625	34.625	4	3	
3030	34.625	34.625	3	3	
2269	73.625	26.625	5	3	

Note: Model 4689 Skylight used in as test model in NCTL Structural Performance Test.

Identify Tested Load:

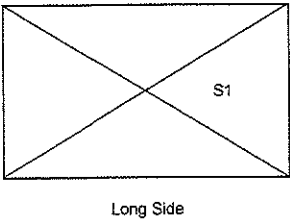
Determine Surface Pressure:

q _z =	-60.00 psf
q _z =	60.00 psf

(-) - Away from Roof Surface
(+) - Towards Roof Surface

Load Area Sketch:

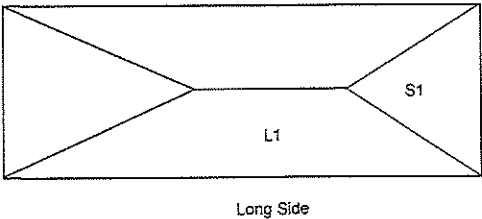
Square:



Short Side Short Side Area, S1:
Area = (Short Side Dimension / 2)²

Long Side Area:
Area = (Long Side Dimension / 2)²

Rectangle:



Short Side Short Side Area, S1:
Area = (Short Side Dimension / 2)²

Long Side Area, L1:

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$$\text{Area} = \text{Short Side Area} + ((\text{Long Side Dimension} - \text{Short Side Dimension}) \times \text{Short Side Dimension} / 2)$$

Summary of Product Areas / Loads:

Model No.	Long Side Dimension (ft)	Short Side Dimension (ft)	Long Side Area (ft ²)	Short Side Area (ft ²)	Long Side Load (lbs)	Short Side Load (lbs)
4689	7.80	4.22	12.01	4.45	720.5	267.0
4669	6.14	4.22	8.49	4.45	509.5	267.0
4646	4.22	4.22	4.45	4.45	267.0	267.0
3636	3.39	3.39	2.87	2.87	171.9	171.9
3069	6.14	2.89	6.77	2.08	406.2	124.9
3046	4.22	2.89	4.01	2.08	240.3	124.9
3030	2.89	2.89	2.08	2.08	124.9	124.9
2269	6.14	2.22	5.58	1.23	334.5	73.8

Skylight to Curbing:

Determine Test Load Values:

Identify Fastener: Anchors: #12 x 2 in. Pan Head S.M.S. / Wood Screws
 Substrate: 2x Wood Curbing
 Material: Southern Yellow Pine (G = 0.55)
 Min. Anchor Embedment: 1.11 in.

Model	Long Side Load (lbs)	Short Side Load (lbs)	Qty'y per Long Side	Qty'y per Short Side	Load per Fastener Long Side (lbs)	Load per Fastener Short Side (lbs)
4689	720.5	267.0	5	4	144	67
4669	509.55	267.0	5	4	102	67
4646	266.97	267.0	4	4	67	67
3636	171.92	171.9	4	4	43	43
3069	406.21	124.9	5	3	81	42
3046	240.30	124.9	4	3	60	42
3030	124.88	124.9	3	3	42	42
2269	334.55	73.8	5	3	67	25

$$\text{Load per Fastener} = \text{Load} / \# \text{ Fasteners}$$

$$\text{Critical Fastener at center of each side. Spacing} = 21.41 \text{ in}$$

Determine Allowable Load Values - NDS Standard:

#12 x 2" Phillips Pan Head S.M.S. / Wood Screws into Wood Curbing (with min. embed. 1.11")

Lateral Loads, Z =		Table 11M	Z =	174 lbs / in.	National Design Standards #12 wood screw 11 ga. Steel Side Member G=0.55 p. embed. = 1.11 d = 0.19 10d = 1.9 p/10d = 0.58 4d = 0.76
			$z = p/10d \times Z$	102 lbs / in.	
			$Z_s = z \times p$	193 lbs	
			$Z' = C_D \times C_{M'} \times C_T \times C_{eg} \times C_g \times C_{delta} \times C_d \times Z$		
Lateral Allowable Loads, Z =		where:			
		Load Duration Factor	$C_D =$	1.6 Wind Loading	Table 2.3.2
		Wet Service Factor	$C_M =$	1.0 Dry	Table 7.3.3
		Temperature Factor	$C_T =$	1.0 Not Applicable	Table 2.3.4
		End Grain Factor	$C_{eg} =$	0.67	Section 9.2.2
		Group Action Factor	$C_g =$	1.0 Not Applicable	Section 7.3.6

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Geometry Factor C_{Δ} = 1.0 Not Applicable 1 Screw
Penetration Depth Factor C_p = 1.0 $p=8/D$ Section 9.3.3
 $Z' = 187$ lbs / fastener

Allowable Load per Fastener = 187 lbs / fastener

since Allowable Load > Required Load OK

Determine Test Load Values:

Identify Fastener:

Anchors: #12 x 2 in. Wood Screws
Substrate: 2x Wood Curbing
Material: Southern Yellow Pine ($G = 0.55$)
Min. Anchor Embedment: 1.11 in.

Model	Long Side Load (lbs)	Short Side Load (lbs)	Qty per Long Side	Qty per Short Side
4689	720.48	266.97	5	4

Load per Fastener = Load / # Fasteners

Load per Fastener = 144.10 lbs / fastener

Determine Max Spacing of Fasteners:

21.41 in. o.c.

since Testing Load > Required Load OK

since Testing Spacing = Actual Spacing OK

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Summary of Product / Anchor Schedule:

Sun Tek Manufacturing, Inc. CMA-D Skylights

Overall Dimension		Attachment of Curb to Wood Deck			
Model	Long Side Dimension (in.)	Short Side Dimension (in.)	Qty per Long Side	Qty per Short Side	
4689	93.625	50.625	13	6	
4669	73.625	50.625	10	6	
4646	50.625	50.625	5	5	
3636	40.625	40.625	4	4	
3069	73.625	34.625	9	4	
3046	50.625	34.625	5	3	
3030	34.625	34.625	3	3	
2269	73.625	26.625	7	3	

Note: Model 4689 Skylight used in as test model in NCTL Structural Performance Test.

Identify Tested Load:

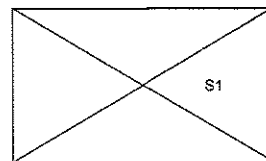
Determine Surface Pressure:

$q_u =$	-60.00 psf
$q_d =$	60.00 psf

(-) - Away from Roof Surface
 (+) - Towards Roof Surface

Load Area Sketch:

Square:

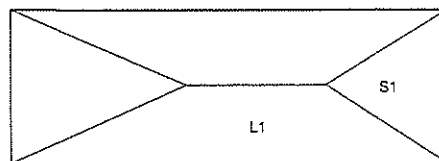


Short Side Short Side Area, S1:
Area = (Short Side Dimension / 2)²

Long Side

Long Side Area:
Area = (Long Side Dimension / 2)²

Rectangle:



Short Side Short Side Area, S1:
Area = (Short Side Dimension / 2)²

Long Side

Long Side Area, L1:
Area = Short Side Area + ((Long Side Dimension - Short Side Dimension) x Short Side Dimension / 2)

Summary of Product Areas / Loads:

<u>Long Side Dimension</u>	<u>Short Side</u>	<u>Long Side Area</u>	<u>Short Side Area</u>	<u>Long Side Load</u>	<u>Short Side Load</u>
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Project: Sun-Tek Manufacturing Inc. Skylight Curb to Decking Attachment Detail
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Model No.	(ft)	Dimension (ft)	(ft ²)	(ft ²)	(lbs)	(lbs)
4689	7.80	4.22	12.01	4.45	720.5	267.0
4669	6.14	4.22	8.49	4.45	509.5	267.0
4646	4.22	4.22	4.45	4.45	267.0	267.0
3636	3.39	3.39	2.87	2.87	171.9	171.9
3069	6.14	2.89	6.77	2.08	406.2	124.9
3046	4.22	2.89	4.01	2.08	240.3	124.9
3030	2.89	2.89	2.08	2.08	124.9	124.9
2269	6.14	2.22	5.58	1.23	334.5	73.8

Curb to Roof Decking:

Determine Test Load Values:

Identify Fastener:

Anchors: #10 x 2-1/2 in. S.M.S. / Wood Screws
 Substrate: 5/8" plywood
 Material: Assumes Species Group 4
 Min. Anchor Embedment: 5/8 in.

Model	Long Side Load (lbs)	Short Side Load (lbs)	Qty per Long Side	Qty per Short Side	Load per Fastener Long Side (lbs)	Load per Fastener Short Side (lbs)
4689	720.5	267.0	13	6	55	44
4669	509.5	267.0	10	6	51	44
4646	267.0	267.0	5	5	53	53
3636	171.9	171.9	4	4	43	43
3069	406.2	124.9	9	4	45	31
3046	240.3	124.9	5	3	48	42
3030	124.9	124.9	3	3	42	42
2269	334.5	73.8	7	3	48	25

Load per Fastener = Load / # Fasteners

Critical Fastener at center of each side. Spacing = 7.14 in

Determine Allowable Load Values - APA Engineered Wood Association:

#10 x 2-1/2" Phillips Pan Head S.M.S. / Wood Screws into Plywood Roof Decking

Ultimate Withdrawal Loads, W = Table 3 W = 345 lbs
Adjustment Factors = Table 5 Assumes Group 4 Plywood (with min. embed. 5/8")
Withdrawal 47% W = 54 lbs
 APA - Convert Ultimate to Allowable Loads
 10% Allowance for Short-Term Loading FS = 3
 W = 54 lbs / fastener
 Allowable Load per Fastener = 54 lbs / fastener
 since Allowable Load > Required Load - OK

Determine Test Load Values:

Identify Fastener:

Anchors: #10 x 2-1/2 in. Wood Screws
 Substrate: 5/8" plywood
 Material: Assumes Species Group 4
 Min. Anchor Embedment: 5/8 in.

Model	Long Side Load (lbs)	Short Side Load (lbs)	Qty per Long Side	Qty per Short Side
4689	720.48	266.97	13	6

Load per Fastener = Load / # Fasteners

Load per Fastener = 55.42 lbs / fastener

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Determine Max Spacing of Fasteners:

7.14 in. o.c.

since Testing Load > Required Load OK

since Testing Spacing = Actual Spacing OK