

CODE COMPLIANT *or* NOT CODE COMPLIANT

that is the question

Outlining how to identify a code compliant and non-code compliant industrial skylight and the importance of ICC-ES Listings.

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Presented by:

Skyco
SKYLIGHTS

Introduction

The following packet is intended to help contractors, architects and building owners understand what constitutes a code compliant industrial skylight. ICC-ES Listings are a great way to ensure compliance for building materials. The packet also includes the main criteria for industrial skylights.

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- Code Complaint Industrial Skylights- Info Sheet
- ICC-ES Listing - Example





Code Compliant or NOT Code Compliant? That is the question.

One skylight manufacturer has made it their mission to only supply code compliant industrial skylights and educate architects, general contractors and roofers on the importance of ICC-ES Listings. In the end, it benefits everyone from the architects to the building owners.

Building codes dictate most aspects of industrial warehouse construction. Most architects, developers and contractors follow the International Building Code (IBC), and in California, the CBC (notorious for its extra tight restrictions, regulations and enforcement). From fasteners to glazing, all materials are addressed by building code.

How do you ensure the building materials are code compliant? One method is by referencing its International Code Council (ICC) Listing. ICC evaluates building materials for performance criteria that meet code requirements. If a product is ICC-ES Listed you can trust it complies. Listed items come with an ESR number (i.e. [ESR-3837](#) for unit skylights). All products in the building spec should be accompanied with an ESR number.

There is no exception for industrial skylights. They are integral parts of the building envelope. Industrial skylights help building owners capitalize on free natural light thus saving on energy costs, raising employee morale and adding much needed ventilation if venting technology is incorporated.

Not all skylights are created equal. More importantly, not all skylights are code compliant. Over the years, some manufacturers have strayed away from following building code and began to offer cheaper products that do not comply with IBC and CBC. The designs and materials used in skylights have become so convoluted that manufacturers think they can deliver non-listed products without notice.

How do you protect yourself against non-compliant skylights? The details and makeup of the skylight need to be identical with the details laid out in the ICC Listing. For example, there are zero industrial skylights approved for a capless system yet some manufacturers offer a capless skylight and pass it off with the ESR number for their ICC-Listed models. Never accept a capless skylight for your building, the domes crack within 5 years and fall risks are very common.

Using non-listed skylights is a very dangerous and costly game. Best case scenario with non-listed skylights is the domes will crack, worst case is works are put in harm's way. The liability of using cheap non-listed products is not worth the up-front costs savings on the front-end and liability on the back-end.

Another example of manufacturers side stepping code requirements is in the glazing materials. Each manufacturer is approved for a very specific glazing material (i.e. Skyco Skylights industrial skylight is approved for their standard Skypro polycarbonate dome, with 800 lbs. impact testing). Without doubt, polycarbonate is the superior glazing material for industrial skylights, but most manufacturers are only approved for acrylics.

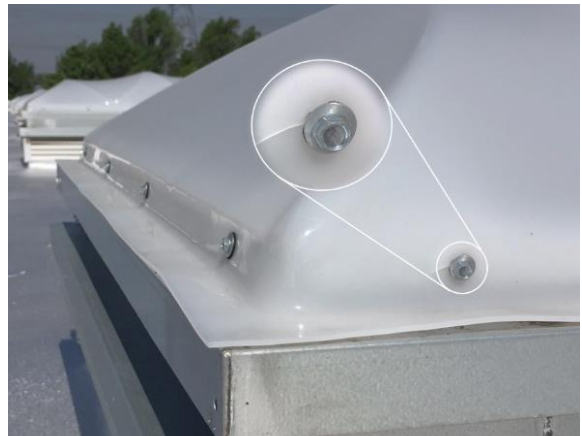


Image 1: Non-Listed Capless unit example. A capless unit is when the screws are fastened through the glazing typically causing cracks and weakening the dome. There are zero code compliant capless units.

There are 7 primary details covered in an ICC-ES Report. You can easily find the ICC-Listing by searching for the ESR number. Each detail is briefly explained below:

Approved Sizes: Industrial skylights are most commonly used in the 4' x 8' size. The sizing in an ICC report is listed as the inside curb dimension so 48" x 96". You will typically see it listed as 4896 in model names. An industrial skylight must be exact to what was listed in the report. The reason is bigger skylights use thicker glazing. When you downsize to a 4896, the manufacturer will use thinner glazing. The frame size and thickness of the dome must be exactly as it's reported in the listing.

Approved Frame Material: Currently all industrial skylights are approved for Aluminum frames. Aluminum helps reduce the weight of the unit down.

Approved Encapsulating System: This is referring to how the dome is fastened to the frame. There are zero approved capless systems. The only approved system is one with a capped dome. This is when a cap is fastened down through the metal (not the glazing) holding the glazing to the frame. Note: The capless image above (Image 1) shows the exposed edges of the glazing. This does not comply with air and water infiltration requirements. If you ever receive capless units please alert your supplier.

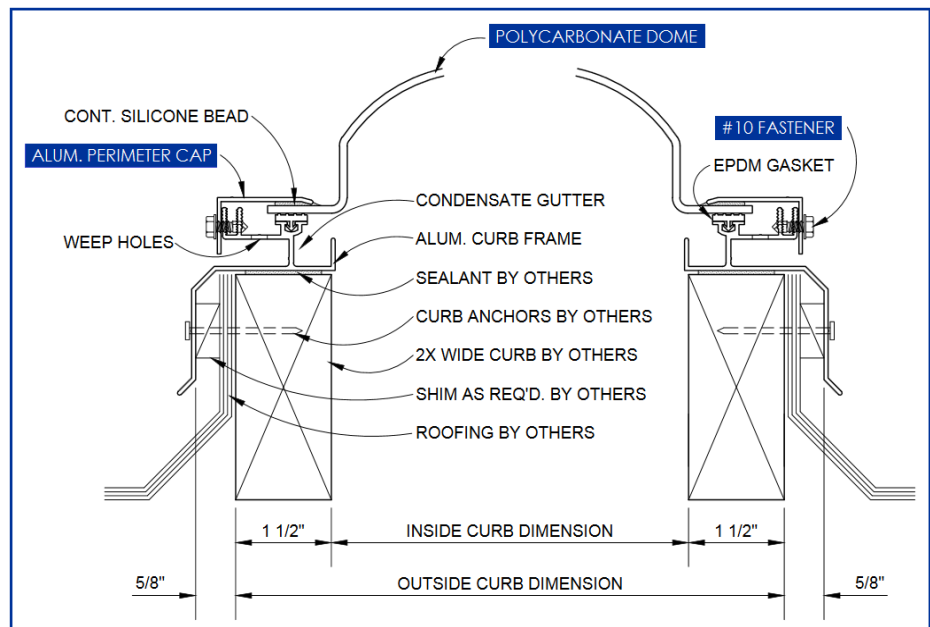


Image 2: Drawing of an approved capped polycarbonate industrial skylight.

Approved Glazing Material: Each manufacturer is approved for different glazing materials. For example, Skyco Skylights' industrial skylights are approved for a polycarbonate dome. Polycarbonate is known for its superior strength and long-lasting qualities. If a skylight has a glazing material not listed in its report then the skylight is not code compliant. If you require polycarbonate for glazing, make sure the brand you choose is approved for polycarbonate domes.

Approved Dome Shape: The ideal shape for a dome is the parabolic shape. This shape has a wave design with varying amounts of peaks (see Image 3). Not all manufacturers are approved for a parabolic shaped dome. It is important to make sure which shape the skylight is approved for, parabolic or smooth.

Approved Glazing Layers: Depending on your climate, your industrial skylights will need single or double-glazing layers. It is important to make sure if you need a double dome glazing that the skylight is approved for it. Most skylights are only approved for either a single dome or a double dome.

Approved Mounting Type: Will the skylight be mounted onto a curb? Or is it self-flashing? Like all the other details, it's vital to make sure the mounting type is listed for that skylight. Note: If the skylight will mount a venting base (or louver), most manufacturers are not listed by ICC for venting bases. Check with the ESR number to make sure a vented base is approved. In approved ICC Listings, the venting base drawings are included in the report.

ICC-Listings can be confusing. Most people don't have the time to read through ICC documents; double checking which products they received. They rely on manufacturers to supply code compliant products. In some cases, this kind of integrity has gone by the way side in trade for lower costs due to the pressures of competitive bidding.

The first step to addressing this issue is by reviewing building spec's for accurate ESR numbers that match model names. If the ESR number matches the skylight model name, estimators can accurately request quotes from manufacturers. The next step is making sure the manufacturer is quoting the exact product specified by the consultants or architects. Finally, project managers need to make sure the products delivered are exactly as ordered.



Image 3: Pictured here is a parabolic shape example. The parabolic dome is ideal for adding strength and optimizing sun light collection at all hours of the day.

TRUST BUT VERIFY

Inspect each step to ensure receipt of code compliant skylights

1.

Verify the spec calls out matching ESR # and Model Name.

2.

Confirm the product quoted matches the spec.

3.

Confirm the product in the submittals match the product quoted.

4.

Make sure the product delivered matches the ICC ESR # specified and listed in previous steps.

Consulting a skylight professional helps clear up any confusion. Skyco Skylights has a team of trained professionals available to help. General Contractors, Roofers, Architects and Building Owners can schedule a consultation with a skylight code compliance professional. Skyco has put together a brief reference guide detailing all ICC-Listed skylights. Save time, money and liability concerns by scheduling a brief code review with a Skyco Skylights professional today.

[Skyco Skylights](http://www.skycoskylights.com) is an industry leading industrial and custom structural skylight manufacturer located in Costa Mesa, CA. offering a full range of products including Industrial Skylights, UL Listed Smoke Vents, Custom Structural Skylights, Photovoltaic Skylights & Canopies, rooftop safety and security products. Each product comes with a 10-year warranty. For additional information, call 949-629-4090 or email info@skycoskylights.com

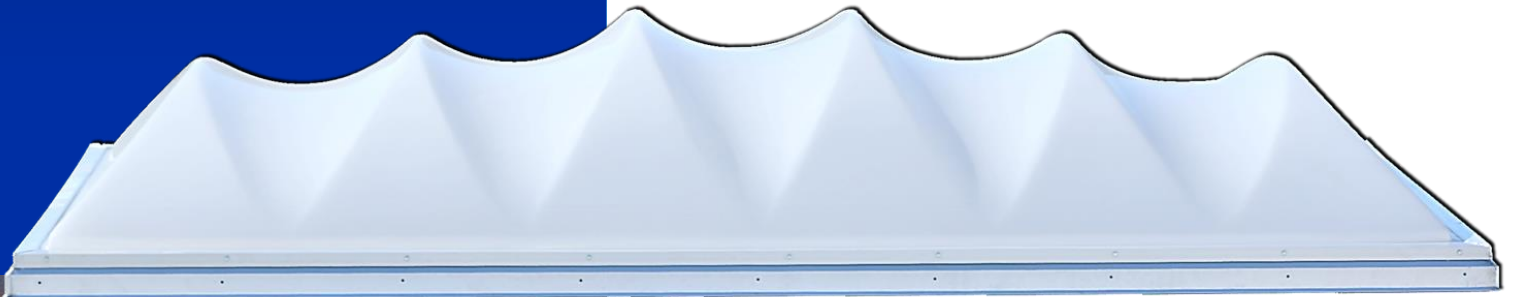


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Polycarbonate domes come standard



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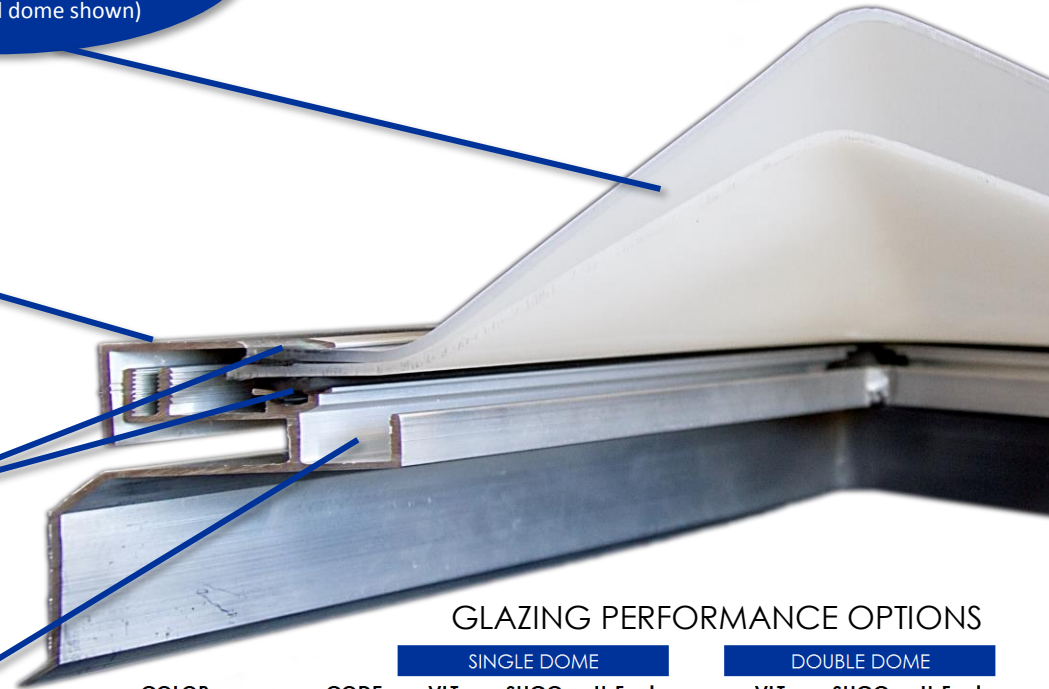
Skyco SKYLIGHTS

Durable Polycarbonate Domes - 800 lbs. Impact Test, Class IV Hail Rating (optional second dome shown)

Advanced Capping System - Eliminates Cracking and Leaks

50 Year Silicone Top Seal-Continuous Gasket Bottom Seal

Condensation Gutter



GLAZING PERFORMANCE OPTIONS

COLOR	CODE	SINGLE DOME			DOUBLE DOME		
		VLT	SHGC	U-Fact	VLT	SHGC	U-Fact
Skypro White	SPW	70%	0.58	0.80	60%	0.50	0.50
Skypro Clear	SPC	96%	0.94	0.80	94%	0.90	0.50
Skypro - IR	SPIR	47%	0.33	0.80	45%	0.33	0.50

Details:

- High Performance Features come standard
- ICC-ES Listed (ESR-3837)
- 800 lbs. Impact Test
- High wind rated models (optional) (130 mph or FM Approved 195 mph)
- Meets UL 972 impact resistance standards
- Curb Mounted or Self Flashing
- 10 Year Pass Through Warranty

VORTEX Venting Base (optional):

- Extreme weather rated design
- Neoprene washers
- Rain shield comes standard
- Superior intake and exhaust
- Optional: Dust Filter or Insect Screen



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ICC-ES Report

ESR-3837

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Reissued 10/2016
This report is subject to renewal 10/2017.

DIVISION: 08 00 00—OPENINGS
SECTION: 08 62 00—UNIT SKYLIGHTS

REPORT HOLDER:

SKYCO SKYLIGHTS

2995 AIRWAY AVENUE, SUITE B
COSTA MESA, CALIFORNIA 92626

EVALUATION SUBJECT:

UNIT SKYLIGHT MODELS A-S-CM AND A-S1-CM



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ICC-ES Evaluation Report

ESR-3837

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DIVISION: 08 00 00—OPENINGS
Section: 08 62 00—Unit Skylights
REPORT HOLDER:
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 2995 AIRWAY AVENUE, SUITE B
 COSTA MESA, CALIFORNIA 92626
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EVALUATION SUBJECT:
UNIT SKYLIGHT MODELS A-S-CM and A-S1-CM
1.0 EVALUATION SCOPE
1.1 Compliance with the following codes:

- 2009 and 2006 *International Building Code*® (IBC)
- 2009 and 2006 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Structural
- Air infiltration
- Water penetration resistance
- Durability

1.2 Evaluation to the following green standard:

- 2012 ICC 700 *National Green Building Standard*™ (ICC 700-2012)

Attributes verified:

- See Section 3.0

2.0 USES

The Skyco Skylights Models A-S-CM and A-S1-CM are plastic-glazed non-openable unit skylights complying with IBC Sections 2405 and 2610 and IRC Section R308.6.

3.0 DESCRIPTION

The Skyco Skylights unit skylight Models A-S-CM and A-S1-CM are glazed using parabolic-shaped domes formed from 0.118-inch-thick (3 mm) flat sheets of Class CC1 polycarbonate plastic described in ICC-ES report [ESR-1893](#). The domes are factory-attached to a 6063-T5 aluminum extruded frame with a 6063-T5 aluminum extruded retainer cap. The connection of Model A-S-CM is

a snap-cap design between the frame and retainer cap, while the Model A-S1-CM is a mechanically fastened design between the frame and retainer cap. The unit skylight may have a 0.098-inch-thick (2.5 mm) Class CC2 acrylic inner dome, as described in ICC-ES report [ESR-1260](#), when applicable. The unit skylight can be a curb mounted unit or self-flashing unit and available in 48-inch-wide-by-96-inch-long (1219 by 2438 mm). Details for the skylights are noted in Figures 1 through 5.

The attributes of the skylights have been verified as conforming to the provisions of ICC 700-2012 Section 701.4.3.3 for fenestration air leakage. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

4.0 DESIGN AND INSTALLATION
4.1 Design:

4.1.1 Allowable Loads: The allowable loads are expressed as performance grade rating values, PG. Under the IBC, the PG rating values must be equal to, or greater than, the maximum loads required by IBC Section 2405.5.2. Under the IRC, the PG rating values must be equal to, or greater than, the maximum loads determined in accordance with IBC Section 2405.5.2, except the design wind forces must be as specified for skylights in IRC Section R301.2.1. See Tables 1 and 2 for allowable positive and negative PG rating values for both curb-mounted and self-flashing units installed with or without retainer fasteners, respectively.

4.1.2 Air Infiltration: When tested at an air pressure differential of 1.57 psf (75 Pa), the skylights have an air leakage rate of less than 0.30 cfm/ft² (1.5 L/s·m²) as required in Sections 402.4.4 and 502.4.1 of the 2009 *International Energy Conservation Code*® (IECC) or Sections 402.4.2 and 502.4.1 of the 2006 IECC.

4.2 Installation: Installation must be in accordance with the manufacturer's published installation instructions, this report, and Sections 2405 and 2610 of the IBC and Section R308.6 of the IRC, as applicable. In the event of conflict between this report and the manufacturer's published installation instructions, this report governs.

The curb-mounted skylights must be installed on a metal curb or wood curb made of minimum nominally 2-by lumber with a minimum 0.42 specific gravity, of a height sufficient so that the installation of the plastic dome is a minimum 4 inches (102 mm) above the plane of the finished roof. The metal or wood curb and attachment to

the roof structure must be designed to resist the appropriate code-prescribed loads. The self-flashing units are designed to mount directly to the roof deck assembly.

The curbs and/or roof deck must have a square and level mounting surface. A ½-inch-diameter (12.7 mm) of butyl sealant, silicone sealant, or an equivalent, must be applied to the top surface of the curb or deck before the skylight is set in place.

The skylight must be attached to the wood curb with a 6d common nail, or equivalent, must be used in each mounting hole, with the fastener length being sufficient to penetrate the wood curb or wood deck framing member a minimum of 1½ inches (38mm). When the skylight must be attached to a metal or a self-flashing curb, a #10-16 corrosion-resistant slotted hex washer head screw with neoprene bonded steel washer, or equivalent, must be used in each mounting hole, with the screw length being sufficient to penetrate the metal or self-flashing curb or wood deck framing member a minimum of 1½ inches (38 mm).

Wood curb-mounted units must have the gap between the skylight frame and the wood curb fully shimmed. Flashing must comply with, and be installed in accordance with, IBC Section 1507 or IRC Section R905, as applicable.

Compatible sealant is applied over the mounting flange of the self-flashing units and covered with the roof covering in such a manner as to ensure a watertight seal.

Additional installation details for wood curb-mounted units are provided in Figures 1 and 2; for self-flashing unit installation details see Figure 3; for metal curb-mounted unit installation details, see Figure 4; and for louvered curb-mounted unit installation details, see Figure 5.

5.0 CONDITIONS OF USE

The Skyco Skylights unit skylight Models A-S-CM and A-S1-CM (Size 48" x 96") described in this report complies with, or are a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The manufacturer’s installation instructions must be available at the jobsite during installation.
- 5.2 The use of the skylights as components of fire-resistance-rated assemblies is outside the scope of this report.
- 5.3 Allowable loads do not exceed those noted in Tables 1 and 2 of this report. Snow loads are outside the scope of this report.
- 5.4 The skylights are manufactured in Costa Mesa, California, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Plastic Glazed Skylights (AC16), dated April 2011 (editorially revised August 2013).

7.0 IDENTIFICATION

Each skylight is identified by a label noting the Skyco Skylights name and address, the evaluation report number (ESR-3837), the plastic classification (Class CC1/CC2), the plastic thickness before thermoforming, model designation, and date of manufacture. In addition to the identification label, a warning label complying with Class 1, ANSI Standard Z35.1 (warning of risk of fall) is applied to each skylight.

TABLE 1—DIMENSIONAL DETAILS AND PERFORMANCE GRADE FOR SKYCO SKYLIGHTS MODEL A-S-CM UNIT SKYLIGHTS WITH SKYPRO POLYCARBONATE PLASTIC SKYWAVE ARC DOMES¹

MODEL NO.	INSIDE CURB DIMENSIONS (inches)	DOME THICKNESS (INCH)	DOME RISE (INCHES)	PERFORMANCE GRADE, PG, AND ALLOWABLE LOADS (PSF)		NUMBER OF SKYLIGHT MOUNTING FASTENERS ^{2,3}
				PG _{pos} (inward forces)	PG _{neg} (outward forces)	
4896	48 x 96	0.118	13.125	20	20	28

For SI: 1 inch = 25.4 mm, 1 psf = 0.0479 kN/m².
¹Installation must comply with Section 4.0 and Figures 1 through 5.

²Fasteners to attach skylights to wood curbs or wood roof framing members, with a specific gravity of 0.42, are 6d common nails, or equivalent, having sufficient length to penetrate the wood member curb or wood roof framing member a minimum of 1½-inches.

³Fasteners to attach skylights to metal curbs or self-flashing curbs are #10-16 corrosion-resistant slotted hex washer head screws with neoprene bonded steel washers, or equivalent, having sufficient length to penetrate the metal curb or wood roof framing member a minimum of 1½-inches.

TABLE 2—DIMENSIONAL DETAILS AND PERFORMANCE GRADE FOR SKYCO SKYLIGHTS MODEL A-S1-CM UNIT SKYLIGHTS WITH SKYPRO POLYCARBONATE PLASTIC SKYWAVE ARC DOMES¹ WITH RETAINER FASTENERS

MODEL NO.	INSIDE CURB DIMENSIONS (inches)	DOME THICKNESS (INCH)	DOME RISE (INCHES)	PERFORMANCE GRADE, PG, AND ALLOWABLE LOADS (PSF)		NUMBER OF RETAINER FASTENERS ²	NUMBER OF SKYLIGHT MOUNTING FASTENERS ^{3,4}
				PG _{pos} (inward forces)	PG _{neg} (outward forces)		
4896	48 x 96	0.118	13.125	20	20	32	28

For SI: 1 inch = 25.4 mm, 1 psf = 0.0479 kN/m².
¹Installation must comply with Section 4.0 and Figures 1 through 5.

²Retainer fasteners are #10-16 corrosion resistant hex washer head self-drilling sheet metal screws.

³Fasteners to attach skylights to wood curbs or wood roof framing members, with a specific gravity of 0.42, are 6d common nails, or equivalent, having sufficient length to penetrate the wood member curb or wood roof framing member a minimum of 1½-inches.

⁴Fasteners to attach skylights to metal curbs or self-flashing curbs are #10-16 corrosion-resistant slotted hex washer head screws with neoprene bonded steel washers, or equivalent, having sufficient length to penetrate the metal curb or wood roof framing member a minimum of 1½-inches.

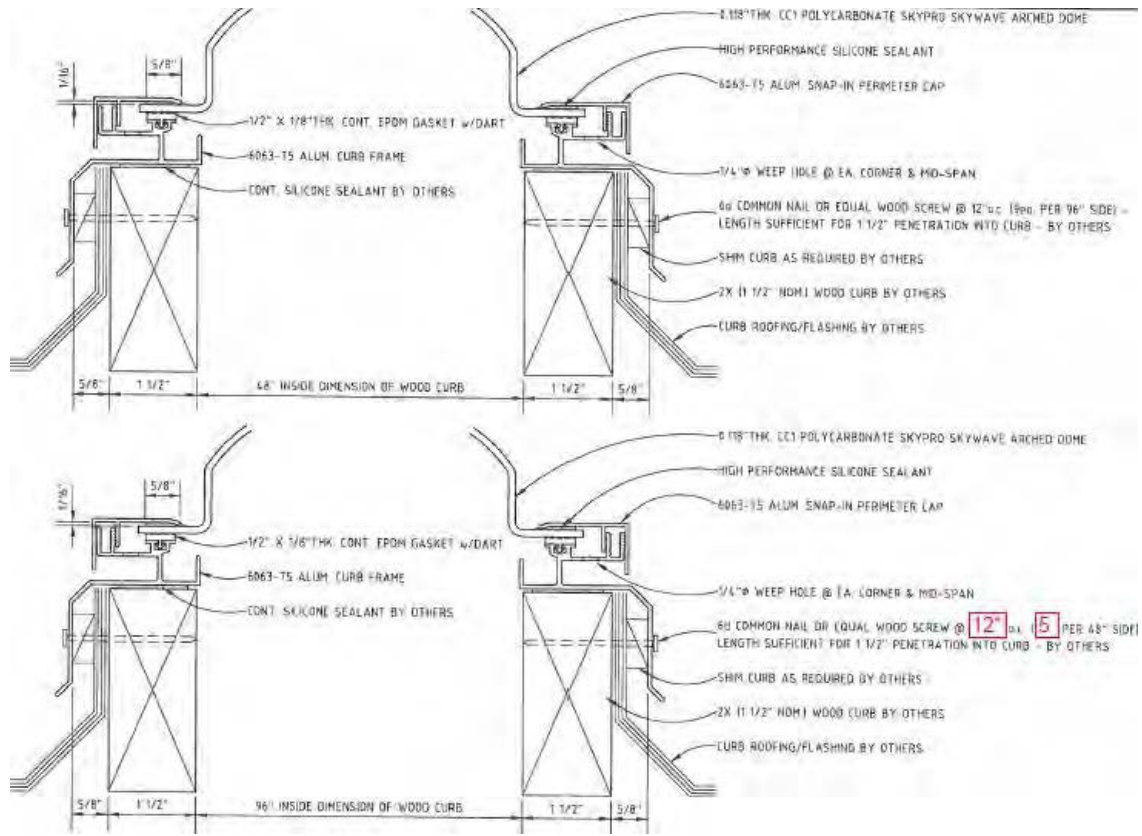


FIGURE 1—SKYLIGHT INSTALLATION DETAILS FOR MODEL A-S-CM

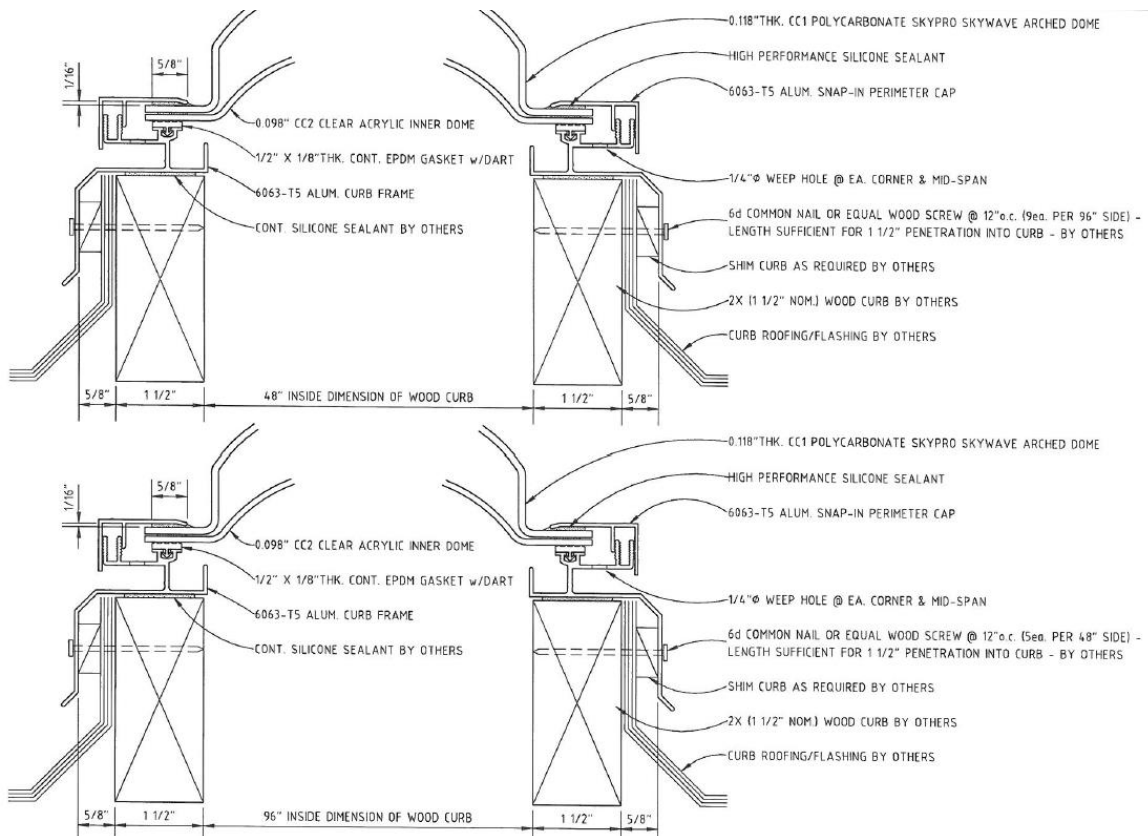


FIGURE 1—SKYLIGHT INSTALLATION DETAILS FOR MODEL A-S-CM (CONTINUED)

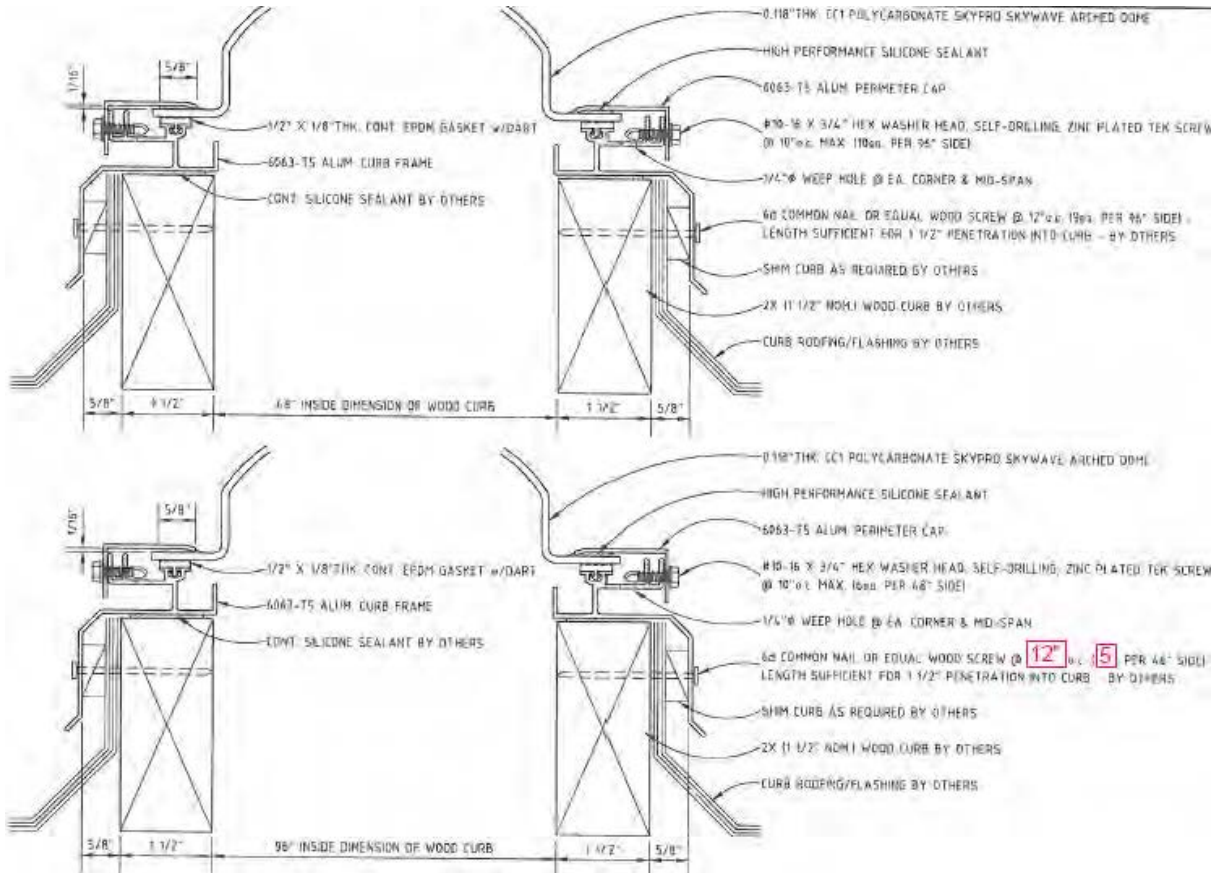


FIGURE 2—SKYLIGHT INSTALLATION DETAILS FOR MODEL A-S1-CM

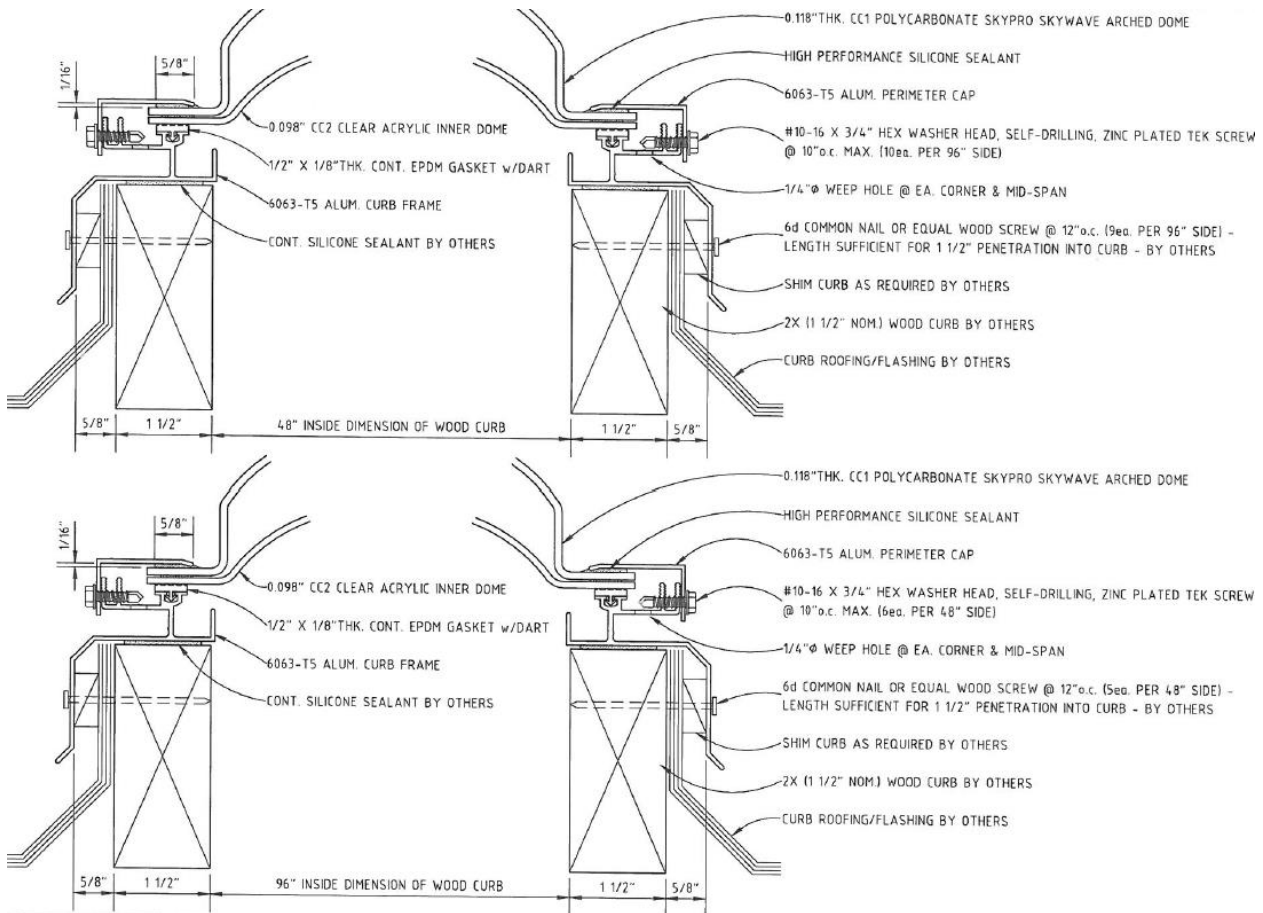


FIGURE 2—SKYLIGHT INSTALLATION DETAILS FOR MODEL A-S1-CM (CONTINUED)

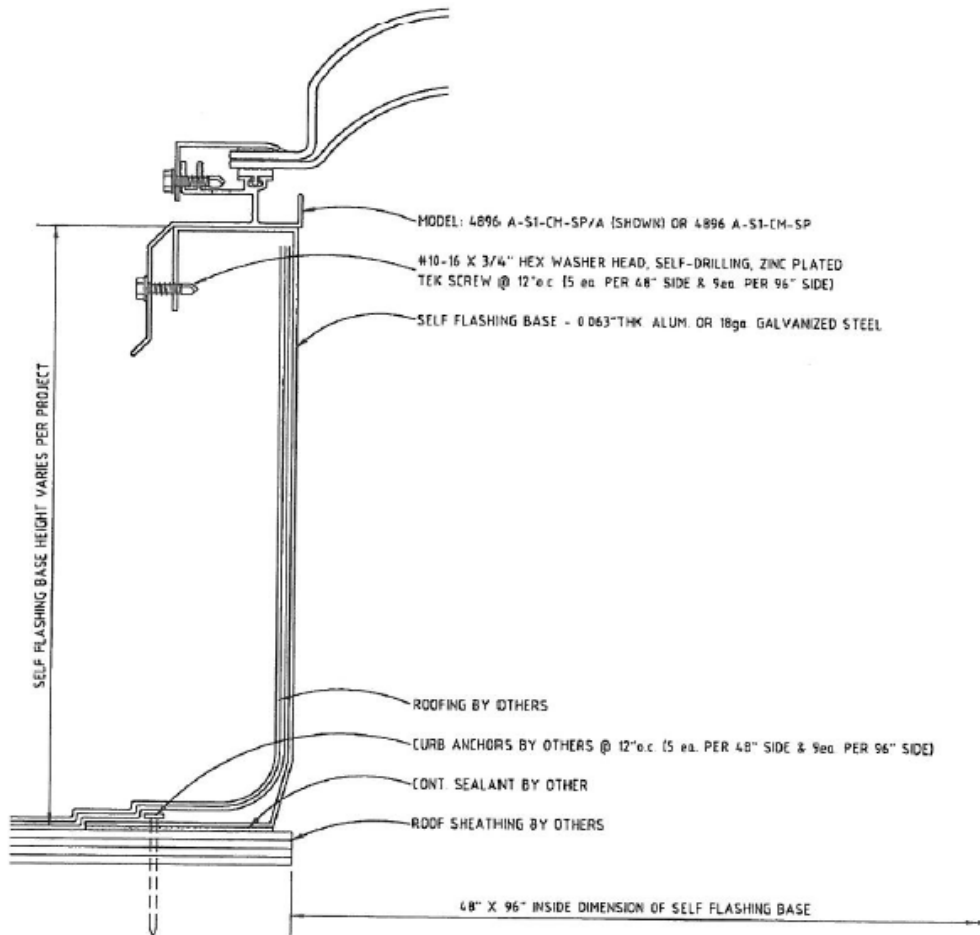


FIGURE 3—SKYLIGHT INSTALLATION DETAILS FOR MODEL A-S1-CM / SIMILAR FOR A-S-CM WITH SELF-FLASHING CURB

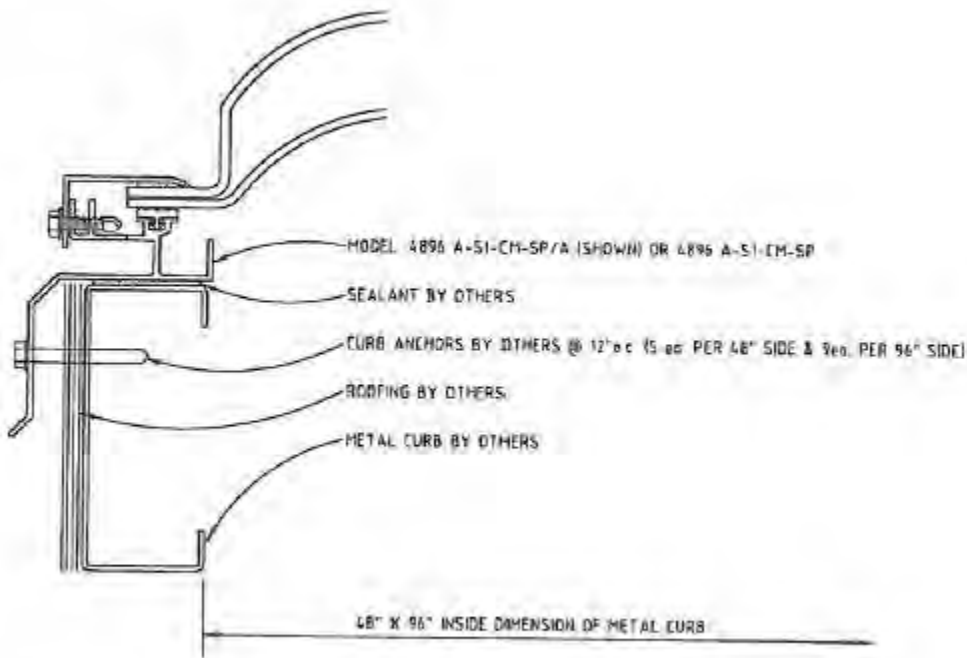


FIGURE 4—SKYLIGHT INSTALLATION DETAILS FOR MODEL A-S1-CM / SIMILAR FOR A-S-CM WITH METAL CURB

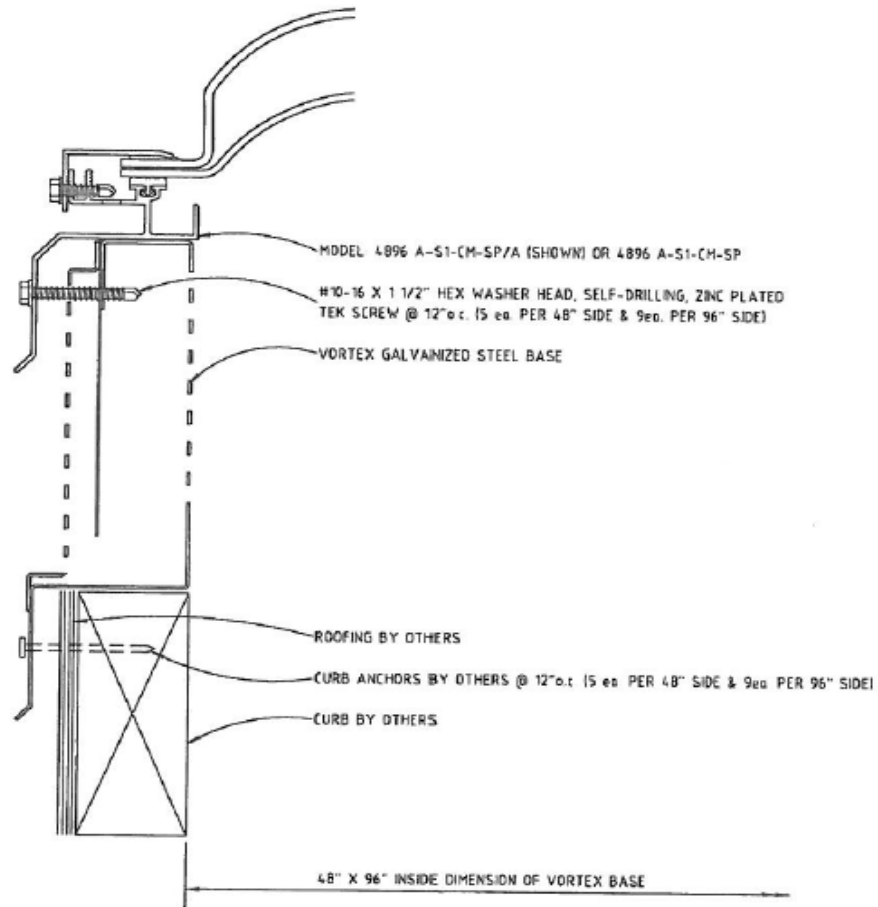


FIGURE 5—SKYLIGHT INSTALLATION DETAILS FOR MODEL A-S1-CM / SIMILAR FOR A-S-CM WITH LOUVERED CURB