

CB05-CB16 GRAIN BIN V-RIB ROOF



INSTALLATION MANUAL P/N 349024



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Chief Industries, Inc. – Agri/Industrial Division

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Manual Revisions

- 5-12-2009
 - Temperature Cable Supports
- 8-31-2015
 - Updated warranty information
- 1-1-2016
 - General formatting update
- 2-17-2017
 - Roof Upgrades – 4” Rib and Reinforcing Rings

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For more information about Chief Industries, Inc. and additional products or services please visit our website

www.agri.Chiefind.com

STANDARD LIMITED WARRANTY

Chief Grain Bin Products

1. **Definitions.** The following terms, when they appear in the body of this Standard Limited Warranty for Grain Bin Products in initial capital letters shall have the meaning set forth below:
 - A. Accepted Purchase Order shall mean the Purchase Order identified below.
 - B. Chief shall mean Chief Agri/Industrial, a division of Chief Industries, Inc.
 - C. Original Owner shall mean the original owner identified below.
 - D. Product shall mean the Agri/Industrial Equipment as described in the Accepted Purchase Order.
 - E. Reseller shall mean the authorized Chief Agri/Industrial Equipment dealer identified below.
2. **Limited Product Warranty.** Upon and subject to the terms and conditions set forth below, Chief hereby warrants to the Reseller, and, if different, the Original Owner as follows:
 - A. All new Products delivered to the Reseller or the Original Owner by Chief pursuant to the Accepted Purchase Order will, when delivered, conform to the specifications set forth in the Accepted Purchase Order;
 - B. All new Products delivered pursuant to the Accepted Purchase Order will, in normal use and service, be free from defects in materials or workmanship; and
 - C. Upon delivery, Chief will convey good and marketable title to the Products, free and clear of any liens or encumbrances except for, where applicable, a purchase money security interest in favor of Chief.
3. **Duration of Warranty and Notice Requirements.** Subject to the **Exceptions, Exclusions and Limitations** set forth below, the warranties set forth in Section 2 above shall apply to all covered non-conforming conditions that are discovered within the first sixty (60) months following delivery of the Product to the carrier designated by the Reseller and/or the Original Owner at Chief's manufacturing facility in Kearney, Nebraska (the "Warranty Period") and are reported to the Chief as provided in Section 4 below within thirty (30) days following discovery (a "Notice Period").
4. **Notice Procedure.** In order to make a valid warranty claim, the Reseller and/or the Original Owner must provide Chief with a written notice of any nonconforming condition discovered during the Warranty Period within the applicable Notice Period specified in Section 3 above. Said notice must be in writing; be addressed to Chief Industries, Inc., Agri/Industrial Division, Customer Service Department, P.O. Box 848, Kearney, NE 68848; and contain the following information: (a) the Customer's name and address; (b) the Reseller's name and address; (c) the make and model of the Product in question; (d) the current location of the Product; (e) a brief description of the problem with respect to which warranty coverage is claimed; and (f) the date on which the Product was purchased.
5. **Exceptions and Exclusions.** Anything herein to the contrary notwithstanding, the warranties set forth in Section 2 above do **not** cover any of the following, each of which are hereby expressly excluded:
 - A. Defects that are not discovered during the applicable Warranty Period;
 - B. Defects that are not reported to the Chief Agri/Industrial Division Customer Service Department in conformity with the notice procedure set forth in Section 4 above within the applicable Notice Period specified in Section 3;
 - C. Any used or pre-owned Products;
 - D. Any Chief manufactured parts that are not furnished as a part of the Accepted Purchase Order;

- E. Any fixtures, equipment, materials, supplies, accessories, parts or components that have been furnished by Chief but are manufactured by a third party;
 - F. Any Products which have been removed from the location at which they were originally installed;
 - G. Any defect, loss, damage, cost or expense incurred by the Reseller or the Original Owner to the extent the same arise out of, relate to or result, in whole or in part, from any one or more of the following:
 - (i) Usual and customary deterioration, wear or tear resulting from normal use, service and exposure;
 - (ii) Theft, vandalism, accident, war, insurrection, fire or other casualty;
 - (iii) Any damage, shortages or missing parts which result during shipping or are otherwise caused by the Reseller, the Original Owner and/or any third party;
 - (iv) Exposure to marine environments, including frequent or sustained salt or fresh water spray;
 - (v) Exposure to corrosive, chemical, ash, smoke, fumes, or the like generated or released either within or outside of the structure on which the Product is installed, regardless of whether or not such facilities are owned or operated by the Reseller, the Original Owner or an unrelated third party;
 - (vi) Exposure to or contact with animals, animal waste and/or decomposition;
 - (vii) The effect or influence the Product may have on surrounding structures, including, without limitation, any loss, damage or expense caused by drifting snow;
 - (viii) Any Product or portion thereof that has been altered, modified or repaired by the Reseller, the Original Owner or any third party without Chief's prior written consent;
 - (ix) Any Product or portion thereof that has been attached to any adjacent structure without Chief's prior written approval;
 - (x) Any Product to which any fixtures, equipment, accessories, materials, parts or components which were not provided as a part of the original Accepted Purchase Order have been attached without Chief's prior written approval;
 - (xi) The failure on the part of the Reseller, the Original Owner or its or their third party contractors to satisfy the requirements of all applicable statutes, laws, ordinances rules, regulations and codes, (including zoning laws and/or building codes);
 - (xii) The use of the Product for any purpose other than the purpose for which it was designed; and/or
 - (xiii) The failure of the Reseller, the Original Owner and/or any third party to:
 - (a) properly handle, transport and/or store the Product or any component part thereof;
 - (b) properly select and prepare a site that is adequate for the installation and/or operation of the Product or any component part thereof;
 - (c) properly design and construct a foundation that is adequate for the installation and/or operation of the Product or any component part thereof;
 - (d) properly set up, erect, construct or install the Product and/or any component part thereof; and/or
 - (e) properly operate, use, service and/or maintain the Product and each component part thereof.
6. **Resolution of Warranty Claims.** In the event any nonconforming condition is discovered within the Warranty Period and Chief is notified of a warranty claim as required by Section 4 prior to the end of the applicable Notice Period set forth in Section 3 above, Chief shall, with the full cooperation of the Reseller and the Original Owner, immediately undertake an investigation of such claim. To the extent Chief shall determine, in its reasonable discretion, that the warranty claim is covered by the foregoing Limited Product Warranty, the following shall apply:
- A. **Warranty Claims With Respect to Covered Non-Conforming Conditions Discovered Within the First Three Hundred Sixty Five (365) Days and Reported to Chief Within Thirty (30) Days**

of Discovery. In the case of a warranty claim which relates to a covered non-conforming condition that is discovered during the first three hundred sixty five (365) days of the Warranty Period and is reported to Chief as required by Section 4 within thirty (30) days of discovery as required by Section 3, Chief will, as Chief's sole and exclusive obligation to the Reseller and the Original Owner, and as their sole and exclusive remedy, work in cooperation with the Reseller and the Original Owner to correct such non-conforming condition, and in connection therewith, Chief will ship any required replacement parts to the "ship to address" set forth in the Accepted Purchase Order FOB Chief's facilities in Kearney, Nebraska, and will either provide the labor or reimburse the Reseller or the Original Owner, as may be appropriate in the circumstances, for any out of pocket expense the Original Owner may reasonably and necessarily incur for the labor that is required to correct such non-conforming condition, provided that if work is to be performed by the Reseller or a third party contractor, Chief may require at least two competitive bids to perform the labor required to repair or correct the defect and reserves the right to reject all bids and obtain additional bids. Upon acceptance of a bid by Chief, Chief will authorize the necessary repairs.

- B. All Other Warranty Claims. Except as is otherwise provided in subsection 6A above, in the case of all other warranty claims which relate to covered non-conforming conditions that are discovered during the Warranty Period and are reported to Chief as required by Section 4 within thirty (30) days following discovery, Chief will, as Chief's sole and exclusive obligation to the Reseller and the Original Owner, and as the Reseller's and the Original Owner's sole and exclusive remedy, ship any required replacement parts to the Original Owner at the "ship to address" specified in the Accepted Purchase Order FOB Chief's facilities in Kearney, Nebraska; and **in such event, Chief shall have no responsibility or liability to either the Reseller or the Original Owner for the cost of any labor required to repair or correct the defect.**

7. Warranty Not Transferable. This Warranty applies only to the Reseller and the Original Owner and is **not transferable**. As such, this Warranty does **not** cover any Product that is sold or otherwise transferred to any third party following its delivery to the Original Owner.

8. Limitation on Warranties, Liabilities and Damages. The Reseller and the Original Owner expressly agree that the allocation of the risk, liability, loss, damage, cost and expense arising from any Product that does not conform to the limited warranty given in Section 2 above are fair and reasonable and acknowledge that such allocation was expressly negotiated by the parties and was reflected in the Purchase Price of the Product. Accordingly the Reseller and the Original Owner expressly agree as follows:

- A. Disclaimer of Implied Warranties. **EXCEPT AS IS OTHERWISE EXPRESSLY SET FORTH HEREIN, CHIEF MAKES NO OTHER REPRESENTATIONS OR WARRANTIES OF ANY KIND WHATSOEVER, WHETHER EXPRESS OR IMPLIED, BY OPERATION OF LAW, COURSE OF DEALING OR OTHERWISE WITH RESPECT TO THE PRODUCT, ANY COMPONENT PART THEREOF OR ANY OTHER GOODS OR SERVICES THAT CHIEF MANUFACTURES, FABRICATES, PRODUCES, SELLS OR PROVIDES TO THE DEALER OR THE ORIGINAL OWNER PURSUANT TO THE TERMS OF ANY ACCEPTED PURCHASE ORDER, INCLUDING WITHOUT LIMITATION ANY REPRESENTATION OR WARRANTY WITH RESPECT TO DESIGN, CONDITION, MERCHANTABILITY OR FITNESS OF THE PRODUCT OR ANY OTHER GOODS OR SERVICES FOR ANY PARTICULAR PURPOSE OR USE.**
- B. Limitation on Liability. **EXCEPT AS IS OTHERWISE EXPRESSLY SET FORTH IN SECTION 6 ABOVE, CHIEF'S LIABILITY TO THE DEALER AND/OR THE ORIGINAL OWNER WITH RESPECT TO ANY DEFECTS IN ANY PRODUCTS OR FOR ANY OTHER GOODS OR SERVICES WHICH DO NOT CONFORM TO THE WARRANTIES SET FORTH ABOVE SHALL NOT, IN ANY EVENT, EXCEED THE ACTUAL COST OF SUCH NON-**

CONFORMING PRODUCT, GOODS OR SERVICES AS DETERMINED PURSUANT TO THE ACCEPTED PURCHASE ORDER; AND

- C. **Limitation on the Nature of Damages.** EXCEPT AS EXPRESSLY PROVIDED IN SECTION 6 ABOVE, CHIEF SHALL NOT, UNDER ANY CIRCUMSTANCES, BE LIABLE TO THE DEALER, THE ORIGINAL OWNER OR ANY THIRD PARTY FOR ATTORNEY FEES COURT COSTS OR ANY OTHER SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, LIQUIDATED OR PUNITIVE DAMAGES OF ANY NAME, NATURE OR DESCRIPTION AS A RESULT OF THE FAILURE OF ANY PRODUCT OR ANY OTHER GOODS OR SERVICES PURCHASED BY THE DEALER OR THE ORIGINAL OWNER FROM CHIEF PURSUANT TO THE ACCEPTED PURCHASE ORDER TO CONFORM TO THE LIMITED WARRANTIES SET FORTH IN SECTION 2 ABOVE.

8. **Applicable Law.** This Limited Product Warranty has been issued, accepted and entered into by the Reseller, the Original Owner and Chief in the State of Nebraska and shall be governed by, and construed in accordance with, the internal laws of the State of Nebraska. Any legal action or proceeding with respect to any goods or services furnished to the Original Owner by Chief in connection herewith, or any document related hereto shall be brought only in the district courts of Nebraska, or the United States District Court for the District of Nebraska, and, by execution and delivery of this Limited Product Warranty, the undersigned Original Owner hereby accept for themselves and with respect to their property, generally and unconditionally, the jurisdiction of the aforesaid courts. Further, the undersigned Original Owner hereby irrevocably waives any objection, including, without limitation, any *forum non conveniens*, which it may now or hereafter have to the bringing of such action or proceeding in such respective jurisdictions.

4843-5948-9057, v. 1

Warning

Water Sensitive Materials - Read this notice carefully

Bundles must be inspected and carrier advised immediately if damage is Important Noted. White rust is a corrosion attack of the zinc coating resulting from the presence of water. Anywhere rust is found will result in a reduction of the life of the galvanized steel.

If water has entered a bundle or if condensation has formed between sheets, the bundle must be opened, the sheets separated and all surfaces dried.

If sheets are to be installed within 10 days:

Store bundled sheets off the ground high enough to allow air circulation beneath bundle and to prevent water from entering. Store 1 end at least 8" (20.32cm) higher than the opposite end. Support long bundles in the center. Prevent rain from entering the bundle by covering with a tarpaulin, making provision for air circulation between the draped edges and the ground.

Do not wrap in plastic.

If sheets are not to be installed within 10 days:

Provide inside dry storage. Storage beyond 6 months is not recommended. If white rust is apparent upon receipt of shipment, notify Chief immediately. Damage to sheets, resulting from improper storage, is the responsibility of the receiver.



Before You Begin

Before starting the installation of the bin, take time to thoroughly study the construction methods in this manual, this will save you time and money.

Chief makes no warranty concerning components, accessories or equipment not manufactured by Chief.

When using a cutting torch or welding galvanized material, the possibility of developing toxic fumes will exist. Provide adequate ventilation and respiratory protection when using this type of equipment during installation.

Introduction

Thank you for purchasing a Chief grain bin. Proper installation and operation will ensure you the best overall experience with your grain bin and guarantee smooth operation.

This proprietary information is loaned with the expressed agreement that the drawings and information therein contained are the property of Chief Industries, Inc. and will not be reproduced, copied, or otherwise disposed of, directly or indirectly, and will not be used in whole or in part to assist in making or to furnish any information for the making of drawings, prints or other reproduction hereof, or for the making of additional products or equipment except upon written permission of Chief Industries, Inc. first obtained and specific as to each case. The acceptance of this material will be construed as an acceptance of the foregoing agreement.

The technical data contained herein is the most recent available at the time of publication and is subject to modification without notice. Chief Industries, Inc. reserves the right to modify the construction and method of operation of their products at any time without any obligation on their part to modify any equipment previously sold and delivered.

Model Number Description

The model nomenclature distinguishes the application of the grain bin. The information includes a designation of the applicable structure diameter, eave height, roof design and design criteria utilized. The definition of the model number nomenclature is as follows:

Example: CB 11 - 08 - V Rib - SZA
 (a) (b) - (c) - (d) - (e)

(a) CB = Chief Bin

(b) 11 = Grain Bin Diameter

Where: 11 = 11 sheets in circumference

(c) 08 = Grain Bin Eave Height

Where: 08 = 08 sheets in height

(d) J Rib = Roof Design Type

Where: J Rib = J Rib design

Where: V Rib = V Rib design

(e) Grain Bin Design Criteria for seismic and wind

Important Note: Prior to starting the installation it is very important to plan ahead and verify the order and location of all bin components. This includes:

- Roof vents and manways
- Ladder, platform and spiral stair components
- Aeration components
- Upgraded stiffener locations for material handling support structures

When installing hardware the minimum and maximum torque values shown below must be followed. All hardware must seat tight against the corresponding component.

Bolt Diameter	Minimum Torque	Maximum Torque
5/16" (.79cm)	22 ft.-lbs.	28 ft.-lbs.
7/16" (1.11cm)	60 ft.-lbs.	75 ft.-lbs.
1/2" (1.27cm)	50 ft.-lbs.	58 ft.-lbs.
5/8" (1.58cm)	105 ft.-lbs.	121 ft.-lbs.
3/4" (1.90cm)	175 ft.-lbs.	201 ft.-lbs.

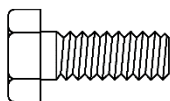
Please note the following wrench / socket size to be used on the corresponding hardware:

Bolt Size	Head Size	Nut Size
5/16"	1/2" wrench	1/2" wrench
7/16"	5/8" wrench	11/16" wrench
1/2"	3/4" wrench	3/4" wrench
5/8"	15/16" wrench	15/16" wrench
3/4"	1-1/8" wrench	1-1/8" wrench

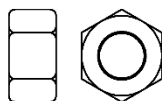
Part Identification

Use the following information to identify parts used during installation.

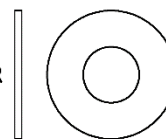
3/4" X 2"
BOLT
#019046



3/4" NUT
#540205



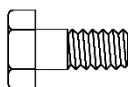
3/4"
FLAT WASHER
#753269



5/8" X 3"
BOLT
#385317



5/8" X 1-1/2"
BOLT
#963175



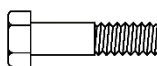
5/8" NUT
#964405



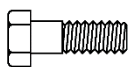
5/8"
FLAT WASHER
#820738



1/2" X 2"
BOLT
#708016



1/2" X 1-1/2"
BOLT
#464842



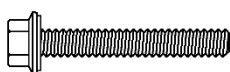
1/2" NUT
#963481



1/2"
FLAT WASHER
#708289



7/16" X 3"
BIN BOLT
#101703



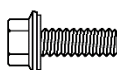
7/16" X 2"
BIN BOLT
#820878



7/16" X 1-1/2"
BIN BOLT
#820944



7/16" X 1-1/4"
BIN BOLT
#960811



7/16" WHIZ
FLANGE NUT
#501635



5/16" X 1-1/4"
BIN BOLT
#820605



5/16" X 1"
BIN BOLT
#820588



5/16" X 3/4"
BIN BOLT
#820589



5/16" WHIZ
FLANGE NUT
#708206



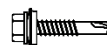
5/16"
FLAT WASHER
#708263



#12-24 X 1-1/2"
SELF- DRILLING
SCREW
#820590



#12-24 X 1-1/4"
SELF- DRILLING
SCREW
#820555



7/16" X 3/4"
SELF TAPPING
SCREW
#708470

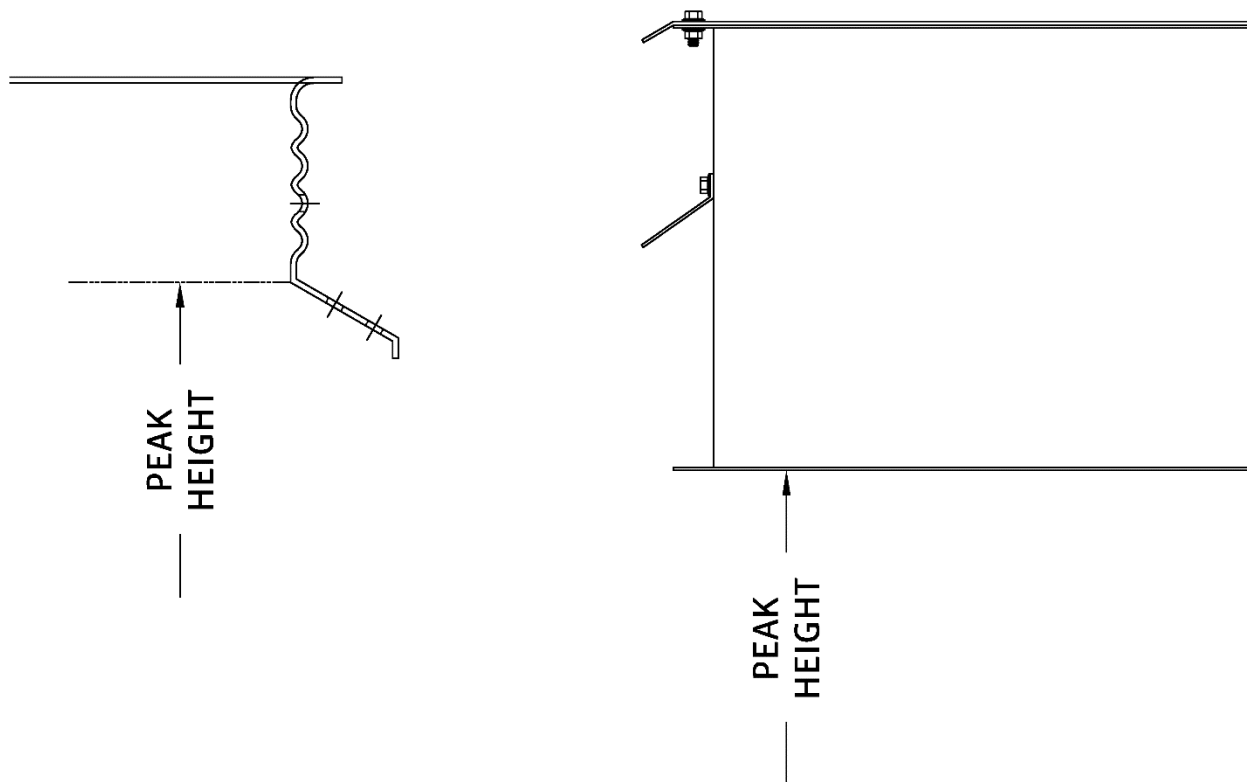


Peak Height for Roof Installation

Position a structure to hold the inner ring at the approximate height, centering the inner ring at the center of the grain bin.

The peak heights listed below are to the bottom of the peak ring with 2 sidewall sheet rings installed. If 1 sidewall sheet ring is desired, deduct 42.50" (107.9cm) from the heights listed below.

Bin Size	Peak Height "CB"	Peak Height "CB-E"
05	11'-2-3/4" (3.42m)	-
06	12'-1-1/2" (3.70m)	-
07	13'-0-1/4" (3.97m)	-
08	13'-11" (4.24m)	13'-7-7/8" (4.16m)
09	14'-9-5/8" (4.51m)	14'-6-1/4" (4.43m)
10	15'-10-5/8" (4.84m)	15'-6-3/4" (4.74m)
11	16'-9-1/4" (5.11m)	-
12	17'-8" (5.38m)	17'-3-3/8" (5.27m)
14	17'-9-3/8" (5.42m)	17'-3-3/4" (5.28m)
16	19'-6-1/2" (5.96m)	19'-0-1/2" (5.80m)

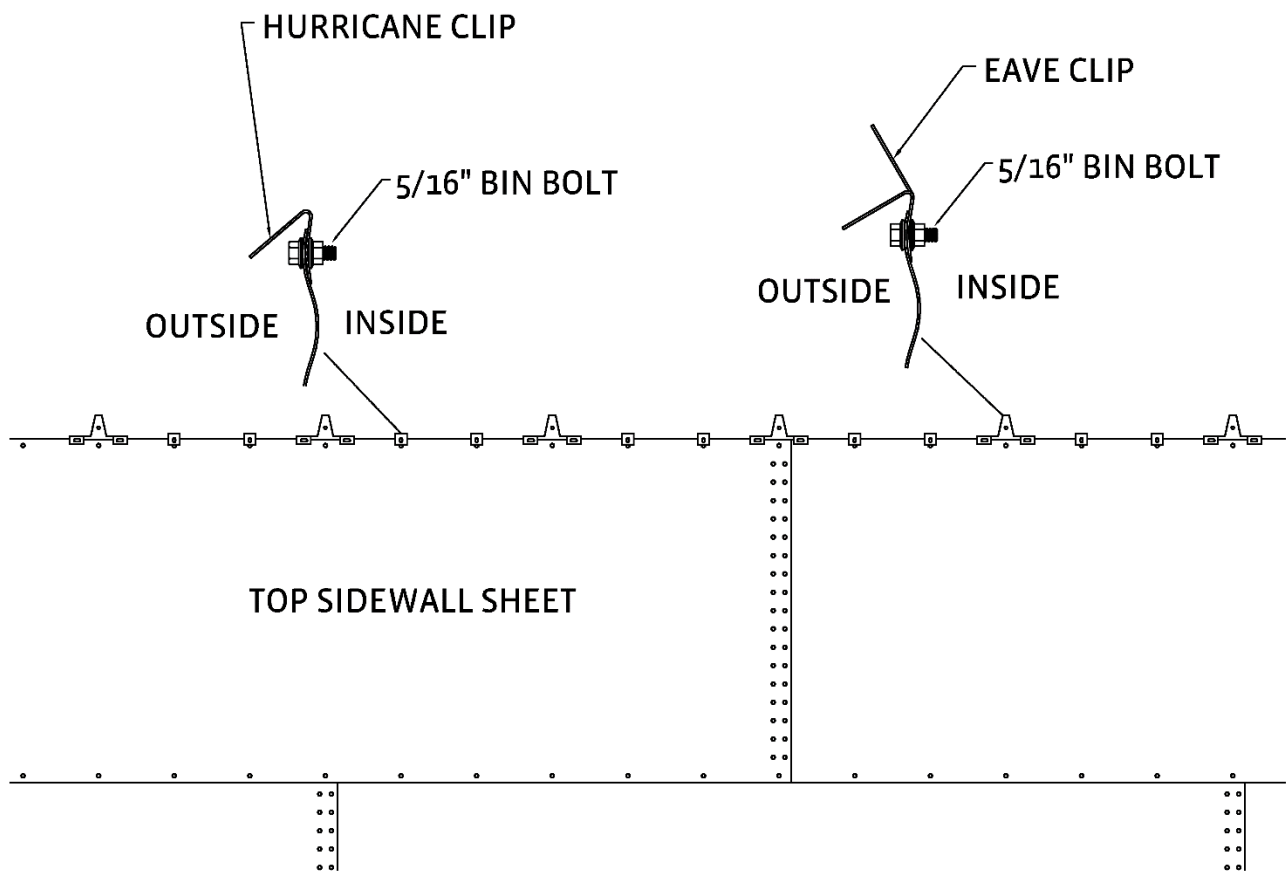
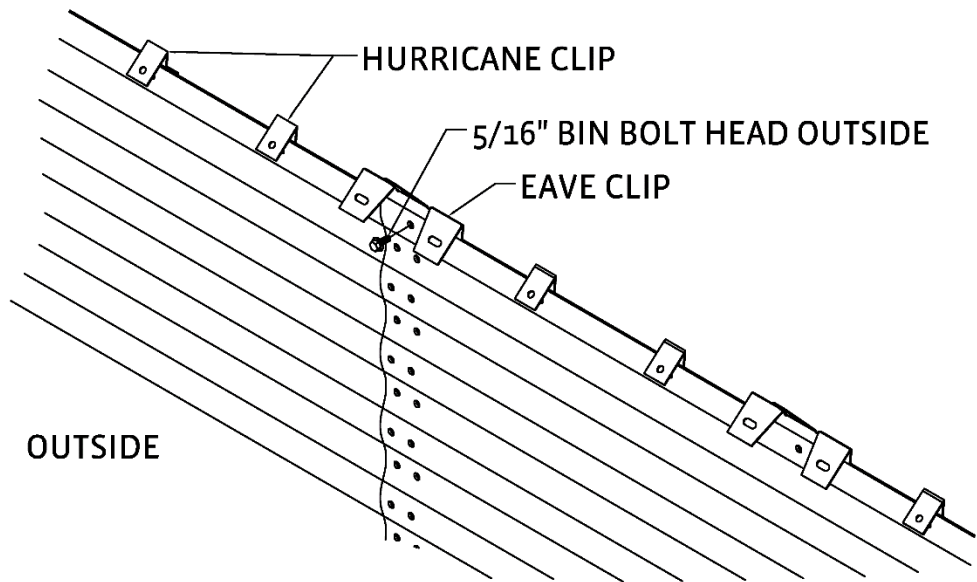


Installation Procedures

Prior to the installation of the roof components, assemble the top 2 sidewall rings and stiffeners according to the instructions found in the grain bin installation manual. Refer to the Chief grain bin installation manual for specific instructions.

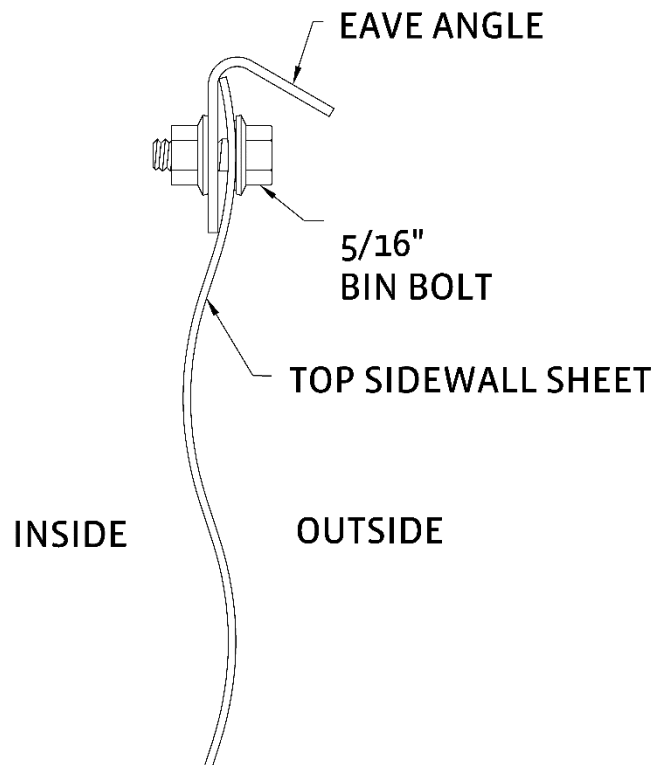
Standard bin sizes require eave clips at the top sidewall location. Selected bin sizes and upgrade packages will require a top angle at the top sidewall location. Refer to the [standard and upgrade loading charts](#) for additional details.

If applicable attach the hurricane and eave clips at the top sidewall location as shown in the following illustrations. Eave clips are installed starting on a vertical seam using 5/16"x1" (.79x2.54cm) bolts. The eave clips will be located every 3rd hole on the top angle. The hurricane clips are required in all remaining holes using 5/16"x1" (.79x2.54cm) bolts.

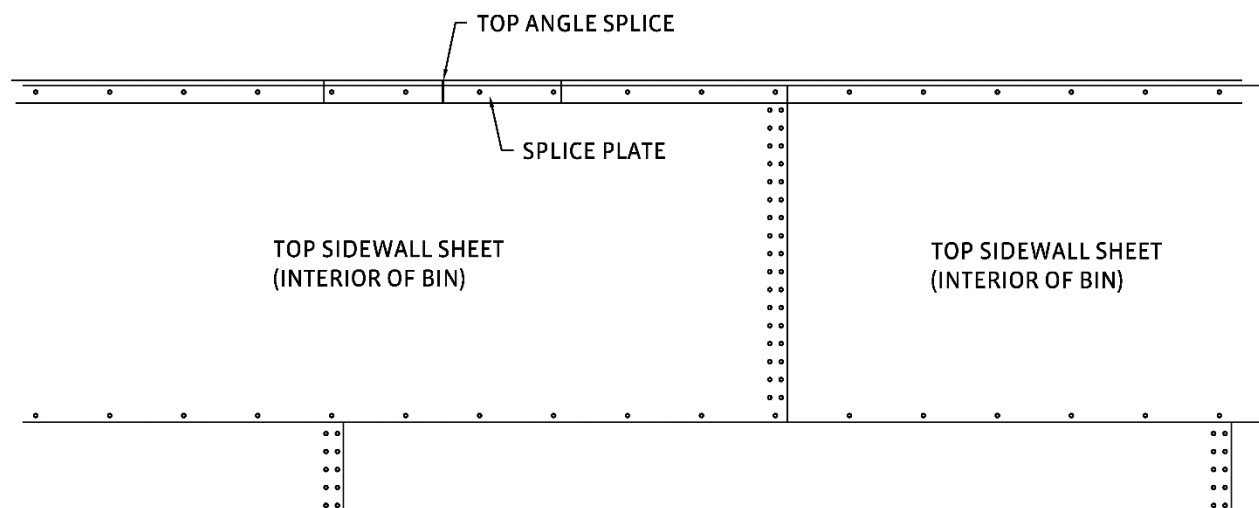


If applicable attach the top angle to the inside of the top sidewall ring using 5/16"x1" (.79x2.54cm) bolts.

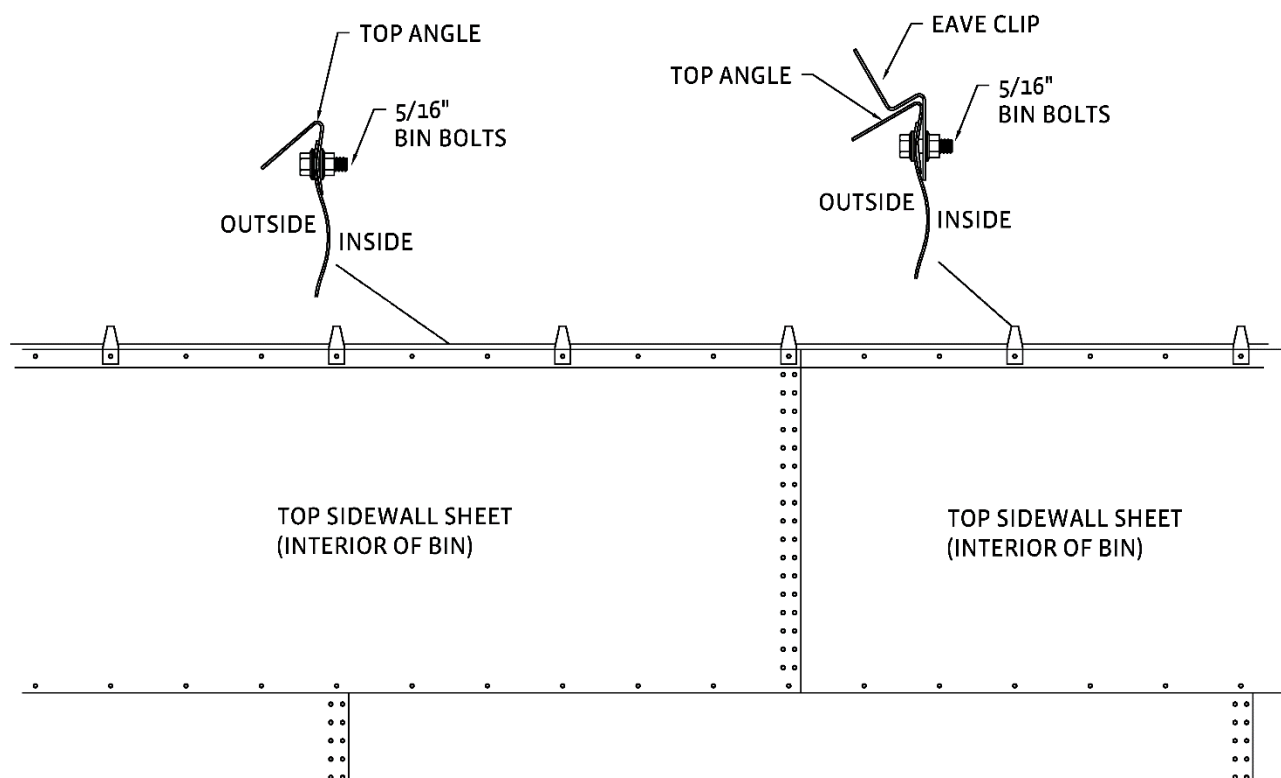
Important Note: There is 1 top angle per sidewall sheet.



On the bin interior, attach a splice plate where the top angle splices are located and fasten using the 5/16"x1" (.79x2.54cm) bolts from the top angle.



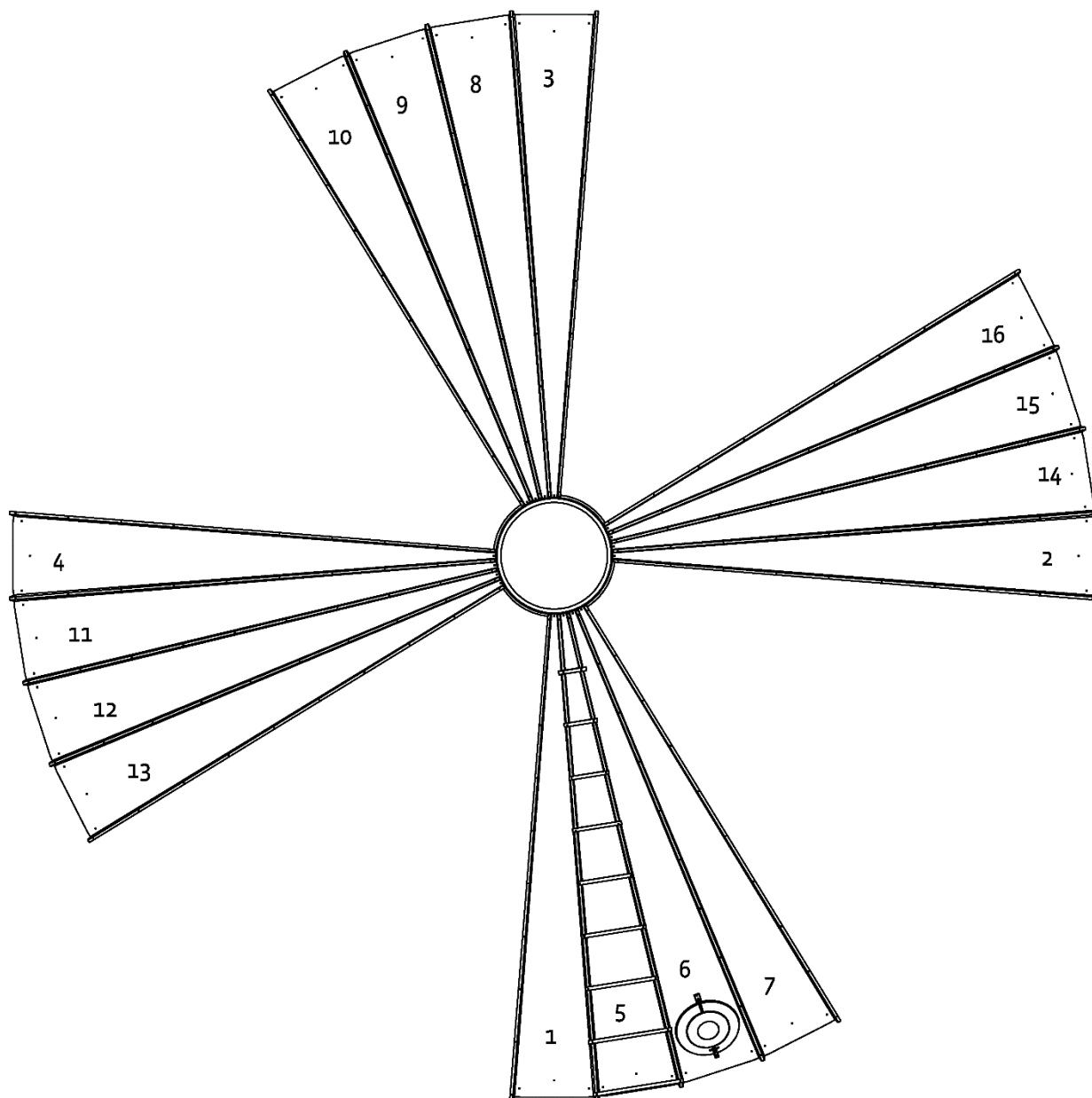
Next attach the eave clips starting on a vertical seam. The eave clips will be located every 3rd hole on the top angle. The eave clips will utilize the 5/16"x1" (.79x2.54cm) bolts from the top angle.



CB05-CB12 Installation

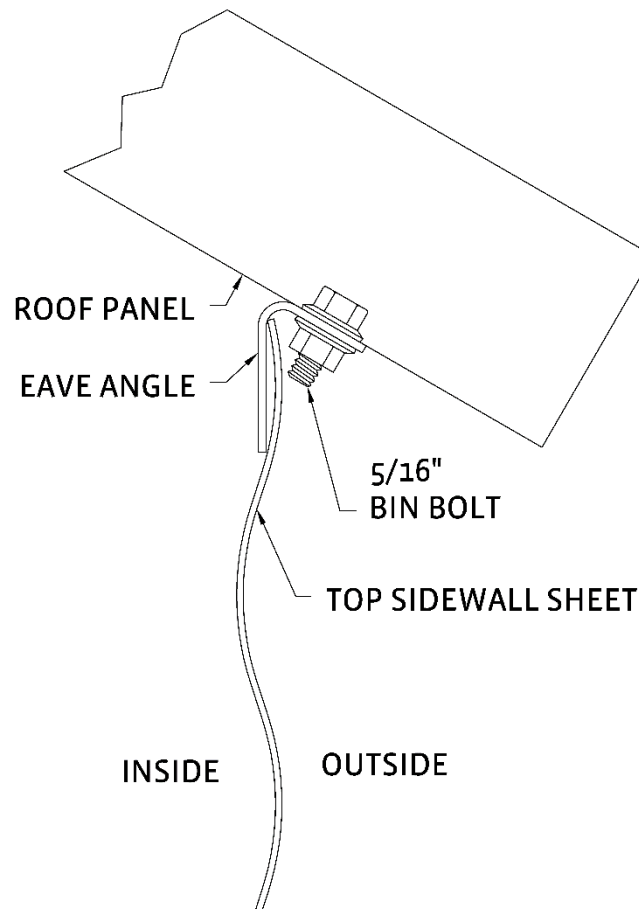
For ease of opening the top lid the roof ladder should be placed approximately 90 degrees from the hinge holes located in the side of the top ring. Choose the ladder location at this time and turn the inner ring accordingly.

Initially install 4 panels in 4 locations that are spaced 90 degrees apart as shown in the following illustration.

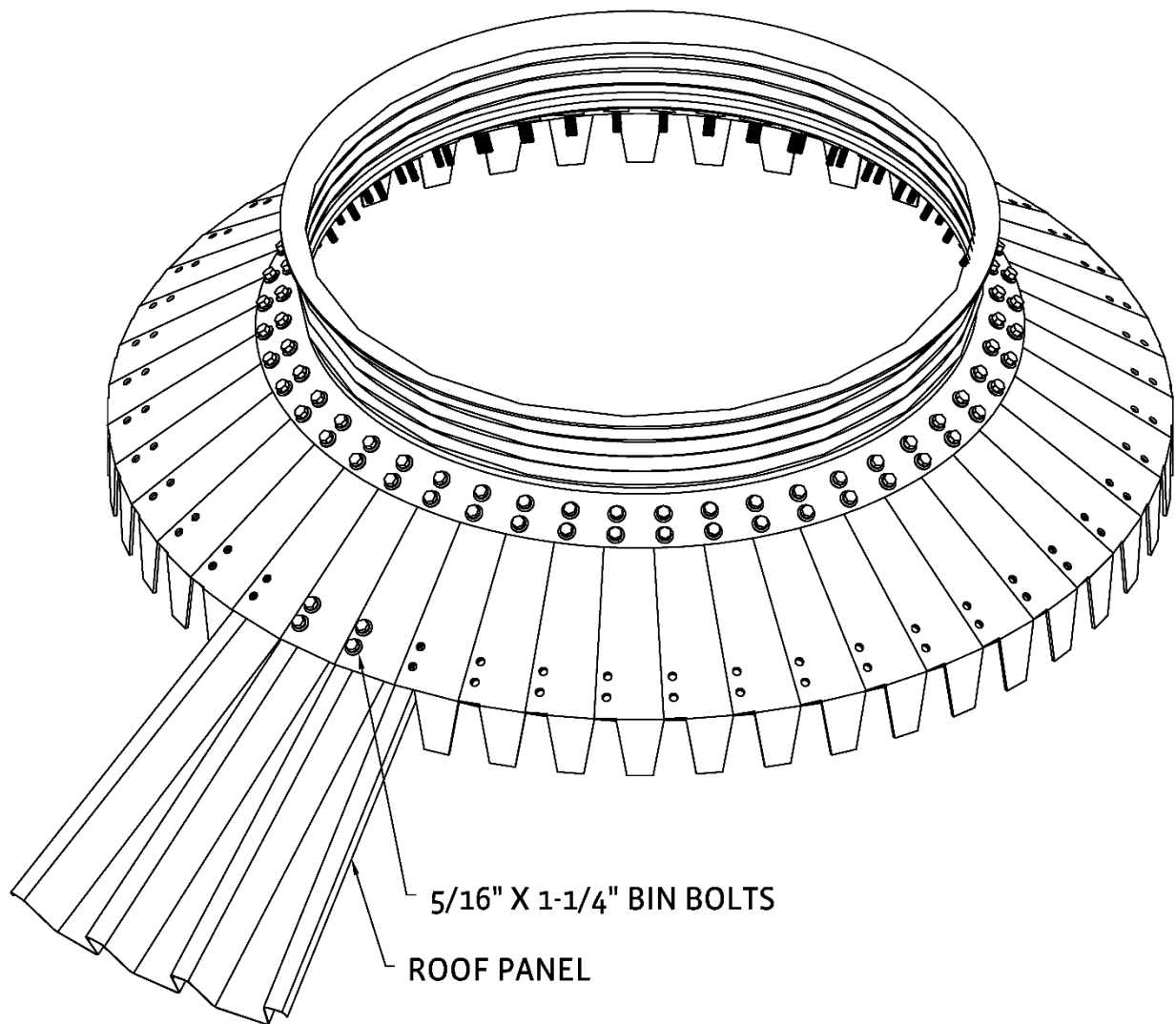


At the sidewall location bolt the wide end of the roof panel to the top angle / hurricane clips. Refer to the [standard and upgrade loading charts](#) for additional details.

As each roof panel is set into place, insert an alignment punch through the hole in the rib at the bottom of each roof panel. Temporarily clamp the two roof panels together with vise grips so that the punch can be removed. Insert a 5/16"x1" (.79x2.54cm) bolt and only hand tighten the hardware at this time.



Attach the top end of the roof panel below the roof peak flashing with 5/16" x 1-1/4" (.79x3.17cm) bin bolts with the bolt heads located on the exterior of the bin roof panel.



Important Note: Roof panels will be shipped using 2 different coded bundles. Verify that when installing, panels are used from alternating bundles to assist with ease of assembly.

Install roof panels in a clockwise direction, always working to the left around the bin. Bolt the top of the roof panel ribs together using 5/16"x1" (.79x2.54cm) bin bolts with the heads located on the top of the ribs. Check the peak ring periodically while installing the roof panels to verify the peak ring is level.

After all roof panels have been installed, seal any gaps between the peak ring flashing and roof panels if desired.

As each roof panel is installed bridging rings should be mounted at the correct locations. Refer to the [standard and upgrade loading charts](#) for additional details.

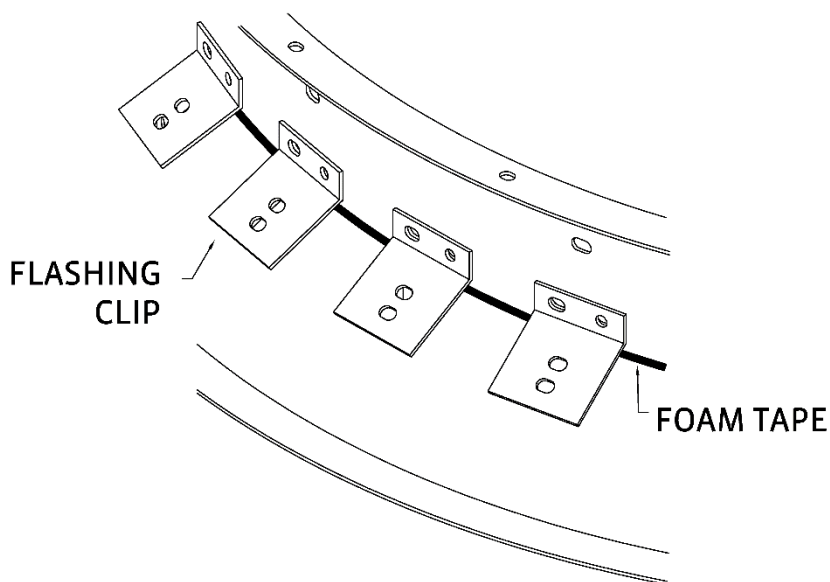
Important Note: Install bridging ring brackets on all roof ribs using 5/16" x 1-1/4" (.79x3.18cm) bin bolts with flat washers located below the roof rib inside the bin.



Important Note: Any additional manhole access panels should be placed evenly around the bin when installing the roof panels.

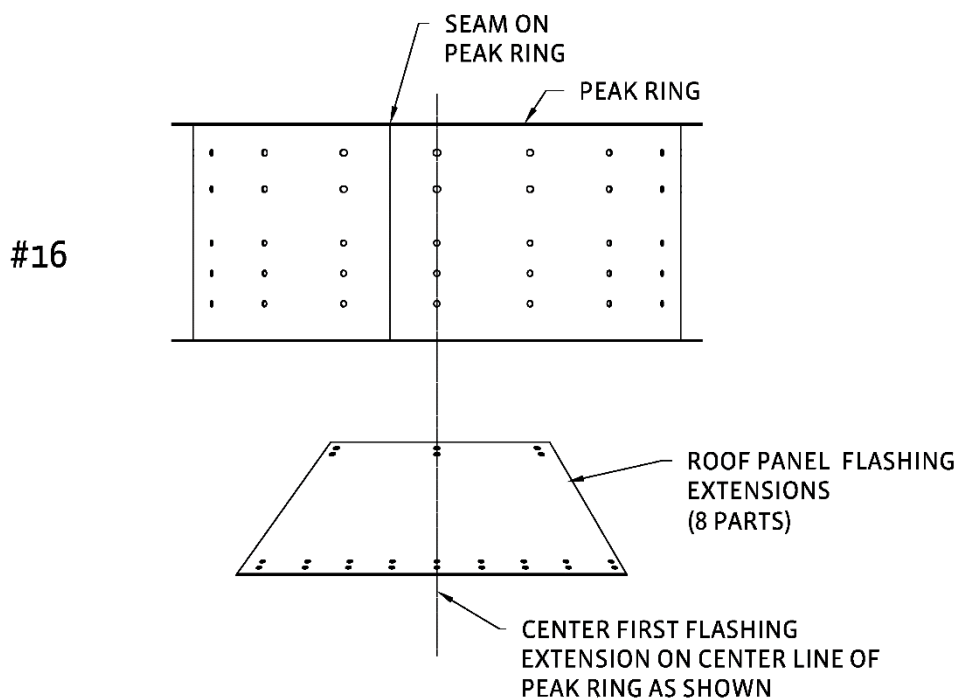
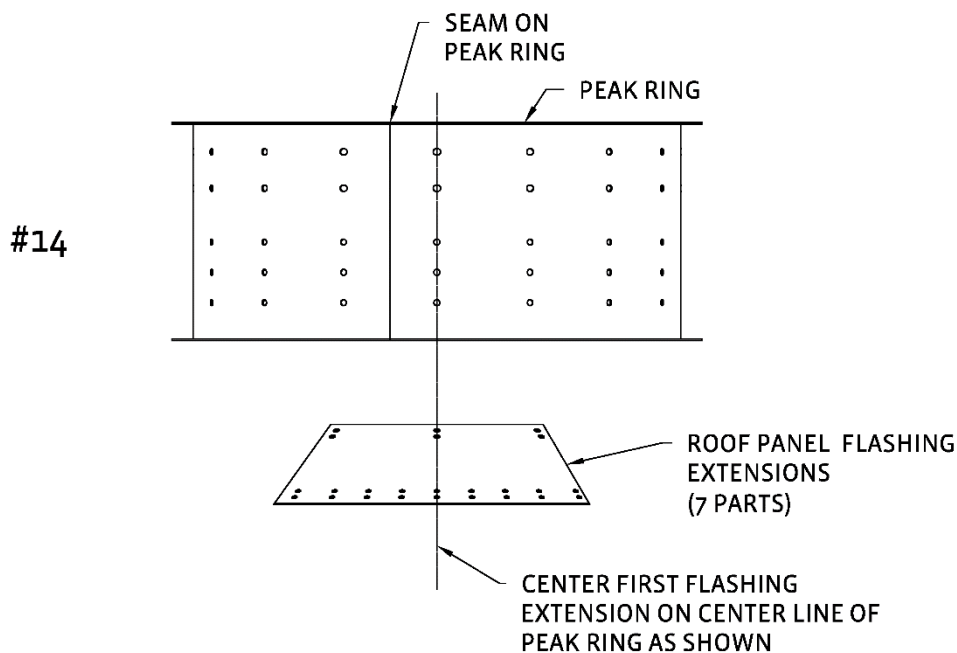
CB14-CB16 Installation

Locate the peak flashing clips and attach these to the peak ring with 7/16" x 1-1/4" (1.11x3.17cm) bin bolts. Place foam tape around the complete perimeter of the peak ring underneath the flashing clips.

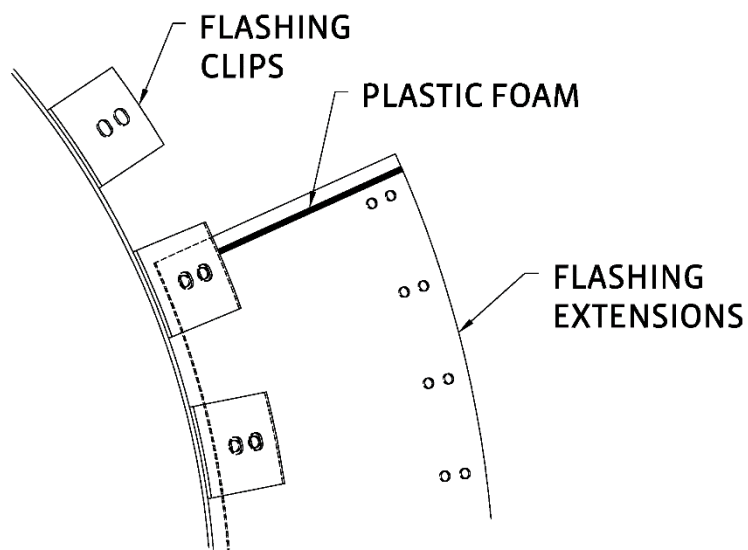


Install the roof panel flashing extensions as shown in the following illustrations. These extensions are installed in a clockwise pattern around the peak with 7/16" x 1-1/4" (1.11x3.17cm) bin bolts.

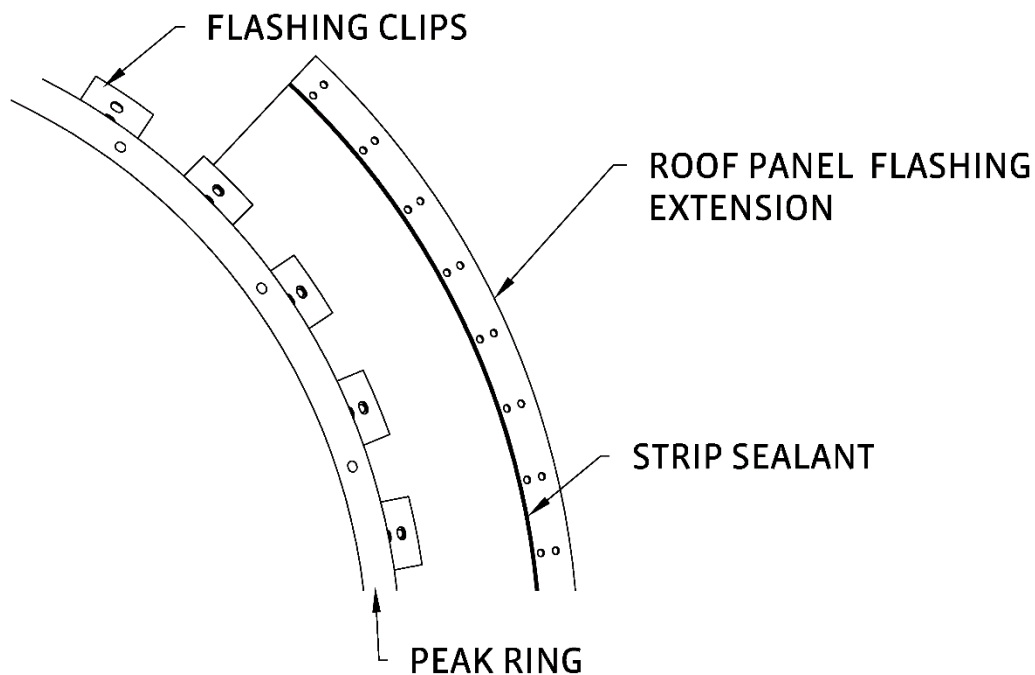
Important Note: Flashing extensions must be oriented properly as shown in the following illustrations to correctly align roof panels.



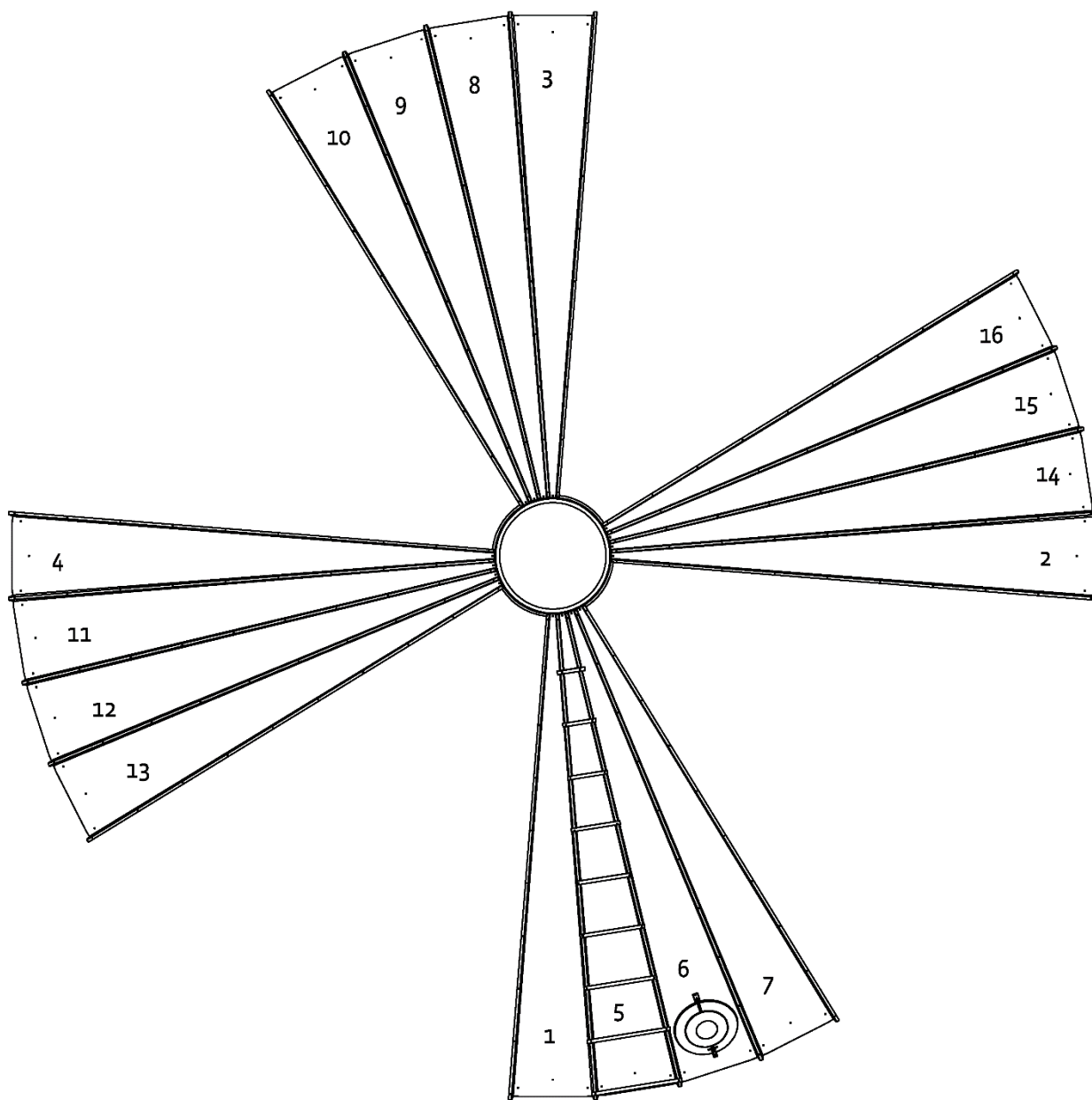
Foam sealant is required on the edge of the flashing extension to create a watertight seal between components.



Place sealant on the roof panel flashing extensions where the top end of the upper roof panel will contact the flashing. Attach the top end of the roof panel with 5/16"x1" (.79x2.54cm) bin bolts with the bolt heads located on the exterior of the bin roof panel. Verify that the upper roof panel rib is aligned with the center of the roof rafter.

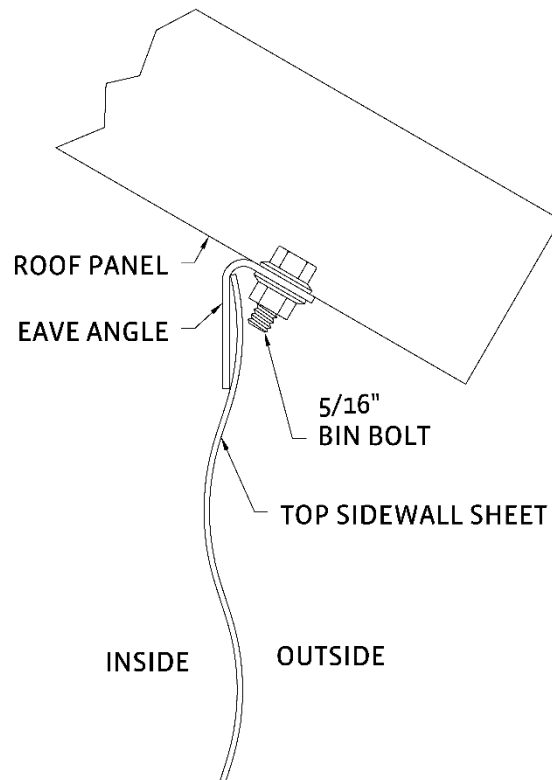


Initially install 4 panels in 4 locations that are spaced 90 degrees apart as shown in the following illustration.

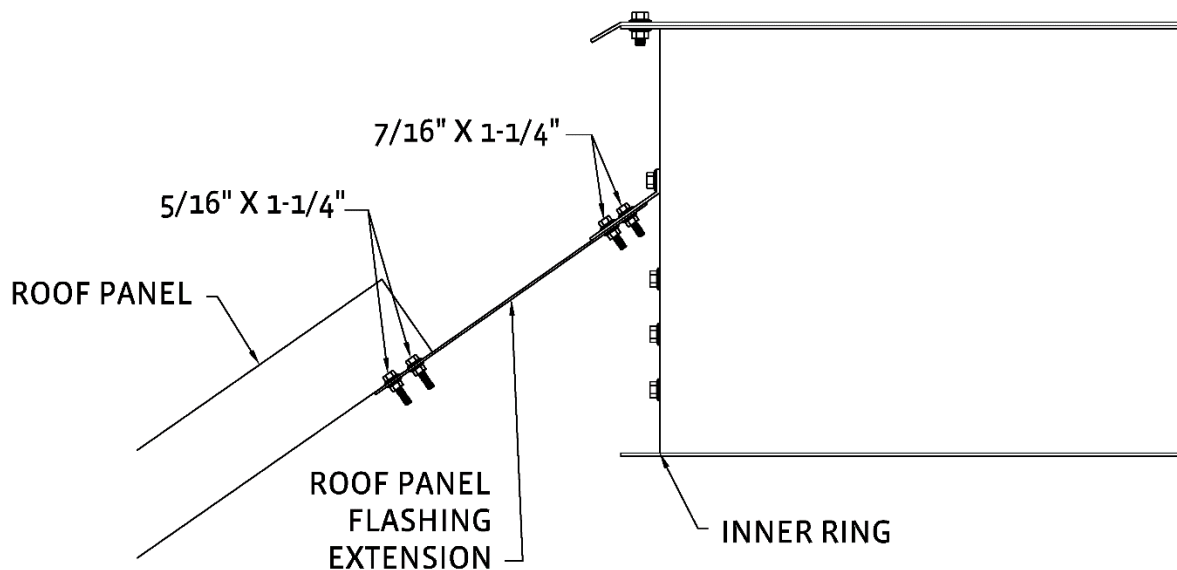


At the sidewall location bolt the wide end of the roof panel to the top angle / hurricane clips. Refer to the [standard and upgrade loading charts](#) for additional details.

As each roof panel is set into place, insert an alignment punch through the hole in the rib at the bottom of each roof panel. Temporarily clamp the two roof panels together with vise grips so that the punch can be removed. Insert a 5/16"x1" (.79x2.54cm) bolt and only hand tighten the hardware at this time.



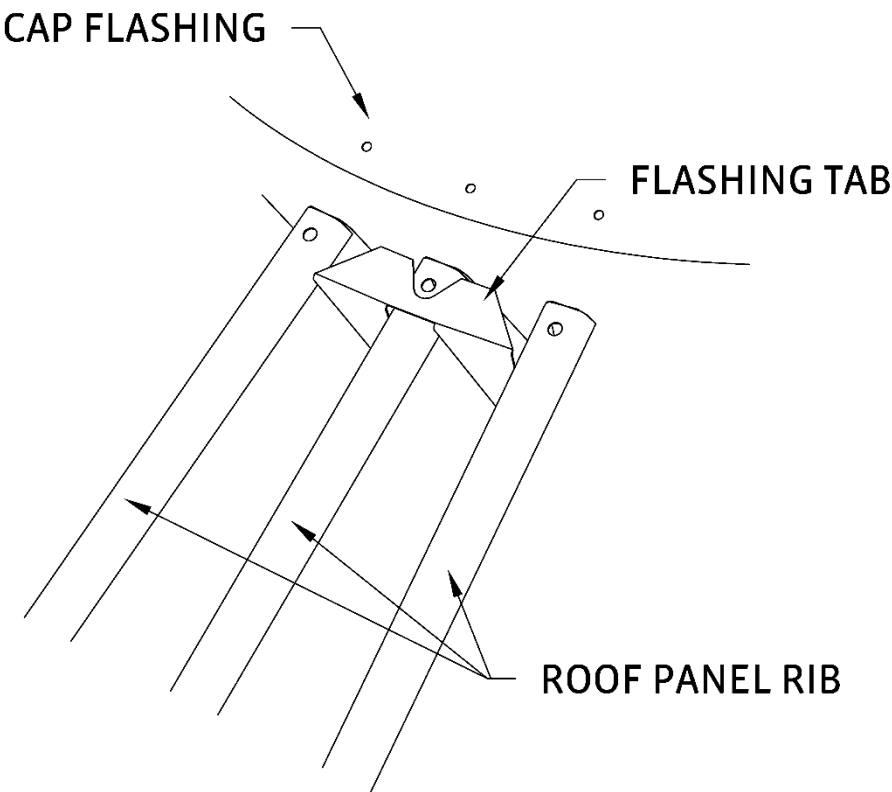
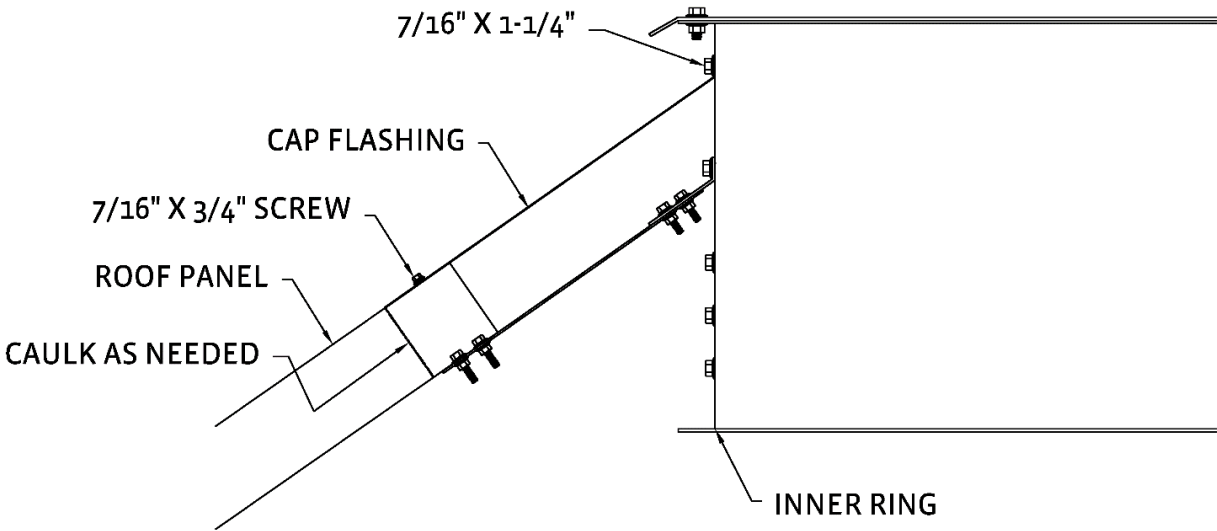
Attach the top end of the roof panel above the roof peak flashing with 5/16" x 1-1/4" (.79x3.17cm) bin bolts with the bolt heads located on the exterior of the bin roof panel.



Continue to install roof panels in a clockwise direction, always working to the left around the bin. Bolt the top of the roof panel ribs together using 5/16"x1" (.79x2.54cm) bin bolts with the heads located on the top of the ribs. Check the peak ring periodically while installing the roof panels to verify the peak ring is level.

Next attach the cap flashing to the inner ring with 7/16" x 1-1/4" (1.11x3.17cm) bin bolts with the bolt heads located on the exterior of the bin roof panel. Position the flashing tabs as shown in the following illustrations under the cap flashing and between roof ribs. The cap flashing and flashing tabs will be secured to the roof panel ribs using 7/16"x3/4" (1.11x1.90cm) screws as shown in the following illustrations. Apply sealant to each overlap of the cap flashing and fasten the overlaps using #12x1.25" self-drilling screws.

After all roof panels have been installed, seal any gaps between the peak ring flashing and roof panels if desired.



As each roof panel is installed bridging rings should be mounted at the correct locations. Refer to the [standard and upgrade loading charts](#) for additional details.

Important Note: Install bridging ring brackets on all roof ribs using 5/16" x 1-1/4" (.79x3.18cm) bin bolts with flat washers located below the roof rib inside the bin.



Important Note: Any additional manhole access panels should be placed evenly around the bin when installing the roof panels.

Reinforcing / Bridging Rings

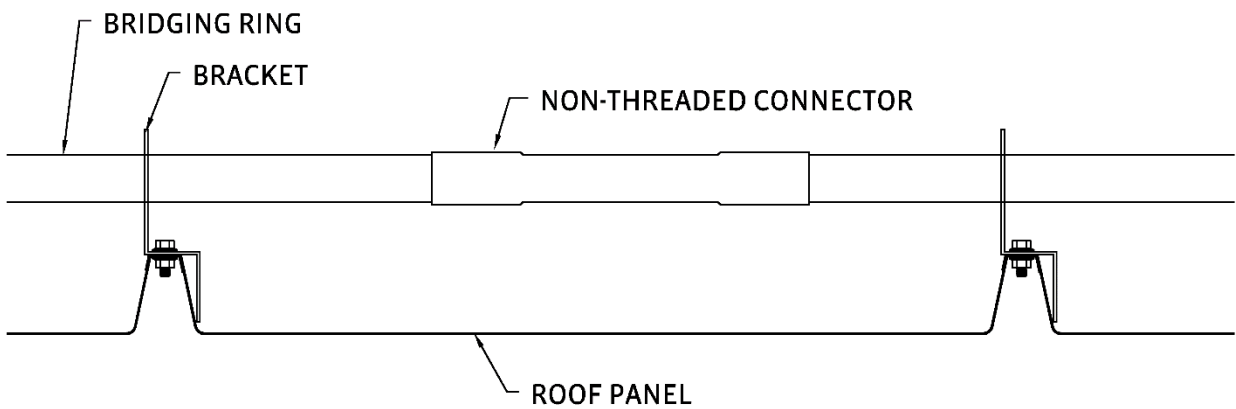
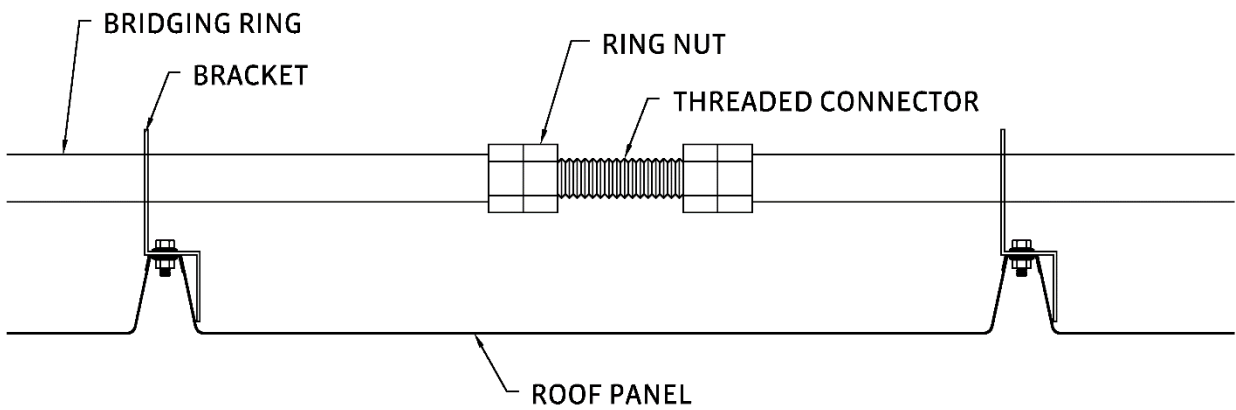
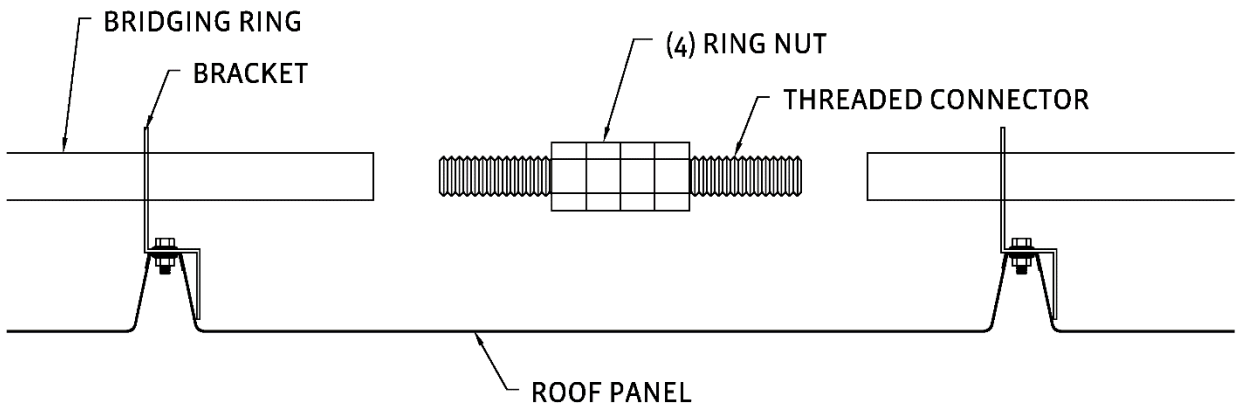
Reinforcing rings or bridging rings are required on various model roofs. Refer to the [standard and upgrade loading charts](#) for additional details. The following chart specifies the proper sequence of ring segments, threaded connectors and non-threaded connectors.

There are (4) 1-1/4" (3.17cm) nuts per threaded connector. Install both nuts centered on the threaded rods before installing them on the roof.

During installation, place a threaded connector into the end of the pipe and add the next pipe. After all reinforcing rings and threaded connectors are installed, expand the threaded connectors equally around the roof until the roof is slightly convex. When the ring is fully expanded, lock the middle nuts against the outside nuts of each splice rod as shown to prevent loosening of the ring.

Important Note: On bins with upper and lower (2) bridging rings, position the ring sections so that the splices on the upper and lower levels are located at 45 degree intervals. Verify that the splices are not located in-line with each other.

Bin Model	Bridging Ring Segments	Threaded Connectors (A)	Non-Threaded Connectors (B)	Sequence of Connectors
CB07 Std. R1	5	2	3	B-A-B-A-B
CB07 Upgrade #1 R1	5	2	3	B-A-B-A-B
CB08 Std. R1	5	2	3	B-A-B-A-B
CB08 Upgrade #1 R1	5	2	3	B-A-B-A-B
CB09 Std. R1	5	2	3	B-A-B-A-B
CB09 Upgrade #1 R1	5	2	3	B-A-B-A-B
CB10 Std. R1	5	2	3	B-A-B-A-B
CB10 Upgrade #1 R1	5	2	3	B-A-B-A-B
CB11 Std. R1	5	2	3	B-A-B-A-B
CB11 Upgrade #1 R1	6	3	3	B-A-B-A-B-A
CB11 Upgrade #1 R2	5	2	3	B-A-B-A-B
CB12 Std. R1	5	2	3	B-A-B-A-B-A
CB12 Upgrade #1 R1	6	3	3	B-A-B-A-B-A
CB12 Upgrade #1 R2	5	2	3	B-A-B-A-B-A
CB12 Upgrade #2 R1	6	3	3	B-A-B-A-B-A
CB12 Upgrade #2 R2	5	2	3	B-A-B-A-B
CB12 Upgrade #2 R3	5	2	3	B-A-B-A-B
CB14 Std. R1	7	3	4	B-A-B-A-B-A-B
CB14 Std. R2	6	3	3	B-A-B-A-B-A
CB14 Upgrade #1 R1	7	3	4	B-A-B-A-B-A-B
CB14 Upgrade #1 R2	6	3	3	B-A-B-A-B-A
CB14 Upgrade #2 R1	7	3	4	B-A-B-A-B-A-B
CB14 Upgrade #2 R2	6	3	3	B-A-B-A-B-A
CB14 Upgrade #2 R3	5	2	3	B-A-B-A-B
CB16 Std. R1	7	3	4	B-A-B-A-B-A-B
CB16 Std. R2	6	3	3	B-A-B-A-B-A
CB16 Upgrade #1 R1	8	4	4	B-A-B-A-B-A-B-A
CB16 Upgrade #1 R2	7	3	4	B-A-B-A-B-A-B
CB16 Upgrade #1 R3	6	3	3	B-A-B-A-B-A
CB16 Upgrade #2 R1	8	4	4	B-A-B-A-B-A-B-A
CB16 Upgrade #2 R2	7	3	4	B-A-B-A-B-A-B
CB16 Upgrade #2 R3	6	3	3	B-A-B-A-B-A
CB16 Upgrade #2 R4	5	2	3	B-A-B-A-B



Reinforcing rings or bridging rings are located at various locations on the roof. Refer to the following chart for the proper location of the reinforcing rings.

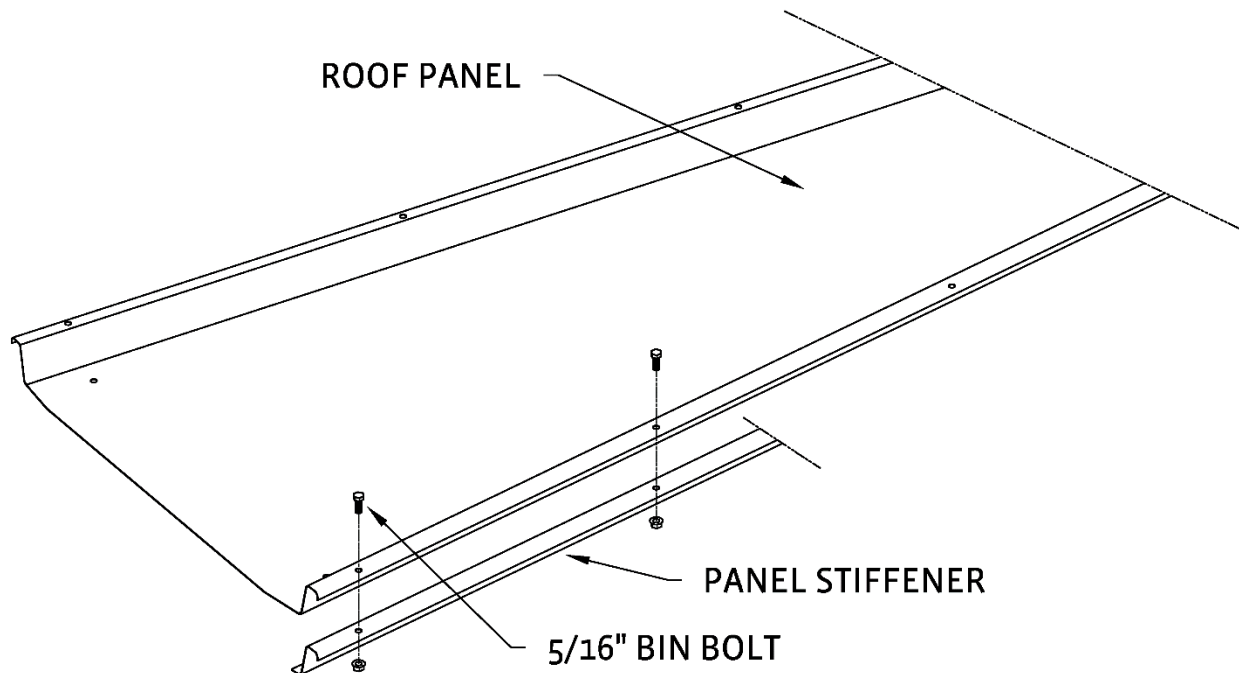
Standard and Upgrade Loading Charts

Standard Roof									
Bin Model Standard	Peak Capacity (LBS)	ASCE 7-10 Ground Snow Load	NBCC 2015 Specified Roof Snow Load	Rib Height	Eave Angle	Ring 1	Ring 2	Ring 3	Ring 4
						(Number of Holes Up From Eave)			
CB05	3,500	75 psf	50 psf (2.39 kpa)	2.5"	-	-	-	-	-
CB06	3,500	75 psf	50 psf (2.39 kpa)	2.5"	-	-	-	-	-
CB07	3,500	70 psf	47 psf (2.25 kpa)	2.5"	-	-	-	-	-
CB08	6,000	42 psf	32 psf (1.53 kpa)	2.5"	-	-	-	-	-
CB09	6,000	32 psf	25 psf (1.20 kpa)	2.5"	-	-	-	-	-
CB10	6,000	51 psf	34 psf (1.63 kpa)	4"	-	5	-	-	-
CB11	6,000	46 psf	31 psf (1.48 kpa)	4"	-	6	-	-	-
CB12	6,000	40 psf	26 psf (1.24 kpa)	4"	-	5	-	-	-
CB14	8,500	37 psf	25 psf (1.20 kpa)	4"	-	4	7	-	-
CB16	8,500	30 psf	20 psf (0.96 kpa)	4"	-	6	9	-	-

Upgrade #1 Roof									
Bin Model Standard	Peak Capacity (LBS)	ASCE 7-10 Ground Snow Load	NBCC 2015 Specified Roof Snow Load	Rib Height	Eave Angle	Ring 1	Ring 2	Ring 3	Ring 4
						(Number of Holes Up From Eave)			
CB05	N/A								
CB06	N/A								
CB07	3,500	88 psf	59 psf (2.82 kpa)	4"	-	3	-	-	-
CB08	6,000	82 psf	55 psf (2.63 kpa)	4"	-	4	-	-	-
CB09	6,000	71 psf	48 psf (2.30 kpa)	4"	-	5	-	-	-
CB10	6,000	67 psf	45 psf (2.15 kpa)	4"	Yes	5	-	-	-
CB11	6,000	75 psf	50 psf (2.39 kpa)	4"	Yes	3	6	-	-
CB12	6,000	60 psf	40 psf (1.92 kpa)	4"	Yes	3	5	-	-
CB14	8,500	42 psf	28 psf (1.34 kpa)	4"	Yes	4	7	-	-
CB16	8,500	42 psf	28 psf (1.34 kpa)	4"	Yes	4	6	9	-

Upgrade #2 Roof									
Bin Model Standard	Peak Capacity (LBS)	ASCE 7-10 Ground Snow Load	NBCC 2015 Specified Roof Snow Load	Rib Height	Eave Angle	Ring 1	Ring 2	Ring 3	Ring 4
						(Number of Holes Up From Eave)			
CB05	N/A								
CB06	N/A								
CB07	N/A								
CB08	N/A								
CB09	N/A								
CB10	N/A								
CB11	N/A								
CB12	6,000	65 psf	44 psf (2.11 kpa)	4"	Yes	3	5	8	-
CB14	8,500	60 psf	40 psf (1.92 kpa)	4" ***	Yes	4	7	10	-
CB16	8,500	55 psf	37 psf (1.77 kpa)	4" ***	Yes	4	6	9	12

Important Note: Bin models that reference (***) designate additional rib stiffeners are required on every roof panel rib as shown in the following illustration.



Accessory Installation

Roof Peak Filler Lid

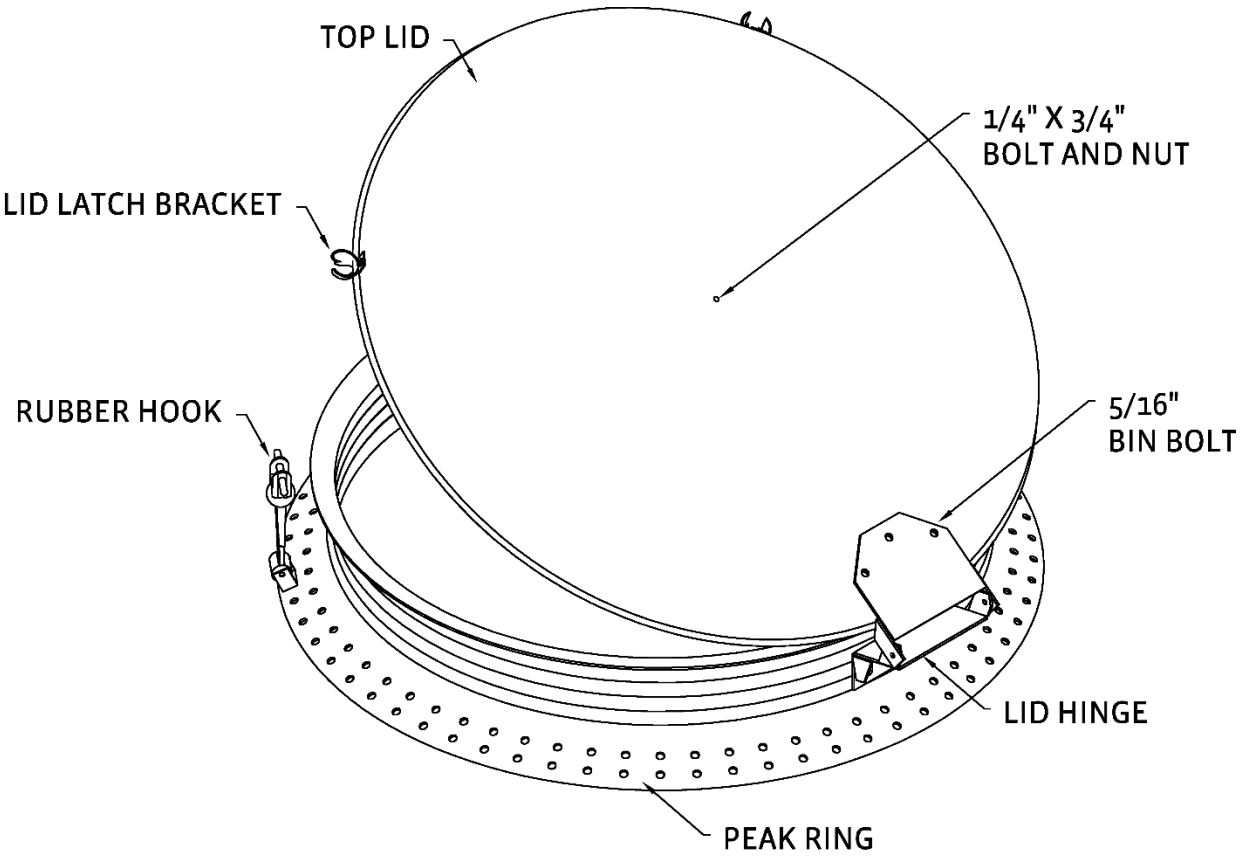
Install the top lid by first bolting the lower hinge bracket to the (3) pre-punched holes on the peak ring using 5/16"x1" (.79x2.54cm) bin bolts and nuts. Bolt heads will be to the interior surface of the peak ring.

Next bolt the upper hinge bracket to the lower hinge bracket using 1/4" x 3/4" (.64x1.90cm) bin bolts. Attach double nuts so the hinge is secure while still allowing the hinge to rotate.

Next bolt the upper lid hinge bracket to the lid using (3) 5/16"x1" (.79x2.54cm) bin bolts and nuts. Bolt heads will be to the interior surface of the bin lid.

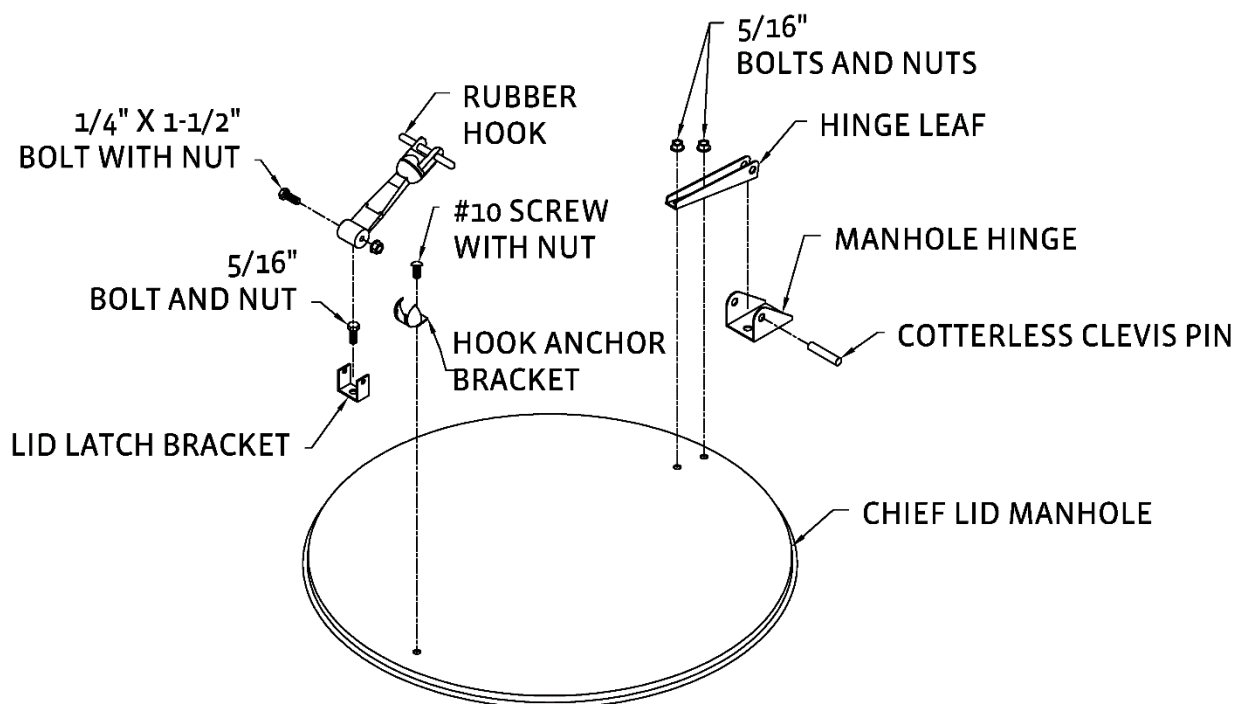
Next bolt the lid latch brackets at the pre-punched holes in the side of the peak ring using a #10 machine screw and nut.

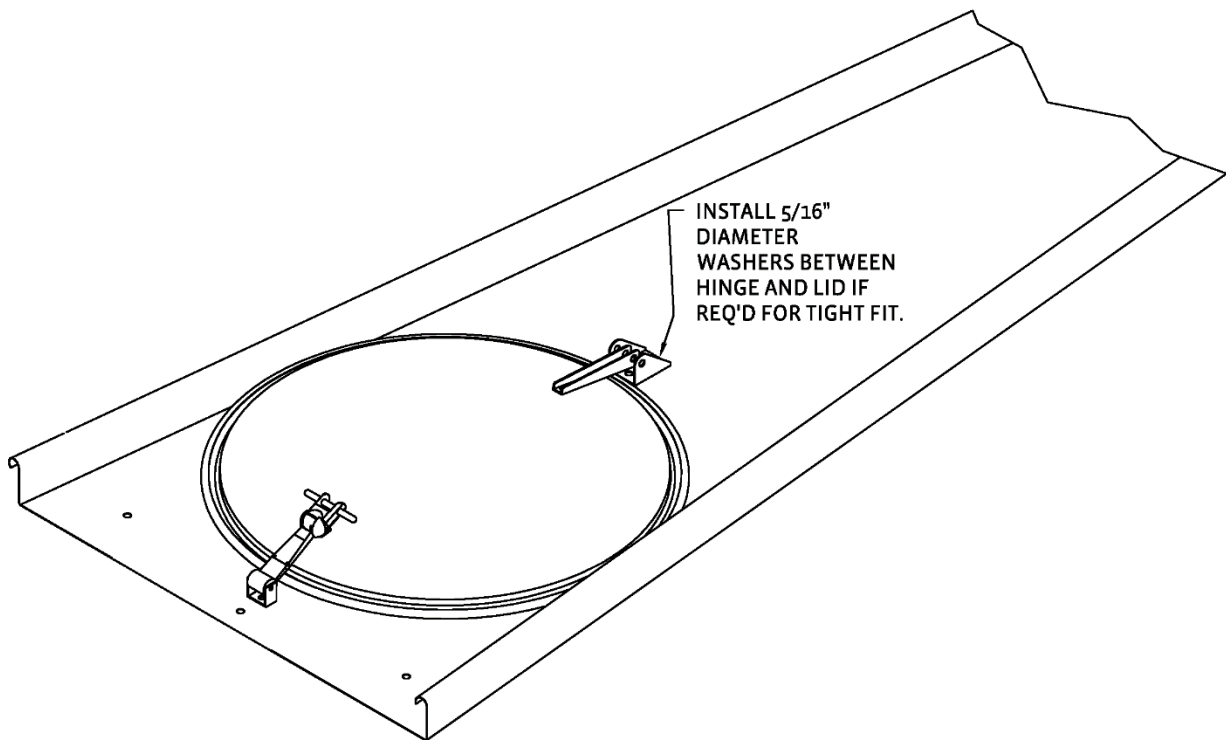
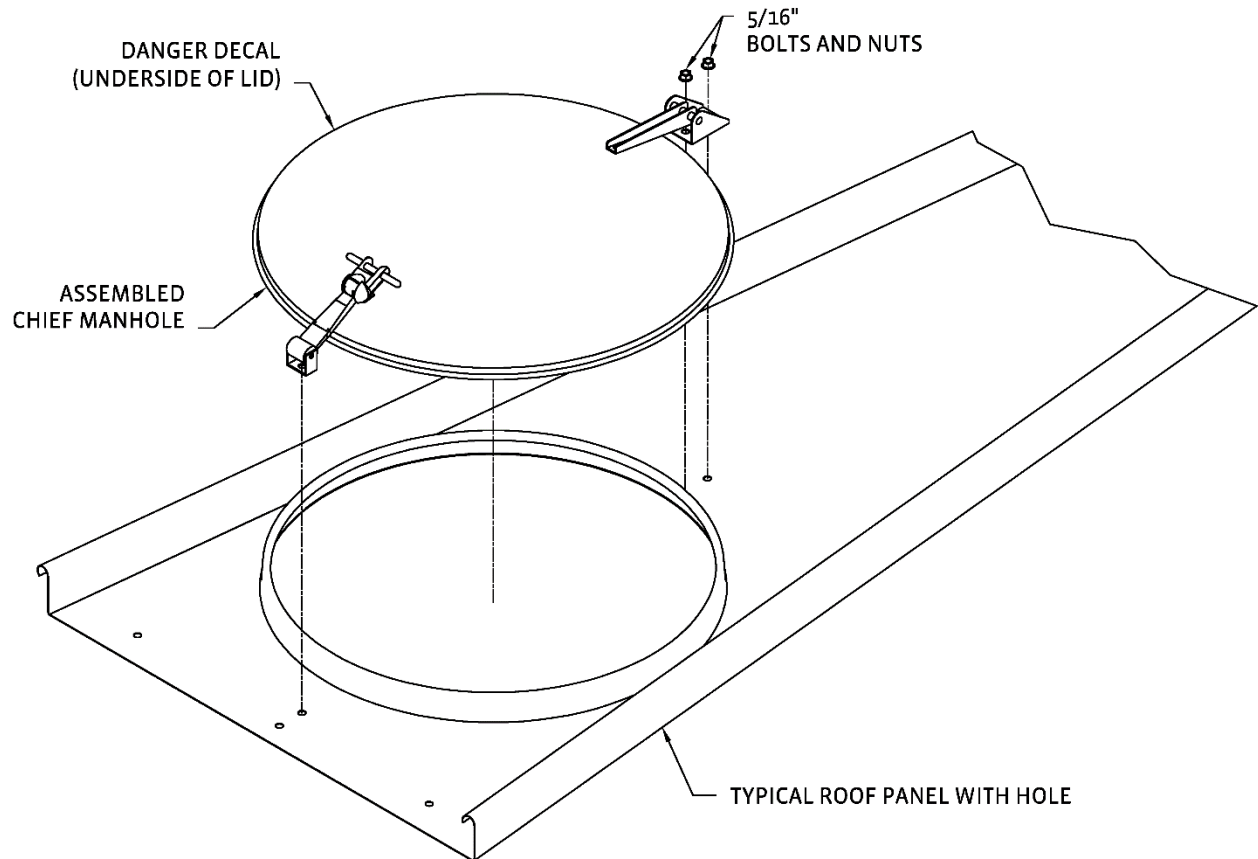
Next attach the hook anchor brackets on top of the roof panel using the same bolts that attach the roof panel to the peak ring. Attach the rubber hooks to the hook anchor brackets using a 1/4" x 1-1/4" (.64x3.18cm) bolt and nut.



Manhole Cover

Install the manhole cover as shown in the following illustrations. Verify that the hinge is located towards the bin peak. Secure the manhole cover with 5/16"x1" (.79x2.54cm) bin bolts. The bolts connecting the hinge to the roof panel and the leaf bracket to the manhole cover will have the bolts heads located on the interior of the bin.

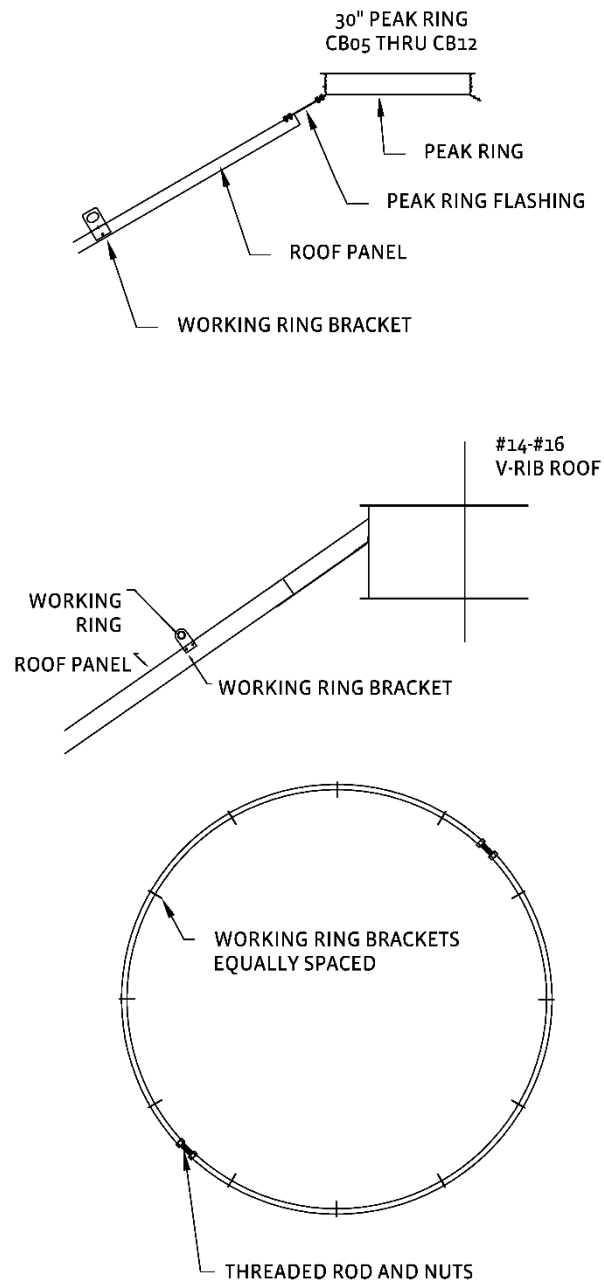




Roof Working Ring

Install the working ring as shown in the following illustrations. The CB05 to CB12 working ring brackets are equally spaced around the ring and located on the 1st hole below the inner ring. The working ring segments will be connected with a threaded rod and 2 nuts, and must be expanded as needed to allow the ring to fit tightly against the brackets. Secure the working ring brackets to the roof panel ribs with 5/16"x1" (.79x2.54cm) bin bolts.

Important Note: The CB14 and CB16 model roofs utilizes a 3 piece working ring, all other sizes utilize a 2 piece working ring. The working ring brackets are located in the 2nd hole below the inner ring.

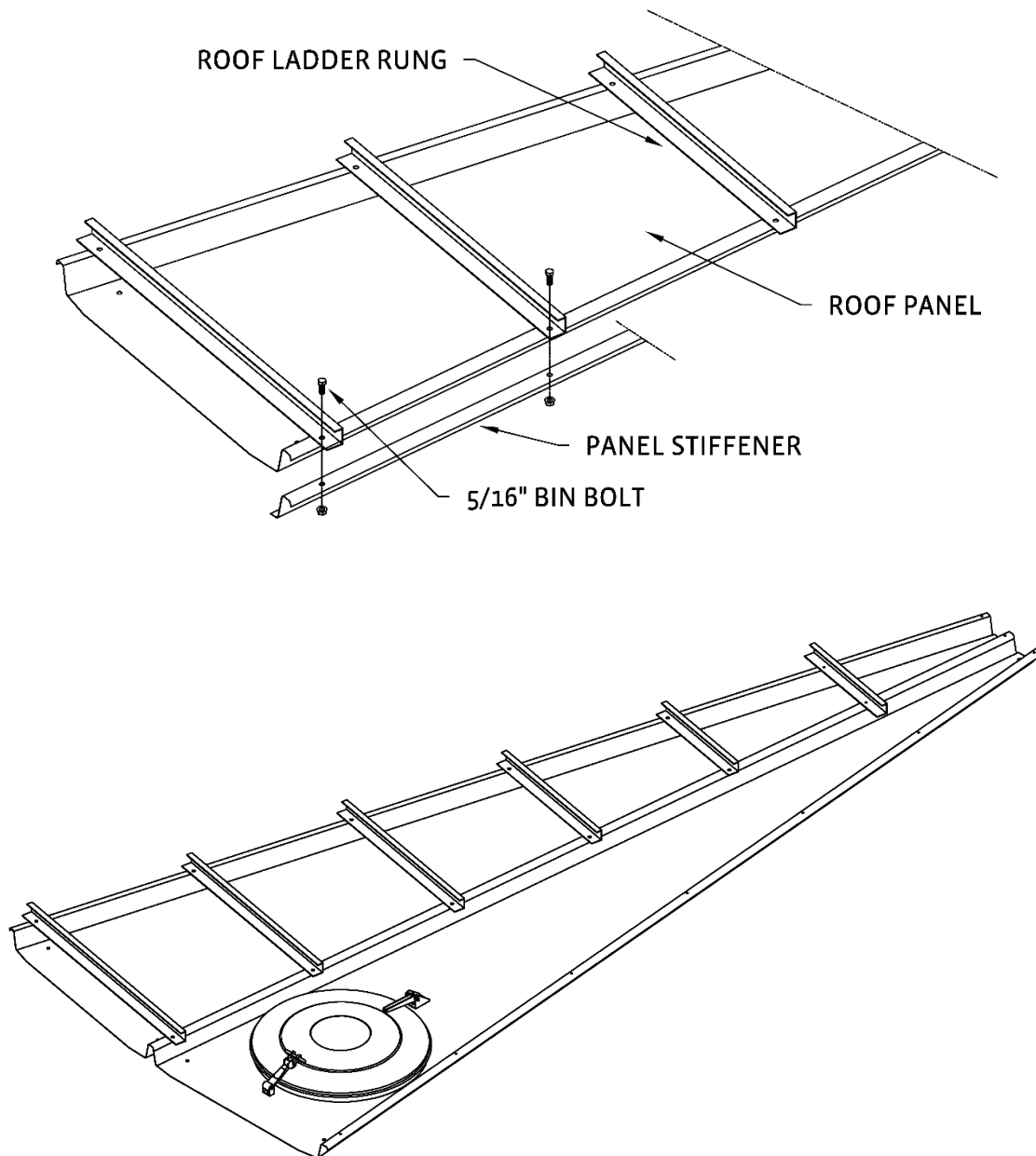


Roof Ladder

Install the roof ladder as shown in the following illustrations. The roof ladder will be located adjacent to the manhole.

Attach the roof ladder rungs to the top of the roof panels using 5/16"x1" (.79x2.54cm) bin bolts. If required, roof panel stiffeners will be located under the roof panels where the ladder rails are located and are attached using the 5/16"x1" (.79x2.54cm) bin bolts from the ladder rungs.

Important Note: Roof panels that contain a roof ladder do not require a ladder rung at the bridging ring locations.

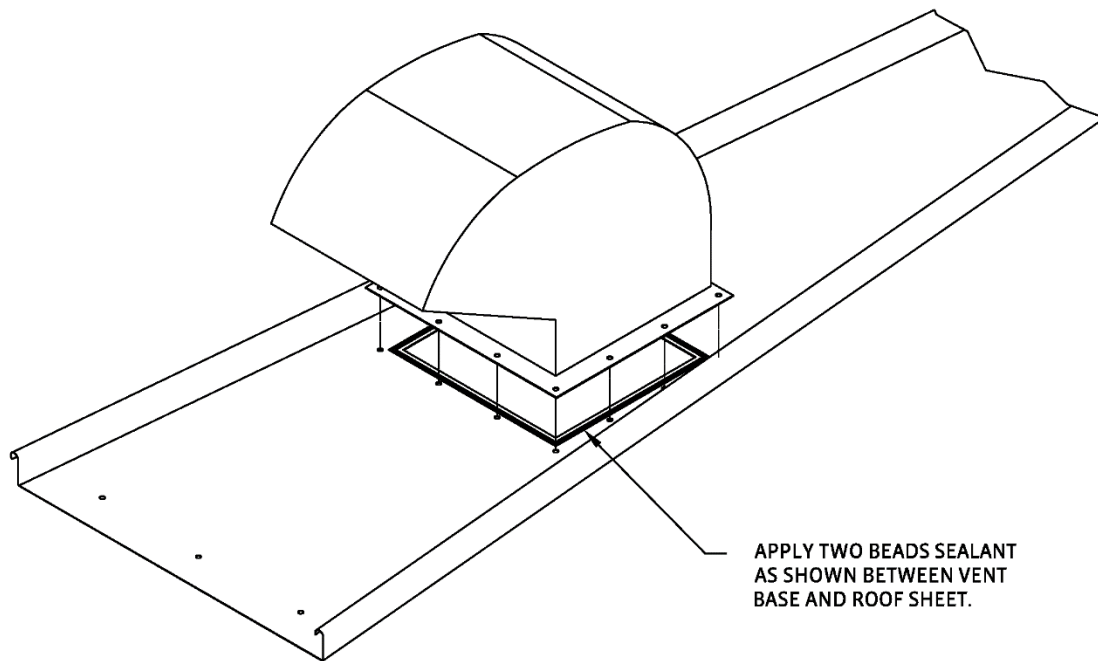


Gooseneck Vents

Gooseneck vents are attached to pre-punched roof panels to provide proper airflow for aeration systems. Prior to installation of hardware apply sealant to the perimeter of the pre-punched opening between the roof panel and the vent base. Secure the vent to the roof panel with 5/16"x1" (.79x2.54cm) bin bolts.

The pre punched roof panels are required to be equally spaced around the bin during the roof installation.

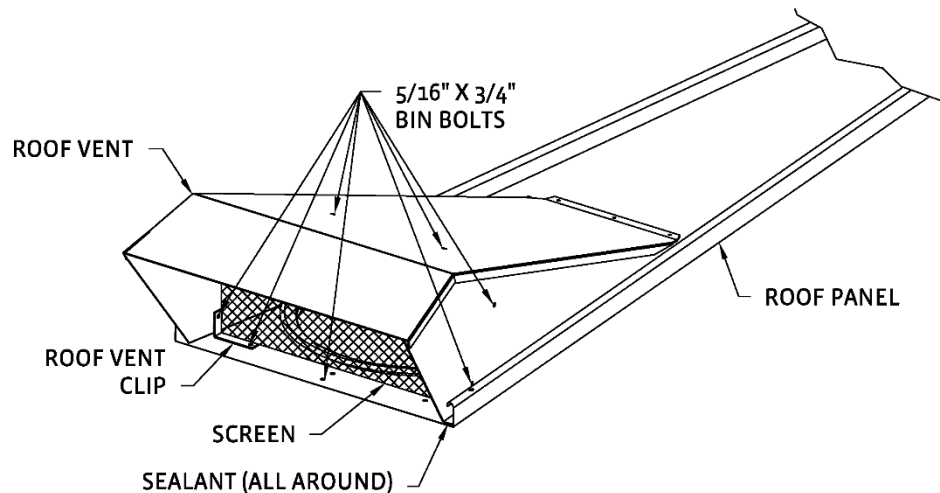
Important Note: Do not weld vents to the roof panels.



Low Profile Vents

Low profile vents are attached to pre-punched manway roof panels to provide proper airflow for aeration systems.

Install the screen and clips on the roof vent body using 5/16"x3/4" (.79x1.90cm) bin bolts, nuts and flat washers as shown below. The bolt heads should be located on the exterior of the vent with the washers and nuts on the inside against the screen.



Locate the roof vent assembly on the roof panel (over the manhole) by aligning the holes in the clips with the corresponding holes in the lower end of the roof panel. Mark the outline of the roof vent with a marking pencil so that the vent can be returned to the same position after the caulking is applied.

Remove the vent from the roof panel, turn upside down, and apply sealant to the mounting surface of the sides and top. At this time, locate the roof vent in its original position and secure the vent using 5/16"x1" (.79x2.54cm) bin bolts in the holes directly above and below the manhole.

Next install the #14 x 3/4" self-drilling screws use the holes in the vent as a guide. Alternatively, 3/8" (.95cm) holes can be drilled through the vent and roof panel to attach the vent with 5/16"x3/4" (.79x1.90cm) bin bolts.

Finally install 5/16"x3/4" (.79x1.90cm) bin bolts in the clips and bottom of screen as shown in the previous illustration.

Important Note: Roofs with structural beams may require field installation of angles between beams at both top and bottom of the manhole opening if 20 PSF or 30 PSF live loading is required.

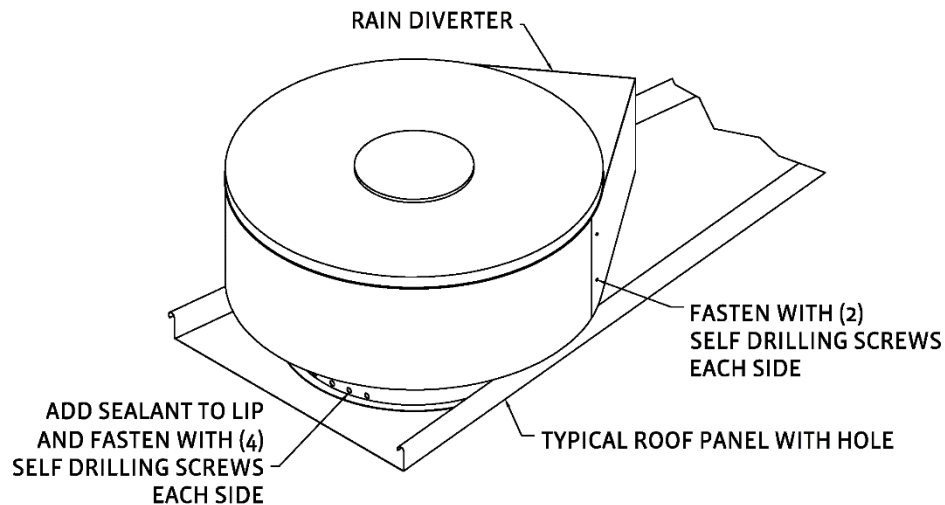
Mushroom Vents

Mushroom vents are attached to pre-punched roof panels to provide proper airflow for aeration systems.

Important Note: Proper planning is required to locate the pre-punched roof panels correctly during the roof installation.

Locate the pre-punched roof panel and apply sealant on the base of the extruded lip where the vent base will be located. Place the vent over the extruded lip and fasten with (8) #12 x 1.25" self-drilling screws equally spaced around the perimeter of the base.

Next fasten the rain diverter on the top of the vent towards the roof peak. Verify that the rain diverter makes contact with the roof panel. Fasten the rain diverter with (2) #12 x 1.25" self-drilling screws per side.

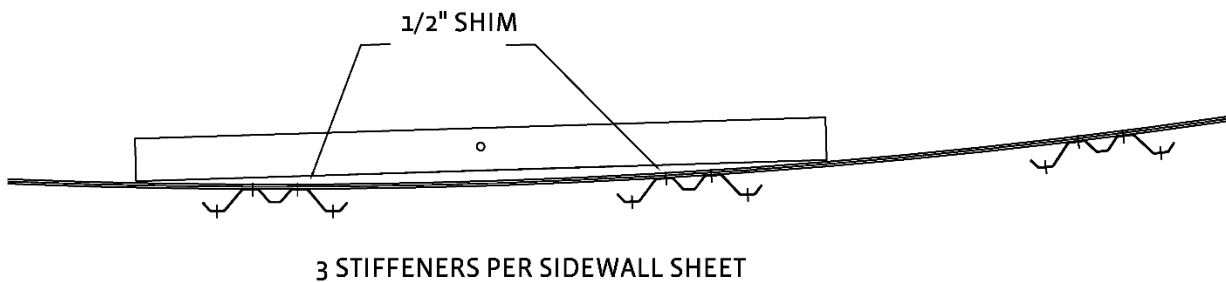
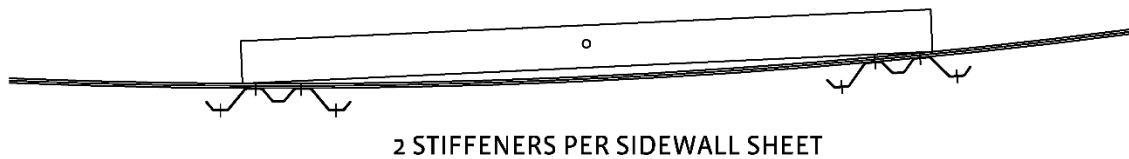


Safety Tie-Off Access Packages

Tie off anchors are provided at the bin eave manhole location. Attach tie-off anchor locations to wall near the bin eave as shown in the following illustrations. Holes will need field drilled for installation. Fasten the 4 x 4 x 3/8" angle with (8) 7/16" Grade 8 bolts.

Sidewall Tie-Off Location

On 3 stiffened bins, place a 1/2" shim between angle and sidewall sheet. Attach the ends of the angle behind the sidewall stiffeners with (8) 7/16"x2" (1.11x5.08cm) grade 8 bolts. Holes will need field drilled for attachment.



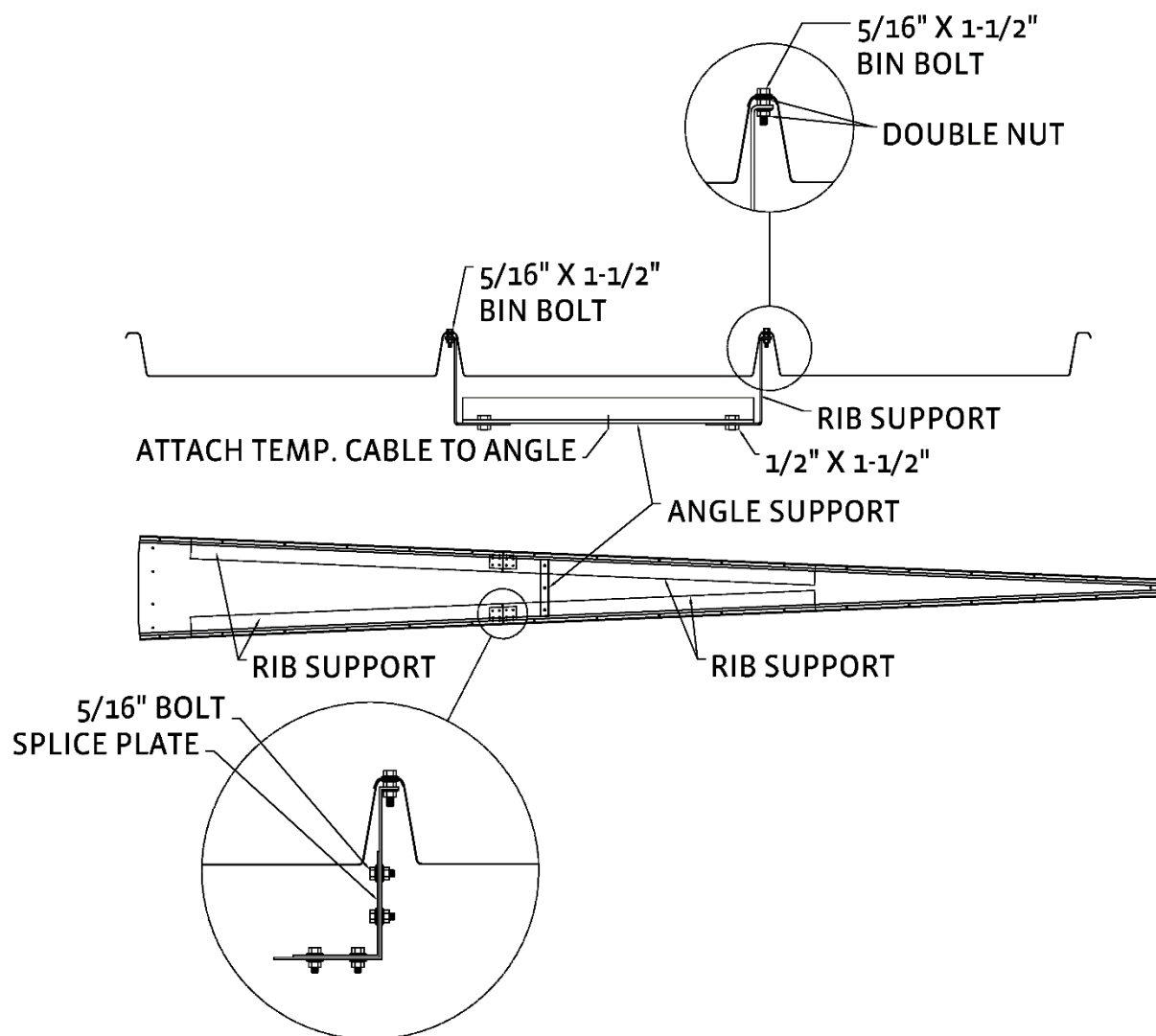
Temperature Cable Packages

On roof panels where the temperature cables are to be installed, attach the rib supports under the roof panels with 5/16" x 1-1/4" (.79x3.17cm) bin bolts, using double nuts as shown in the following illustration.

On CB10 to CB16 attach 2 rib supports per roof sheet and fasten together using a splice plate with 5/16"x1" (.79x2.54cm) bolts. Attach the angle support to the rib support using 1/2" x 1-1/2" (1.27x3.81cm) bolts. Attach the temperature cable to the angle support. Temperature cables located in the center of the bin do not require a support kit.

Important Note: For all temperature cable packages follow the temperature cable manufacturer's recommendations and installation instructions. Provide adequate sealant where the temperature cable leads exit the bins.

Important Note: Support of temperature cables by any means other than Chief Industries' recommended brackets may cause structural damage to the bin roof and will nullify the Chief grain bin warranty.



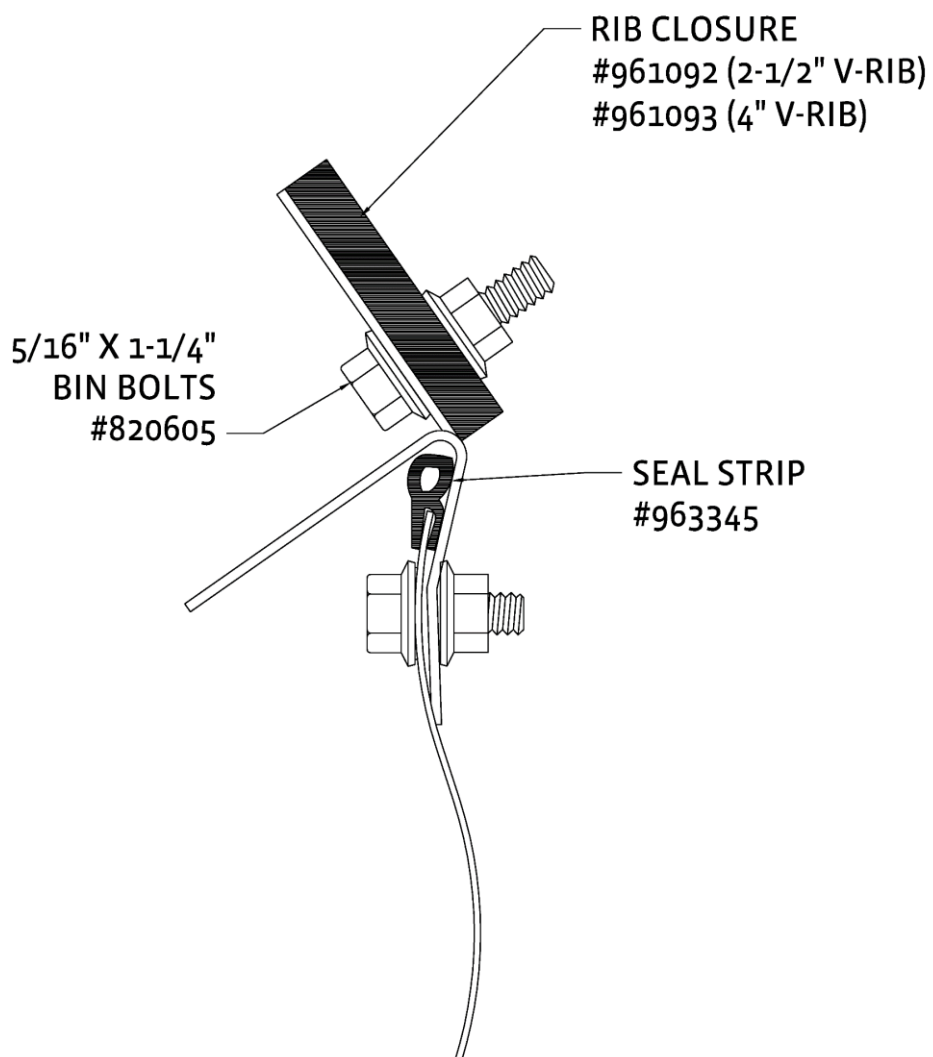
Important Note: Temperature cable scan only be installed on bins with a sidewall height of 12 rings or less.

Bin Size	Number of Temperature Cables	Radius From Bin Centerline
CB05	1	-
CB06	1	-
CB07	1	-
CB08	3	7'-0" (2.13m)
CB09	3	7'-4" (2.23m)
CB10	3	7'-7" (2.31m)
CB11	3	8'-7" (2.61m)
CB12	3	9'-3" (2.81m)
CB14	1	-
	4	14'-6" (4.41m)
CB16	1	-
	5	16'-4" (4.97m)

Important Note: Do not attach temperature cables adjacent to where a side draw unload system is located.

Eave Seal Kit (Optional)

An optional eave seal kit can be added to the top sidewall sheet as shown in the following illustration.





Should you have any questions concerning assembly instructions, parts or drawings, please feel free to contact us at any of the following.

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