Intertek-ATI
130 Derry Court
York, PA 17406

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TAS 100(A)-95 TEST REPORT

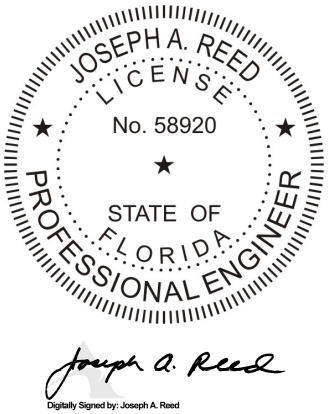
Rendered to:

SUNMODO CORPORATION

SERIES/MODEL: EZ Metal Roof Mount
TYPE: Solar Panel Roof Attachment

This report contains in its entirety:

Cover Page:	**1 Page**
Report Body:	**5 Pages**
Photographs:	**2 Pages**
Drawings:	**13 Pages**



2018.08.23 10:02:41 -04'00'

Report No:	**I6899.01-109-18**
Test Date:	**7/25/18**
And:	**7/26/18**
Report Date:	**8/17/18**
Revision 1:	**8/22/18**
Expiration Date:	**7/26/28**
Miami-Dade County Notification No.:	**ATI 18031**

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TAS 100(A)-95 TEST REPORT

Rendered to:

SunModo Corporation
14800 NE 65th Street
Vancouver, Washington 98682

Report No:	I6899.01-109-18
Test Date:	7/25/18
And:	7/26/18
Report Date:	8/17/18
Revision 1:	8/22/18
Expiration Date:	7/26/28
Miami-Dade County Notification No.:	ATI 18031

Series/Model: EZ Metal Roof Mount

Project Summary: Intertek B&C was contracted by SunModo Corporation to conduct wind driven rain testing per Florida Building Code Test Protocols for the High Velocity Hurricane Zone (HVHZ) – Testing Application Standard TAS 100(A)-95 on EZ Metal Roof Mount solar panel roof attachment. All test data, photos, and results are included herein. The sample was provided by the client.

Test Specification: All tests were performed in accordance with the referenced specification, unless stated otherwise.

> TAS 100(A)-95, *Test Procedure for Wind and Wind Driven Rain Resistance and/or Increased Windspeed Resistance of Soffit Ventilation Strip and Continuous or Intermittent Ventilation System Installed at the Ridge Area.*

Calibration: Reference Intertek B&C Report No. I2490.03-109-18, dated 04/30/18 for calibration data.

Test Specimen Description:

Roof Deck Description: An 8' 0" wide by 6' 0" long roof deck with 2:12 slope was utilized. The roof deck consisted of #2 Spruce-Pine-Fir nominal 2x6 rafters sheathed with 15/32" plywood. The rafters were spaced 24" on center. The plywood was secured to the rafters with 1-5/8" drywall screws spaced 6" on center around the perimeter and 12" on center at the intermediate supports. The plywood sheathing was covered with self-stick ice and water shield underlayment only.

EZ Metal Roof Mount Installation: The test specimens consisted of a 1" tall aluminum shoe and a 2-1/6" tall aluminum standoff. The aluminum shoe utilized a 1" diameter by 0.13" thick sealing washer on the underside and a 3/4" diameter by 1/8" thick EPDM gasket on the topside. The aluminum shoe was secured to the deck with a 5/16" x 4-1/2" lag screw. The lag screw was centered over a stud in the deck assembly and installed per the manufacturer's installation instructions. A 1-1/16" wide by 2-1/16" tall aluminum standoff was threaded onto the top of the aluminum shoe. A solar panel L-foot bracket was set on top of the aluminum standoff and secured with a 3/8" x 3/4" hex head screw. Two replicates were installed to the roof deck.

Test Results: The following results have been recorded:

Protocol TAS 100(A)-95 Wind Driven Rain

Test Procedure: The wind speed intervals were conducted as follows:

Interval No.	Wind Speed (mph)	Time (min)	Water Spray
1	35	15	On
2	0	5	Off
3	70	15	On
4	0	5	Off
5	90	15	On
6	0	5	Off
7	110	5	On
8	0	5	Off

Wind Speed	Results	Allowed
35 mph	No leakage	.
70 mph	No leakage	.
90 mph	No leakage	.
110 mph	No leakage	.
	No leakage	14.30 fl-oz

Results: Pass

Official Observers: The following representatives witnessed all or part of the testing.

Name	Company
Eric M. Brennan	Intertek B&C
Tyler J. Holland	Intertek B&C
Joseph A. Reed, P.E.	Intertek B&C
Kyle W. Ruth	Intertek B&C

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Intertek B&C for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire.

Results obtained are tested values and were secured by using the designated test methods. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen can be made. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Intertek B&C.

Digitally Signed by: Kyle Ruth

Kyle W. Ruth
Technician – Product Testing

Digitally Signed by: Joseph A. Reed

Joseph A. Reed, P.E.
Senior Director

KWR:wnl

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Photographs (2)
Appendix B: Drawings (13)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	8/17/18	N/A	Original report issue
1	8/22/18	Drawings	Removed EZR drawing page

Appendix A

Photographs

Photo No. 1
Test Specimens

Photo No. 2
Underneath of Test Deck Before Testing

Photo No. 3
EZ Metal Roof Mount Installation

Photo No. 4
Underneath of Test Deck After Testing

Appendix B

Drawings

NOTES: UNLESS OTHERWISE SPECIFIED

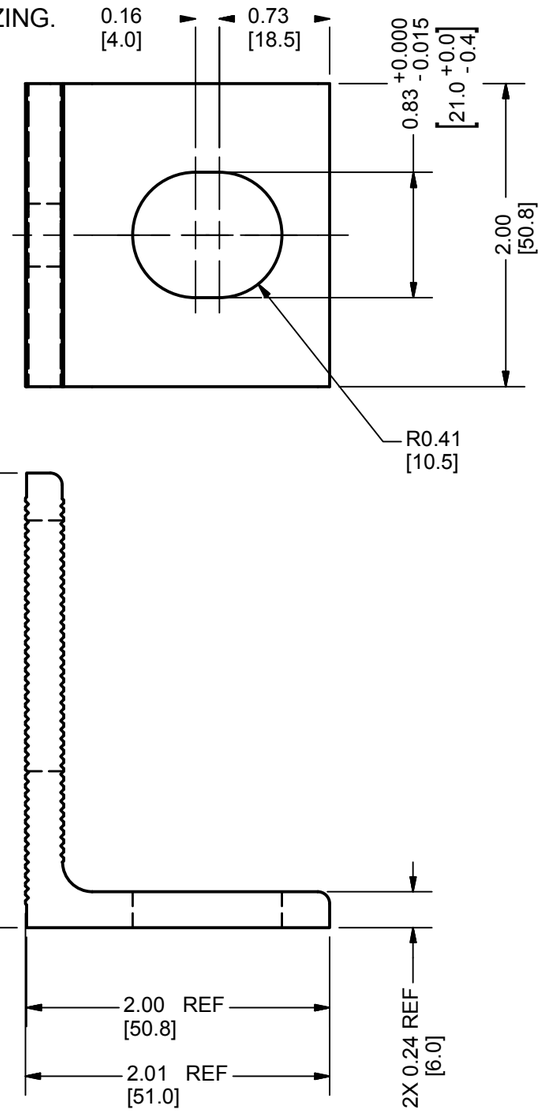
1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].

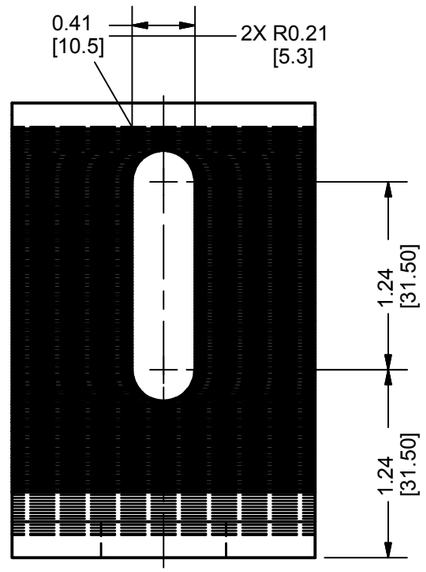
2. MATERAIL: ALUMINUM 6005-T5.
FINISH: CLEAR ANODIZED 10um THICK.

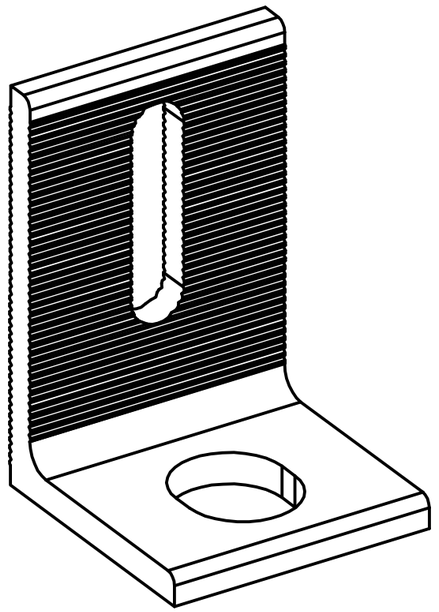
3. SUNMODO EXTRUSION A20061 WITH ANODIZING.

intertek Total Quality. Assured.

Report #: I6899.01
Date: 08/17/18
Verified by:







THIS DRAWING IS CONFIDENTIAL PROPERTY OF SUNMODO AND ITS CONTENTS MAY NOT BE DISCLOSED WITHOUT THE PRIOR WRITTEN CONSENT OF SUNMODO CORP.

MATERIAL: SEE NOTES	**Sunmodo Corp.**
Third Angle Projection:	1905 E 5TH STREET, STE A, VANCOUVER, WA 98661
GENERAL SPECIFICATIONS: All Dimensions in inches [millimeters]. Tolerances: X.XXX ±0.01 [0.25mm]; X.XX ±0.02 [0.50mm]; X.X ±0.039 [1.0mm]; Unless otherwise spec'd. Break all sharp edges .010-.020 unless otherwise specified.	TITLE: L-FOOT
DRAWN BY: zcg — DATE: 10/29/2013	B — DRAWING NUMBER: A20064-003
CHECKED BY	SCALE: NONE — SHEET 1 of 1
APPROVALS	

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	01/19/2017

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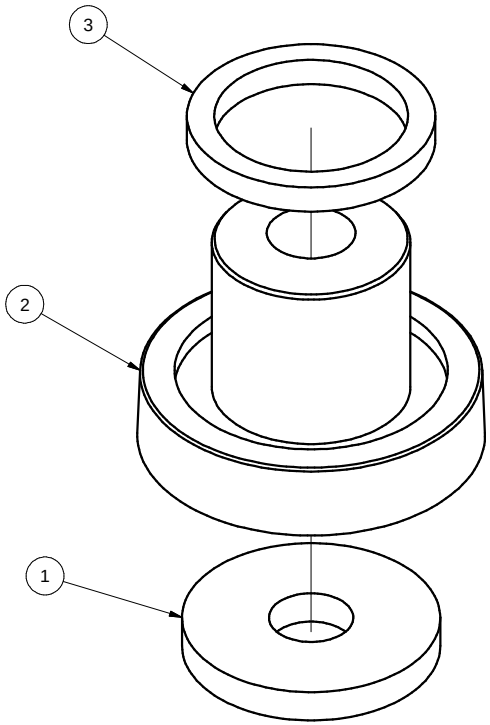
Total Quality. Assured.

Report #: I6899.01
Date: 08/17/18
Verified by:



ITEM	PART NUMBER	DESCRIPTION	QTY
3	C10006-001	EPDM GASKET 19.5mm ID X 3.0mm	1
2	A20051-002	MOUNT ROOF STANOFF	1
1	C10007-001	SEALING WASHER, 26mm ODX3.5mm	1

MATERIAL: SEE BOM

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd

Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 01/19/2017
CHECKED BY:
APPROVALS:

Sunmodo Corp.
14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE: EZ METAL ROOF MOUNT KIT

B
DRAWING NUMBER: K10278-001

SCALE: NONE
SHEET 1 of 1

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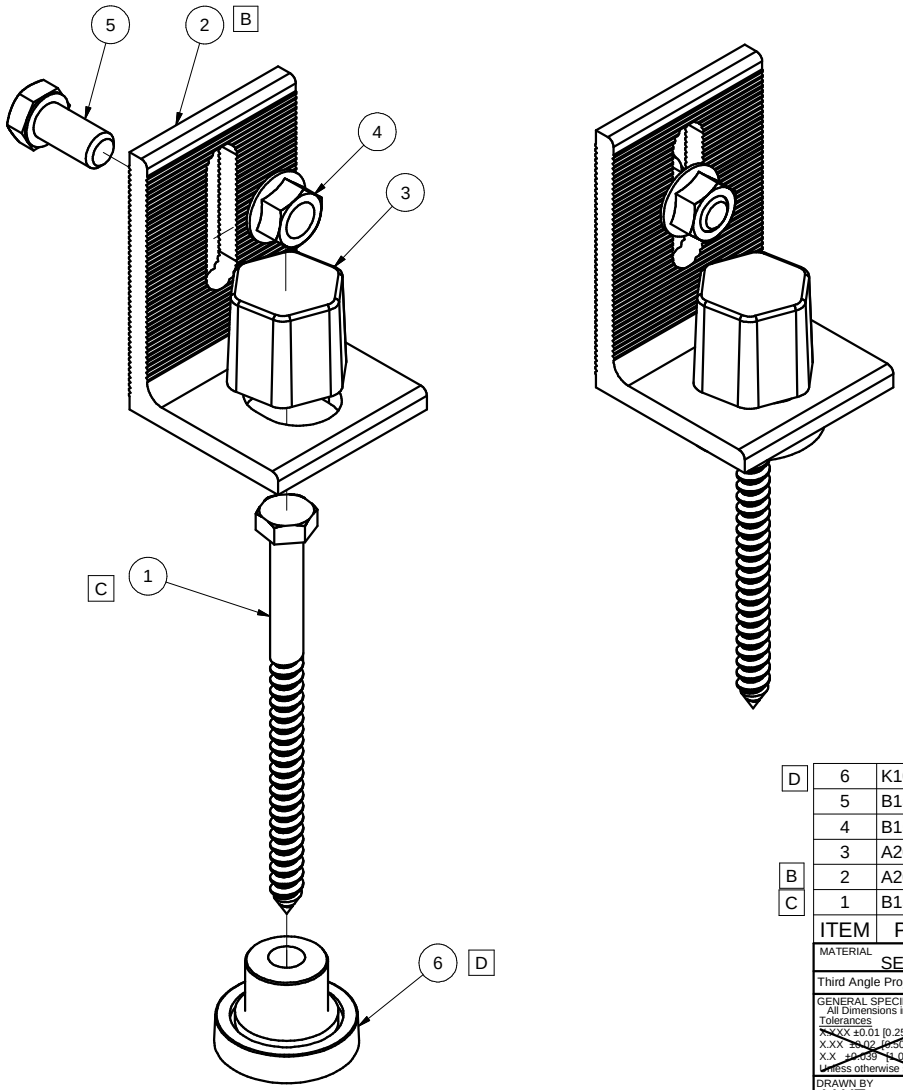
REVISIONS			
REV	DESCRIPTION	BY	DATE
A	CHANGED DECRIPTION	LWF	04/18/2013
B	USE A20064-003 INSTEAD OF A20064-001	LIN	04/18/2015
C	B15015-004 WAS B15015-002	LWF	10/11/2016
D	PIECE PARTS ARE ASSEMBLED TOGETHER	LWF	05/11/2017

intertek
Total Quality. Assured.

Report #: I6899.01
Date: 08/17/18
Verified by:



ITEM	PART NUMBER	DESCRIPTION	QTY
6	K10278-001	EZ METAL ROOF MOUNT KIT	1
5	B15018-001	HEX CAP SCREW 3/8-16 X 3/4	1
4	B15003-001	FLANGE NUT 3/8-16	1
3	A20066-001	AL HEX CAP	1
2	A20064-003	L-FOOT	1
1	B15015-004	HEX LAG BOLT 5/16 X 4.5	1

MATERIAL: SEE BOM

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 04/18/2013
CHECKED BY:
APPROVALS:

Sunmodo Corp.
14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE: METAL ROOF MOUNT KIT WITH L FOOT

B
DRAWING NUMBER: K10082-001

SCALE: NONE
SHEET 1 of 1

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NOTES:UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES[MILIMETERS].

2. MATERIAL:304 STAINLESS STEEL.

3. HEX LAG BOLT PER ASME B18.2.1-1996

4. NO SCRATCHES,NO BURRS.

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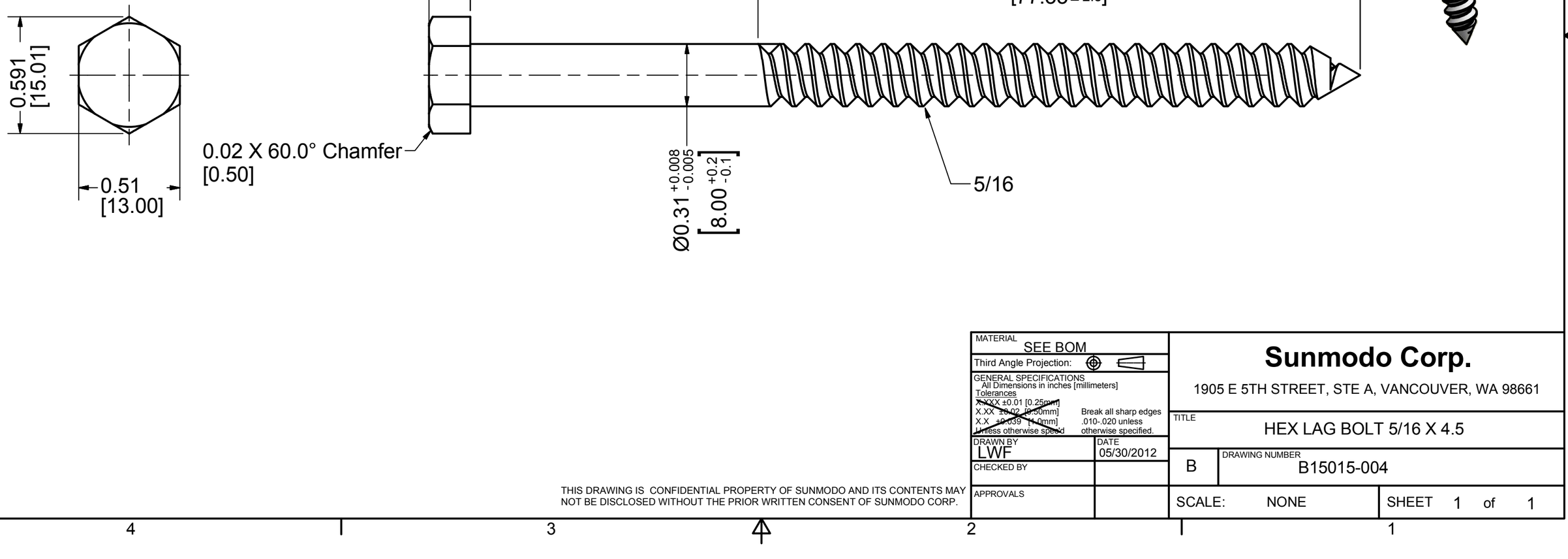
Total Quality. Assured.

Report #:	I6899.01
Date:	08/17/18
Verified by:	



MATERIAL	SEE BOM
Third Angle Projection:	
GENERAL SPECIFICATIONS	All Dimensions in inches [millimeters]
Tolerances	X.XXX ±0.01 [0.25mm] X.XX ±0.02 [0.50mm] X.X ±0.039 [1.0mm] Unless otherwise specified
	Break all sharp edges .010-.020 unless otherwise specified.
DRAWN BY	LWF
DATE	05/30/2012
CHECKED BY	
APPROVALS	

Sunmodo Corp.

1905 E 5TH STREET, STE A, VANCOUVER, WA 98661

TITLE	HEX LAG BOLT 5/16 X 4.5
B	DRAWING NUMBER B15015-004
SCALE: NONE	SHEET 1 of 1

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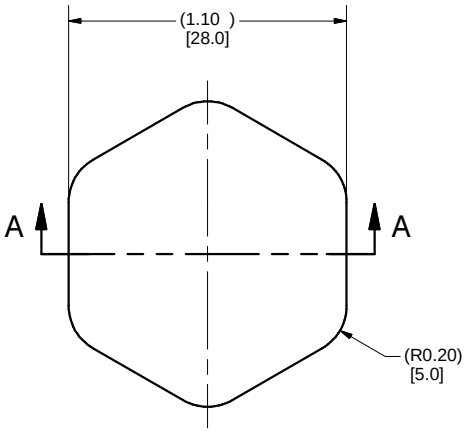
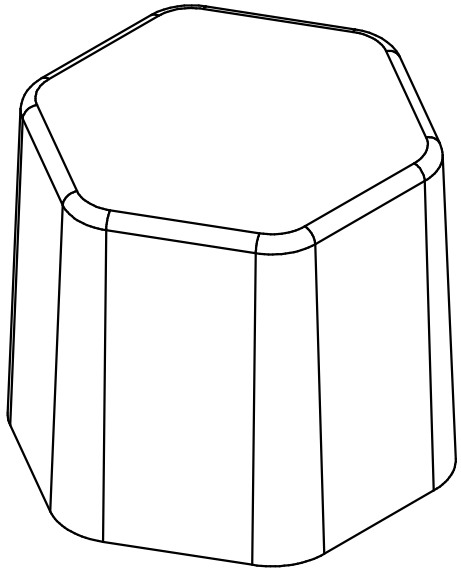
NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].
2. MATERIAL: AL DIE CASTING MATERIAL ANSI/AA A380.
3. PART SHALL BE FREE OF OIL AND DIRT MARKS.
4. NOTE THE ANGLE DOES NOT PULL MODE 2°.
5. BREAK ALL SHARP EDGES AND BURRS.
6. SLIVER POWDER COAT.
7. THE UNSPECIFIED DIMENSIONS ARE SPECIFIED BY 2D CAD FILE.

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	0.83 WAS 0.71, 1.02 WAS 0.91	zcg	08/13/2012
B	UPDATE MATERIAL SPECIFICATION	LWF	09/24/2015
C	ADD TRANSPARENT POWDER COATING	LWF	03/23/2017
D	CHANGE FROM"TRANSPARENT POWDER COAT" TO"SLIVER POWDER COAT"	LWF	05/08/2017





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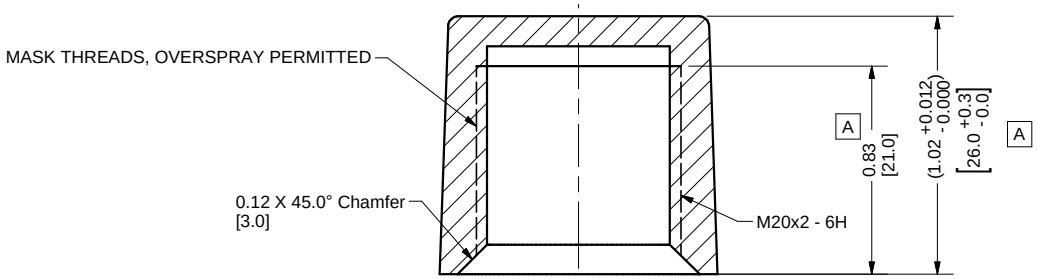
Total Quality. Assured.

Report #: I6899.01
Date: 08/17/18
Verified by:



SECTION A-A

MATERIAL	SEE NOTES
Third Angle Projection:	
GENERAL SPECIFICATIONS	All Dimensions in inches [millimeters]
Tolerances	X.XXX ±0.01 [0.25mm] X.XX ±0.02 [0.50mm] X.X ±0.039 [1.0mm] Unless otherwise spec'd
	Break all sharp edges .010-.020 unless otherwise specified.
DRAWN BY	zcg
DATE	08/13/2012
CHECKED BY	
APPROVALS	

Sunmodo Corp.
14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE: AL HEX CAP

B | DRAWING NUMBER: A20066-001

SCALE: NONE | SHEET 1 of 1

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EZ Roof Mount System Components

Primary Materials

EZ Roof Mount Kit includes:

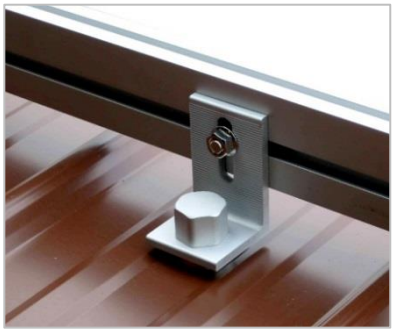
- Flashing
- L-Foot
- Roof Shoe and Gasket
- 4” Lag Bolt
- AL Hex Cap
- 3/8” Flange Nut and Bolt

K10068-XXX
EZ Roof Mount with L-Foot
(-001 as shown)

EZ Roof Mount Standoff Kit:

- Flashing
- L-Foot
- Roof Shoe and Gasket
- 4” Lag Bolt
- AL Hex Cap
- 3/8” Flange Nut and Bolt
- Standoff: 2” shown

K10070-XXX
EZ Roof Mount with Standoff
(Standoff heights: 2”, 3”, 5” and 7”)



EZ Metal Roof Mount Kit includes:

- L-Foot
- Metal Roof Shoe and Gasket
- 4” Lag Bolt
- AL Hex Cap
- 3/8” Flange Nut and Bolt

K10082-001
EZ Metal Roof Mount with L-Foot
(as shown)

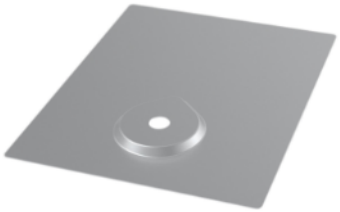
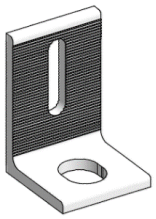
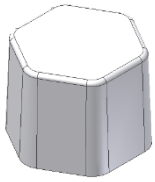
K20082-002
EZ Metal Roof Mount with L-Tall Foot

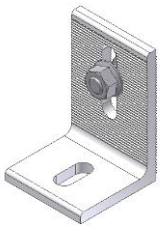
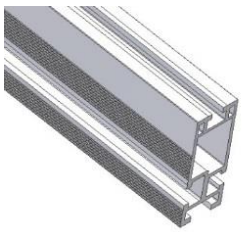
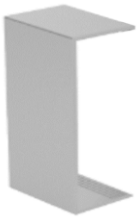
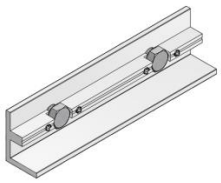
Both are available in black
(-BK1 or BK2)

EZ Metal Roof Mount Standoff Kit:

- L-Foot
- Roof Shoe and Gasket
- 4” Lag Bolt
- AL Hex Cap
- 3/8” Flange Nut and Bolt
- Standoff: 2” shown

K10064-XXX
EZ Metal Roof Mount with Standoff
(Standoff heights: 2”, 3”, 5” and 7”)

	Aluminum Flashings are offered in two sizes: 10”X12.5” and 18”X18”. Available in clear, black and brown anodize.	A20052-XXX AL Flashing
	Aluminum L-Foot is offered in clear, black and brown.	A20064-XXX AL L-Foot
	AL Hex Cap Available in clear and black	A20066-001 and -BK1 AL Hex Cap
	Aluminum Shoe is provided with EPDM Sealing Washer installed.	A20065-001 AL Shoe C10006-001 Sealing Washer
	Aluminum Shoe (for metal roofs) is provided with EPDM Sealing Washer installed.	A20051-XXX AL Shoe C10007-001 Sealing Gasket
	5/16 Stainless Steel Lag Bolts are available lengths: 3.5”, 4”, 4.5” and 5”	B15015-XXX 5/16 Stainless Steel Lag Bolt
	OMG XHD (Extra Heavy Duty) #15 Roofing Fastener	B15040-001 (4 reqd per mount) OMG 1/4 X 3" Decking Screw XHD003B #15X3

	Aluminum L-Foot available in clear and black.	K10066-XXX Standard L-Foot Kit K10096-XXX Tall L-Foot Kit (3/8” Flange Nut and Bolt included)
	Aluminum Standoff heights: 2”, 3”, 5” and 7” (part of EZ Roof Kit K10070-XXX)	A20049-XXX Standoff (multiple lengths)
	Helio Rails: Features both 1/4” and 3/8” side slots, and 1/4” top slot for clamping PV panels. Available in 84”, 124”, 164” and 206” lengths. Last 3 digits denote rail length. 4 stock sizes in clear and black.	A20144-XXX (Clear) A20144-XXX-BK (Black) HR250 (Standard Rail) A20145-XXX (Clear) A20145-XXX-BK (Black) HR350 (Heavy Rail) A20146-XXX (Clear) A20146-XXX-BK (Black) HR500 (Super Rail)
	Plastic Rail End Caps available for Helio Standard and Heavy rails (optional)	C10017-001 (Black) C10017-001-GR (Gray) HR250 (Standard Rail C10021-001 (Black) C10021-001-GR (Gray) HR250 (Heavy Rail)
	Metal Rail End Caps available for Helio Standard and Heavy rails (optional)	A20284-001 A20284-BK1 (Black) HR250 (Helio Standard) A20285-001 HR350 (Helio Heavy) A20263-001 HR500 (Helio Super)
	3/8” Slot Rail Splice Kit with 2X 3/8-16 hex bolts and flange nuts with integral grounding. ***May be repositioned until torqued to final value.***	K10178-001 HR250/HR350 3/8” Splice **For single-use only**

intertek Total Quality. Assured.

Report #: I6899.01
Date: 08/17/18
Verified by:

Installation Instructions:

EZ Roof Mount Kit K10068-XXX

1. From the marked location, move down the roof 2-1/4" from the bottom of the shingle, and drill the pilot hole for the Lag Bolt with a 7/32" drill bit. For maximum strength, the hole should not be more than 3" in depth, and a drill stop may be used to insure this.

2. Clean sawdust, and fill hole with sealant, such as Chem-link M1 for wood and composite roofs, or ChemLink DuraLink for metal roofs. Install AL Shoe to roof by using 5/16" Lag Bolt. Tighten to 25 ft. lbs. torque.

3. Make sure the Sealing Washer is positioned correctly on the threaded shank of the AL Shoe. Use roofer bar to lift roof shingle, slide the flashing under shingle, and insert the Flashing on threaded shank as shown. For additional waterproofing apply beads of sealant as shown.

4. Insert L-Foot to AL Shoe on top of Flashing. Place AL Hex Cap on Shoe, and lightly hand tighten Hex Cap.

5. Install AL Rail to L-Foot to the specific orientation. Then, tighten 3/8" Flange Nut to 15 ft-lbs. and Hex Cap to 15 ft-lbs. torque.

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Total Quality. Assured.

Report #:	I6899.01
Date:	08/17/18
Verified by:	

Installation Instructions:

EZ Roof Mounting Standoff Kit K10070-XXX

Mount the AL Shoe using steps 1-3 (shown above).

A. Place AL Standoff on AL Shoe threads and tighten by hand, then by wrench. Use 15 ft.-lbs. nominal torque.

B. Using the 3/8” Flange Bolt (supplied with AL L-Foot) attach to the top of the Standoff.

C. Install AL Rail to L-Foot to the specific orientation. Then, tighten 3/8” Flange Nut to 15 ft-lbs. and Hex Cap to 15 ft-lbs. torque.

intertek
Total Quality. Assured.

Report #:	I6899.01
Date:	08/17/18
Verified by:	

Installation Instructions:

EZ Roof Mount with C-Bracket Kit K12005-001

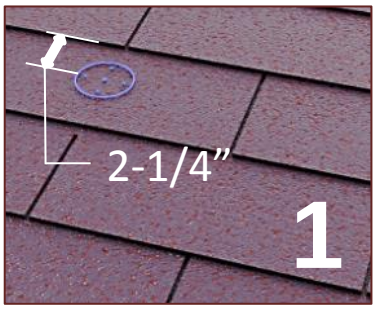
Mount the C-Bracket using steps 1-3 (shown above).

D. Mount the C-Bracket instead of an L-Foot, using the Hex Nut. The C-Bracket can be used to mount a variety of rails and other rooftop equipment.

Optional Mounting Instructions:

EZ Roof Mount Kit K10068-B20

1. From the desired location, move down the roof 2-1/4” from the bottom of the shingle, and locate the EZ Roof Mount AL Shoe center. The AL Shoe will be used as a template to locate the 4 screws.



2. Place a bead of Chem-link M1 for wood and composite roofs along the length of the screw four (4) 1/4” X 3” self-drilling Decking Screws. Mount the AL Shoe to the roof through the shingles using the four Decking Screws. The screws will penetrate the roof sheathing and should protrude through the sheathing at least 1/2”. Maximum pullout strength requires that the threads extend below the sheathing.

3. Make sure the Sealing Washer is positioned correctly on the threaded shank of the AL Shoe. Use roofer bar to lift roof shingle, slide the flashing under shingle, and insert the Flashing on threaded shank as shown. For additional waterproofing apply beads of sealant as shown.

4. Insert L-Foot to AL Shoe on top of Flashing. Place AL Hex Cap on Shoe, and lightly hand tighten Hex Cap.

5. Install AL Rail to L-Foot to the specific orientation. Then, tighten 3/8” Flange Nut to 15 ft-lbs. and Hex Cap to 15 ft-lbs. torque.

Warning: The self-drilling decking screw mount option is only suitable for roofs less than 5/12 pitch and should only be used with a direct L-Foot attachment.

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Installation Instructions:

EZ Metal Roof Mount Kit K20051-XXX

1. From the marked location drill the pilot hole for the Lag Bolt with a 7/32” drill bit. For maximum strength, the hole should not be more than 3” in depth, and a drill stop may be used to insure this.

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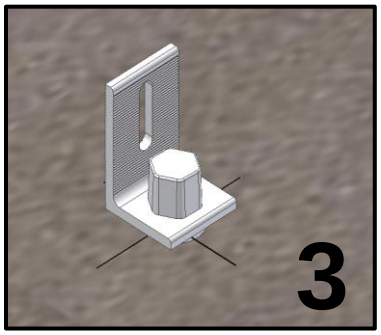
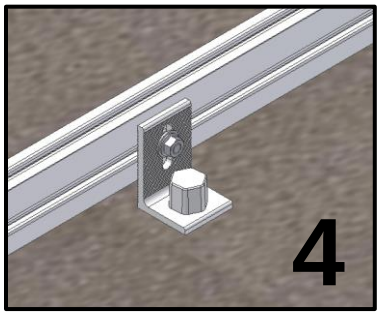
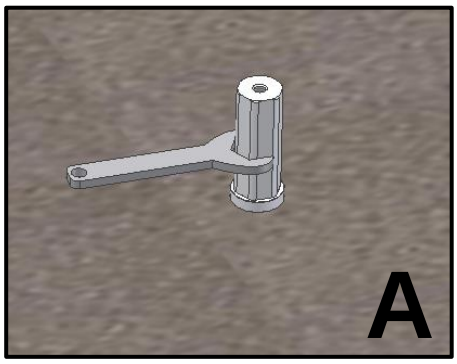
2. To ensure a strong and water tight seal, wipe away excess grease or debrris from the mounting location. Fill pilot hole with sealant, such as ChemLink DuraLink for metal roofs. Install AL Shoe to Metal Roof by using 5/16” Lag Bolt. Tighten to 25 ft. lbs. torque.

3. Install L-Foot to AL Shoe and lightly hand tighten Hex Cap.



4. Install AL Rail to L-Foot to the specific orientation. Then, tighten 3/8” Flange Nut to 15 ft-lbs. and Hex Cap to 15 ft-lbs. torque.



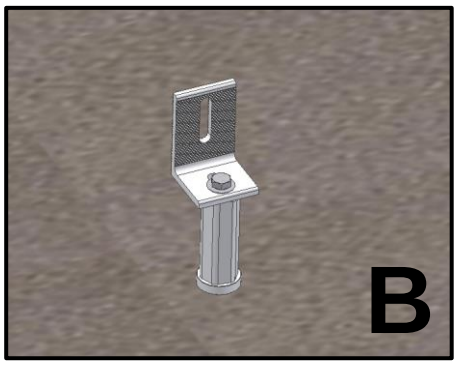


Installation Instructions:

EZ Metal Roof Mounting Standoff Kit K10064-XXX

Mount the AL Shoe using steps 1 and 2 (shown above).

A. Place AL Standoff on AL Shoe threads and tighten by hand, then by wrench. Use 15 ft.-lbs. nominal torque.



B. Using the 3/8” Flange Bolt (supplied with AL L-Foot) attach to the top of the Standoff.

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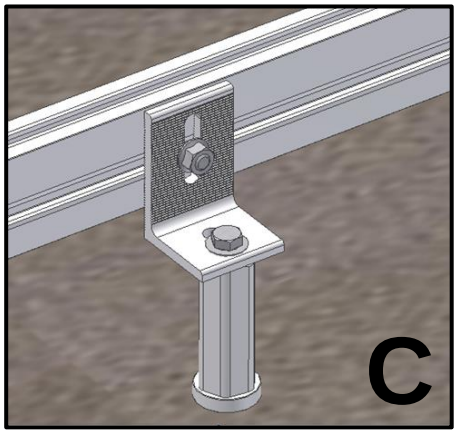
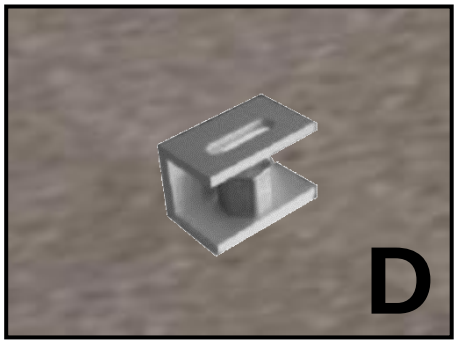


C. Install AL Rail to L-Foot to the specific orientation. Then, tighten 3/8” Flange Nut to 15 ft-lbs. and Hex Cap to 15 ft-lbs. torque.

Installation Instructions:

EZ Metal Roof Mount with C-Bracket A22001-001

Mount the C-Bracket using steps 1 and 2 (shown above).



D. Mount the C-Bracket instead of an L-Foot, using the Hex Nut. The C-Bracket can be used to mount a variety of rails and other Metal Rooftop equipment.