

Ground Mounting System

2013 Edition v1.3

This Installation Manual was created to help with the assembly of the IronRidge Ground Mounting System.

Ground Mount

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Introduction

The IronRidge Ground Mounting System is a flexible and easy-to-install mounting solution that scales to the largest PV installations. The aluminum and steel components combined with installer-supplied steel pipe form durable and cost-effective mounting structures.

Installer Responsibility

The installer is solely responsible for:

- i. Complying with all applicable local or national building codes, including any that may supersede this manual;
- ii. Ensuring that IronRidge and other products are appropriate for the particular installation and the installation environment;
- iii. Ensuring that all structural support members, including the roof, its rafters, and connections, can support the array under all code level loading conditions;
- iv. Using only IronRidge parts and installer-supplied parts as specified by IronRidge. Substitution parts may void the warranty;
- v. Ensuring that anchoring devices including lag screws have adequate pullout strength and shear capacities as installed;
- vi. Maintaining the waterproof integrity of the structural support or roof, including selection of appropriate flashing;
- vii. Ensuring safe installation of all electrical aspects of the PV array; and
- viii. Ensuring that PV module is UL or CE listed and verification of PV Module’s capacity to support the loads associated with the given array; and
- ix. Ensuring correct and appropriate design parameters are used in determining the design loading used for the specific installation. Parameters, such as snow loading, wind speed, exposure and topographic factor should be confirmed with the local building official or a licensed professional engineer.

Customer Support

IronRidge makes every effort to ensure your mounting kit is easy to install. If you need assistance at any point with your installation or have suggestions on how we can improve your experience, call IronRidge customer support: (707) 459-9523.

Module Clamp Table

Module Thickness		Clamp Info		Part Numers		
Mm	Inches	Clamp Type	Bolt Height	End Clamp	Mid Clamp (hex)	Mid Clamp (tbolt)
31.0 - 32.5	1.22 - 1.28	I	2.00"	29-7000-125	29-7000-105	29-70TB-105
33.3 - 34.8	1.31 - 1.37	A	2.00"	29-7000-134	29-7000-105	29-70TB-105
34.8 - 36.8	1.37 - 1.45	B	2.00"	29-7000-224	29-7000-105	29-70TB-105
39.0 - 41.0	1.53 - 1.61	C	2.25"	29-7000-157	29-7000-101	29-70TB-101
41.1 - 42.7	1.62 - 1.68	J	2.25"	29-7000-165	29-7000-101	29-70TB-101
42.7 - 44.2	1.68 - 1.74	E	2.25"	29-7000-171	29-7000-101	29-70TB-101
45.0 - 47.0	1.77 - 1.85	F	2.50"	29-7000-214	29-7000-108	29-70TB-108
46.7 - 48.3	1.84 - 1.90	K	2.50"	29-7000-187	29-7000-108	29-70TB-108
49.0 - 51.1	1.93 - 2.01	G	2.50"	29-7000-204	29-7000-108	29-70TB-108
57.4 - 58.9	2.26 - 2.32	H	2.75"	29-7000-230	29-7000-104	29-70TB-104

Tools Required For Assembly

The following tools are required to assemble the Ground Mounting System.

Note: Your installation may require incidental material, such as wood, to construct temporary supports or gravel to promote drainage below the concrete footings.

Tool	Use
Post hole digger or powered auger	Digging footings
Transit	Levelling pipes
24-inch Pipe wrenches	Tightening threaded pipe couplings
Torque wrench	
Tape measure	
Equipment for mixing/placing concrete	
Equipment for cutting pipe	
Open-end wrench, Box-end wrench, or socket drive with sockets to support the following size heads:	
• 3/16" Allen Head	3/8" Set screws
• 7/16"	1/4" Cap-end screws and bolts
• 9/16"	3/8" Cap-end screws and bolts
• 3/4"	1/2" Cap-end screws and bolts

Torque Values

Use the following torque values for **Galvanized Bolts**.

Galvanized Bolt Size	Required Torque Value (Dry)
• 3/8"-16 (Cap U-bolts)	15 ft. lbs.
• 3/8"-16 (Standard Rail Connector U-bolts)	60 in. lbs.
• 3/8"-16 (Standard Rail Connector Angle & Set Screw)	20 ft. lbs.
• 1/2"-13	40 ft. lbs.

Use the following torque values for **Stainless Steel Bolts**.

Caution: Stainless Steel hardware can seize up in a process known as galling. To significantly reduce the likelihood of galling, apply a very small drop of anti-seize lubricant to the threads of all Stainless Steel bolts before installation.

Stainless Steel Bolt Size	Required Torque Value (Lubricated)
• 1/4"-20 (End and Mid Clamps)	10 ft. lbs.
• 3/8"-16	17 ft. lbs.

Grounding Setup

All electrical installation and procedures should be conducted by skilled, licensed and bonded electricians. All work must comply with all national, state and local installation procedures, product and safety standards. These standards include but are not limited to applicable National Electrical Code (NEC®), National Electrical Installation Standards (NEIS™), UL Standards, and OSHA Regulations.

Note: For installations that utilize WEEBs, WEEB Lugs and WEEB Bonding Jumpers, please refer to Wiley/Burndy installation manual for "IronRidge Light and Standard Series Rail" for proper installation procedures.

Component List

The IronRidge Light Rail System contains the following parts:

Standard Rail Connector

Connects the Standard Rail to the pipe supports.



Top Cap

Joins the horizontal cross members to the vertical piers.



Standard Rail

Provides support for the PV modules.



End Clamp

Clamps the outside ends of the PV modules to the rails.



Mid Clamp

Clamps the inside edges of the PV modules to the rails.



End Cap

Caps off the end of the rail and prevents the collection of debris inside rail.



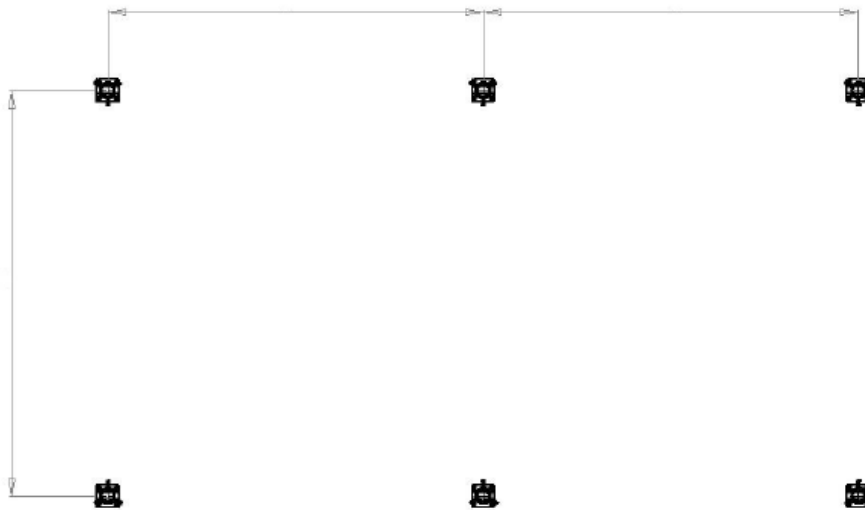
Assembly

Step 1. Laying Out Pier Positions

A. Establish your pier locations at the installation site.

Note: Pier distances will vary depending on load conditions. Please consult with your local distributor for more information.

B. Once the grid of pier positions has been established, verify that all angles are square.

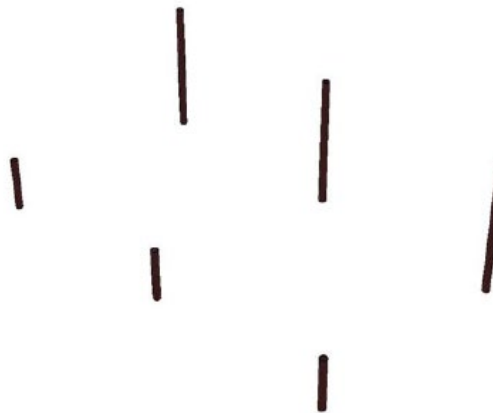


Step 2. Installing The Piers

A. Level and square the vertical piers. Be certain that legs are precisely aligned and that the front and back rows are parallel.

B. Install the piers according to your requirements.

C. Sighting with a laser level, transit, or string line, even the tops of the poles.



Cross Bracing: Under some conditions, certain Ground Mounting installations will include cross bracing. If your installation requires the use of the optional cross bracing, please refer to the Ground Mounting Brace Assembly installation instructions, found on page 12 of this document *before proceeding to Step 3.*

Step 3. Assembling The Truss Structure

- A.** Mount a Top Cap on each vertical pole.
(Set screws are pre-installed in Top Cap.)
- B.** Insert 3/8" - 16 x 1/2" set screws into the Top Cap.

Do not tighten the set screws at this point.



- C.** Set the horizontal poles in the cap grooves, and attach the poles with U-bolts (3/8-16), nuts, washers and lock washers.

- D.** Tighten the nuts to 15 ft. lbs.

- E.** Once the assembly is complete and aligned, tighten the set screws to 20 ft. lbs.

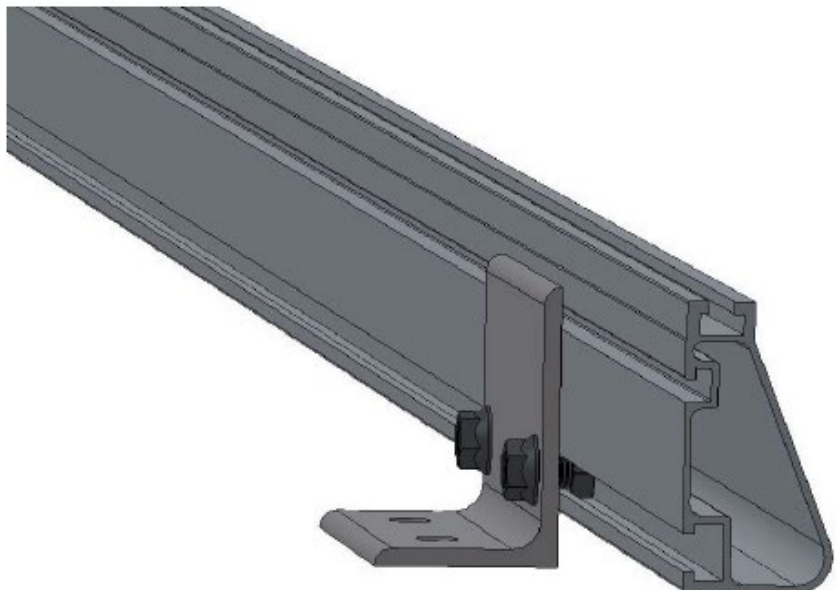


Step 4. Attaching The Standard Rail Connectors To The Rails

- A.** Determine the location of the Standard Rail connectors on the rails. (See Step 6)
- B.** Attach the Standard Rail Connectors to the rails by sliding the 3/8"-16 Connector bolt heads into the Standard rail slots.
- C.** With the Standard Rail Connector in place, screw the flange nuts onto the bolts, but only finger tighten at this point. This will allow for slight adjustment in Step 6.

Note: To significantly reduce the likelihood of galling, apply a very small drop of anti-seize lubricant to the threads of all Stainless Steel bolts before installation.

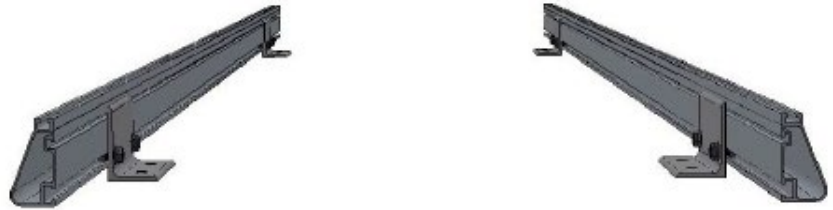
- D.** Attach the remaining Standard Rail connectors in the same manner.



Step 5. Mounting The PV Panels To The Rails

- A.** Lay out the Standard Rails so that they are parallel to each other.

Make sure the slotted sides of the rails are facing inward and that the rails are the proper distance apart to fit the panels.

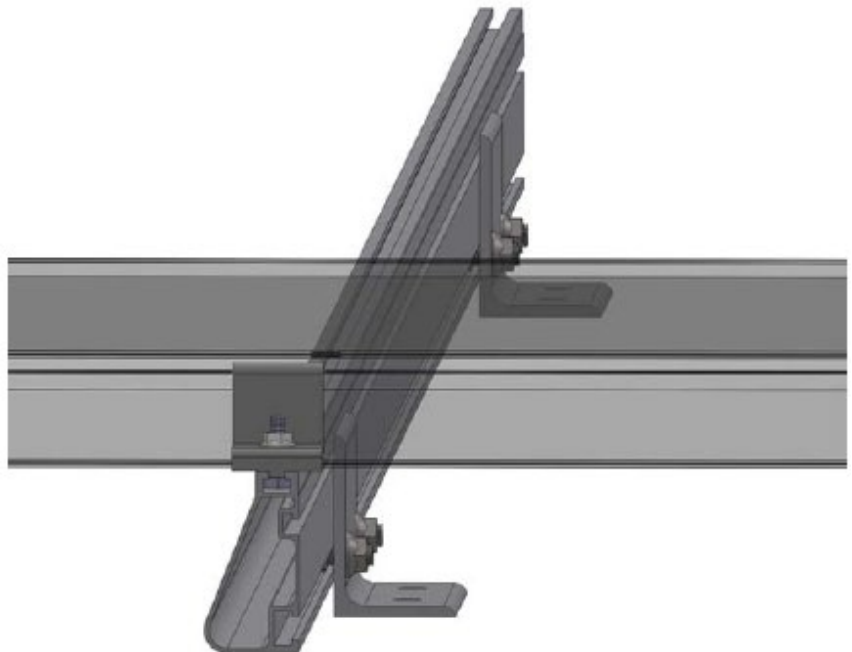


- B.** Lay the first PV module in position on the rails. Slip the head of the 1/4"-20 End Clamp bolt into the Standard Rail top slot. Slide the End Clamp over the bolt, making sure it is firmly hooked over the side of the module. Complete the clamp assembly with a flange nut as shown. Tighten the End Clamp to 10 ft. lbs.

Note: For installations that utilize WEEBs, please refer to Wiley/Burndy installation manual for "IronRidge Light and Standard Series Rails" for proper installation procedures.

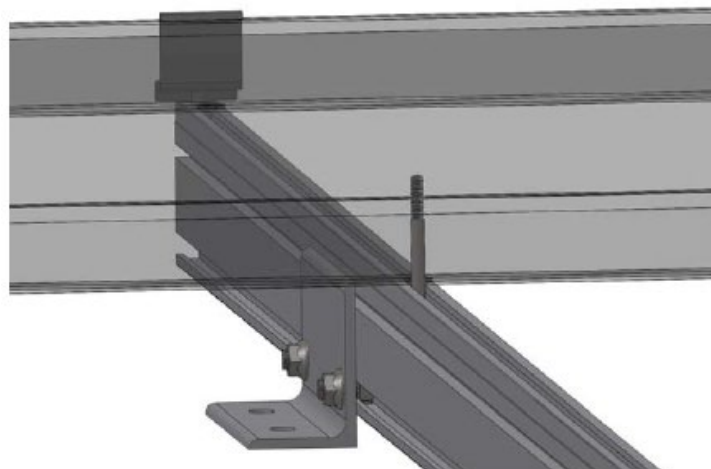
Warning: Do NOT over-torque as this may damage the PV module.

Note: To significantly reduce the likelihood of galling, apply a very small drop of anti-seize lubricant to the threads of all Stainless Steel bolts before installation.



- C.** Repeat with another End Clamp on the second rail.

- D.** Working from the opposite side of the PV module, slide the 1/4"-20 Mid Clamp bolts into the Standard Rails until they are flush against the panel.



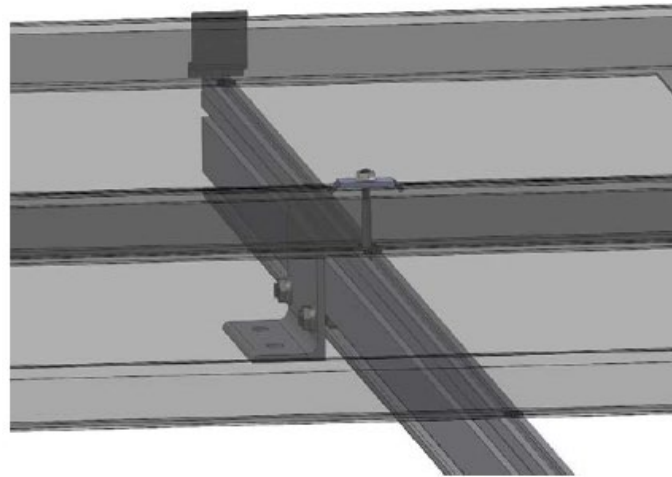
E. Place the second PV Module into position on the rails, sliding it against the first so the Mid Clamp bolts are in contact with the edges of both panels.

F. Put a Mid Clamp on each bolt, then a flange nut.

G. Tighten the Mid Clamps to 10 ft. lbs.

Note: For installations that utilize WEEBs, please refer to Wiley/Burndy installation manual for "IronRidge Light and Standard Series Rails" for proper installation procedures.

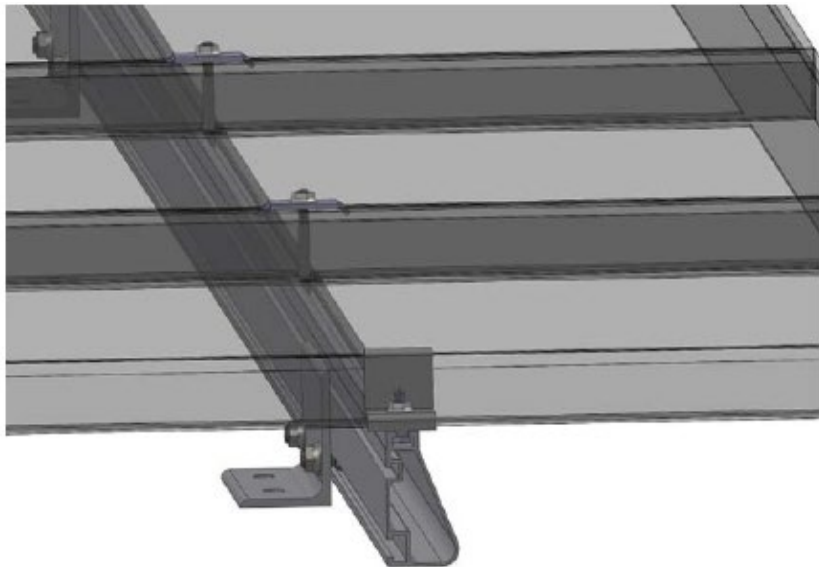
Warning: Do NOT over-torque as this may damage the PV module.



H. Repeat the procedure using Mid Clamps to secure each successive module.

I. Secure the last module at the end of the rails using the End Clamps.

J. Repeat for the remaining sets of rails and panels.



Step 6. Mounting The Panel Assembly To The Truss Structure

- A.** Carefully lift the panel assembly onto the truss structure.

Be sure to center the panel assemblies on the horizontal pipes, leaving an equal amount of overhang on north and south sides.

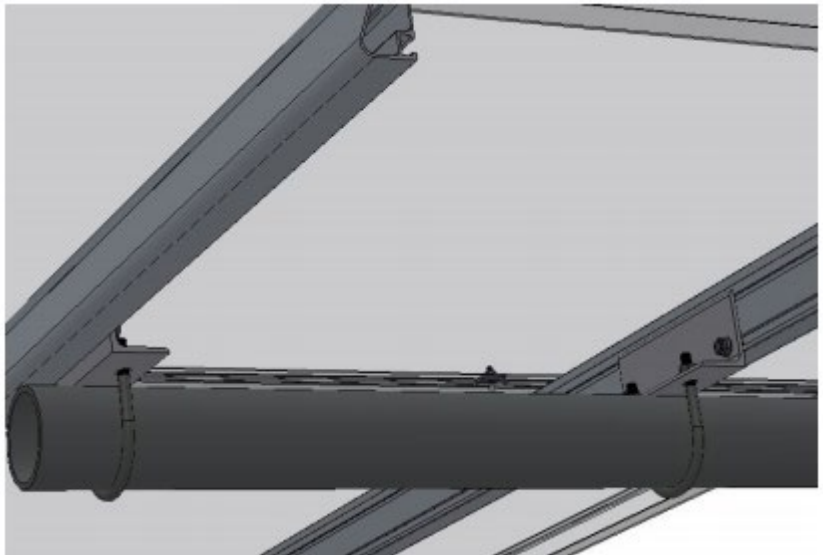


- B.** Secure the panel assembly to the truss structure with the 3/8"-16 Galvanized U-bolts, nuts, washers and lock washers.

- C.** Tighten the nuts to 60 in. lbs.

- D.** Tighten the XRS Connector flange nuts to 17 ft. lbs.

- E.** Repeat with the remaining panel assemblies.



Brace Assembly (Optional)

2" Brace Assembly (29-0200-CBR) or 3" Brace Assembly (29-0300-CBR)

The Ground Mounting Brace Assembly is an additional bracing component only needed in certain situations for ground mount installations. Your installation may not require the Brace Assembly, in which case you may disregard this addendum. *Please note this addendum's steps should be followed in between Step 2 and Step 3 of the Ground Mounting Installation Guide.*

Component List

Note: The component list indicated here is for reference only. The actual component quantities will vary according to the quantity and make of modules for which the mount is configured.

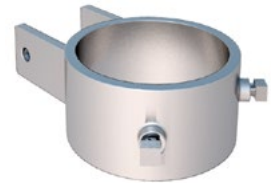
Diagonal Brace

Connects the vertical piers together, acting as a diagonal brace.



Sleeve

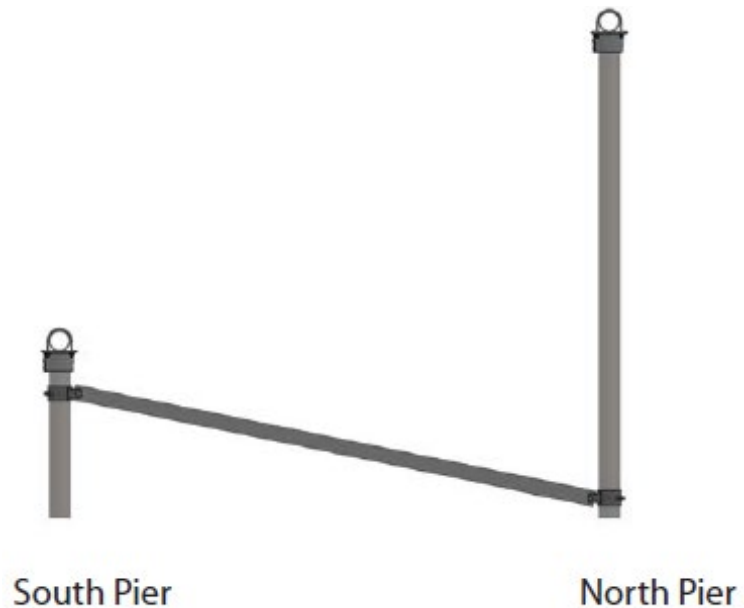
Joins the diagonal cross brace to the vertical piers.



Installation

Step 1. Installing The Brace Assembly

- A.** Slide sleeve onto northern pier, raising it 2-3" above the ground, and tighten to 40 ft. lbs.
- B.** Attach the diagonal brace to the sleeve using the provided 1/2" hardware.
- C.** Slide the second sleeve on the south pier, raising the diagonal brace to align holes in both the sleeve and brace. Insert hardware to hold.
- D.** Raise southern pier's sleeve to end of upward travel. Tighten set screws.
- E.** Torque all sleeve and diagonal brace hardware to 40 ft. lbs.



Warranty Information

Effective for IronRidge, Inc. ("IronRidge") mounting structure components ("Products") manufactured after April 1st, 2012, IronRidge provides the following warranties, for Products installed properly and used for the purpose for which the Products are designed:

- finishes shall be free of visible defects, peeling, or cracking, under normal atmospheric conditions, for a period of three (3) years from the earlier of (i) the date of complete installation of the Product or (ii) thirty days after the original purchaser's date of purchase of the Product ("Finish Warranty");
- components shall be free of structurally-related defects in materials for a period of ten (10) years from the earlier of (i) the date of complete installation of the Product or (ii) thirty days after the original purchaser's date of purchase of the Product;
- components shall be free of functionally-related manufacturing defects for a period of twenty (20) years from date of manufacture.

The Finish Warranty does not apply to: (a) surface oxidation of the galvanized steel components or any foreign residue deposited on Product finish; and (b) Products installed in corrosive atmospheric conditions, as defined solely by IronRidge; corrosive atmospheric conditions include, but are not limited to, conditions where Product is exposed to corrosive chemicals, fumes, cement dust, salt water marine environments or to continual spraying of either salt or fresh water. The Finish Warranty is VOID if (c) the practices specified by AAMA 609 & 610-02 – "Cleaning and Maintenance for Architecturally Finished Aluminum" (www.aamanet.org) are not followed by Purchaser for IronRidge's aluminum based components; and (d) if the practices specified by ASTM A780 / A780M - 09 "Standard Practice for Repair of Damaged and Uncoated Areas of HotDip Galvanized Coatings" are not followed by Purchaser for IronRidge's galvanized steel-based components.

The warranties above do not cover any parts or materials not manufactured by IronRidge, and exclude nonfunctionally-related defects, as defined solely by IronRidge. The warranties do not cover any defect that has not been reported to IronRidge in writing within twenty (20) days after discovery of such defect.

In the event of breach of or non-compliance with the warranties set forth above, IronRidge's sole obligation and liability, and the sole and exclusive remedy for such breach or non-compliance, shall be correction of defects by repair, replacement, or credit, at IronRidge's sole discretion. Such repair, replacement or credit shall completely satisfy and discharge all of IronRidge's liability with respect to these warranties.

Refurbished Product may be used to repair or replace the defective components. Transportation, installation, labor, or any other costs associated with Product replacement are not covered by these warranties and are not reimbursable. These warranties additionally do not cover (a) normal wear, or damage resulting from misuse, overloading, abuse, improper installation (including failure to follow professional instruction and certification), negligence, or accident, or from force majeure acts including any natural disasters, war or criminal acts; and (b) Products that have been altered, modified or repaired without written authorization from IronRidge or its authorized representative; and (c) Products used in a manner or for a purpose other than that specified by IronRidge. A formal document proving the purchase and the purchase date of the Product is required with any warranty claim.

Except as set forth above, IronRidge sells the Products on an "AS IS" basis, which may not be free of errors or defects, and ALL EXPRESS OR IMPLIED REPRESENTATIONS AND WARRANTIES, INCLUDING ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUALITY, WORKMANLIKE EFFORT, CORRESPONDENCE TO DESCRIPTION, DESIGN, TITLE OR NON-INFRINGEMENT, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR TRADE PRACTICE, ARE HEREBY DISCLAIMED.