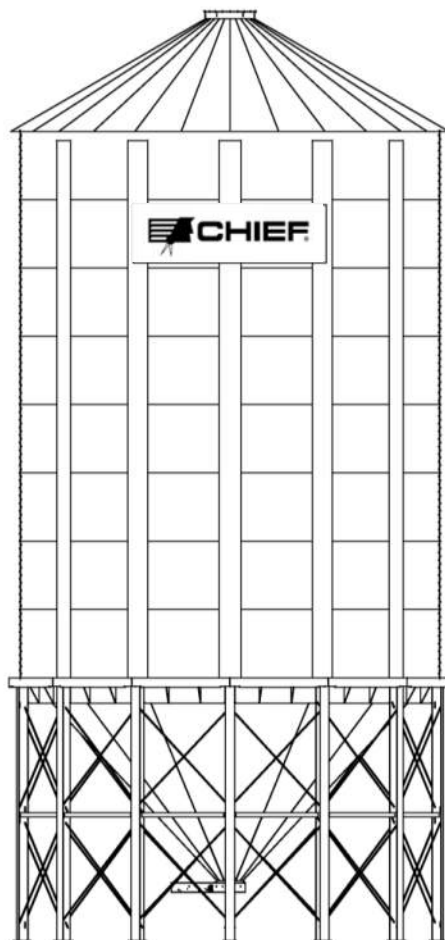




CHIEF INDUSTRIES, INC.  
AGRI/INDUSTRIAL DIVISION



**CHT07**  
**COMMERCIAL HOPPER TANK**  
**42" SHEET**  
**ERECTION MANUAL**

## Manual Revisions

	<i>Date:</i>	<i>Revision Made</i>
#340674	01-06-09	Changed Roofs to 30 degree
#340674	05-12-09	Changed temperature support kits
#340674	11-17-09	Changed Hopper Flashing
#340674	09-01-10	Changed base angle to leg out

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## **CHIEF INDUSTRIES, INC.**

AGRI/INDUSTRIAL DIVISION

### **STANDARD LIMITED GRAIN BIN WARRANTY**

#### **1. WHAT IS COVERED BY THIS STANDARD LIMITED WARRANTY**

If you are the original retail purchaser of Chief Manufactured Grain Bins, which includes Bulk Feed Bins and Hopper Tanks, Chief Industries, Inc., expressly warrants to you that the components manufactured by Chief Industries, Inc., were, on the date of delivery to you, free from defects in the composition of material, Chief workmanship, and design.

#### **2. DURATION OF THIS STANDARD LIMITED WARRANTY AND NOTICE REQUIREMENTS**

This Standard Limited Warranty is applicable under normal use and service to defects which become evident within a period of five (5) years from date of delivery of your Chief Grain Bin to you and which are reported in writing to Chief Industries within 30 days of discovery of the defect. In any event, Chief's obligations under this Standard Limited Warranty shall expire sixty-one (61) months from the invoice date.

In order to obtain warranty service, simply contact Chief Industries in writing with the following information: (1) Your name; (2) Location of the product; (3) Dealer name; (4) Description of problem; (5) Any pertinent information; (6) Date of purchase. No claim will be processed until all of this information has been received in writing by Chief Industries. For warranty service, contact Chief Industries, Inc., Agri/Industrial Division, Customer Service Department, P. O. Box 848, Kearney, NE 68848.

#### **3. CHIEF'S OBLIGATIONS**

By purchasing your Chief Grain Bin subject to this Standard Limited Warranty, you and Chief Industries expressly agree to an allocation of the risks of product failure between you and Chief Industries. This allocation is recognized by both parties and is reflected in the price of the Chief Grain Bin.

#### **4. REMEDIES AVAILABLE FROM CHIEF**

If a defect in your Chief Grain Bin is covered by this standard limited warranty, Chief Industries will supply replacement parts F.O.B. Chief Industries, Kearney, Nebraska. In addition, during the first year of the warranty, Chief Industries will supply labor necessary to make repairs in your Chief Grain Bin made necessary by such defect or faults. Chief Industries will request at least two competitive bids for labor, as shall in the judgement of Chief Industries be the most appropriate remedy for the failure covered by this warranty. Of course, Chief Industries reserves the right to reject all such bids and to obtain additional bids. Upon acceptance of a bid by Chief Industries, Chief Industries will authorize the necessary repair.

#### **5. REMEDIES NOT AVAILABLE FROM CHIEF**

The obligations stated in the preceding paragraph are the SOLE AND EXCLUSIVE REMEDIES available from Chief Industries in the event of problems with your Chief Grain Bin. Chief Industries will not be liable for the costs of dismantling defective parts or installing replacement parts, including labor costs, after the first year, and Chief Industries will not be liable for any special, incidental or consequential damages based upon breach of warranty, breach of contract, negligence, strict tort, or any other legal theory.

#### **6. WHAT IS NOT COVERED BY THIS STANDARD LIMITED WARRANTY**

This Standard Limited Warranty does not cover:

- (a) Chief manufactured product not sold as part of the grain bin.
- (b) Products, components, equipment, accessories, or parts manufactured by someone other than Chief Industries.
- (c) Accessories, Temporary Grain Storage Bins or Bins designed for storage of products other than whole grain storage.
- (d) Damage or loss during shipment of the Chief Grain Bins.
- (e) Damage or loss caused by the acts or omissions of the erector or his agents.

#### **6. WHAT IS NOT COVERED BY THIS STANDARD LIMITED WARRANTY (continued)**

- (f) Damage or loss caused, in whole or in part, by inadequate or improper site selection, inadequate or improper site preparation, inadequate or improper foundation, or any other failure to provide a suitable erection or installation environment for or a suitable erection or installation of the Chief Grain Bin, or of any product, component, equipment, accessories, parts used in conjunction with the Chief Grain Bin.
- (g) Damage or loss caused, in whole or in part, by use of the Chief Grain Bin for purposes other than those for which it was designed.
- (h) Damage or loss caused, in whole or in part, by unauthorized attachments, modifications, or alterations of the Chief Grain Bin.
- (i) Damage or loss caused, in whole or in part, by improper or inadequate maintenance, misuse, or abuse of the Chief Grain Bin.

#### **7. NO OTHER WARRANTIES**

(1) Complete and Exclusive Agreement: THIS AGREEMENT IS THE COMPLETE AND EXCLUSIVE AGREEMENT BETWEEN YOU AND CHIEF INDUSTRIES, INC., CONCERNING THE ALLOCATION OF THE RISKS OF DAMAGE OR LOSS ARISING FROM MANUFACTURED COMPONENT FAILURE. It supersedes all prior agreements, whether written or oral, and all other communications between you and Chief concerning the allocation of those risks. No employee of Chief Industries, Inc., or any other person, including Authorized Dealers and any other person authorized to sell Chief Grain Bins, has any authority to make any representations, promises, or warranties in addition to those contained herein.

(2) THIS STANDARD LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

#### **8. ALLOCATION OF RISKS**

THIS AGREEMENT ALLOCATES THE RISKS OF DAMAGE OR LOSS ARISING FROM PRODUCT FAILURE BETWEEN CHIEF INDUSTRIES, INC., AND PURCHASER. THIS ALLOCATION IS RECOGNIZED BY BOTH PARTIES AND WAS REFLECTED IN THE PURCHASE PRICE OF THE GOODS.



WATER SENSITIVE MATERIALS

**WARNING**  
**READ THIS NOTICE CAREFULLY**

**BUNDLES MUST BE INSPECTED AND CARRIER  
ADVISED IMMEDIATELY IF DAMAGE IS NOTED.**

**WHITE RUST WILL ATTACK PAINTED  
AS WELL AS GALVANIZED SHEETING.**

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

**IF SHEETS ARE TO BE ERECTED WITHIN TEN (10) DAYS**

Store bundled sheets off the ground high enough to allow air circulation beneath bundle and to prevent water from entering. Store one end at least 8" higher than the other. Support long bundles in center. Prevent rain from entering bundle by covering with tarpaulin making provision for air circulation between draped edges and ground. DO NOT wrap in plastic.

**IF SHEETS ARE NOT TO BE ERECTED WITHIN TEN (10) DAYS**

Provide inside dry storage. Storage beyond six (6) months is not recommended. If white rust is apparent upon receipt of shipment, notify sales office immediately.

Damage to sheets, resulting from improper storage, will be the responsibility of the receiver.

## **Section 1 – Grain Bin Specifications**

### **WARRANTY**

The Manufacturer warrants only that its products are free from defects in materials and workmanship on the date of shipment from its plant. THE MANUFACTURER'S OBLIGATION UNDER THIS WARRANTY SHALL BE LIMITED TO REPAIRING OR REPLACING (BUT NOT DISMANTLING AND INSTALLING) SUCH PRODUCTS WHICH PROVE TO BE THUS DEFECTIVE. Any products so repaired or replaced as provided herein shall be subject to warranty only for the remainder of the time applicable to the original warranty period.

The Manufacturer shall determine whether correction of any defect or failure under this warranty shall be by repair or replacement. The Manufacturer's liability shall not arise unless repairs are made under the supervision of, or with written approval of the Manufacturer. Shipping costs incurred in returning defective material shall be paid by the Manufacturer, but only if such shipment is authorized in writing by the Manufacturer. If the Manufacturer's examination proves the product to be defective as herein defined, return shipment shall be prepaid by the manufacturer, otherwise, return shipment shall be freight collect to the consignee. Title to any replaced materials shall pass to the manufacturer. This warranty does not cover products, accessories, parts or attachments which are not made by the Manufacturer, except to the extent of the warranty given the bin manufacture by the actual manufacturer. All claims filed under the provisions of this warranty must be presented to the manufacturer in writing during the warranty period and not more than thirty (30) days after detection of any apparent defect.

This warranty is extended to the original owner of the products purchased hereunder and is non-transferable and non-assignable.

THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, WHICH EXTENDS BEYOND THE DESCRIPTION STATED HEREIN, INCLUDING ANY WARRANTIES OR MERCHANTABILITY, AND THE MANUFACTURER SHALL NOT BE RESPONSIBLE FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGE (SUCH AS DAMAGE TO THE CONTENT OF ANY HOPPER TANK) OR ANY LOSS OF ANY KIND WHATSOEVER.

Motors purchased from bin manufacture are warranted by their manufacturer and warranty claims must be directed to their authorized service agency. We have provided a listing of these agencies in the Product Manual. Motor warranty claims directed to the bin Manufacturer will be returned with a reminder of this requirement.

### PRODUCT END USE

The end use of this Hopper tank is for the storage of free-flowing grain of up to 52lbs. Per cubic foot density (soybean meal, meatscraps and many other materials are not free flowing and should not be stored in any of these tanks). It is not to be used for any other bulk storage or for any liquid storage. TO DO SO WILL VOID THE WARRANTY!

### PRODUCT CHANGES

The manufacturer reserves the right to make changes in specification, construction, or design of products at any time in such manner as it may consider necessary or advisable and to discontinue the manufacture and sale of any products all without prior notice.

### HOPPER TANK CAPACITIES

Hopper tank Bushel capacities are based on 1.250 cubic foot per bushel and a 6% compaction factor. Level bushel capacity is based on a fill to the sidewall height of the hopper tank. Maximum bushel capacity is based on fill to the sidewall height of the hopper tank and peaked into the roof area at 24° degree angle.

Cubic foot capacity is based on a fill to the eave height of the Hopper Tank and peaked into the roof at 24° degree angle without a compaction factor. The tonnage capacity is based on the cubic foot capacity and a bulk density of 56 pounds per cubic foot.

### CAUTIONS

1. Install suffocation warning decals in a prominent location near each service opening. Normally this is the crawl door and the roof manhole opening at the eave and peak. Three of these decals are included with the hardware box.
2. Foundation must be dead level. An out of level foundation can cause increased stresses on the hopper tank, possibly cause a structural failure and will void the warranty.
3. The galvanized panels leave our plant in prime condition. Store them off the floor in a heated room if possible. If stored outside, place panels end down off of the ground. Store panels on edge or on end allowing 1/4" of air space between panels if you are unsure as to whether or not moisture is present. Exposure to trapped moisture can cause white rust, which will void the warranty.
4. Follow the recommendations listed below or damage to the hopper tank is possible and will void the warranty.
  - a. Do not allow grain to freeze in tank. High moisture grain will expand causing greatly increased wall loads
  - b. Do not allow excessive snow and ice to accumulate on any portion of the hopper tank roof.

Do not store grain against the roof due to the possibility of structural failure and the probability of grain spoilage due to contact with condensation and lack of air movement.



## 1. GENERAL DESIGN INFORMATION

- a) All Chief Industries grain bins are designed for storage and handling of 49.5 PCF (793 kg/m<sup>3</sup>) free flowing grain (52.5 PCF (841 kg/m<sup>3</sup>) compacted grain @ 6%). Grain fill level shall not exceed 1" (25.4 mm) down from eave.
- b) Storage of products other than grain (products heavier than 49.5 PCF (793 kg/m<sup>3</sup>), products having unusual flow characteristics or unusual corrosive properties) must be approved by Chief Industries' Engineering Department prior to quoting. Storage of soybean meal or meat scraps or other non-flowing products in standard tanks will void the warranty.
- c) Each individual sidewall ring has been designed to accommodate the vertical and horizontal wall loads imposed by the stored grain. Sheeting gauge and design strength for each ring is individually analyzed for all bin sizes. Also, stiffener gauges and design strengths are individually determined for each bin's full sidewall height range. All steel materials are purchased in accordance with the applicable ASTM Standard.
- d) All bolted connections are designed using high strength bolts which meet the specifications of the applicable ASTM or SAE Standards.
- e) All bins must be filled uniformly at the center and unloaded through the center discharge only, until grain no longer flows by gravity. Bins filled or emptied off-center will void the warranty; except approved sidedraw systems. (Refer to Section 5c for Sidedraw Usage)
- f) All Galvanized Steel used for storage and drying bins conform to ASTM specification A653 and the Galvanized coating to A924, TYPE G-115; 1.15 oz/ft.<sup>2</sup> (Z350; 350 gm/m<sup>2</sup>) total for both sides as follows:

22 Ga. Thickness & lighter = CS TYPE A; 33ksi min yield (grade 230)

18 & 20 Ga Thickness = SS Grade 40, Class I; 40ksi min yield (grade 275)

17 Ga. Thickness & heavier = SS Grade 55, Class I; 55ksi min yield (grade 340)

(Please note: SS = Structural Steel)

## 2. ROOF DESIGN

All roofs are certified to withstand normally anticipated environmental and service conditions.

### **IMPORTANT:**

**Roof peak loads in excess of specified rating can cause structural roof damage and will void all bin warranties.**

#### **A) J-Rib Roof Design**

1) The CB5 thru CB11 grain bin roofs are available standard with a 30° slope. The CB9 thru CB11 bin roofs are designed to incorporate a structural bridging ring. These roofs have 4 roof panels per sidewall sheet and are certified for 90mph (145 km/hr) wind with 17 PSF (0.79 kPa) ground snow load plus roof dead load and concentrated peak load of 1000 LB (454 kg) with a 30" (762 mm) peak ring diameter.

2) The CB12 through CB34 grain bin roofs have a 30° roof slope and utilize a complete structural framing system which supports loads independent of the roof panels. The CB12 through CB16 bin roofs are certified for 90 mph (145 km/hr) wind with a 30 PSF (1.44 kPa) ground snow load plus roof dead load and a concentrated peak load of 16,000 LB (7258 kg) with a 40" (1016 mm) peak ring diameter. CB18 through CB34 bin roofs are certified for 90 mph (145 km/hr) wind with a 40 PSF (1.92 kPa) ground snow load and unbalanced snow, plus roof dead load and a concentrated peak load of 30,000 LB (13,608 kg) for CB18 through CB22, 40,000 LB (18,143 kg) for CB24 and CB26, and 25,000 (11,340 kg) for CB30 and CB34 with optional 50,000 LB (22,679 kg) for CB30 and CB34, with a 72" (1829mm) peak ring diameter.

3) **WORKING RING:** Standard on all #5 thru #34 bins. Constructed of 1-1/2" (38mm) pipe and provides a continuous ring around the center and is attached with heavy gauge brackets located on top of roof ribs, close to roof cap.

#### **B) V-Rib Roof Design**

1) All CBU & CBUE Storage and Drying Bins are designed for 90 mph (145 km/hr) with a 30 PSF (1.44 kPa) (ground snow load plus roof deadload). Additional concentrated load may be applied at the peak of the bin up to 3,500 lbs. (1588kg) for #5 thru #7 and 6,000 lbs.(2722 kg) for #8 thru #12 bins with a 30" (762 mm) peak ring and up to 8,500 lbs.(2949 kg) for #14 and #16 bins with a 40" (1.0 m) peak ring.

2) The roof slope of CBU & CBUE Storage and Drying Bins is 30° for all #5 through #16 bins. Roof panels are 22 gauge and have four roof panels per sidewall sheet. One piece roof panels are standard for all roofs and feature 2-1/2"(64mm) deep ribs for #5 through #12 roofs and 4" (102 mm) deep ribs for #14 and #16 roofs. An optional eave sealer is available if desired.

3) Roof Rib Fasteners are 5/16" (8 mm) diameter JS500 zinc plated hex head bin bolts facilitates quicker assembly of the bin roof and a positive, structural and weather resistant rib to rib connection.

4) Heavy gauge formed galvanized eave clips bolt directly to roof panel and wall sheet. Clips are adjustable with slotted holes to raise or lower roof as desired. "Hurricane Clips" are standard on all bins.

5) **WORKING RINGS:** Standard on all #5 thru #16 bins. Constructed of 1-1/2" (38mm) pipe and provides a continuous ring around the center and is attached with heavy gauge brackets located on top of roof ribs, close to roof cap.

6) **ROOF BRIDGING RINGS:** One outside roof bridging ring is standard on all #10 thru #12 bins and optional for #7 thru #9 bins. Two roof bridging rings are standard for #14 and #16 bins. Rings are fabricated from heavy gauge 1-1/2" (38mm) diameter tube and threaded connectors expand to position the ring in place.

### 3. GRAIN BIN USAGE

#### a) CBU & CBUE UNSTIFFENED BIN SERIES

The Unstiffened bins are designed and intended for storage and drying of common small grains. This includes all models except for the 8 thru 10 rings tall bins which are used for storage (Not Drying) only. All unstiffened bins up through 7 rings tall will accommodate a stirring device consisting of no more than three down augers.

#### b) CB STIFFENED TO EAVE BIN SERIES

The CB Stiffened to Eave Bins may be used for all common drying applications, these bins are available in sizes CB #5 thru #16. If stirring devices consisting of more than six down augers are to be used, contact Chief Industries, Inc., for recommendations. This bin must be used when Stirway II's, Recirculating devices, and stirring devices with four or more down augers are to be installed.

Note: See detail on using Stirring Devices

### 4. THE GENERAL CONTRACTOR'S RESPONSIBILITIES

It is the responsibility of the General Contractor to insure that the complete bin system (bin, foundation, grain transport equipment, aeration equipment, and other accessory equipment) is constructed in a quality workmanship manner and that all equipment is installed per the respective manufacturer's instructions.

In addition, the General Contractor is responsible for the fitness of use of any system which he constructs. All accessory equipment incorporated into the system should be approved for the intended use of each respective equipment manufacturer.

#### a) Field Modifications and Erection Defects

Chief Industries, Inc., assumes no responsibility for field modifications or erection defects which create structural or storage quality problems. If any field modifications are necessary which are not specifically covered by the contents of our erection manual, contact Chief Industries, Inc., for approval of the field modifications. Any unauthorized modification or erection defect which affects the structural integrity of the Chief bin will be cause for immediate nullification of the Chief Grain Bin Warranty.

#### b) Concrete Information for Design and Construction

The suggested foundation designs shown in the bin erection manuals are based on the allowable soil bearing capacity of the undisturbed soil and should be checked by a licensed engineering firm. Using soil borings to determine the allowable soil bearing capacity, a professional engineer will need to be engaged by the contractor to design the foundation and floor slab accordingly. All suggested foundation designs must be approved by a licensed engineer in order to meet local governing building codes and local soil and weather conditions. Wall loads and floor pressure for standard Chief grain bins are available from Chief Industries, Inc., upon request.

**IMPORTANT: THE FINISHED FLOOR SURFACE MUST BE LEVEL AT THE BIN WALL LOCATION. LOW SPOTS IN PERIMETER WALL ELEVATION WITHOUT ADEQUATE SHIMMING CAN CAUSE STRUCTURAL DAMAGE TO THE BIN SIDEWALL. FAULTY CONCRETE WORK OR SHIM OMISSION WILL NULLIFY THE BIN'S WARRANTY.**

The suggested concrete foundation designs must not be used in conjunction with unload and aeration tunnels. Concrete and reinforcing bar requirements must be determined by a certified professional engineer. The design must consider soil bearing capacity, soil consolidation, footing requirements, tunnel requirements and the interaction of all foundation components under loaded condition. Non-uniform settlement of the foundation can cause severe structural damage to bin and foundation. An improperly designed or constructed foundation will void all aspects of the bin warranty. It is the responsibility of the General Contractor to insure that an adequate foundation is provided for the bin.

## 5. ACCESSORY EQUIPMENT

All accessory equipment should be installed and maintained in accordance with each individual suppliers installation and operation instructions. However, if any sidewall penetrations or other modifications to Chief Industries, Inc., standard bin design are required, refer to bin erection manual or contact Chief Industries, Inc., for special recommendations. Do Not Modify Bin Design Without Chief Approval. It is the responsibility of the General Contractor to insure that all equipment is properly installed and that the equipment is compatible with the intended use. A qualified electrician should be contracted to complete all electrical wiring and servicing.

Chief Industries, Inc., provides no warranty concerning parts, accessories or equipment not manufactured by Chief Industries, Inc.

### a) Roof Peak Service Loads

When determining the service loads on the roof peak, the weight of all accessory equipment suspended or supported by the peak should be considered. The weights should be calculated using the equipment dead load plus the operating load. For example, the weight of an overhead conveyor should include the catwalk, conveyor head assembly, motors, drives, downspouts, discharges and weight of grain when in operation. If conveyor and catwalk design is such that snow build up is likely during winter months, snow load must be added in the peak load calculation. If a temperature cable is suspended from peak add 1000 lbs. (452 kg.) per 40 foot (12.2 m) of cable length to the peak's service load. Interpolate value for intermediate cable length; i.e., 60 foot (18.3 m) cable would exert 1500 lbs. (680 kg), of load.

**Do not allow excessive snow and ice to accumulate on any portion of the roof.**

### b) Bin Loading Equipment

Center filling through the peak opening is required for all bins. Off center loading will create unequal pressures on the bin wall and result in structural damage. If downspouting is to be used, it is recommended that a dead head or cushion box be used to promote uniform filling. Also, the use of spreaders or splash plates are recommended for distributing the grain fines, promoting uniform air flow through grain and leveling the grain peak.

Standard Commercial Bins (CB18 (55'8") and larger) can be loaded at a rate below 40,000 bushels per hour. If bin is to be loaded at a rate of 40,000 bushel an hour or greater, or is smaller than a CB18 (55'8"), contact Chief Industries, Inc. for upgrade recommendations.

**IMPORTANT: FILL CONVEYORS AND THE CATWALK MUST NOT BE SUPPORTED BY STANDARD GRAIN BIN WALL. USE INDEPENDENT SUPPORT TOWERS TO SUPPORT OVERHEAD CONVEYORS OR CB STIFFENED BINS WITH UPGRADED STIFFENERS TO SUPPORT THIS TYPE OF LOAD.**

### c) Bin Unloading Equipment

All bins must be unloaded through center discharge. If intermediate wells are installed in the floor, they must not be opened until all gravity flow through the center well has ceased. Therefore, center and intermediate wells must have separate control rods. The center well's sweep auger pivot should be centered in the bin to insure unobstructed sweep rotation. If unloading auger exits through bin wall, thoroughly seal around auger tube to prevent moisture and airflow leakage. Reinforcing of sidewall sheets will be necessary if auger exits through the bin wall at a point exposed to direct grain pressure. Contact Chief Industries, Inc., for reinforcing recommendations.

Standard Commercial Bins (CB18 (55'8") and larger) can be unloaded at a rate below 20,000 bushels per hour. If bin is to be unloaded at a rate of 20,000 bushel an hour or greater, or is smaller than a CB18 (55'8"), contact Chief Industries, Inc. for upgrade recommendations.

Sidedraw baffle systems may be installed in the bin sizes specified in Chief catalog. Also, Only Chief approved sidedraw units can be installed in a Chief grain bin.

**IMPORTANT: ANY SIDEDRAW UNIT IMPROPERLY INSTALLED IN A CHIEF BIN WITHOUT CHIEF INDUSTRIES' APPROVAL, OR SIDEDRAW UNITS MANUFACTURED BY OTHER THAN CHIEF INDUSTRIES, INC., COULD RESULT IN STRUCTURAL DAMAGE TO THE BIN AND WILL VOID THE BIN WARRANTY.**

**Note:** If multiple sidedraws are being used, only 1 sidedraw may be used at a time. It is required that the bin is coned from the center discharge to level the grain in the tank before refilling after the sidedraw has been used. Prior to prolonged storage, grain should be coned or taken to a level condition.

#### **d) Roof Vents**

**IMPORTANT: HIGH UNLOADING RATES CAN CREATE A VACUUM INSIDE BIN. IF UNLOADING RATES EXCEED 5000 BUSHELS (125 MT) PER HOUR, A MINIMUM OF ONE FREE INTAKE VENT (GOOSE NECK VENT RECOMMENDED) MUST BE INSTALLED. ONE UNOBSTRUCTED STANDARD CALDWELL BIN VENT WILL PROVIDE ADEQUATE VENTING UP TO AN UNLOADING RATE OF 80,000 BPH (2000 MT/HR). IF SUBSTANTIALLY HIGHER RATES ARE NEEDED, PLEASE CONTACT CHIEF INDUSTRIES FOR A RECOMMENDED VENT REQUIREMENT. (Note: refer to maximum loading and unloading rates allowed in the bin).**

#### **e) Temperature Cables**

Temperature cables can be installed in all standard Chief bins; the number and location of temperature cables for each bin size are listed in the temperature cable installation section of the erection manual.

Temperature cable support kits supplied by Chief Industries, Inc., are available and must be used whenever temperature cables are installed. Be sure to allow adequate clearance for sweep augers or other internal equipment. Follow temperature cable manufacturer's recommendations for shortening temperature cables if necessary, provide adequate sealant where temperature cable lead wire exits the bins.

**IMPORTANT: SUPPORT OF TEMPERATURE CABLES BY ANY MEANS OTHER THAN CHIEF INDUSTRIES' RECOMMENDED SUPPORT KITS MAY CAUSE STRUCTURAL DAMAGE TO THE BIN ROOF AND WILL NULLIFY THE CHIEF GRAIN BIN WARRANTY.**

**IMPORTANT: ALL TEMPERATURE CABLES SHOULD BE SECURED TO FLOOR TO PREVENT CABLE FROM DRIFTING TOWARD BIN WALL DURING FILLING. THE USE OF LIGHT TWINE OR MONOFILAMENT LINE SECURED TO A RECESSED ANCHOR IS RECOMMENDED.**

***Note: Structured Roofs are designed for a maximum load of 2,000 lbs. per temperature cable. If this load is exceeded, this may cause structural damage to the bin roof and will nullify the Chief Grain Bin Warranty.***

#### f) Fans and Transitions

Aeration fans should be sized in accordance with Chief's specifications for the particular bin being considered.

All fans must be installed per Chief's recommendations and leveled prior to operation. A qualified electrician should be contracted to complete all electrical wiring and servicing.

The transition through the bin wall must be thoroughly sealed around the outside of the transition entrance collar to prevent airflow leakage. Use of strip caulking in combination with flashing provided by the transition manufacturer is recommended. If the transition interrupts a stiffener line, the special transition stiffener available from Chief Industries, Inc., must be installed as described in the erection manual. Also, if the transition enters through the bin's bottom sidewall sheet (full floor aeration and tube aeration), adequate reinforcing of the bottom sidewall sheet must be added. Contact Chief Industries, Inc., for recommendations. Standard drying bins do not require reinforcing of bottom sidewall sheet as long as transition enters below the false floor level.

#### g) Heaters

The heater unit must be properly matched with the fan size to be used. Heater unit and fan must be compatible, and it is recommended that both units be supplied by the same manufacturer to insure compatibility and safety. Heater unit installation and servicing should only be completed by personnel properly trained by the manufacturer of products being used. The fan and heater need to be located on the bin to assure uniform airflow to the bin. The units should be located at a 180° angular position from the outlet of the withdrawal tube.

**DANGER:** Fuel tanks, lines and all valves must be compatible with the type of fuel to be used. Failure to use certified fuel tanks, lines or valves can result in death or severe personal injury.

**DANGER:** Never use anhydrous ammonia tanks or improperly modified fuel tanks for L.P. gas storage.

**DANGER:** L.P. fuel flow control regulators must be installed as recommended by heater unit manufacturer.

**DANGER:** Natural gas flow regulators at the service entrance must be installed by natural gas supplier and must not be modified.

The drying temperature should be established based on the type of grain to be dried. Contact Chief for optimum drying temperature. Excessive heat can result in grain damage, overdrying and potential grain fires.

**CAUTION:** When drying sunflower seeds, the drying temperature should not exceed 105° Fahrenheit (41° Celsius). Higher temperatures can result in sunflower oil combustion.

#### h) Aeration Floors

Chief recommends the use of channellock floors with steel supports for full floor applications. Commercial applications, (floors loaded and unloaded more than once per year) and bins with a total grain depth of 60' (18.3 m) or greater require an 18 gauge (1.3 mm) floor. The floor layout support spacing must be followed for the particular bin being constructed. Floor supports, fan locations and auger tube should be oriented as shown in the manufacturer's floor plan to insure optimum airflow movement.

Corrugated perforated floors require a concrete block and lumber support system. Concrete block and lumber floor supports are not recommended in bins larger than the #13 or bins taller than eight rings. Airflow restrictions when using concrete block and lumber can significantly reduce the air flow efficiency.

#### **i) Roof Ventilation**

Any grain bins using forced air for aeration or drying must be provided with sufficient exhaust or intake vents to prevent excessive internal pressures, either positive or negative. The vent supplier should be consulted for ventilation requirements on each project, with the specific bin size, grain type and depth, fan size and floor type taken into consideration. Chief Industries, Inc., does not recommend the use of negative aeration systems. In the event that negative aeration is to be used, the intake vent requirement should be sized for the bin in the empty condition.

**IMPORTANT: ROOF VENT MUST BE FREE OF DEBRIS OR OTHER OBSTRUCTIONS PRIOR TO OPERATION OF FANS.**

**POWER FANS SHOULD NOT BE OPERATED WHEN AMBIENT TEMPERATURE IS BELOW 35° FAHRENHEIT (2° Celsius) DUE TO POTENTIAL OF VENT ICING.**

**OBSTRUCTED OR ICED VENTS CAN SIGNIFICANTLY INCREASE INTERNAL TO EXTERNAL PRESSURE DIFFERENTIAL AND COULD RESULT IN STRUCTURAL DAMAGE TO BIN ROOF, WALL OR BOTH.**

#### **j) Stirring Device**

Stirring devices can be installed in any drying bin, with the limitations discussed in Section 3. The bins storage capacity will be reduced when installing a stirring device. Drying bin storage capacities listed in the Chief catalog should be used with the additional capacity reduction for down auger drive unit clearance. Inside ladders may require short brackets for wall attachment to provide clearance for the stirring device.

**CAUTION: The grain level must not be filled above the stirring device. Grain pressure on the stirring device could cause roof or stirring device damage.**

Down augers may require shortening in order to provide minimum floor clearance of 3"-5" (76mm -127 mm) or additional clearance for sweep augers. Manufacturer's down auger shortening procedure should be followed.

#### **k) Recirculators or Continuous Flow**

Recirculators can only be installed in CB bins. These devices should be installed as instructed by the manufacturer and with the following additional considerations:

- a. Consult floor manufacturer for recommended floor reinforcing measures at base of recirculator.
- b. If transfer auger exits through roof panels, provide sealant around auger tube to prevent water leakage.
- c. The weight of the transfer auger must not be supported by the roof panels. The transfer auger should be supported by the recirculator boot and an adjacent bin or independent support.

## Sidedraw Operation

***WARNING! Sidedraw rules must be followed when operating bins with sidedraw systems installed in them. Failure to do so could cause structural damage to the bin and will void the Bin Warranty.***

Sidedraw Units may be installed only in Bin sizes specified in the Chief Industries Catalog. The Chief Industries Sidedraw Unit or engineering approved systems are the only sidedraw units that can be installed in a Chief Grain Bin.

Note: When installing a Chief Sidedraw system the 1<sup>st</sup> baffles must be placed on 1<sup>st</sup> ring of bin at cave. The 1<sup>st</sup> wind ring also needs to be installed on 1<sup>st</sup> ring of bin, when using these systems.

Sidedraws systems are to only be used with dry grain. Do not use Sidedraws with any poor flowing product.

It is recommended that Sidedraws are placed in the 4<sup>th</sup>, 5<sup>th</sup>, or 6<sup>th</sup> bin from the base of the tank.

It is not recommended that Sidedraws be installed in Commercial Hopper tanks (CHT's)

Bins with sidedraw systems can NOT be loaded and unloaded from the sidedraw at the same time.

If multiple sidedraws are installed on a bin, only one sidedraw can be used at a time. If 2 sidedraws are installed in a bin, they must be placed 180 degrees apart.

It is required that the bin is coned from the center discharge to level the grain in the tank before refilling after the sidedraw has been used.

Prior to prolonged storage, grain should be cored or taken to a level condition.



## Section 2 – Bin Erection

**Chief Industries, Inc. will not assume any responsibility for parts damaged due to faulty or improper erection procedures.**

***Chief Industries, Inc. recommends that Bin Jacks be used for all bins taller than 8 rings and all bins larger than 30' in diameter.***

### **WARNING:**

**The allowable lifting capacity of the BIN JACKS *must never be exceeded*. Always check Bin weight to insure a safe and trouble free erection.**

### ***Grain Bin Color Codes***

Chief Grain Bins are color coded based on bin diameter. Components such as Roof Rafters, Wind Rings, and Base Angle will be marked with the following Color Codes to help identify them.

<b>Bin Size</b>	<b>Color Code</b>	<b>Bin Size</b>	<b>Color Code</b>
#05	Yellow/Blue	#14	Orange/Black
#06	Green/Blue	#16	Red
#07	Orange/Blue	#18	Black
#08	Red/Black	#20	Pink
#09	Pink/Black	#22	Blue
#10	Blue/Black	#24	Brown
#11	Brown/Black	#26	Yellow
#12	Yellow/Black	#30	Green
#13	Green/Black	#34	Orange

### **NOTE:**

**Roof panels and Bridging Rings for V-Rib Roofs have different Color Codes than shown above.**

**(Refer to the Roof Assembly Section for Roof Panel and Bridging Ring Color Codes)**

## *Checking Shipment*

**Check your shipment at the time of pickup and delivery against the packing list furnished with the shipment. If a shortage exists or if any damaged material is evident, note such shortage or damage on the freight bill before you sign for the shipment.**

Claims of shortages will not be honored after thirty days from receipt of shipment. Parts that are short or damaged are the responsibility of the delivering carrier, not the manufacturer or dealer.

It is advisable to reorder damaged or missing parts immediately so that there will be no delay in erecting the bin. After receiving the invoice for the reordered material, file a claim with the delivering carrier at once.

The galvanized panels leave our plant in prime condition; store off the floor in a heated room if possible. If stored outside, place panels down, off the ground. Upon arrival of shipment if you are not certain whether or not moisture is present, store panels on edge or on end allowing 1/4" air space between panels until dry. **Exposure to trapped moisture can cause white rust, which will void the warranty.**

## *Stop and Study*

Before beginning erection of the bin, take the time to thoroughly study the construction methods in this manual. It will save you both time and money.

### **Important:**

The peak load capacities listed under Auxiliary Roof Loads must not be exceeded. If your application will exceed the listed values, contact Chief Industries for recommendations.

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

## *Sight Selection*

Choose a site that has good drainage away from the bin so that water will not stand around the bin. The soil should be firm and preferably without fill. If fill is required, water and compact the fill material to avoid uneven settlement. A field investigation of the soil bearing conditions is recommended especially for larger grain bins where the foundation loads and floor pressure become large. A licensed engineering firm should be employed to take soil borings, determine the maximum allowable soil pressure and design the bin foundations and floor slab accordingly.

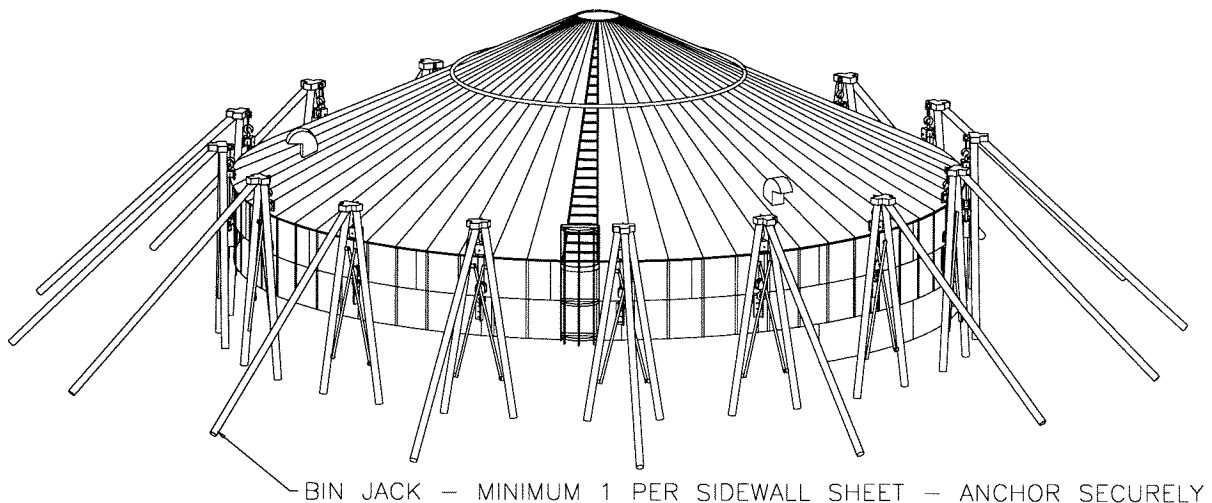
## *Bin Jack Erection*

Position the structure you provided to hold the Inner Ring at its approximate height, centering the Inner Ring on the center of the Bin.

**Use at least one Bin Jack per Sidewall Sheet.** (For example, on the #18 Bin, use 18 Bin Jacks, etc.)

The application of one bin jack per sidewall sheet will minimize sidewall distortion during erection. Failure to use the proper quantity of jacks may result in inward-outward lay of the bin sidewall or even permanent distortion of the bin sidewall sheets.

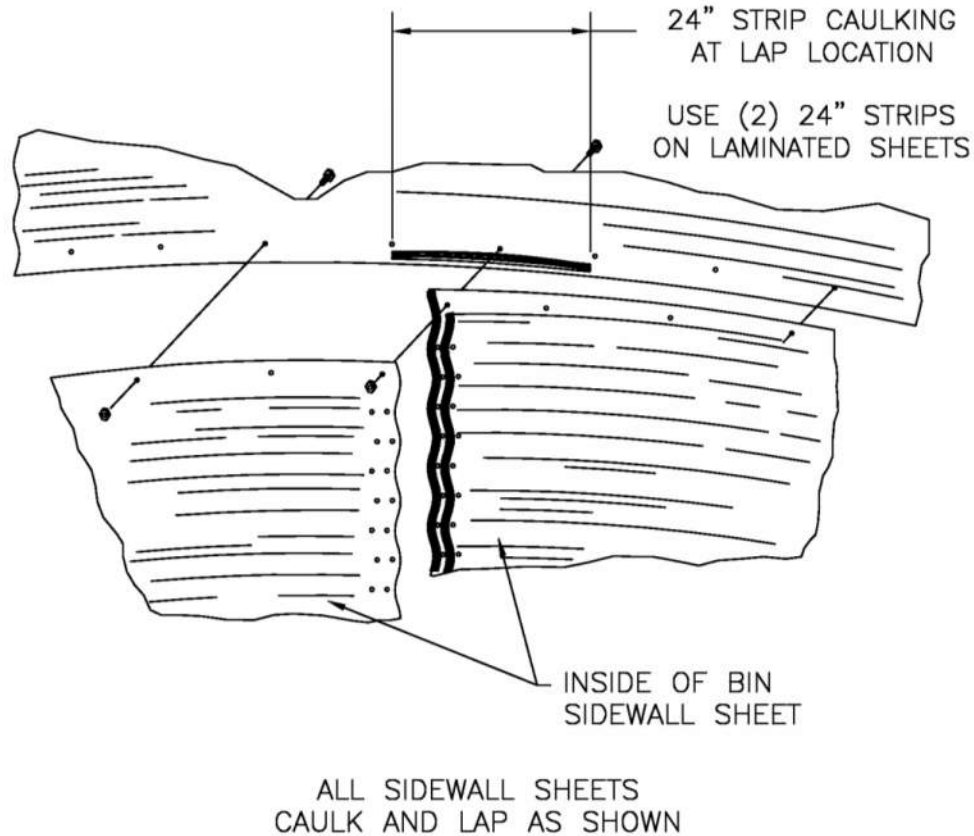
**The recommendation of at least one Bin Jack per sidewall sheet is based on keeping the bin round, refer to the warning below, and make sure the lifting capacity of the jack is sufficient for the weight of the bin. Note that all jacks may not shift equally, Therefore make sure the lifting capacity rating by the jack manufacturing is met.**



BIN JACK — MINIMUM 1 PER SIDEWALL SHEET — ANCHOR SECURELY

## *Assembling Sidewall Sheets*

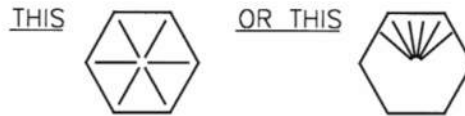
**Note:** Transition sheets are always 14ga. If there are more than one ring of 14ga sidewall sheets the transition sheet **must be** the last row of 14ga sidewall sheets installed. Use 7/16"x1" bin bolts at bottom sidelap of transition sheets. Use 5/16"x3/4" bin bolts at the top sidelap at vertical seams of transition sheet. Standard 14ga Sidewall Sheets are Color Coded Yellow, 14ga Transition Sheets are color coded Yellow and Black.



Wipe off the outside ends of *all* the Sidewall Sheets to remove excess oil so that the Strip Caulking will adhere to the metal. Place the Strip Caulking as near to the vertical inside edge of sheet at every vertical seam.

On Bins 12 gauge or heavier a horizontal strip of caulking is needed on the inside at the center bottom of the Sidewall sheet located on the hill near to the bottom holes. This strip of caulking should fit where the endlap of the next ring Sidewall Sheets bolts up to this location.

All bolts are washer head bolts with sealing washers S.A.E. Grade 8, with whiz flange nuts. Grade 8 bolts are marked with six radial lines on the bolt head as shown. If these descriptions do not correspond with the bolts shipped with the bin, please contact the customer service department immediately. ***Do not substitute any other Bolts.***

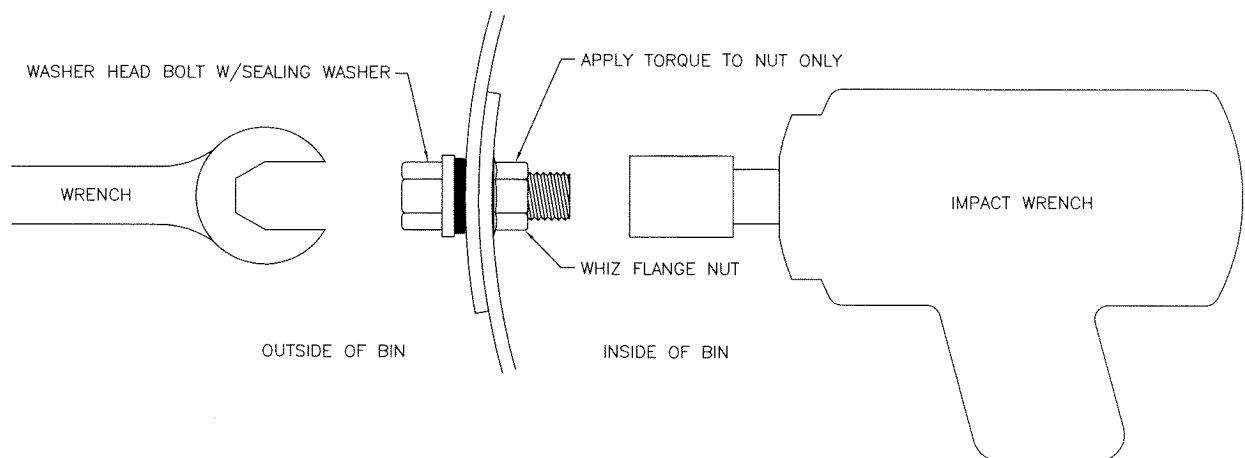


Bin bolts must be **TIGHT**. The following table contains recommended minimum and maximum torque values.

BOLT DIA. (INCHES)	TORQUE		FT. LBS
	MINIMUM	MAXIMUM	
5/16"	22	28	
7/16"	60	75	

Tighten the bin bolts from the inside of the bin (nut end of the bolt) to eliminate “spin off” of the sealing washer.

**USE ONLY THOSE BOLTS SUPPLIED BY CHIEF INDUSTRIES.  
THE SUBSTITUTION OF BOLTS FROM OTHER SOURCES IS NOT  
PERMITTED.**

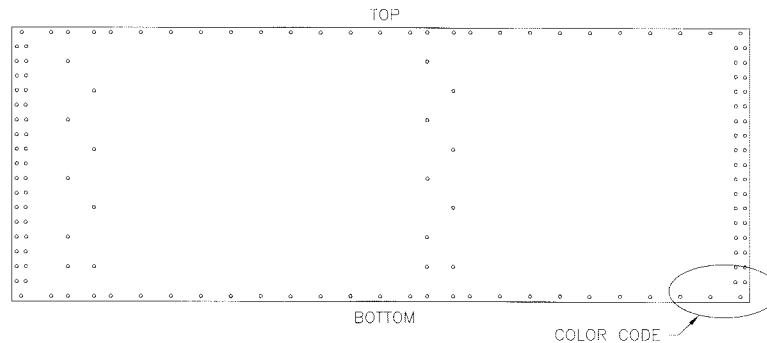


The top 2 rings of the bin and the roof should be assembled on the concrete bin floor. Attach the lifting brackets to the bolts at the endlaps of the sidewall sheets. The lifting brackets must be attached to the endlap by at least 8 standard bin bolts.

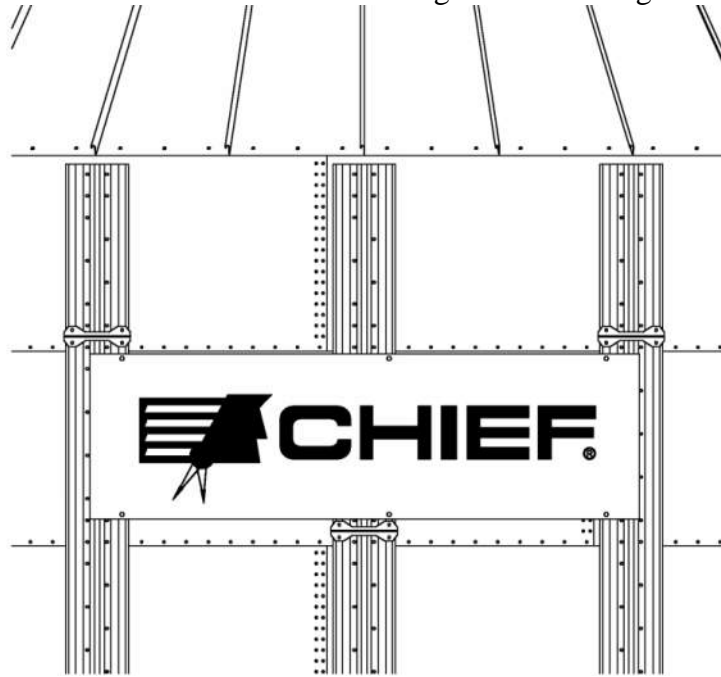
NOTE: Proper bolting sequence *MUST* be followed at all times.

Select the sidewall sheets needed to form the top ring and the second ring from the top. The sidewall sheet gauges and where they are positioned on the bin are listed there. Also note where your door will be located and begin the bin erection to accommodate that placement. For stiffened bins, find the correct gauge of stiffeners needed from the same chart you are using for the sidewall sheet gauges.

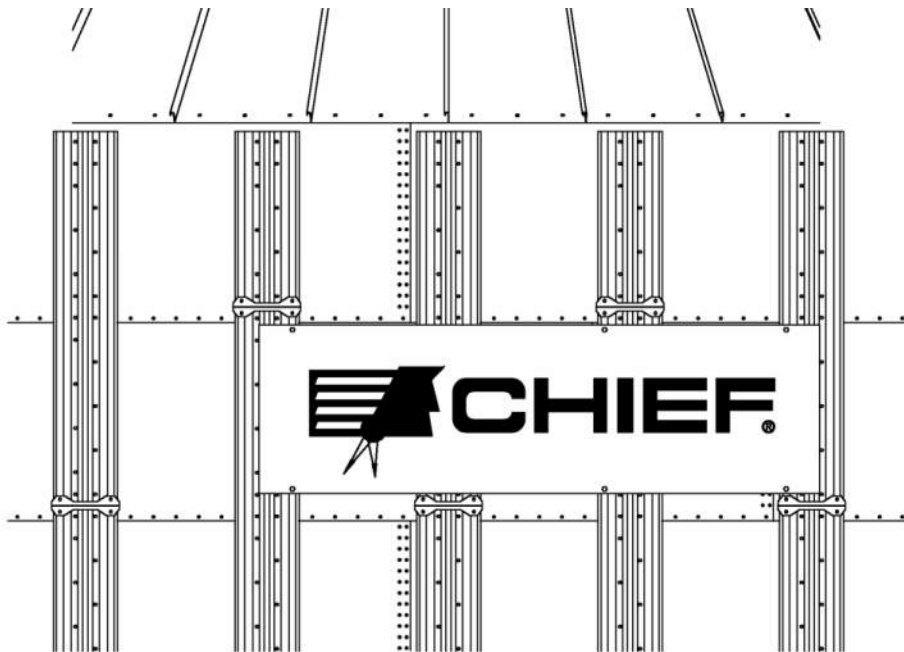
All sidewall sheets are color coded by manufacturing as listed in sidewall erection section. The color code is sprayed on the bottom edge of the stack of sheets. The sidewall sheets should be installed with the colored coded edge to the bottom.



The Sign Sheet must be installed in the second ring as shown in figures below.



(Shown installed on a 2 stiffened bin)



(Shown installed on a 3 stiffened bin)

Install the Sign Sheet by field drilling (6) six  $\frac{1}{2}$ " holes in the Sign Sheet and stiffeners as shown above. Bolt the Sign Sheet to the stiffeners with (6) six  $\frac{7}{16}$ " bolts.

### *Crane and Jack Capacities:*

The total roof dead load for each of the respective bin roof sizes is shown in the table below. This weight includes the roof panels and all structural members (roof beams, compression rings, bolts, ect.)

When determining the crane capacity necessary to erect the roof structure, the booming distance must be considered. If the crane sizes available will not lift the roof structure (using one crane), two cranes may be used, utilizing a spreader bar. The spreader bar must be adequately designed to carry the entire roof dead weight.

**WARNING!! OVERLOADING CRANE CAPACITY CAN RESULT IN  
SUBSTANCIAL PROPERTY DAMAGE OR SEVERE PERSONAL INJURY.  
ALWAYS CHECK CRANE CAPACITY PRIOR TO LIFTING ROOF STRUCTURE**

Roof	Size	Dead Load
V-Rib	#5 without Structure	572 lbs
V-Rib	#6 without Structure	771 lbs
V-Rib	#7 without Structure	1000 lbs
V-Rib	#8 without Structure	1261 lbs
V-Rib	#9 without Structure	1553 lbs
V-Rib	#10 without Structure	2018 lbs
V-Rib	#12 without Structure	2806 lbs



## Section 3 – Foundation Details

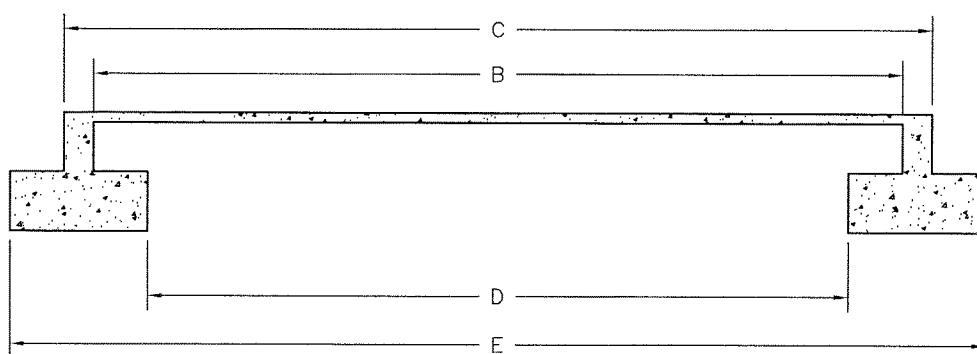
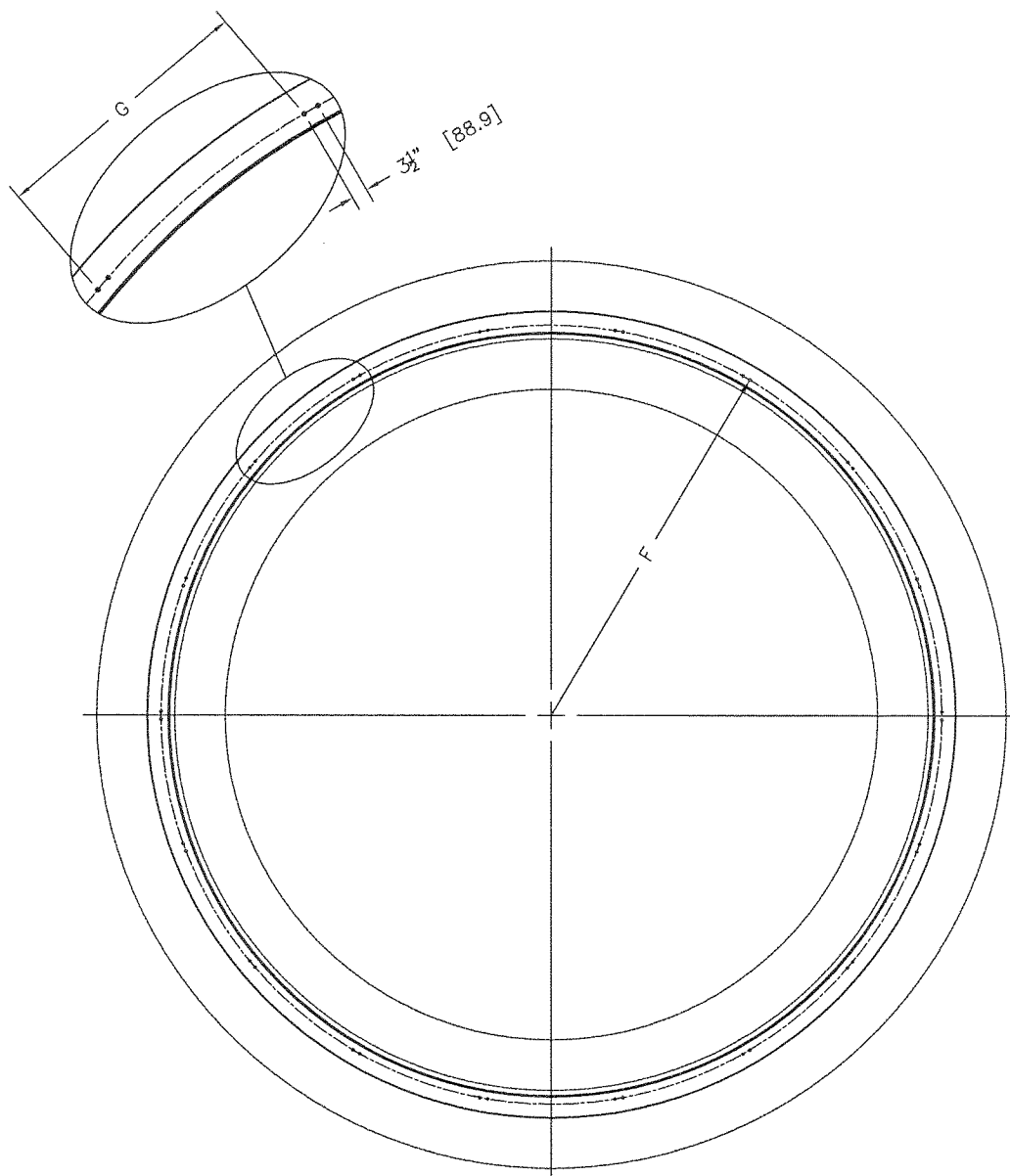
### *A. Sight Selection*

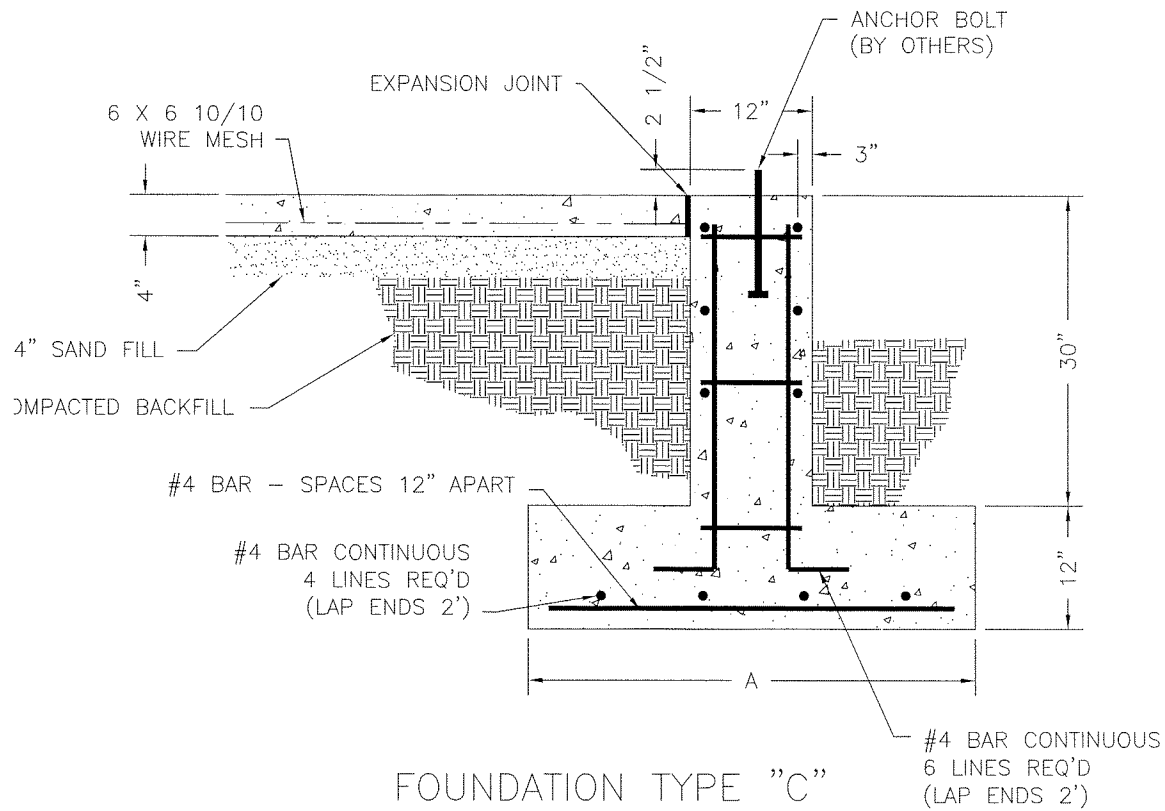
Choose a site that has good drainage away from the bin so that water will not stand around the bin. The soil should be firm and preferably without fill. If fill is required, water and compact the fill material to avoid uneven settlement. A field investigation of the soil bearing conditions is recommended especially for larger grain bins where the foundation loads and floor pressure become large. A licensed engineering firm should be employed to take soil borings, determine the maximum allowable soil pressure and design the bin foundations and floor slab accordingly.

### *B. Stem Wall Details*

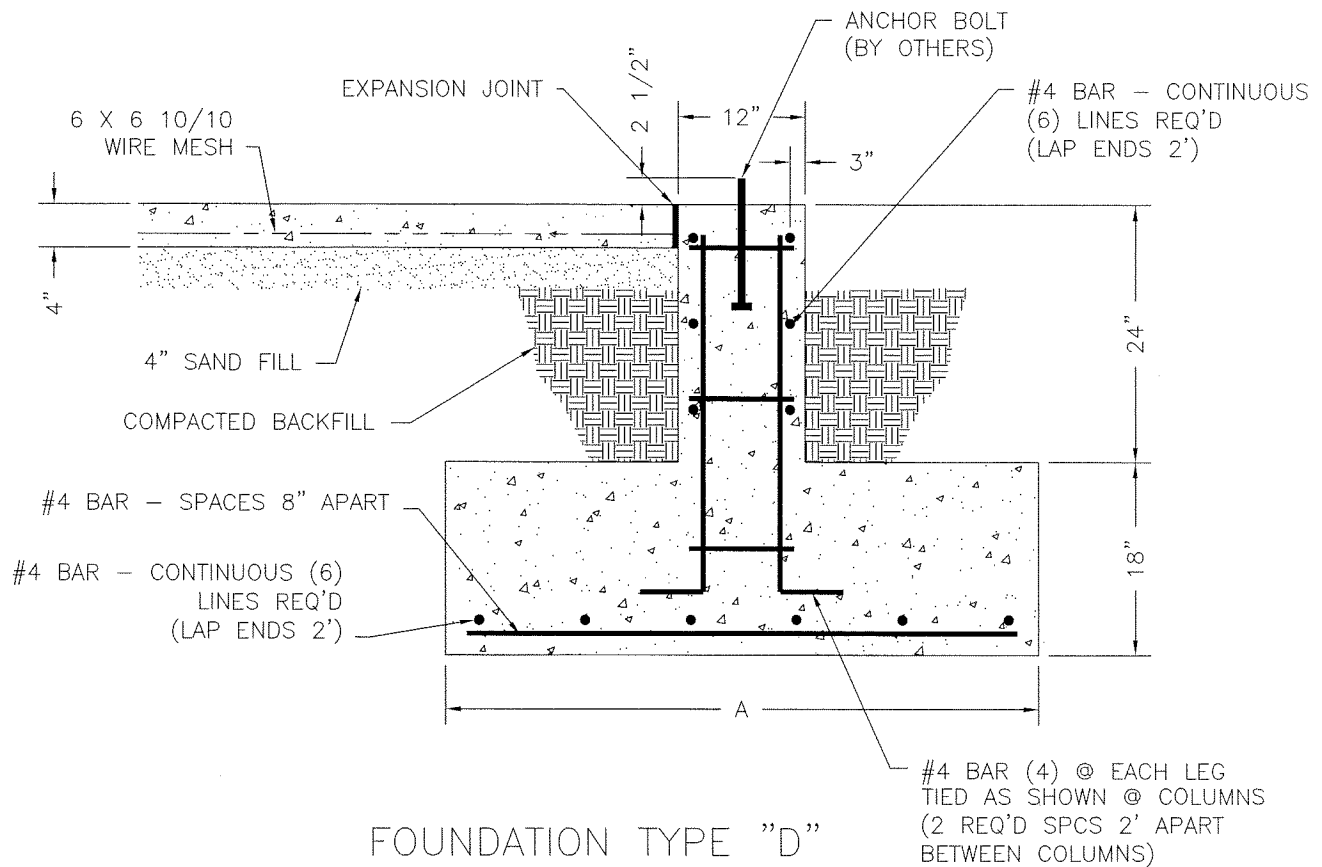
CONCRETE LAYOUT TABLE									
TANK	# OF	FDN	DIMENSIONS						
DIAMETER	RINGS	TYPE	A	B	C	D	E	F	G
21'-8"	5 - 8	C	3' 8"	21' 3"	23' 3"	18' 7"	25' 11"	11' 1-1/2"	4' 11-3/8"
21'-8"	9 - 11	C	4' 4"	21' 3"	23' 3"	17' 11"	26' 7"	11' 1-1/2"	4' 11-3/8"
21'-8"	12 - 14	D	5' 4"	21' 3"	23' 3"	16' 11"	27' 7"	11' 1-1/2"	4' 11-3/8"

FOUNDATIONS SUGGESTED MINIMUM QUANTITIES OF MATERIALS							
TANK	# OF	FDN	LINEAL FT.	SQ. FT.	CU. YDS.	ANCHOR BOLT	
DIAMETER	RINGS	TYPE	REBAR	WIRE MESH	CONCRETE	SIZE	QUA
21'-8"	5 - 8	C	1220	355	22 1/2	3/4" X 1' 3"	28
21'-8"	9 - 11	C	1260	355	24 1/2	3/4" X 1' 3"	28
21'-8"	12 - 14	D	1640	355	32 1/2	3/4" X 1' 3"	28





FOUNDATION TYPE "C"

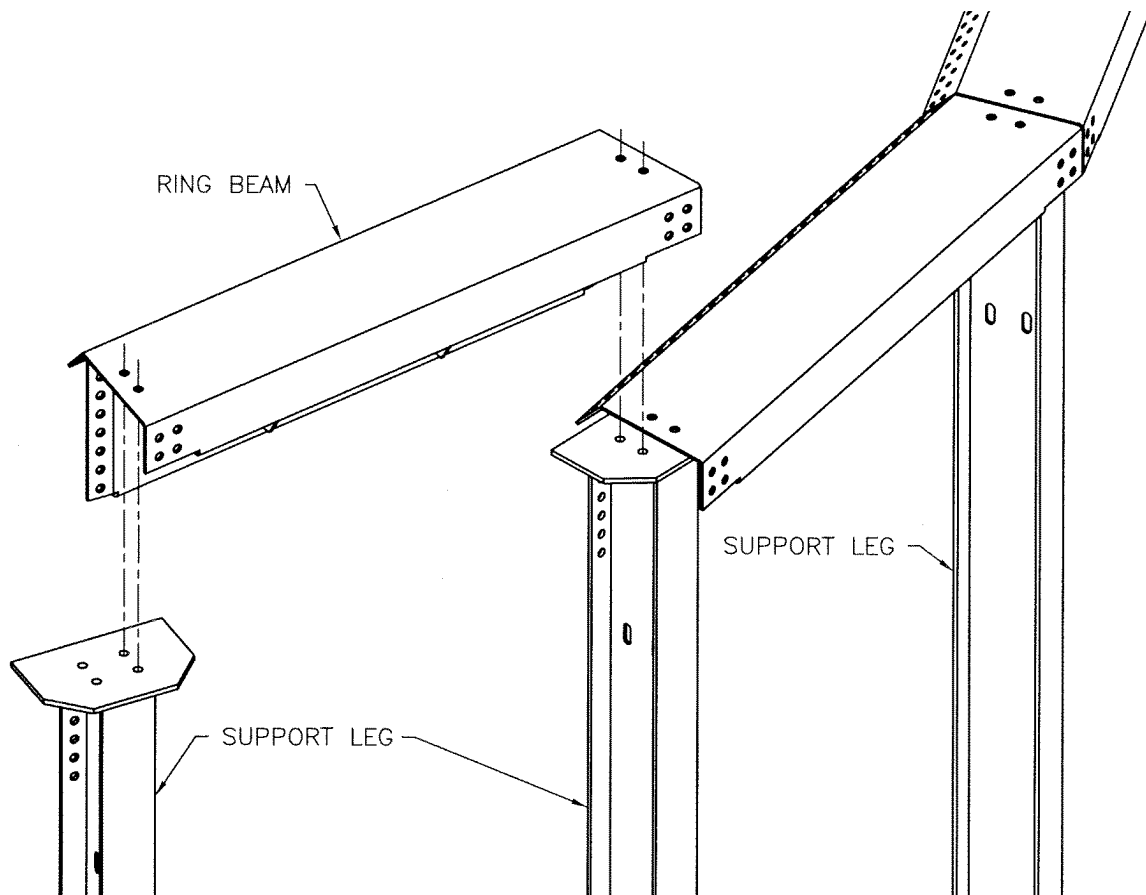


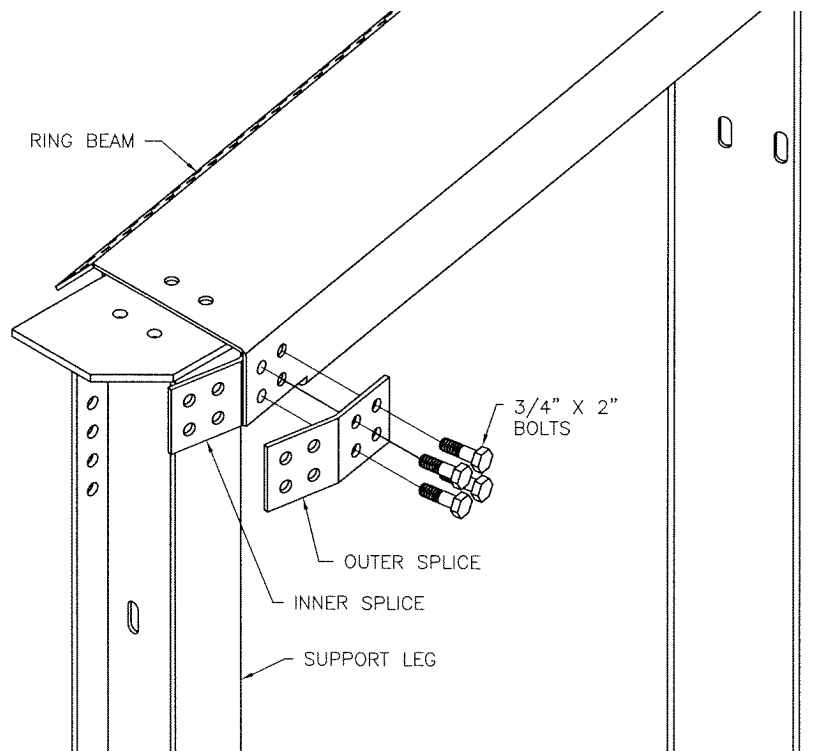
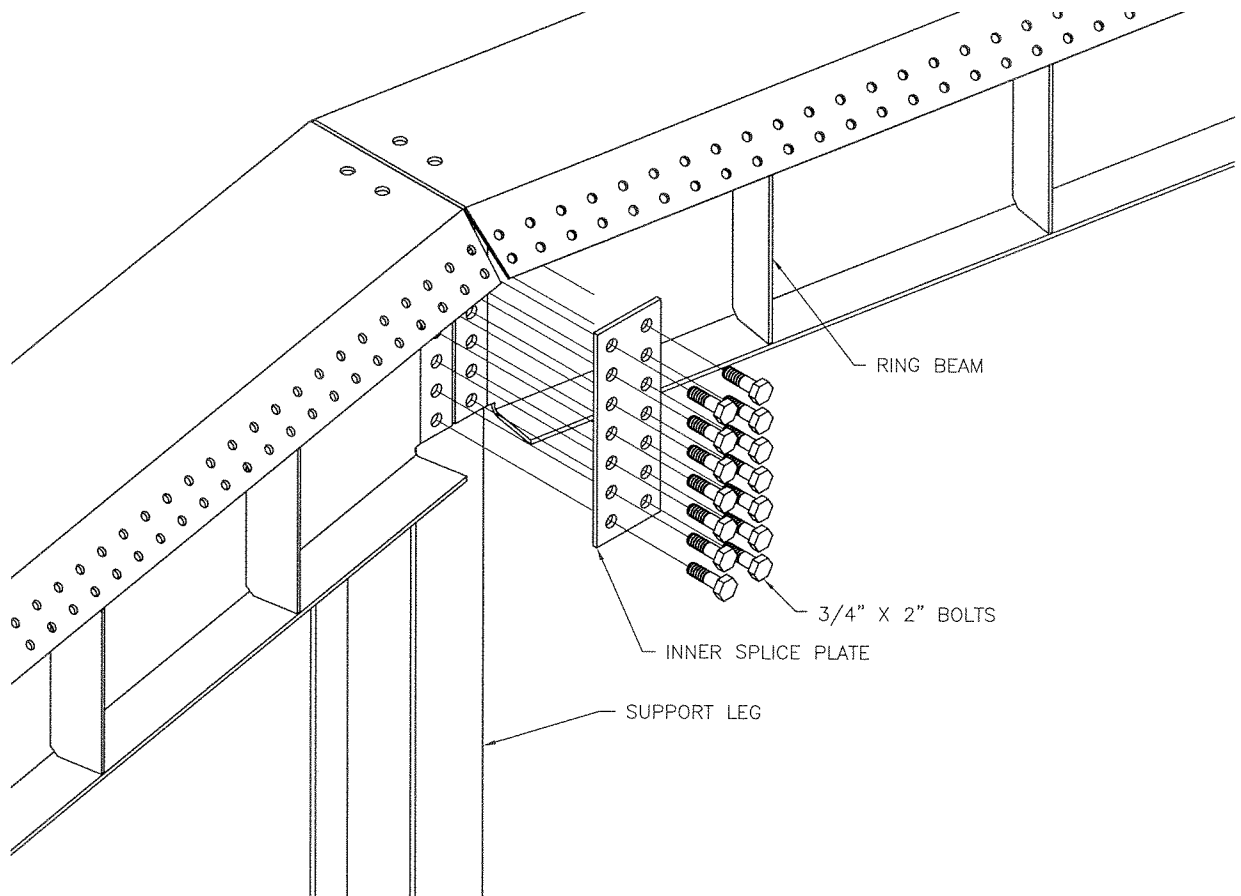
FOUNDATION TYPE "D"

## Section 4 – Base and Hopper Erection

### A. *Support Leg and Ring Beam Assembly*

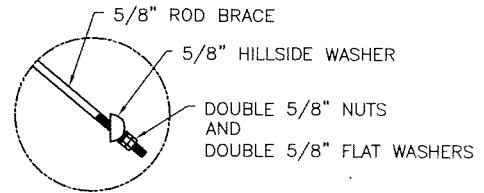
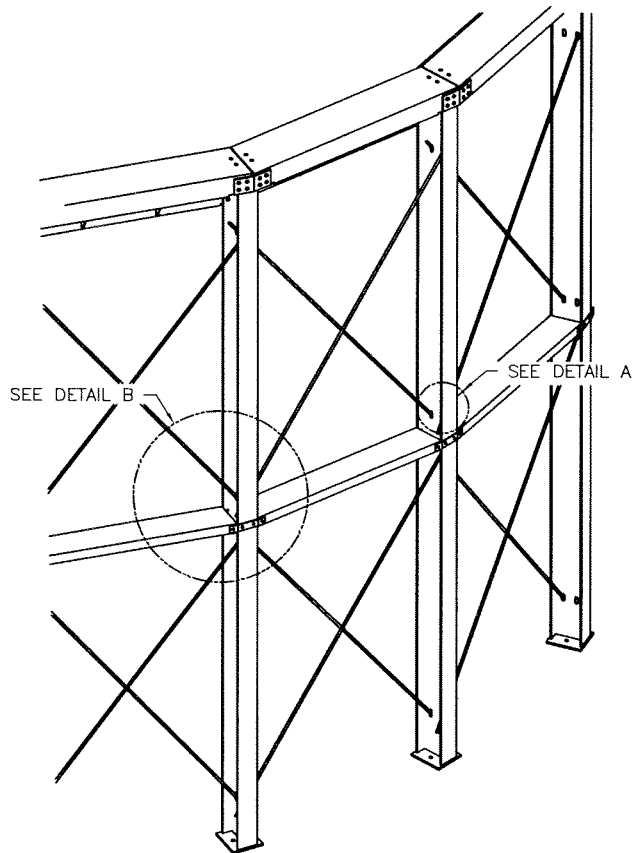
1. Set all support leg over the anchor bolts; leave the nuts loose enough to permit the legs to move, but not tip.
2. Lift the ring beam sections into place, and install all splice plates as shown. Do not tighten any bolts at this time.



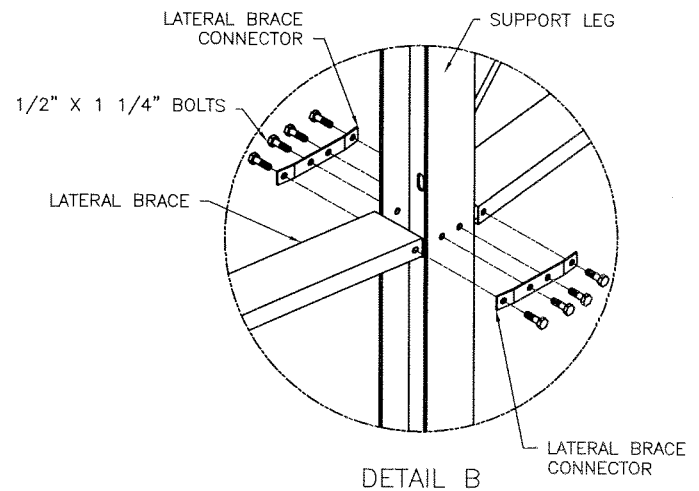


## *B. Lateral and Rod Braces*

1. Install lateral braces and rod braces as shown. Do not tight any bolts at this time



DETAIL A

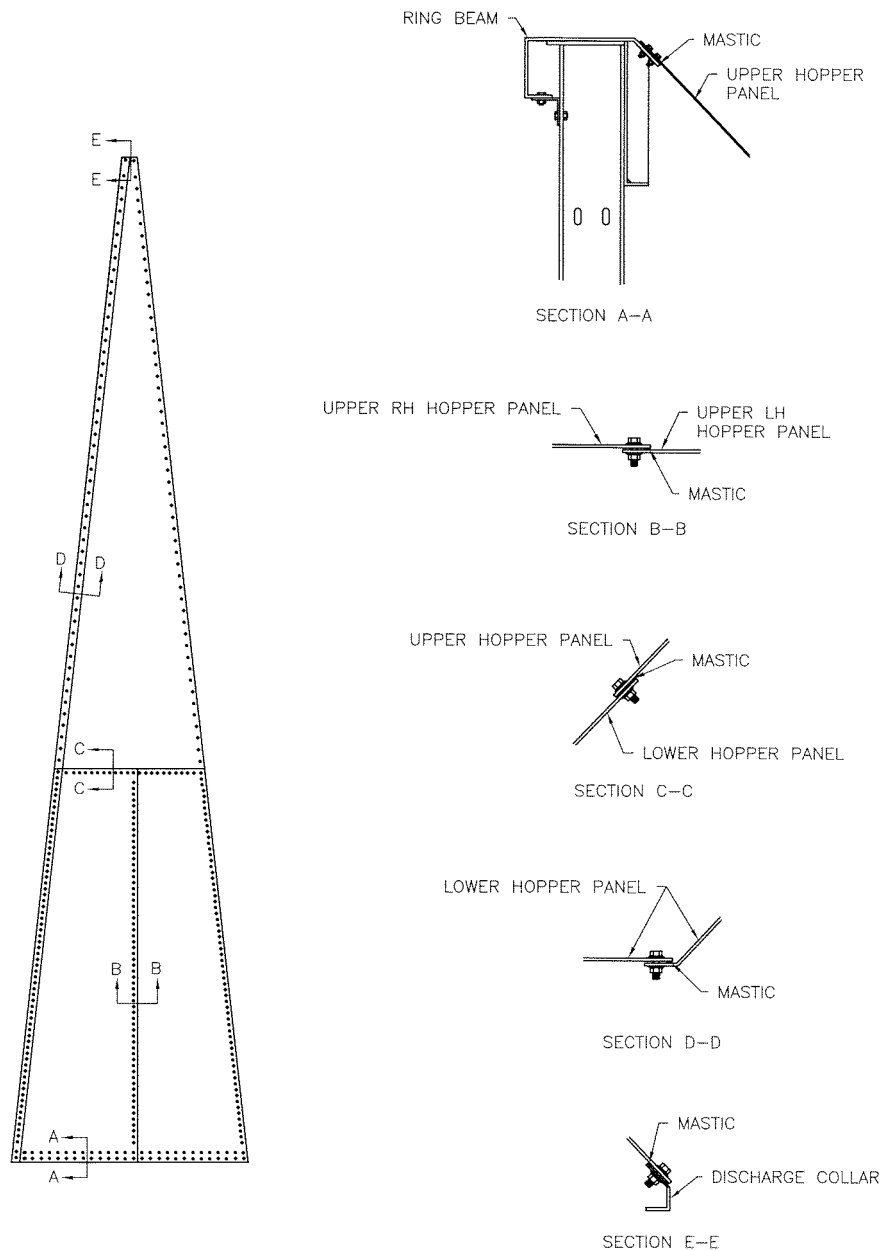


DETAIL B

### C. Hopper Panel Erection

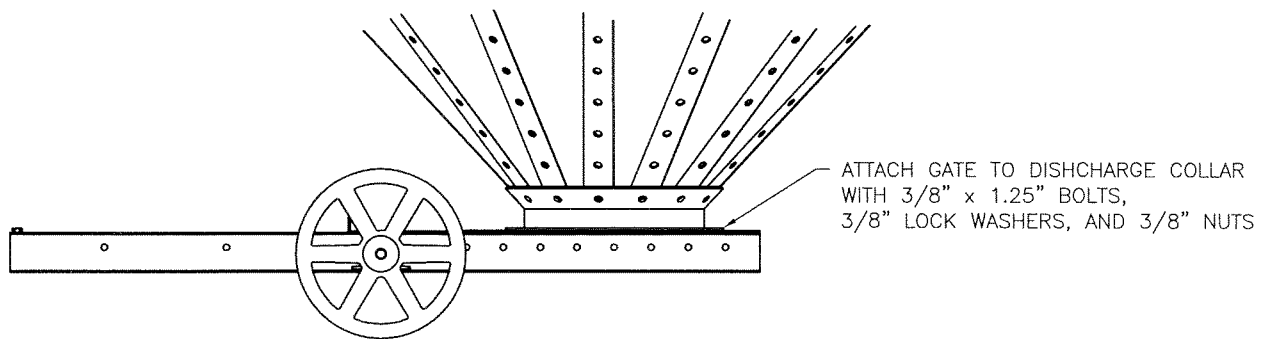
1. Caulk and install all upper hopper panels as shown leaving all bolts loose.
2. Caulk and install all lower hopper panels as shown leaving all bolts loose.
3. Install Discharge Collar to lower hopper panels.
4. When all hopper panels have been installed, begin by tightening all hopper panel bolts. Then adjust rod bracing as need to insure all support legs are plumb and ring beams are level.
5. Tighten all remaining bolts in base.

**Note: All bolts in hopper panels are installed with heads of bolts on inside of hopper.**



Note: All connections are 1/2" Bin Bolts

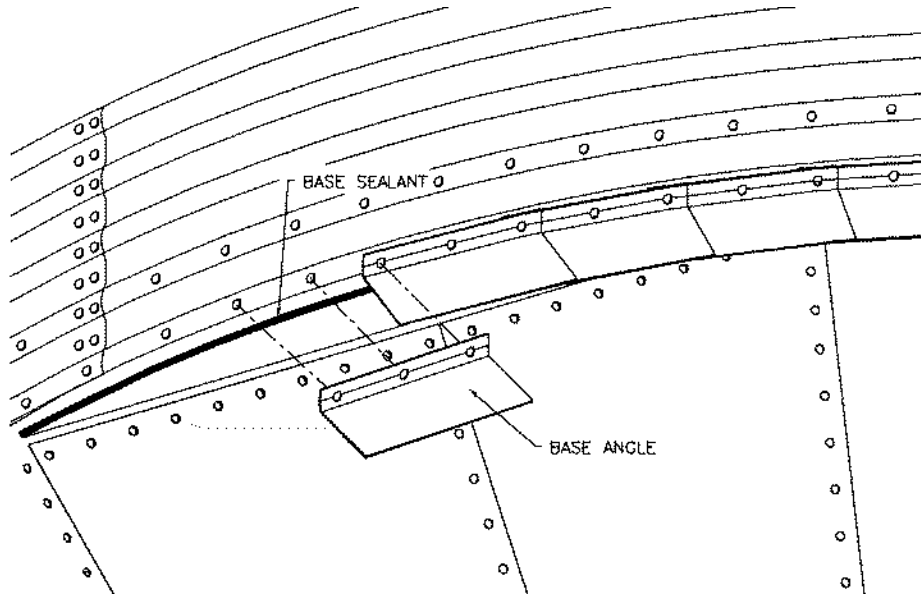
6. Bolt gate to discharge collar with 3/8" x 1.25" bolt, 3/8" lock washers, and 3/8" nuts.



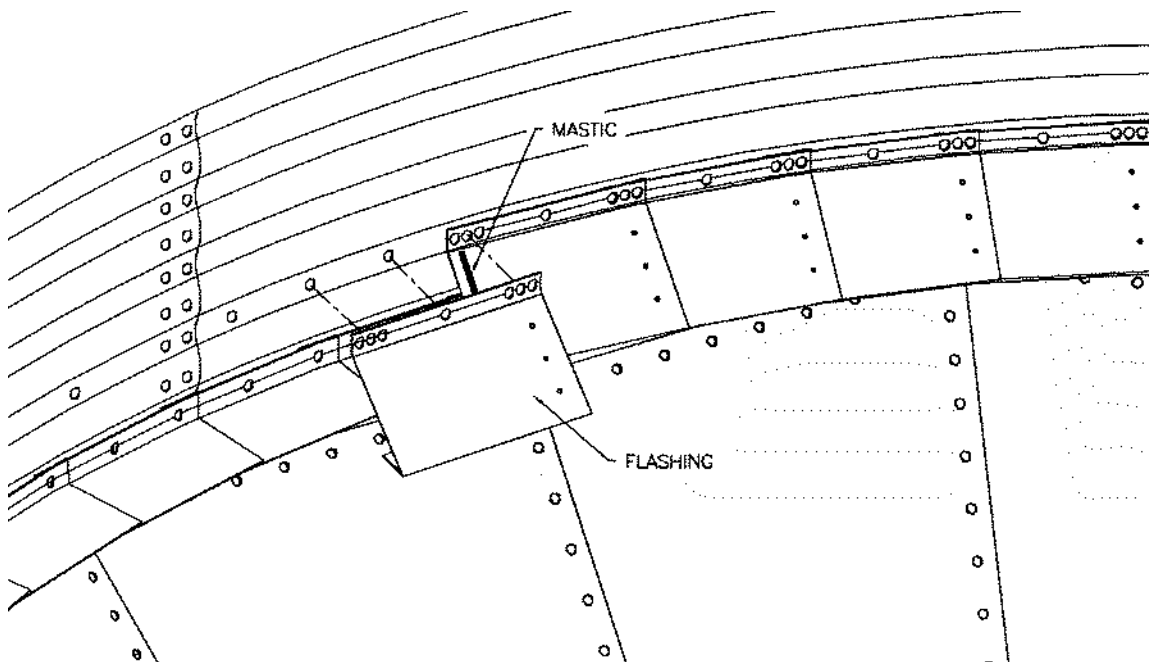


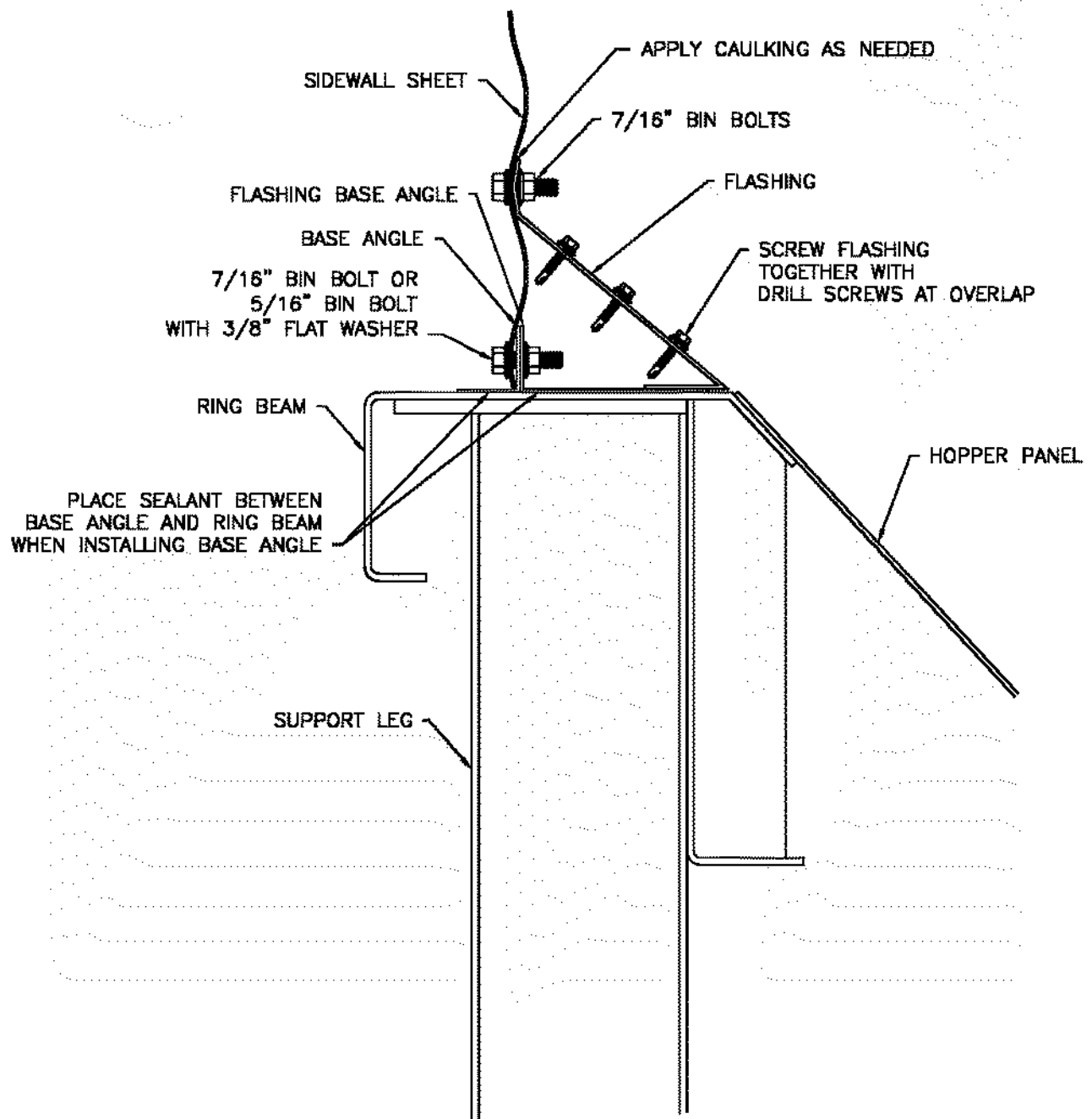
#### *D. Hopper Flashing (optional)*

There are 12 pieces of flashing and base angle per sidewall sheet. Attach base angle to sidewall sheet with either 7/16" bin bolt or 5/16" bin bolt with flat washer. Apply sealant to the ring beam under the base angle before installing.



Attach flashing to sidewall sheet with 7/16" bin bolts. Apply mastic between flashing pieces as shown. Attach flashing together with drill screws as shown.





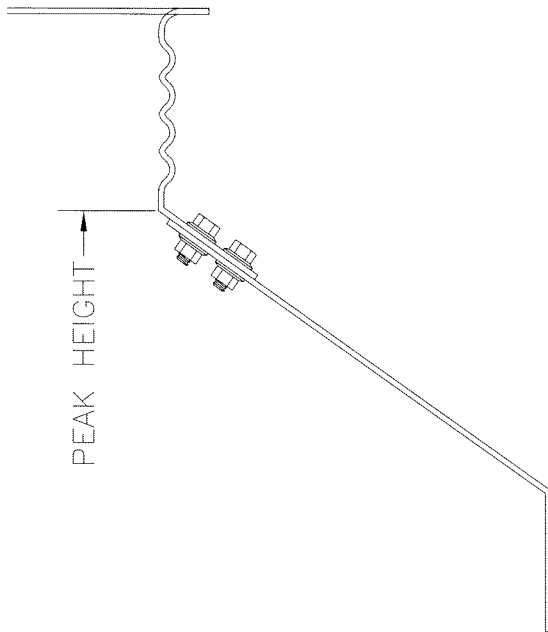
## Section 5 – Roof

### A. Roof Assembly

After the first ring of the bin is erected raise the peak ring to the proper height listed in the chart below.

Tank Size	Height
05	11'-2 3/4"
06	12'-1 1/2"
07	13'-0 1/4"
08	13'-11"
09	14'-9 5/8"
10	15'-8 3/8"
12	17'-5 7/8"

**Height = (top of floor to bottom of peak ring with Two rings installed)**



**Important!** All roof panels are color coded for each tank size. The chart below lists the proper color code for each tank size roof panels.

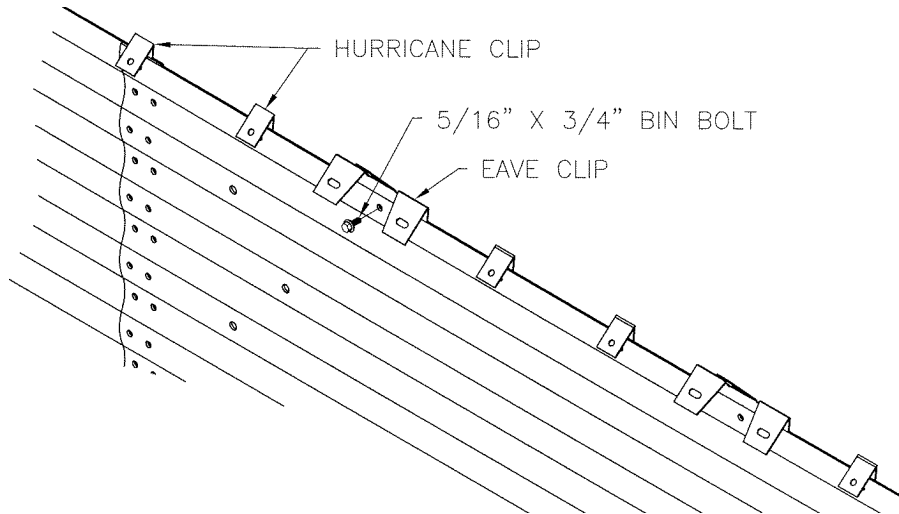
Tank Size	Roof Panel Color Code
05	Green/White
06	Red
07	Yellow
08	Green
09	Blue
10	Orange
12	Brown

#5 thru #12 Peak Height Detail

Tank Size	Bridging Ring Color Code
10	Orange
11	Brown
12	Brown
14	White
16	Blue

### *B. Eave Clip Installation*

Before installing roof panels, eave clips and hurricane clips must be installed to the inside of the top ring of the tank using 5/16" x 3/4" bin bolts. Leave clips loose until roof panels are installed.



Install 4 roof panels 90 degrees apart from each other by bolting the panels to the eave clips and peak ring.

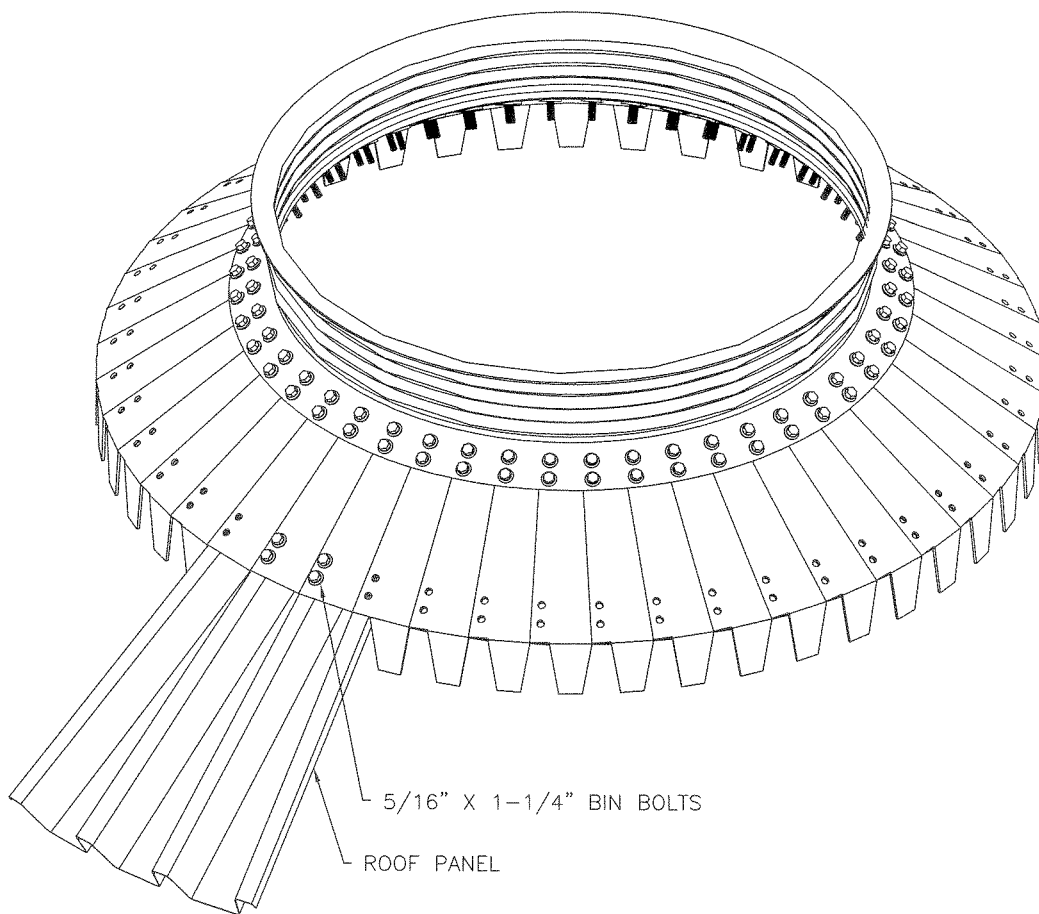
Note: The roof panel to the right of the first panel is the roof ladder panel. Add the ladder rungs as the bolts are being installed. All ladder rungs are attached to the roof panel ribs with 5/16" x 3/4" Bin bolts.

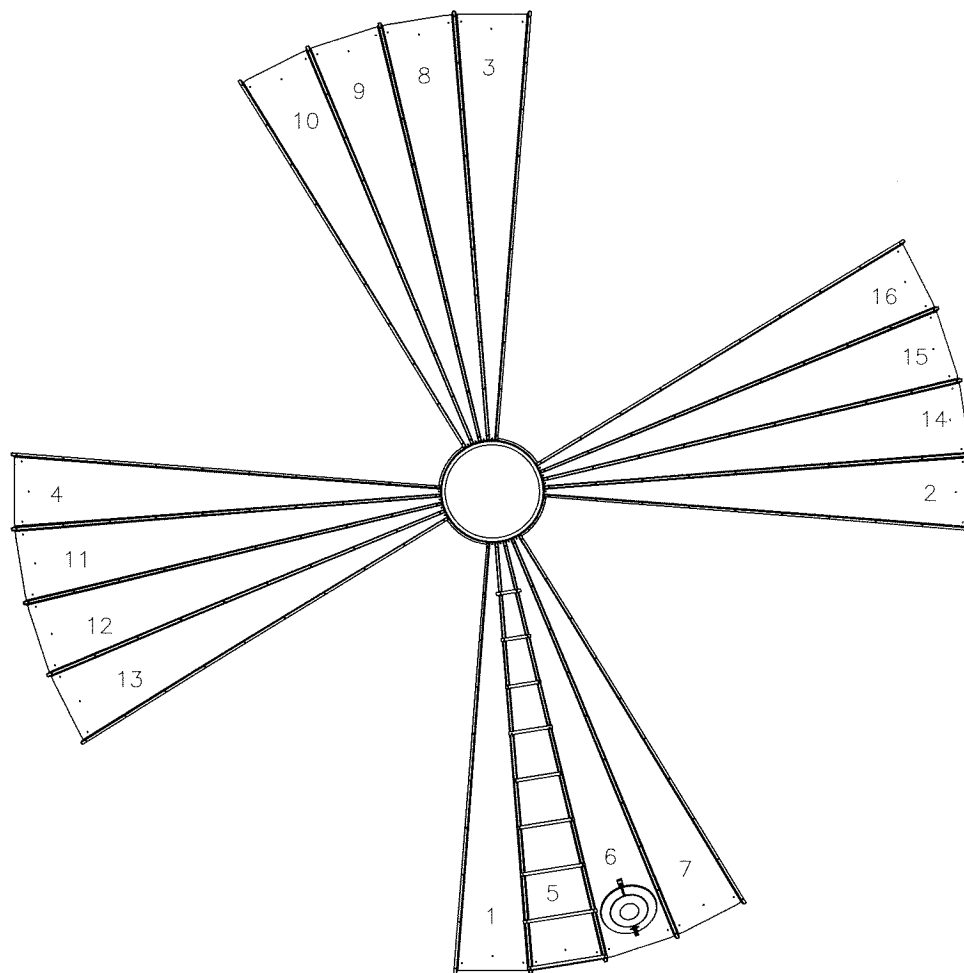
### *C. Roof Panel Installation (#5 - #12)*

Install 4 roof panels 90 degrees apart from each other by bolting the panels to the eave clips and peak ring.

Install the roof panels to the bottom side of the inner ring assembly and attach the roof panel ribs to the peak with 5/16" x 1-1/4" bin bolts.

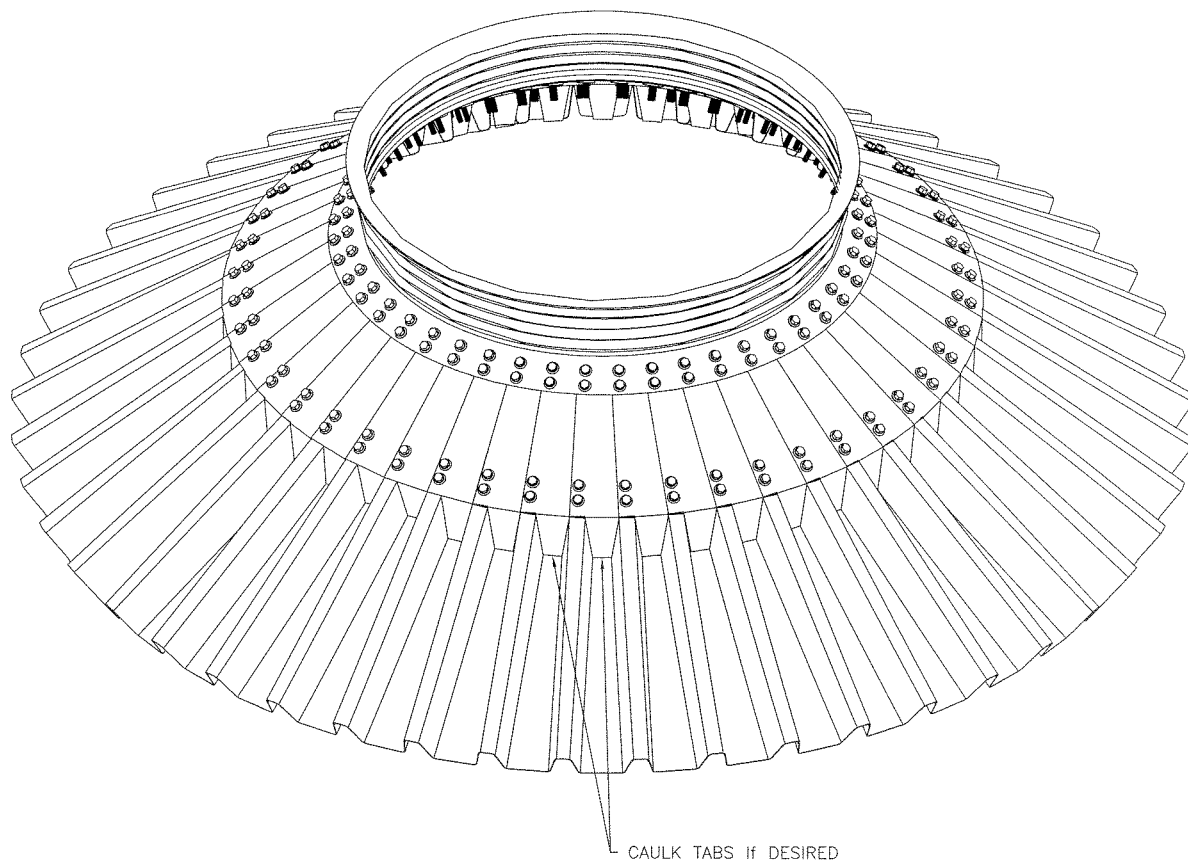
Note: The roof panel to the right of the first panel is the roof ladder panel. Add the ladder rungs as the bolts are being installed. All ladder rungs are attached to the roof panel ribs with 5/16" x 3/4" Bin bolts.





*Typical Roof Top View*

Install roof panels as shown. Bolt roof panels together with 5/16 x 3/4" Bin Bolts. Be sure to check peak ring periodically while installing roof panels to make sure it is keep level.

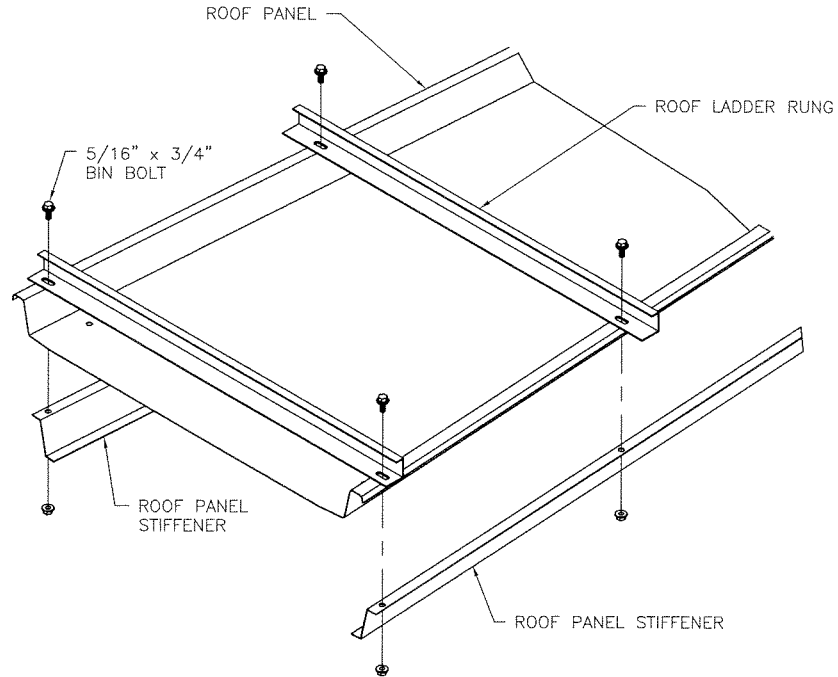


After all roof panels have been installed, the tabs between the ribs can be caulked if desired.

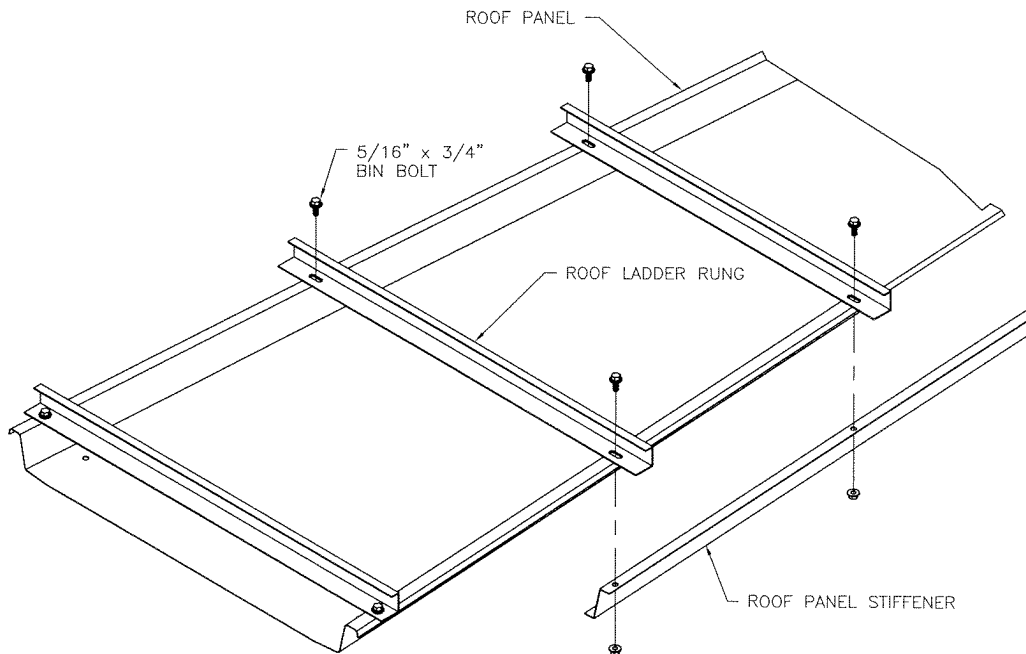
### *D. Roof Rib Stiffeners*

(#6 through #9 bins only)

Install Roof rib stiffeners on the roof panel the roof ladder is on as shown below.  
(Holes in roof panel will need to be reamed out for the 5/16" x 3/4" Bin Bolts.)



**#06 and #07 Roof Panel Rib Stiffeners**

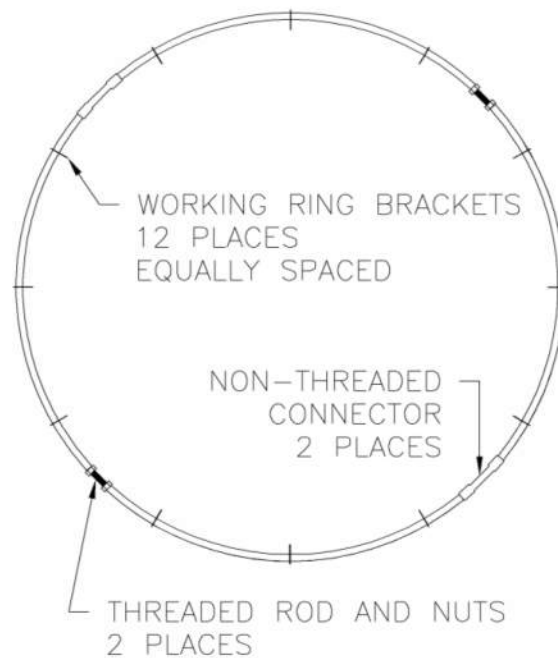
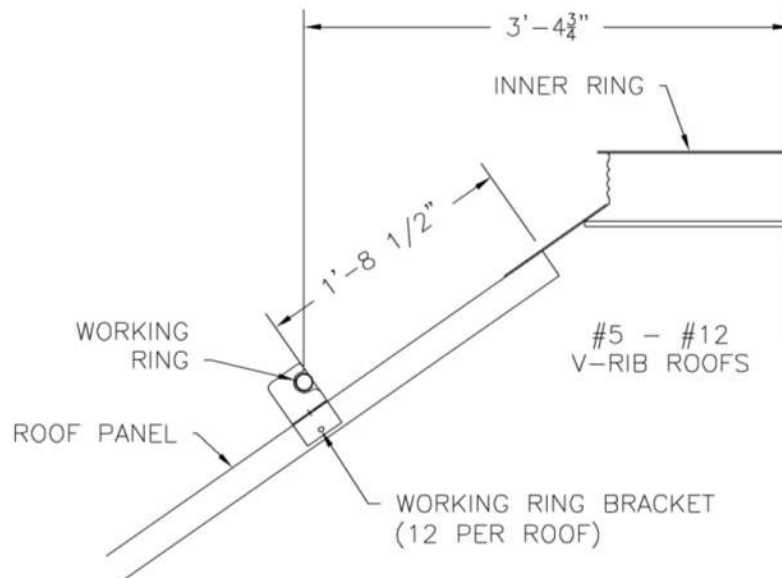


**#08 and #09 Roof Panel Rib Stiffeners**



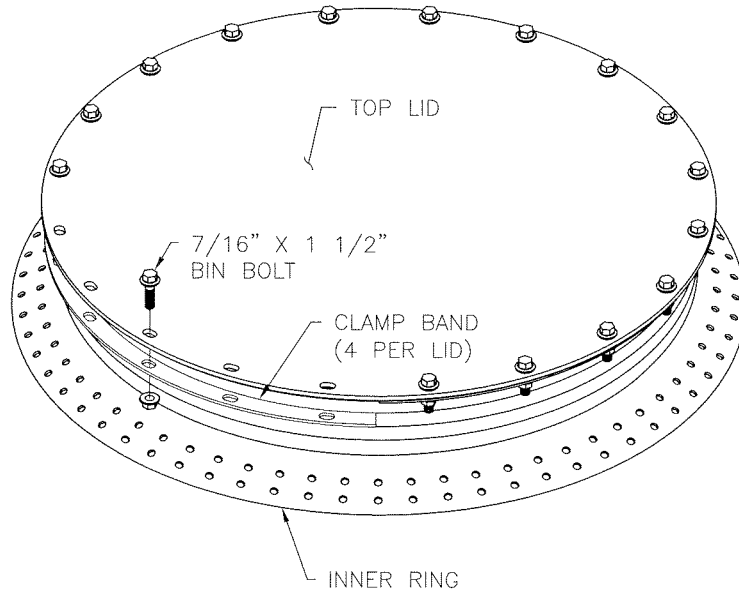
### *E. Working Ring*

Field locate and Install the working ring to the roof panels as shown, with 5/16" x 3/4" Bin bolts. The working ring clips are to be evenly spaced around the ring. Connect the working ring segments together with the connectors as shown below.



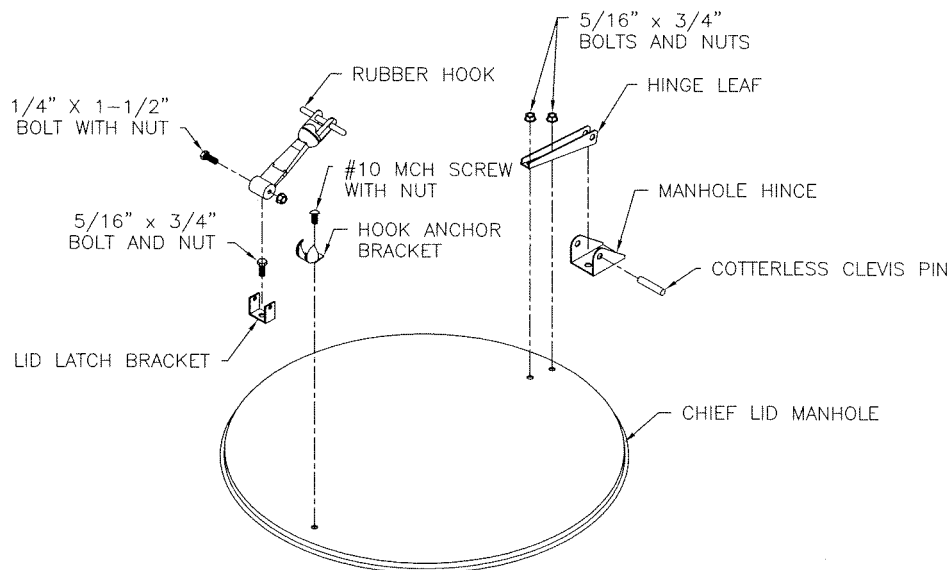
### *F. Top Lid*

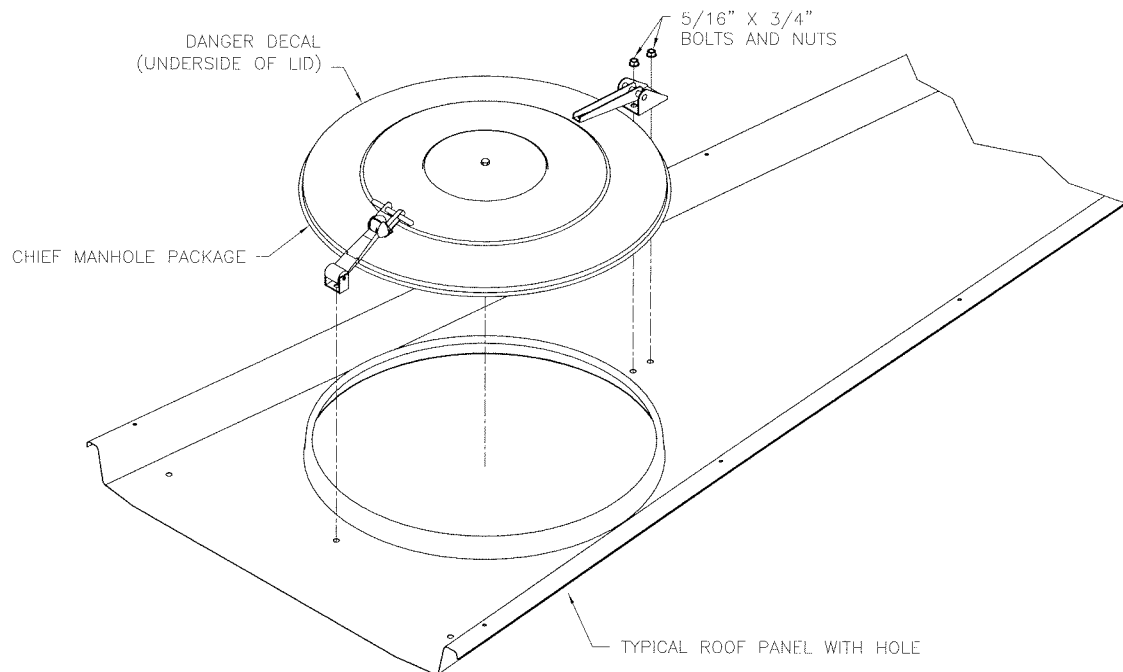
Bolt the flat top lid to the inner ring with the for clamp bands as shown with (20) 7/16" x 1 1/2" Bin Bolts. (Note: The flange on the inner ring may need to be field drilled to allow clearance for the bolts.)



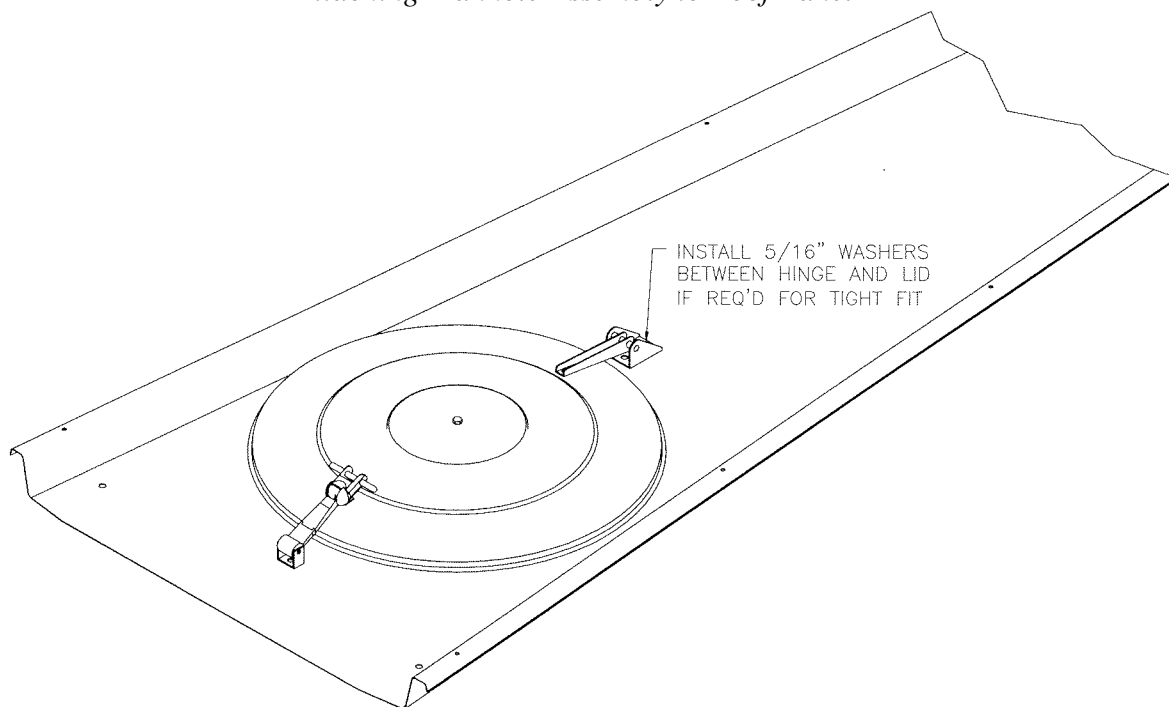
### *G. Manhole Lid*

- (1) Install manhole lid as shown below. Note that manhole hinge should be installed toward top of bin.





*Attaching Manhole Assembly to Roof Panel*

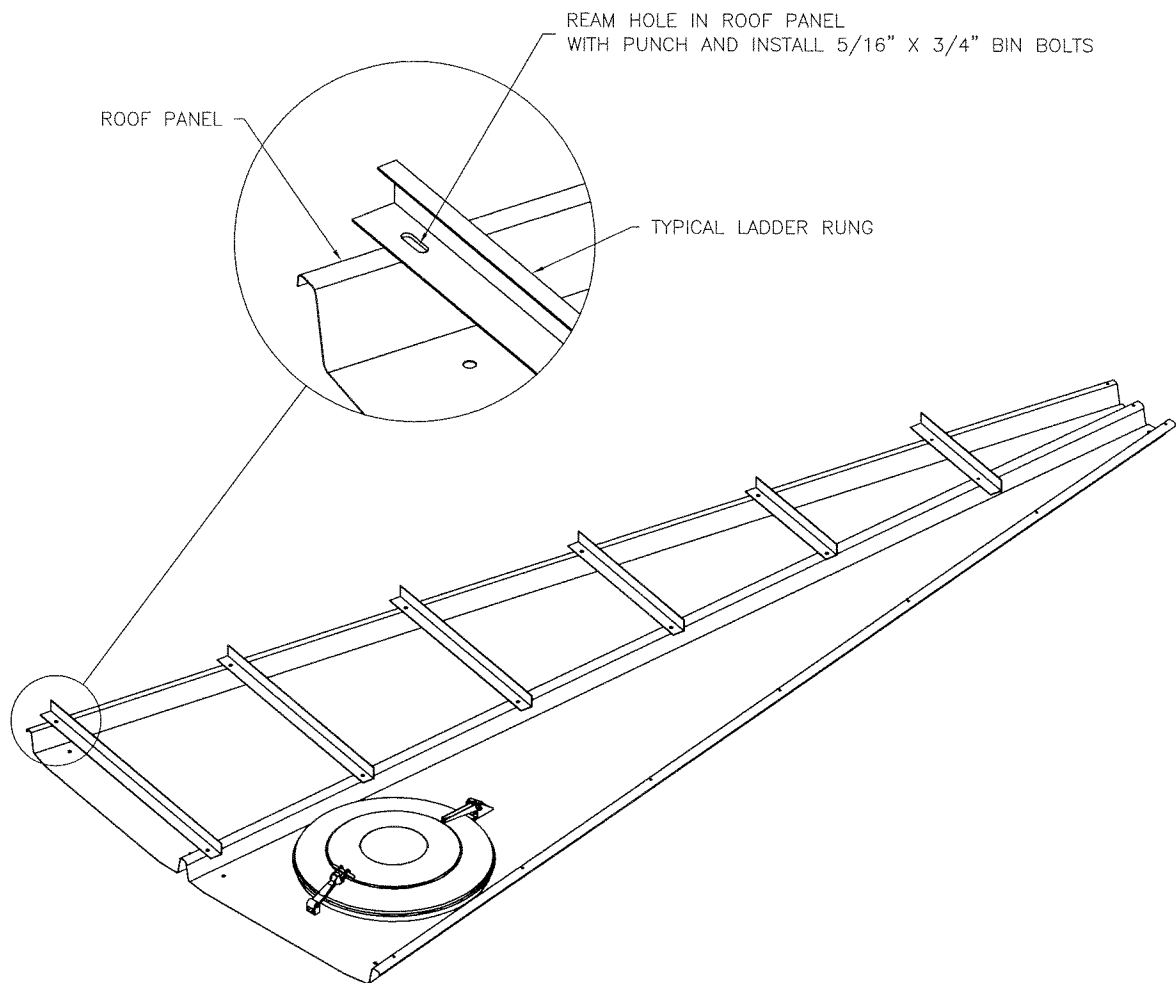


*Complete Assembly*

**NOTE:** Leaf to lid and hinge to roof panel bolts are to be installed with heads inside.

## *H. Roof Ladder*

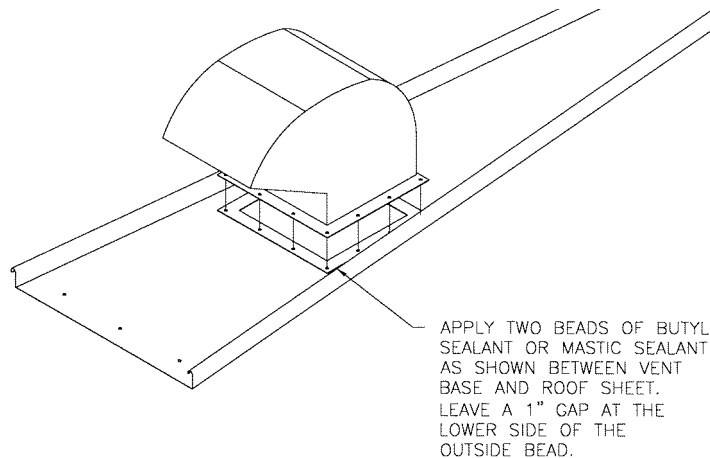
For ease in opening the top lid, roof ladder should be placed approximately 90° from hinge holes located in the side of the inner ring.



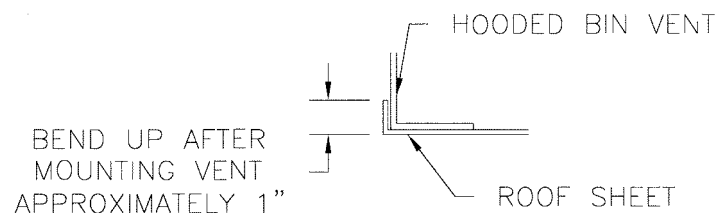
## *I. Roof Vents*

### Goose Neck Vent Installation

1. Refer to the bulletin that comes with the vent for installation procedures
2. Locate Goose Neck Vent on the desired roof sheet. Typically slide Goose Neck Vent up the roof sheet (Toward the small end) until the corners of the base intersect the roof sheet ribs.
3. Using the base as a template, mark and drill the 11/32" diameter mounting holes.
4. Apply (2) two beads of butyl sealant or mastic sealant as shown, between the Goose Neck Vent base and roof sheet. Leave a 1" gap at the lower side of the outside bead.



5. Assemble Goose Neck Vent to roof sheet using 5/16" x 3/4" hex bin bolts and nuts. Tighten all bolts and check sealant along upper end of Goose Neck vent base for any gaps or pockets. Apply extra sealant as required.
6. Peen up edge on inside of Gooseneck Vent to make a watertight seal. The lip should be approximately 1" all the way around.



7. **Do Not Weld** Gooseneck vent to roof, as rusting will result.

*J. Temperature Cable Supports (optional)*

**Note:** Temperature cables can only be installed in bins with V-Rib roofs up to 12 rings tall.

<b>#5 - #16 Temperature Cables</b>		
Bin Size	Total # Temp. Cables	Temp. Cables #/Radius
#5	1	0"
#6	1	0"
#7	1	0"
#8	3	84"
#9	3	88"
#10	3	91"
#11	3	103"
#12	3	111"
#14	1-4	0"-174"
#16	1-5	0"-196"

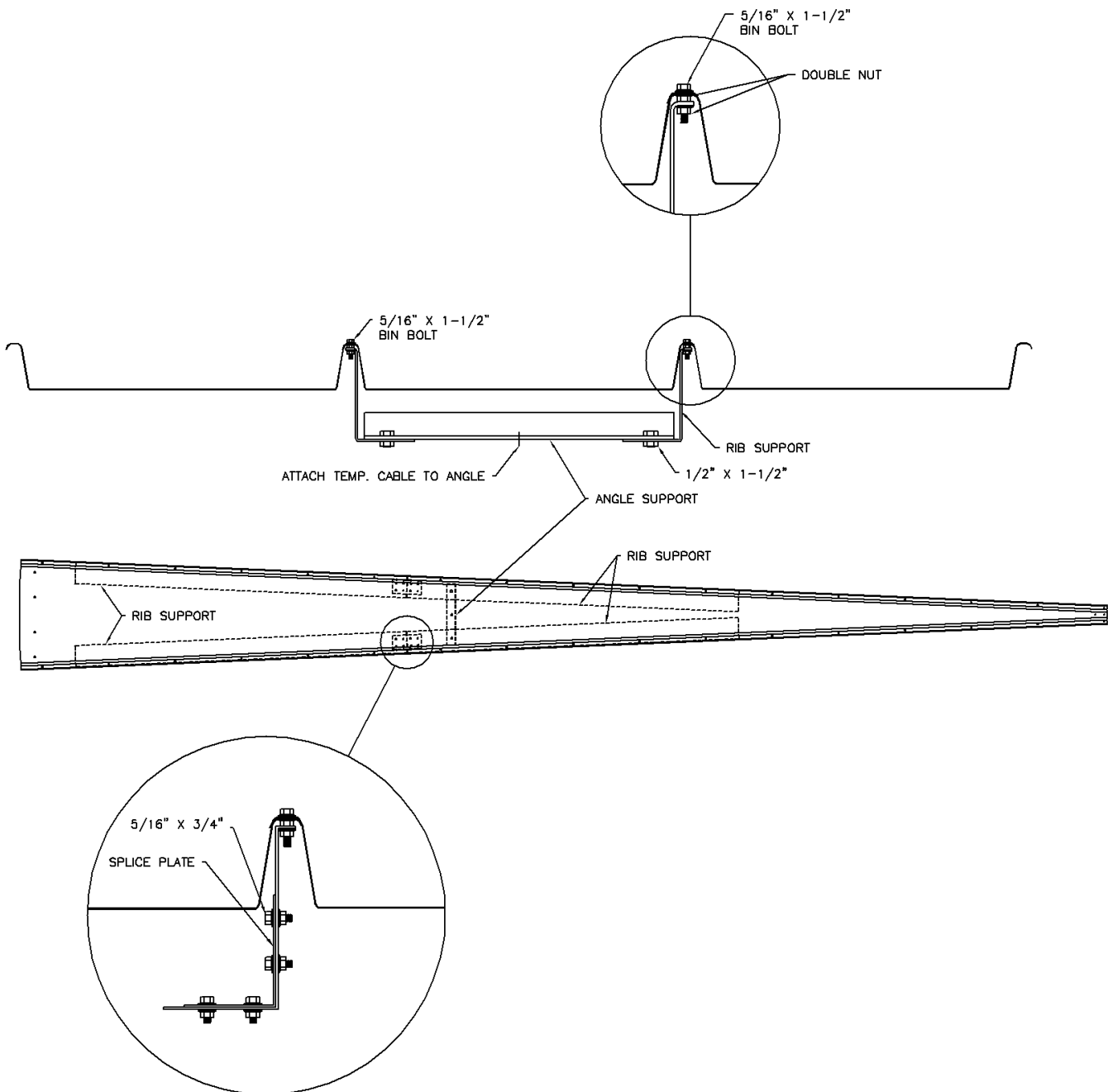
On roof panels that temperature cables are to be installed, attach roof panel ribs with 5/16" x 1-1/4" bin bolts, Install Rib supports under roof ribs with double nuts as shown. Attach rib supports together with splice plates. Attach angle support to rib supports with 1/2" x 1-1/2" bolts. Attach temperature cable to angle support per temperature cables manufactures instructions.

Note:

#10 thru #16 requires 2 rib supports per roof sheet.

#8 and #9 roofs do not require splice plates; there is only one rib support per roof sheet.

Center Temperature cables can be attached to the peak ring and do not require a support kit.



## Section 6 – Sidewall Sheet and Stiffener Gauge Chart

Note: All Sidewall and Stiffener gauges in the charts below are for standard bins. If bins are designed for High Load/Unload rates or Seismic Conditions, Contact Chief Industries, Inc. for gauge chart needed.

CHT07-05			
Ring	SWS	Stiffeners	
1	20	18	
2	20		18
3	20	18	18
4	20		
5	18	18	18

CHT07-06			
Ring	SWS	Stiffeners	
1	20	18	
2	20		18
3	20	18	
4	20	18	18
5	20		
6	18	18	18

CHT07-07			
Ring	SWS	Stiffeners	
1	20		18
2	20	18	
3	20		18
4	20	18	
5	20	18	18
6	20		
7	18	16	16

CHT07-08			
Ring	SWS	Stiffeners	
1	20	18	
2	20		18
3	20	18	
4	20		18
5	20	18	
6	20	18	18
7	18		
8	18	16	16

CHT07-09			
Ring	SWS	Stiffeners	
1	20	18	
2	20		18
3	20	18	
4	20		18
5	20	18	
6	20		18
7	18	16	16
8	18		
9	18	14	14

CHT07-10			
Ring	SWS	Stiffeners	
1	20		18
2	20	18	
3	20		18
4	20	18	
5	20		18
6	20	18	
7	18		16
8	18	16	16
9	18		
10	18	14	14

CHT07-11			
Ring	SWS	Stiffeners	
1	20		18
2	20	18	
3	20		18
4	20	18	
5	20		18
6	20	18	
7	18		16
8	18	16	
9	18	14	14
10	18		
11	18	12	12

CHT07-12			
Ring	SWS	Stiffeners	
1	20		18
2	20	18	
3	20		18
4	20	18	
5	20		18
6	20	18	
7	18		16
8	18	16	
9	18		14
10	18	14	14
11	18		
12	17	12	12

CHT07-13			
Ring	SWS	Stiffeners	
1	20		18
2	20	18	
3	20		18
4	20	18	
5	20		18
6	20	18	
7	18		16
8	18	16	
9	18		14
10	18	14	
11	18	12	12
12	17		
13	17	12	12

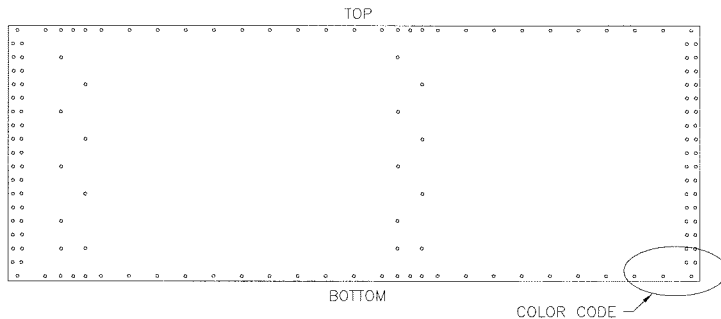
CHT07-14			
Ring	SWS	Stiffeners	
1	20		18
2	20	18	
3	20		18
4	20	18	
5	20		18
6	20	18	
7	18		16
8	18	16	
9	18		14
10	18	14	
11	18		12
12	17	12	12
13	17		
14	17	10	10



## Section 7 – Sidewall Erection

### A. Sidewall Sheets and Stiffeners

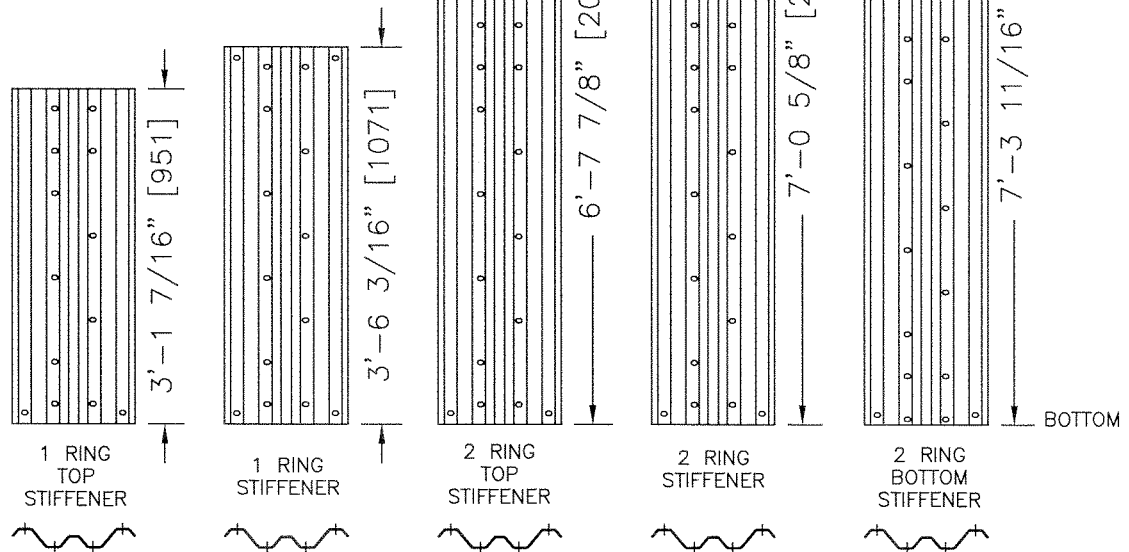
**NOTE:** All sheets must be installed with color code right side down as shown below. Check the edges of the sheet for traces of the shop color code. The shop color code is always located on the bottom edge of the sheet. The color codes and their corresponding gauges are listed in the table below.



Sidewall Sheet Gauge	Color
20	White
18	Orange
17	Light Blue
16	Green
14	Yellow
14 Transition	Yellow/Black
13	Brown
12	Dark Blue
11	Pink
10	Black
9	Light Green
8	Red

STIFFENER GAUGE	COLOR CODE
18	ORANGE
16	GREEN
14	YELLOW
12	DARK BLUE
10	BLACK
8	RED

Note: Bottom Stiffeners are also color coded with a GOLD stripe.



# 3 STIFFENED SIDEWALL SHEETS

## 2 STIFFENED SIDEWALL SHEETS

## UNSTIFFENED SIDEWALL SHEETS

18GA THRU 20GA SIDEWALL SHEET  ALWAYS 5/16" X 3/4" BIN BOLTS			
14GA DOUBLE PUNCHED SIDEWALL SHEET  ALWAYS 5/16" X 3/4" BIN BOLTS			
14GA TRANSITION SIDEWALL SHEET  5/16" X 3/4" BIN BOLTS ON ENLAPS AND TOP SIDELAP 7/16" X 1-1/4" BIN BOLTS ON BOTTOM SIDELAP			
8GA THRU 13GA SIDEWALL SHEET  ALWAYS 7/16" BIN BOLTS			

ALL SIDEWALL SHEETS 14GA THRU 20GA USE 5/16" X 3/4" BIN BOLTS

USE 7/16" X 1-1/4" BIN BOLTS ON ALL SIDEWALL SHEETS AND STIFFENERS UP TO EITHER LAMINATED 11GA SIDEWALL SHEETS OR 8GA STIFFENERS\*

USE 7/16" X 1 1/2" BIN BOLTS ON ALL SIDEWALL SHEETS AND STIFFENERS WHEN EITHER IS LAMINATED 10GA OR HEAVIER\*\*

USE 7/16" X 2" BIN BOLTS AT BOTTOM SEAM OF TANK WHEN SIDEWALL SHEETS ARE DOUBLE LAMINATED 1111GA THRU 88GA

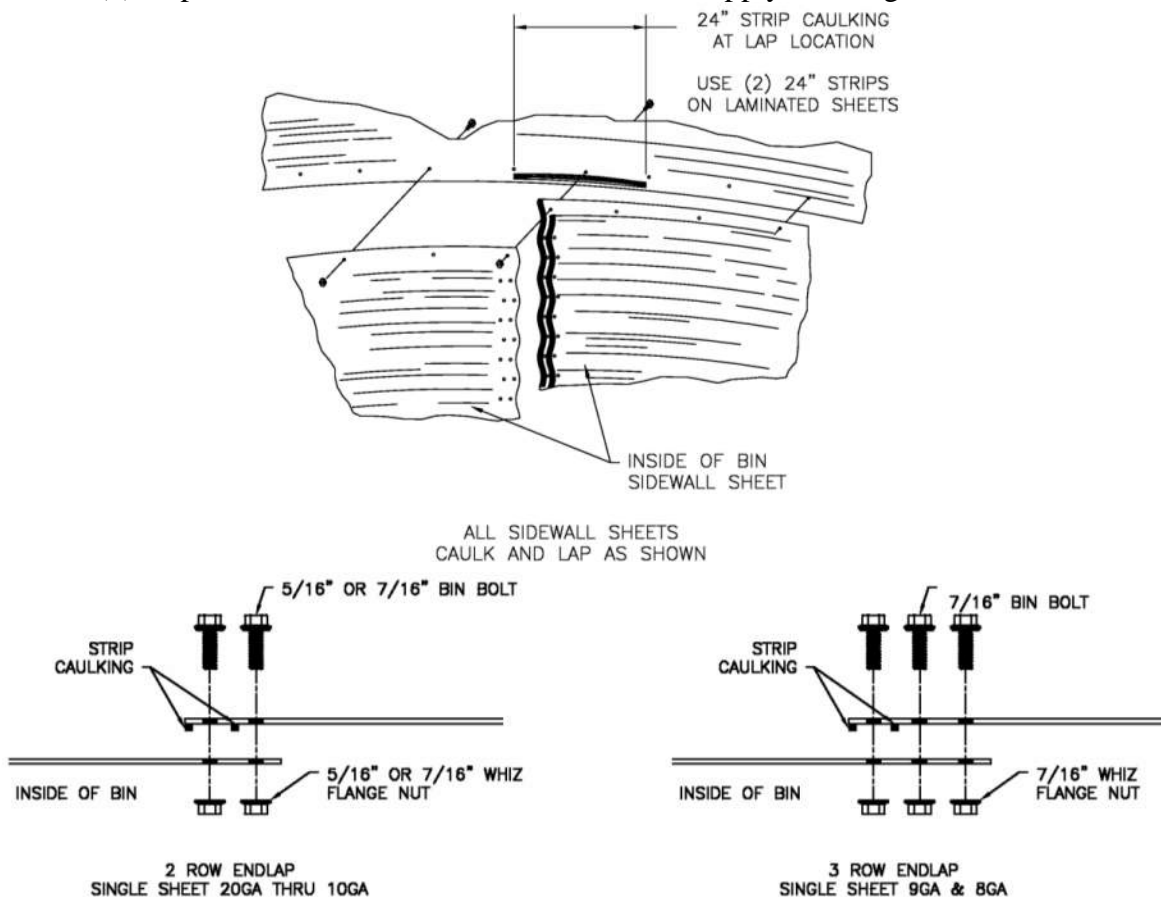
\*WHEN EITHER STIFFENERS OR SIDEWALL SHEETS ARE DOUBLE LAMINATED 13GA OR 12GA EXTRA 7/16" X 1-1/2" BIN BOLTS (5 EXTRA PER SHEET ON 2 STIFFENED TANKS, AND 7 EXTRA ON 3 STIFFENED TANKS) ARE PROVIDED FOR THE CORNERS OF THE SIDEWALL SHEETS AND AT THE CONNECTION BETWEEN THE STIFFENERS AND SIDEWALL SHEETS AT THE HORIZONTAL SEAM

\*\*WHEN EITHER STIFFENERS OR SIDEWALL SHEETS ARE DOUBLE LAMINATED 8GA OR 9GA EXTRA 7/16" X 2" BIN BOLTS (5 EXTRA PER SHEET ON 2 STIFFENED TANKS, AND 7 EXTRA ON 3 STIFFENED TANKS) ARE PROVIDED FOR THE CORNERS OF THE SIDEWALL SHEETS AND AT THE CONNECTION BETWEEN THE STIFFENERS AND SIDEWALL SHEETS AT THE HORIZONTAL SEAM

### ENDLAP DIFFERENCES


**NOTE:** Proper Bolting Sequence Must Be Followed At All Times.

- (1) Tighten bolts in top 2 rings and top stiffeners.
- (2) Select sheets of the proper gauge for the 3rd ring of the bin. Select proper gauge and length of stiffeners.
- (3) Install stiffener splice plates, to both ends of stiffeners with (2) 7/16" x 1-1/4" Bin Bolts and whiz flange nuts per splice before securing the stiffener to the bin. Note: On top stiffeners, splice plate is only required on the bottom end of the stiffener.
- (3) Wipe excess oil from ends of the sheets and apply caulking as shown below



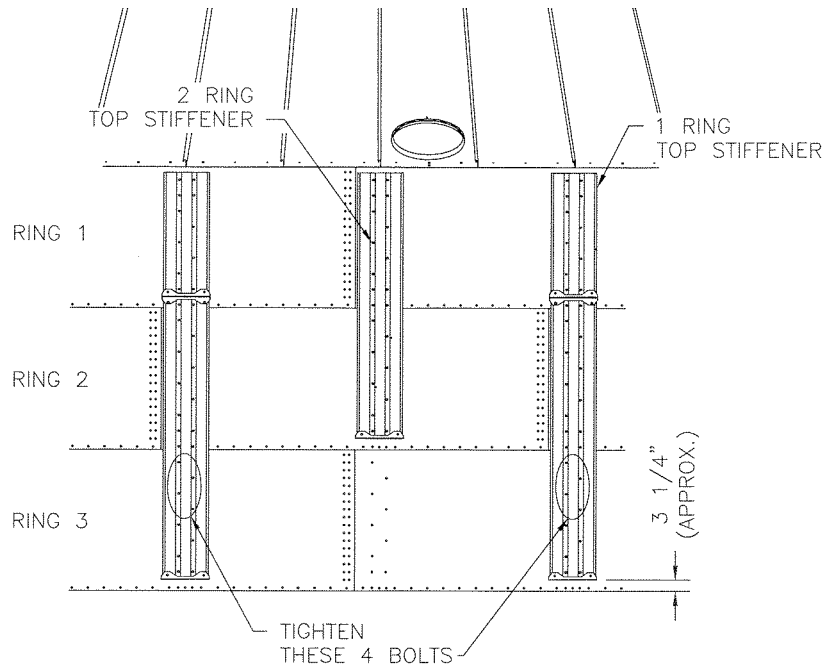
- (4) Loosely assemble 3<sup>rd</sup> ring
- (5) Loosely install stiffeners of the proper gauge to the exterior of the bin with 7/16" bin bolts. Stiffener bolts are always placed with heads inside the bin. Using large alignment punch, force stiffener up so that splices are tightly compressed. Tighten (4) four bolts in 3<sup>rd</sup> ring to keep stiffeners compressed. Loosely install the (2) 7/16" x 1-1/4" bolts connecting the stiffener splices to the stiffener splice plate above.

**Note:**

Blocks may be used to place under the stiffener splices to compress the stiffener splices.

**Note:**

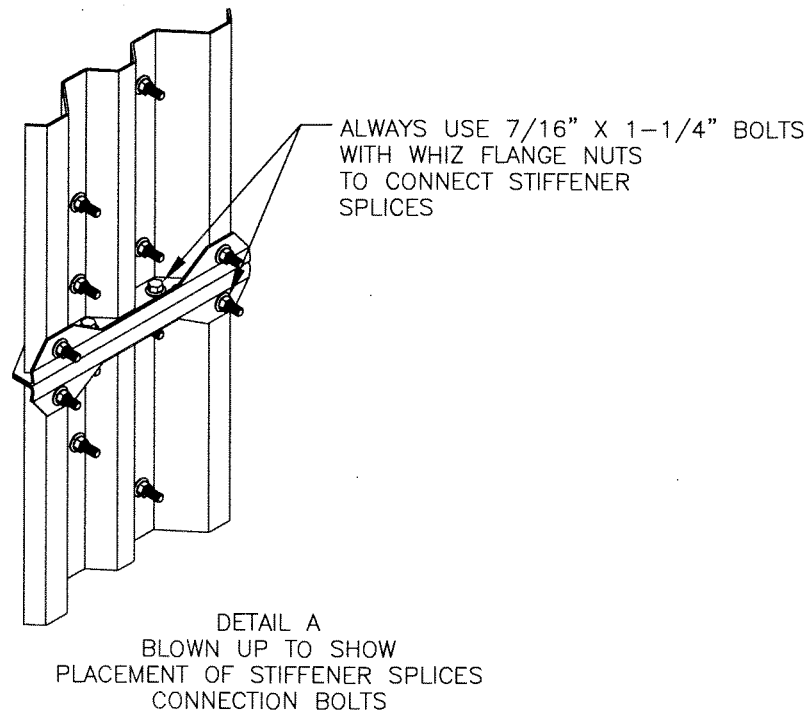
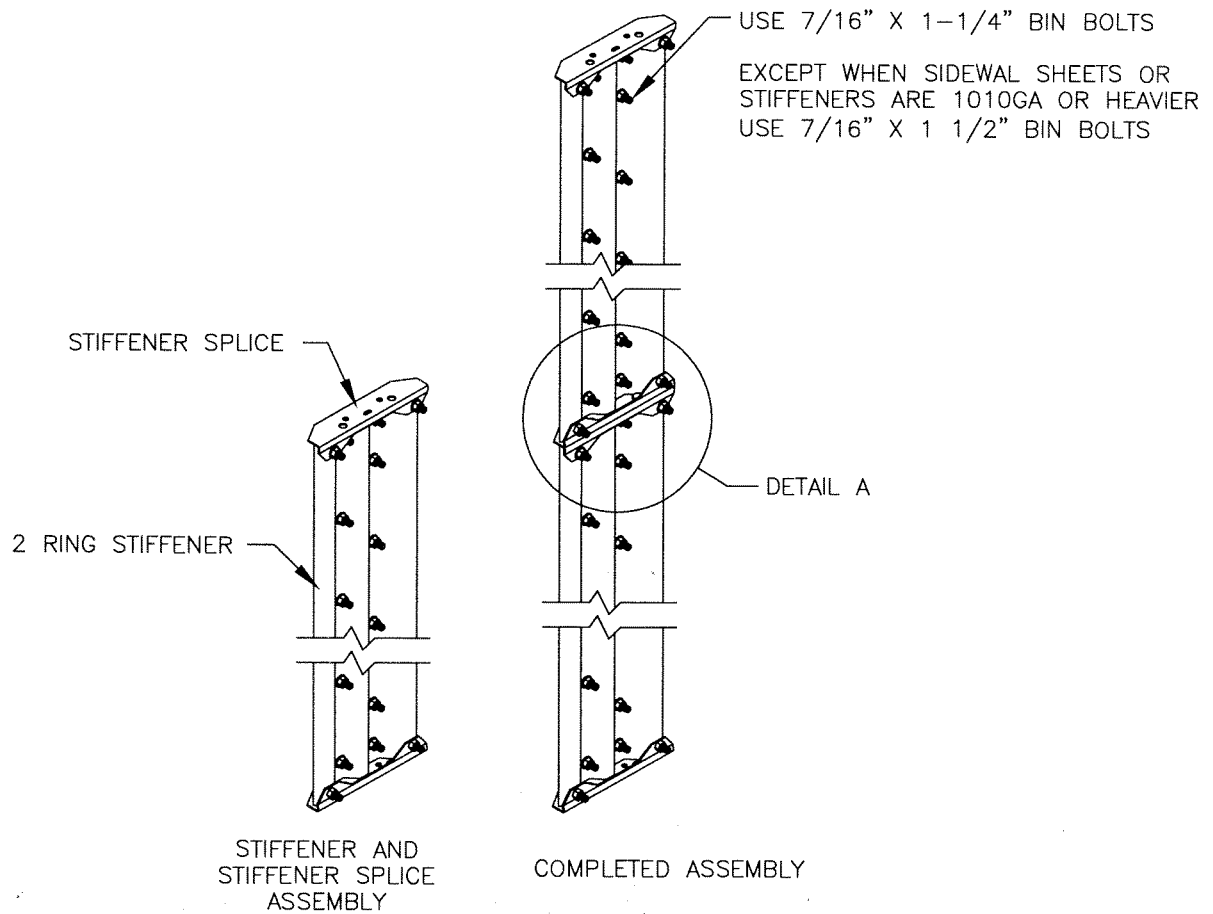
Install bolts on sidewall sheets seam that are in the center of stiffener holes before installing next stiffener.



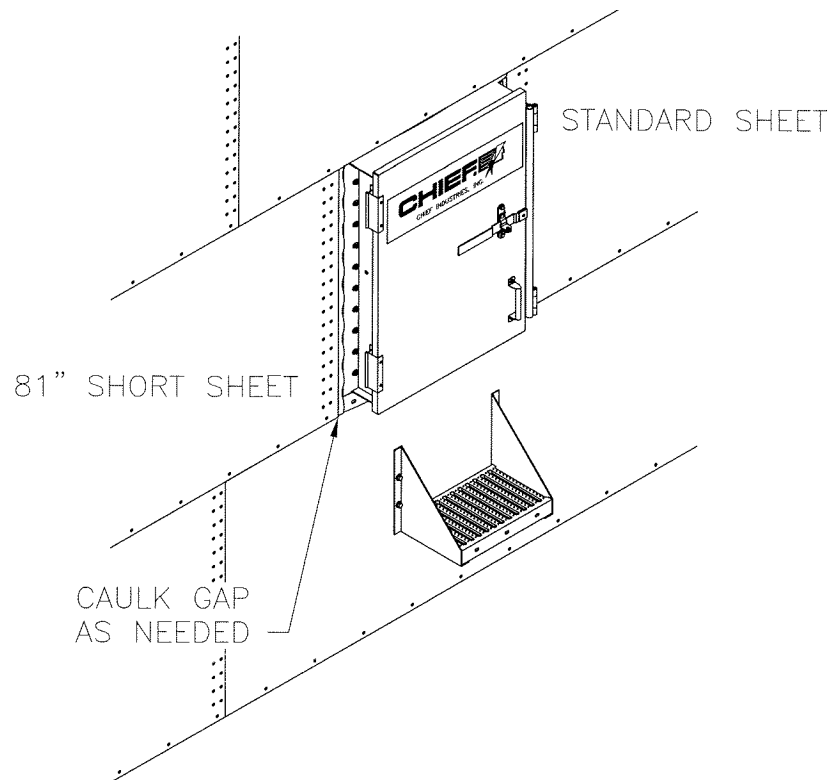
- (6) Lower the bin on to the foundation. This will force the 2 ring stiffeners in 2<sup>nd</sup> and 3<sup>rd</sup> ring up to splices.
- (7) Tighten stiffeners to sheets and stiffener splice to stiffener splice bolts.
- (8) Tighten bolts in vertical seams in 3<sup>rd</sup> ring.
- (9) Tighten bolts in horizontal seams between 2<sup>nd</sup> and 3<sup>rd</sup> ring beginning at center of sheet and working both ways.
- (10) Add ladder sections as required (See separate Ladder Manual)
- (11) Repeat steps 1 thru 10 to add 4<sup>th</sup> ring and each additional ring. Proper bolting sequence must be followed at all times to assure proper assembly.

**NOTE:** Use 7/16"x1 1/4" bin bolts at bottom sidelap of transition sheets. Use 5/16"x3/4" bin bolts at the top sidelap at vertical seams of transition sheet.

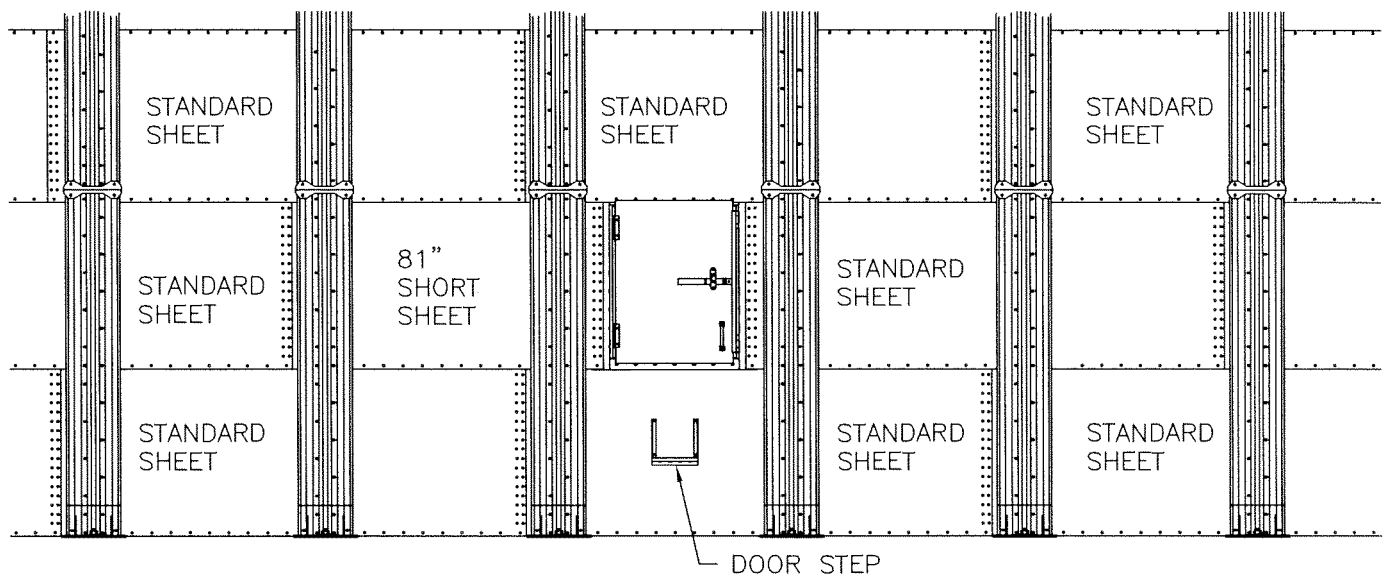
**NOTE:** All bins have all 2 ring bottom stiffeners at the bottom, a 1 ring stiffener must be placed at every other stiffener line in the 3<sup>rd</sup> ring.



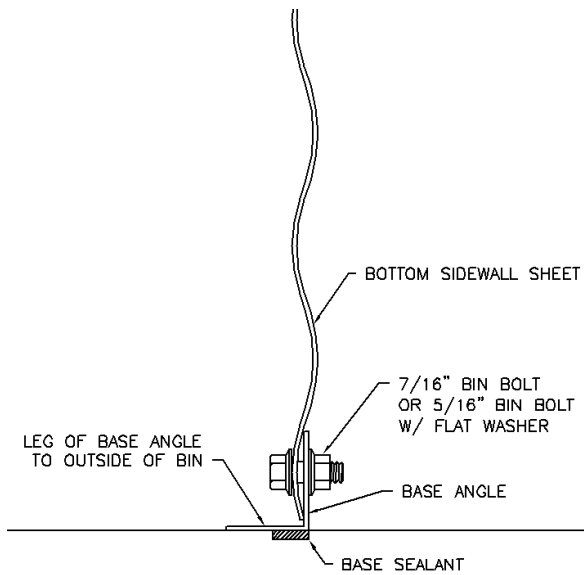
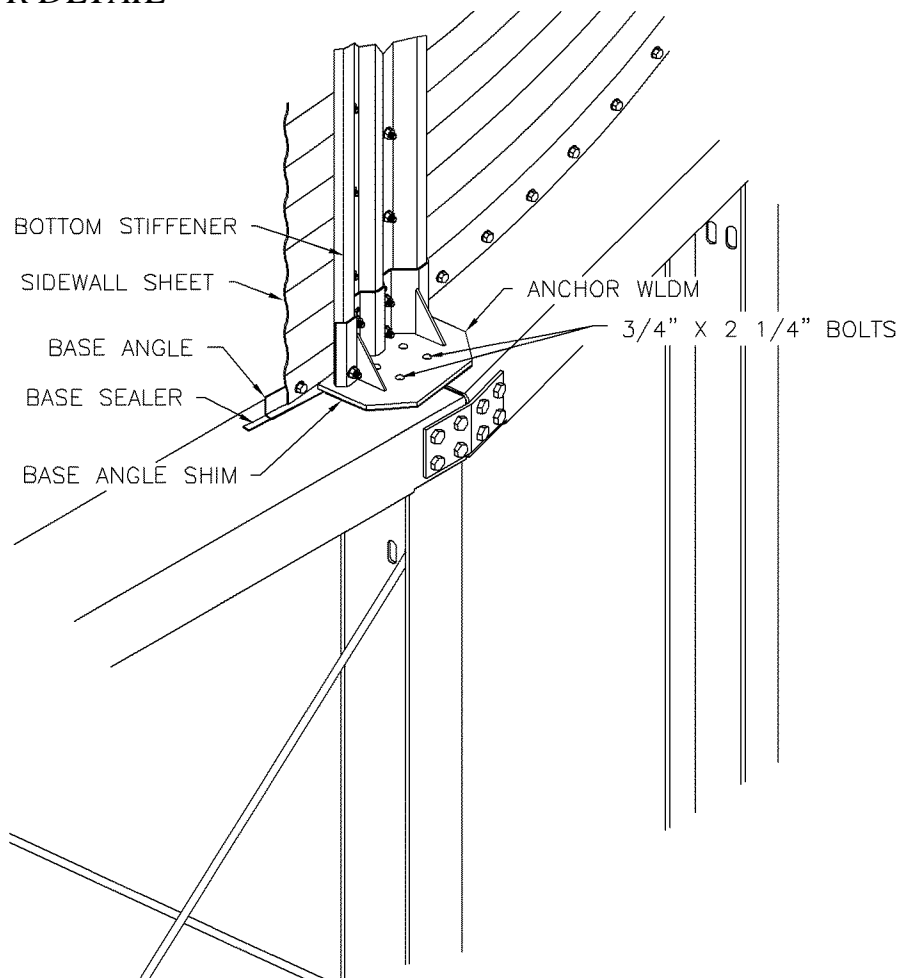
## *Titan Light Duty One Ring Door*



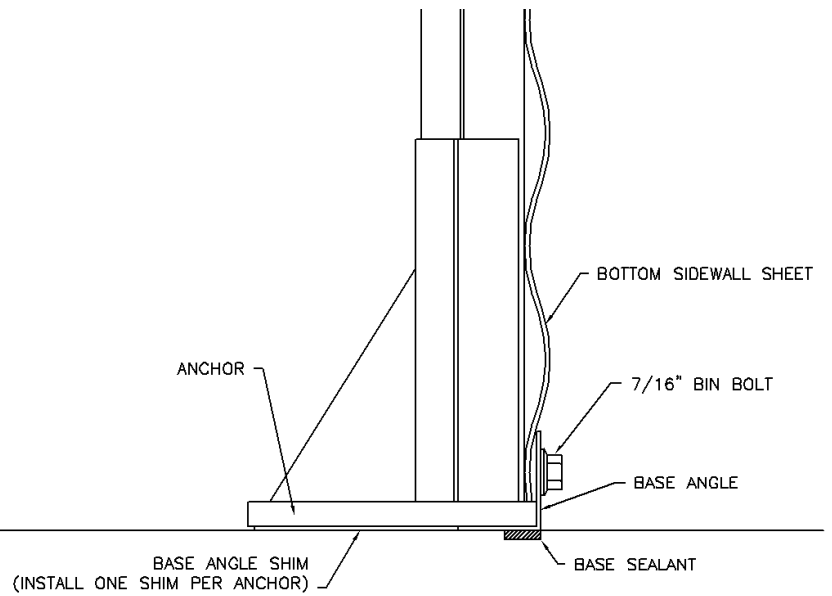
## Finished Door Layout



## ANCHOR DETAIL

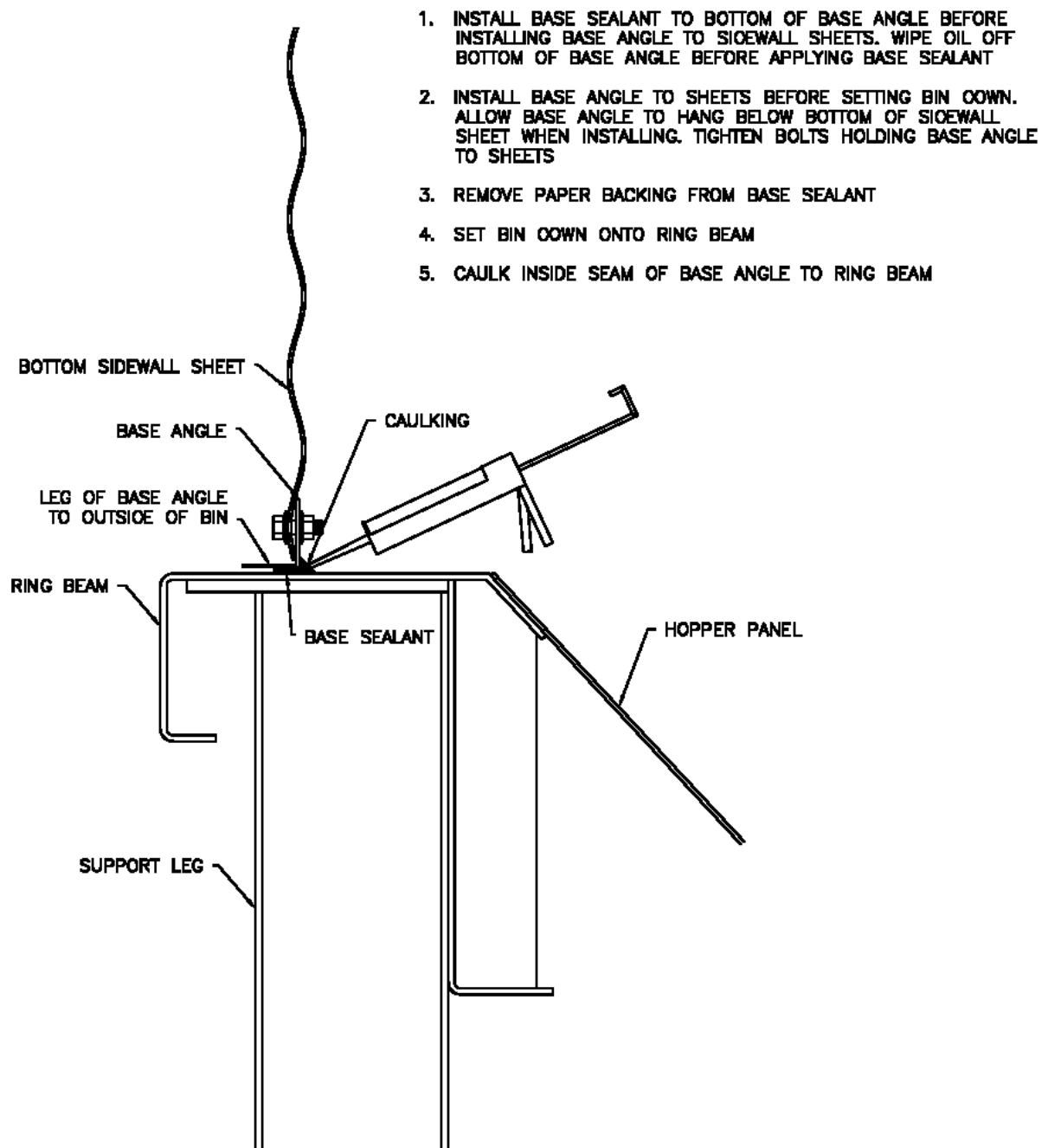


BASE ANGLE DETAIL



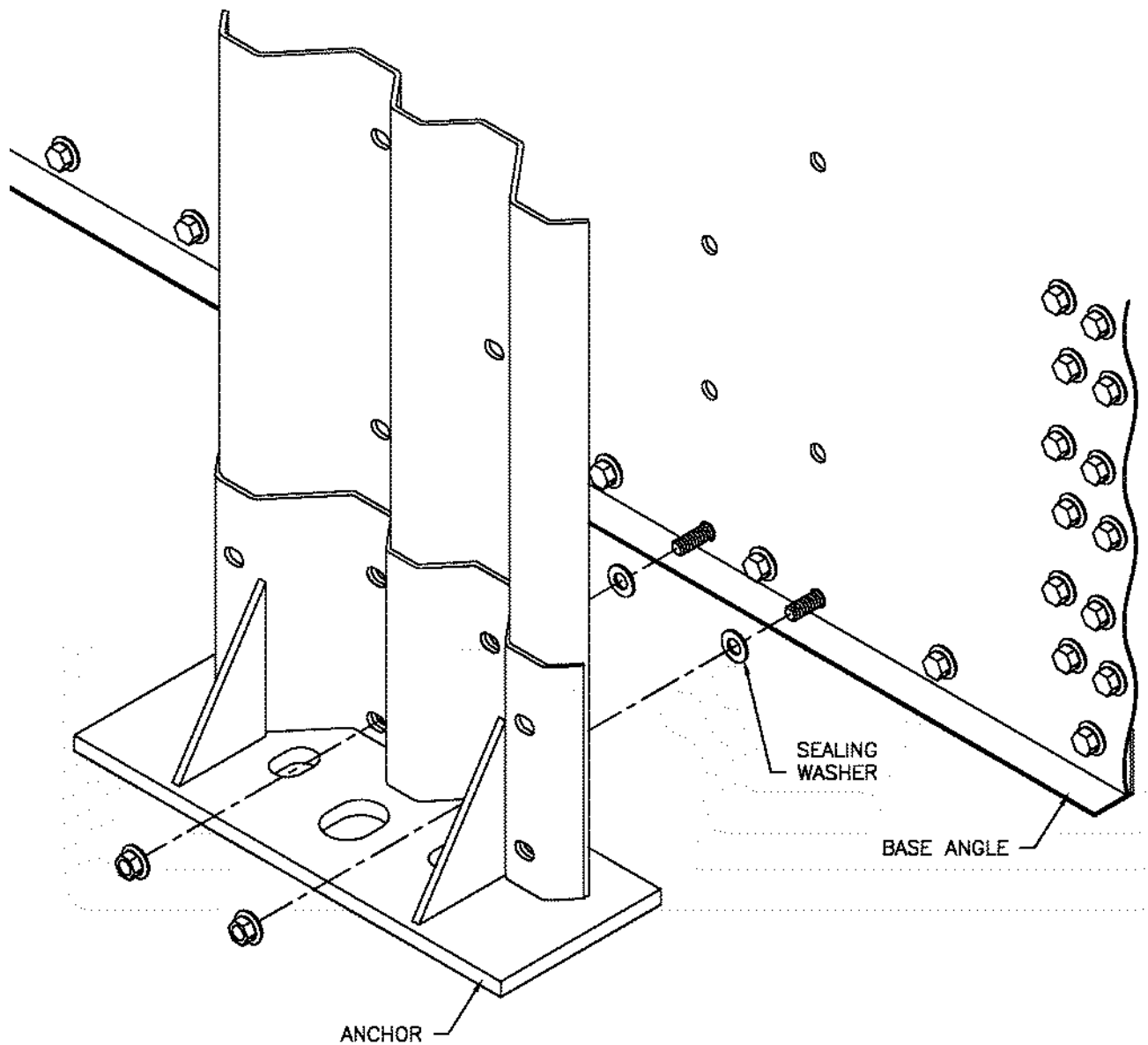
BASE ANGLE DETAIL AT STIFFENER ANCHOR

- (1) Apply base sealant to bottom of base angle before install base angle to sheet.
- (2) Bolt the base angle to the bottom of the bottom sheet as shown, with either 5/16" x 3/4" with a 3/8" flat washer between the whiz nut and the base angle or 7/16" bin bolts.
- (3) Install base angle shims under all anchor brackets as shown.



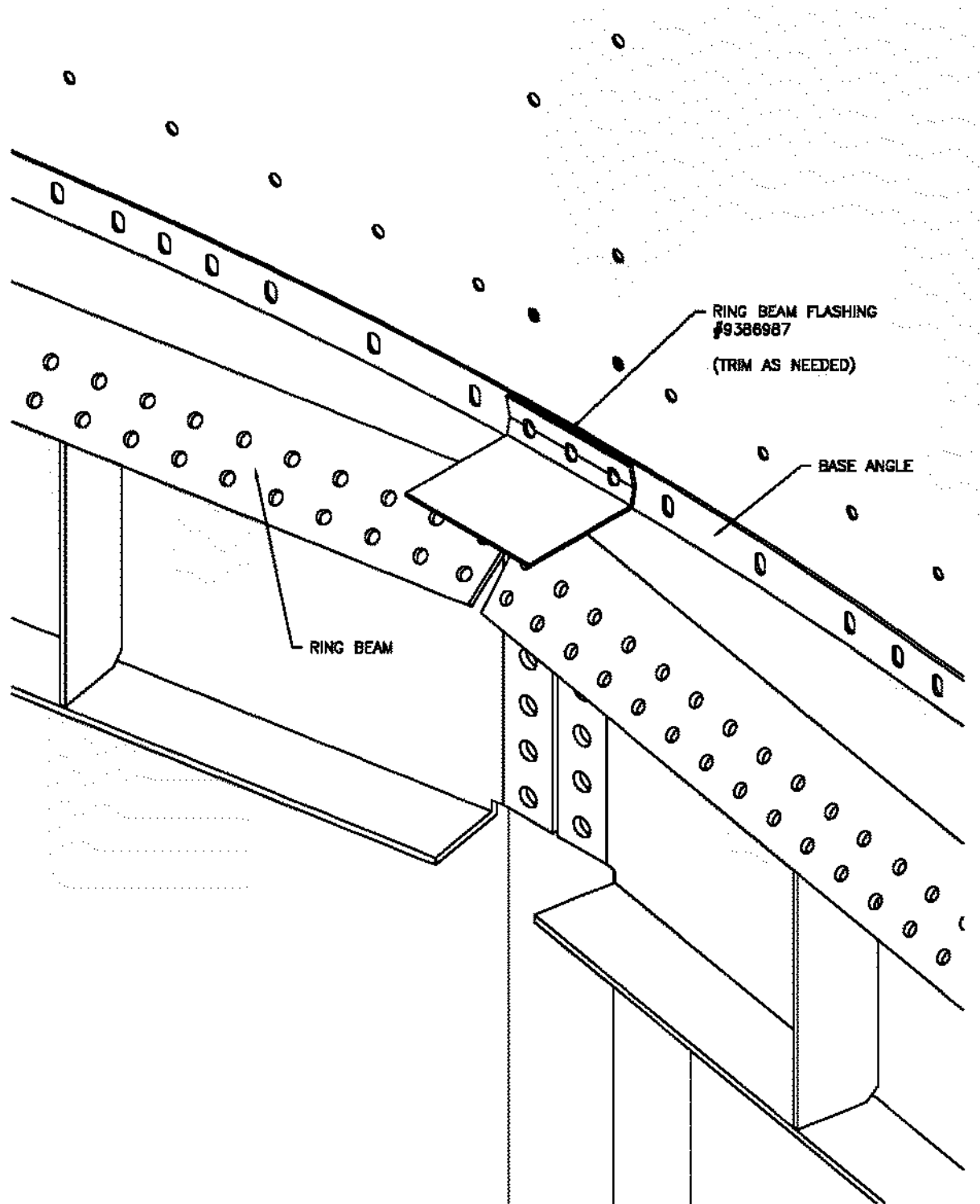


Install Sealing Washers in-between bottom stiffeners and wall sheet on bottom two holes on stiffener as shown.



## Ring Beam Flashing

If there is no flashing package being installed on the hopper tank, then a ring beam flashing will be installed at every ring beam as shown below.



		45° HOPPER (LBS)	TANK (LBS)	TOTAL (LBS)				45° HOPPER (LBS)	TANK (LBS)	TOTAL (LBS)
CHT05	4	4372	3084	7456		CHT09	5	19060	5981	25041
	5	4372	3494	7866			6	19060	6971	26031
	6	4372	4002	8374			7	19060	8055	27115
	7	4372	4510	8882			8	19060	9147	28207
	8	4372	5074	9446			9	19060	10235	29295
	9	4372	5581	9953			10	19060	11426	30486
	10	4372	6194	10566			11	19060	12776	31836
	11	4372	6739	11111			12	22338	14156	36494
							13	22338	15946	38284
CHT06	5	6889	3759	10648			14	22338	17410	39748
	6	6889	4371	11260						
	7	6889	5043	11932		CHT10	5	22349	6945	29294
	8	6889	5653	12542			6	22349	8149	30498
	9	6889	6377	13266			7	22349	9250	31599
	10	7309	6995	14304			8	22349	10645	32994
	11	7309	7715	15024			9	22349	12111	34460
	12	7309	8512	15821			10	26399	13853	40252
							11	26399	15423	41822
CHT07	5	11753	4324	16077			12	28778	17052	45830
	6	11753	4915	16668			13	28778	18754	47532
	7	11753	5696	17449			14	28778	20942	49720
	8	11753	6397	18150			15	28778	22906	51684
	9	11753	7258	19011			16	28778	25138	53916
	10	11753	7976	19729						
	11	11753	8917	20670		CHT12	5	40992	8909	49901
	12	11753	9768	21521			6	40992	10483	51475
	13	11753	10718	22471			7	40992	12188	53180
	14	11753	11865	23618			8	44164	14112	58276
							9	44164	16389	60553
CHT08	5	15186	5123	20309			10	44164	18733	62897
	6	15186	5926	21112			11	44164	21133	65297
	7	15186	6796	21982			12	48084	23787	71871
	8	15186	7700	22886			13	48084	26199	74283
	9	15186	8728	23914			14	48084	28989	77073
	10	15186	9647	24833			15	48084	31459	79543
	11	15186	10792	25978			16	48084	34376	82460
	12	15186	11764	26950						
	13	15186	12851	28037						
	14	16612	14271	30883						

Note: Weight are with standard tank design, and do not include accessories such as ladders and vents.

## Section 8 – Miscellaneous

### *A. Maintenance Instructions*

- ROOF:** Annual inspection of the roof structure should be made to be sure there is no holes in the roof panels and all connections are water tight. If leaks should occur apply weatherproof caulk in the area of concern.
- SIDEWALL:** Sidewall inspection must also be conducted at least annually. Should leaks occur apply caulk to area of concern.
- Should spoilage occur, thoroughly clean surfaces. If oxidation is present, remove oxidation and apply corrosive resistance paint.
- BASE:** Inspect base as often as possible for spoilage, as this is a direct indication of excess moisture. If spoilage is present, thoroughly clean surface. If oxidation is present, remove oxidation and apply corrosive resistance paint. After paint has dried, apply base sealer to effected area.
- DOORS:** Inspect doors and manholes as often as possible to be sure proper seal is maintained.
- DECALS:** Be sure all warning decals are installed in proper locations. Replace all damaged or unreadable warning decals.

## *B. Comment Sheet*

Dear Erector:

In an effort to better serve and please you, list below any problems you may have encountered with your product or the erection procedures in this manual. Also list any suggestions you may have for improvements.

Erection Manual Problems:

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Recommended Solutions:

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Product Problems:

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Product Improvements Suggestions:

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Thank you for your time and reason. All responses will be reviewed by our engineering staff.

Please detach this page and send to:

Agri Engineering Department  
Chief Industries, Inc.  
P.O. Box 848  
Kearney, NE 68848-0848



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