12'-48' Diameter Unstiffened Bins

40-Series Bin 4.00" Corrugation 6000 lb. Peak Load Roof

Construction Manual

PNEG-4094

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PNEG-4094

All information, illustrations, photos and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

Contents

Table of Contents

Safety Guidelines

Safety guidelines are general-to-specific safety rules that must be followed at all times. This manual is written to help you understand safe operating procedures and problems that can be encountered by the operator and other personnel when using this equipment. Save these safety guidelines for future reference.

As owner or operator, you are responsible for understanding the requirements, hazards, and precautions that exist and to inform others as required. Unqualified persons must stay out of the work area at all times.

Alterations must not be made to the equipment. Alterations can produce dangerous situations resulting in SERIOUS INJURY or DEATH.

This equipment must be installed in accordance with the current installation codes and applicable regulations, which must be carefully followed in all cases. Authorities having jurisdiction must be consulted before installations are made.

When necessary, you must consider the installation location relative to electrical, fuel and water utilities.

Personnel operating or working around equipment must read this manual. This manual must be delivered with equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

ST-0001-3

Cautionary Symbols Definitions

Cautionary symbols appear in this manual and on product decals. The symbols alert the user of potential safety hazards, prohibited activities and mandatory actions. To help you recognize this information, we use the symbols that are defined below.

DANGER This symbol indicates an imminently hazardous situation which, if not avoided, **will result in serious injury or death.**

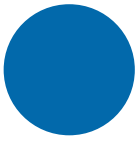
WARNING This symbol indicates a potentially hazardous situation which, if not avoided, **can result in serious injury or death.**

CAUTION This symbol indicates a potentially hazardous situation which, if not avoided, **can result in minor or moderate injury.**

NOTICE This symbol is used to address practices not related to personal injury.

This symbol indicates a general hazard.

This symbol indicates a prohibited activity.



This symbol indicates a mandatory action.

ST-0005-2

Safety Cautions

Use Personal Protective Equipment

- Use appropriate personal protective equipment:

Eye Protection

Respiratory Protection

Foot Protection

Hearing Protection

Head Protection

Fall Protection

Hand Protection

- Wear clothing appropriate to the job.
- Remove all jewelry.
- Tie long hair up and back.

ST-0004-1

Follow Safety Instructions

- Carefully read all safety messages in this manual and safety signs on your machine. Keep signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from the manufacturer.
- Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.
- If you do not understand any part of this manual or need assistance, contact your dealer.

ST-0002-1

Maintain Equipment and Work Area

- Understand service procedures before doing work. Keep area clean and dry.
- Never service equipment while it is operating. Keep hands, feet, and clothing away from moving parts
- Keep your equipment in proper working condition. Replace worn or broken parts immediately.

ST-0003-1

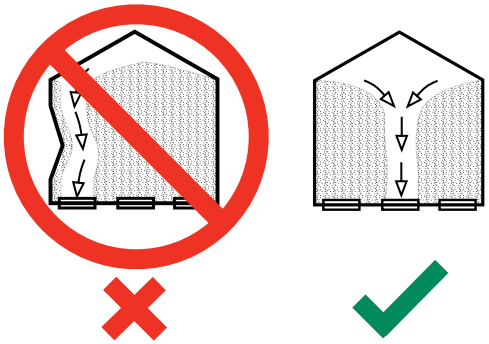
Prevent Roof Damage Due to Vacuum Pressure

- Roof damage can result from excessive vacuum or internal pressure from fans or other air moving systems. The manufacturer does not warrant this type of roof damage.
- Adequate ventilation or “makeup air” devices must be provided for all powered air handling systems.
- The manufacturer does not recommend the use of downward flow systems (suction).
- Severe roof damage can result from any blockage of air passages.
- Operating fans during high humidity or cold weather conditions can cause air exhaust or intake ports to freeze.

ST-0028-2

Unload the Bin Correctly

- Use CENTER FLOOR OUTLET ONLY until NO grain remains above this outlet.
- Side floor outlets to be used ONLY when above condition is satisfied.
- Lock all side floor outlets to avoid accidental premature use.
- See manufacturers instructions for proper use of factory supplied sidedraw (wall) discharge systems.



ST-0060-1

Sharp Edge Hazard

- This product has sharp edges, which can cause serious injury.
- To avoid injury, handle sharp edges with caution and always use proper protective clothing and equipment.

ST-0036-2

Rotating Auger Hazard

- Keep clear of rotating augers and moving parts.
- Do not remove or modify guards or covers.
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.
- Failure to follow these precautions will result in serious injury or death.

ST-0037-1

Do Not Enter Bin

- Rotating flighting will kill or dismember.
- Flowing material will trap and suffocate.
- Crusted material will collapse and suffocate.

    - If you must enter the bin:

        1. Shut off and lock out all power sources.
        2. Use a safety harness and safety line.
        3. Station another person outside the bin.
        4. Avoid the center of the bin.
        5. Wear proper breathing equipment or respirator.

ST-0061-1

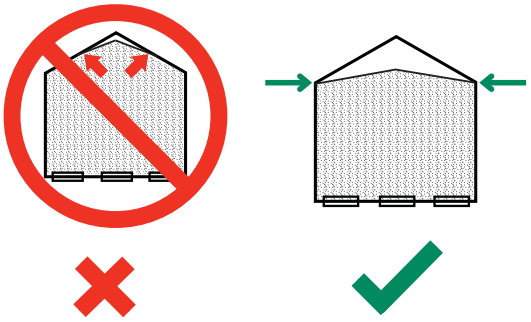
Stay Clear of Hoisted Equipment

- Always use proper lifting or hoisting equipment when assembling or disassembling equipment.
- Do not walk or stand under hoisted equipment.
- Always use sturdy and stable supports when needed for installation. Not following these safety precautions creates the risk of falling equipment, which can crush personnel and cause serious injury or death.

ST-0047-1

Do Not Overfill the Bin

- Do not overfill bin. Stored grain must be no higher than the roof eaves at the outer edge.
- Filling the bin above this point creates excessive internal pressure and can cause swelling and eventual roof failure. The over filling of a bin can also cause the blockage of roof vents and eaves, which will lead to a build-up of air pressure causing roof damage.



ST-0050-1

Install and Operate Equipment Properly

- This product is intended for the use of grain storage only. Any other use is a misuse of the product.

ST-0057-1

Store Bin Sheets Properly

- Sidewall bundles or sheets must be stored in a safe manner. The safest method of storing sidewall bundles is by laying them horizontally with the arch of the sheet upward, like a dome.
- Sidewall sheets stored on edge must be secured so that they cannot fall over and cause injury.
- Use care when handling and moving sidewall bundles.

ST-0058-1

Safety Sign-Off Sheet

Below is a sign-off sheet that can be used to verify that all personnel have read and understood the safety instructions. This sign-off sheet is provided for your convenience and personal record keeping.

Date	*Employee Name*	*Supervisor Name*

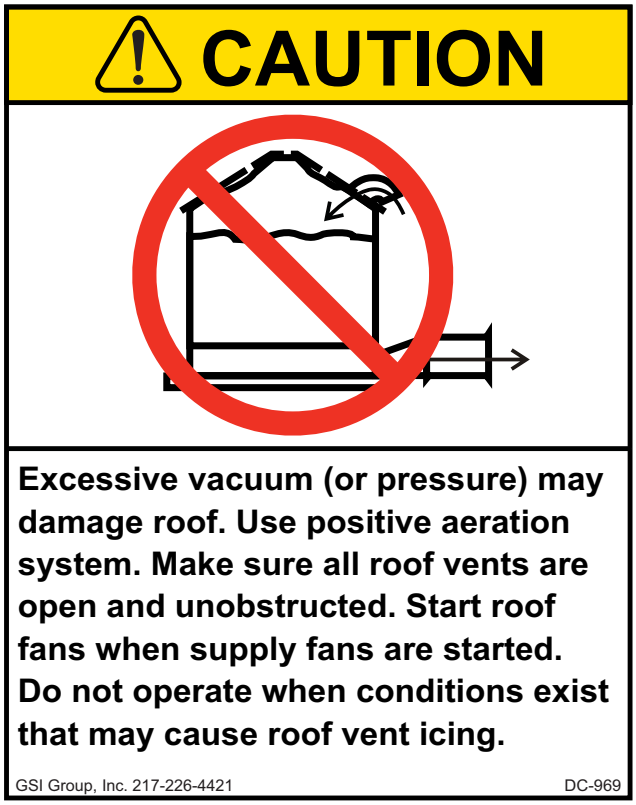
ST-0007

2. Decals

The safety decals on your equipment are safety indicators which must be carefully read and understood by all personnel involved in the installation, operation, service and maintenance of the equipment.

To replace a damaged of missing decal, contact us to receive a free replacement.

GSI Decals
1004 E. Illinois St.
Assumption, IL. 62510
Phone: 1-217-226-4421

Location	Decal #	Decals	Description
Located next to aeration system.	**DC-969**		**Caution Vacuum Pressure**

Location	Decal #	Decals	Description
On bin door covers	DC-GBC-1A		Danger Keep Clear of Augers
On bin door covers	DC-GBC-2A		Warning Unload Instructions

General Information

General information, overview and instructions needed before performing work.

Read this manual carefully. This manual will provide instructions on building the sidewall. You will also need to consult other instructions in building the bin.

These include, but may not be limited to:

1. A sidewall gauge layout chart. If such a chart is not included with this manual, contact GSI.
2. Roof instructions must be followed. Roof instructions are included in this manual.
3. Ladders, roof stairs, roof handrails and other products are covered by separate instruction manuals. Consult the appropriate accessory manual. Inside ladder instructions are included in this manual.
4. Aeration systems and transitions are to be installed according to the instructions provided with the system or transition.
5. It is critical that the anchor bolts are installed and spaced correctly.

Tools Required for Construction

General tools needed to perform this construction:

1. Combination wrench set 7/16" to 1".
2. Alignment punches 12" long.
3. 1/2" Drive socket set and ratchet.
4. Nail aprons or tool pouches to hold supplies.
5. Gloves for hand protection.
6. Tape measure.
7. 1/2" Drive electric or pneumatic torque gun with variable impact capabilities.
8. 1/2" Drive impact socket set.
9. Lifting jacks.
10. Center pole roof support.
11. Step ladders.
12. Large C-clamp or welding V-grip for clamping.

NOTE: *Quantities required will depend on the number of workers and size of the bin.*

Guidelines for Proper Storage of Grain Bin Materials Prior to Construction

Storage of the build materials prior to construction is important. Do not to allow moisture to remain between sheets or panels.

Wet storage stain (rust) will develop when closely packed bundles of galvanized material, such as sidewall and roof sheets, have moisture present. Inspect roof and sidewall bundles on arrival for any moisture. If moisture is present, it must not be allowed to remain between the sheets. Separate the sheets or panels immediately and wipe them down. Spray with a light oil or diesel fuel.

If possible, sidewall bundles, roof sheets and other closely packed galvanized materials should be stored in a dry, climate controlled building. If outdoor storage is unavoidable, the materials should be stored so that they are raised above the ground and vegetation. Any stacking and spacing materials should not be corrosive or wet. Be sure to protect materials from the weather, but permit air movement around the bundles if possible.

Storing roof bundles and sidewall sheets at a slight incline can also help minimize the presence of moisture. Storing the bundles with the center of the dome up (like an arch) is one option for minimizing moisture during storage. Sidewall bundles can also be stored on edge but must be secured so that they do not fall over and cause injury.

If “white rust” or “wet storage stain” occurs, contact the manufacturer immediately about ways to minimize the adverse effect upon the galvanized coating.

Overview for a Typical Bin Installation

These are the typical steps one would perform when constructing a grain bin. Procedures may vary depending on site requirements.

Pre-Assembly Activities

1. Sorting and grouping parts.

Assembly

1. Build one ring of sidewall sheets, making sure to caulk all seams.
2. Install the center collar tower support in the center of the bin.
3. Install eave clips and intermediate eave angles to the sidewall sheets. (Note how these are aligned.)
4. Install roof panels.
5. Install roof flashing.
6. Install peak cap.

Guidelines for Construction Procedures and Lifting Jack Usage

1. Before constructing the bin, consider the location of the door and other accessories. Proper placement of lifting jacks in relationship to anchor bolts could make a difference on odd or even ring bins. Walk-through door is centered between two (2) stiffener anchor bolts. The sidewall sheets are also staggered 1/3 from end to end.
2. Anchor all jacks securely with metal stakes and cable.
3. Raise the bin just high enough to assemble the next ring. When lifting the bin, **crank all jacks equally**. This will prevent bowing the previously assembled rings and make for easier hole alignment. *(See Figure 3A.)*

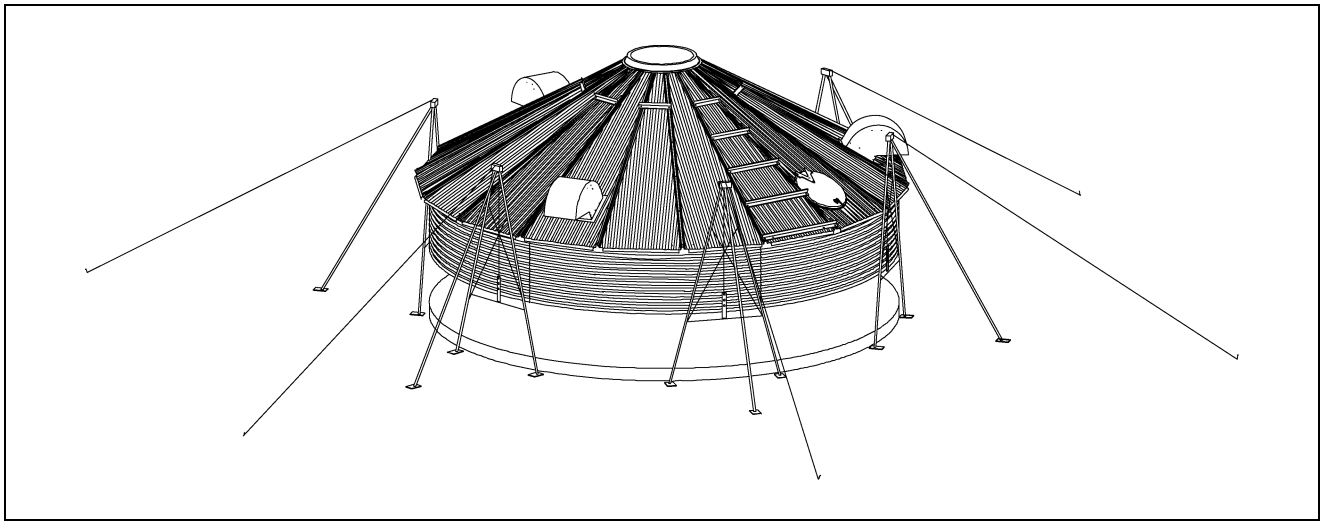


Figure 3A *Lifting Jack*

4. Bolt the next ring to the **inside** of the first ring. Be sure to **stagger** the sheets and select the proper gauge material.
5. Lower the bin onto the foundation after assembling and tightening bolts on the new ring or rings.
6. Re-bolt the lifting straps to the lowest ring in place thus far. Continue ring additions until ready for the door installation.

NOTE: *The number of lifting jacks required is best determined by personal experience. Factors such as bin size, soil compaction, wind velocity, jack design, etc., are all to be considered when deciding how many to use. If in doubt, use one jack on every vertical seam. Be sure to use heavy duty jacks for commercial installation.*

NOTE: *Add inside and outside ladders to bin walls as you continue to raise the bin. (Refer to the manual supplied with the ladder.)*

Instructions for Stirring Devices

Bins are offered in more than one structural series for specific uses. To maintain the warranty, the appropriate “series” grain bin must be used. Consult the sales catalog or contact the Engineering Department for current recommendations. Note that the use of any stirring device with three (3) or more vertical screws may require a heavier than “standard” series bin. Any re-circulating device or system should be used in the “re-circulating” series bins. **NOTE:** ***For GSI bins larger than 33'-48' diameter an alternate method of mounting is to attach suspension chain to intermediate center collar.***

Stirring devices may create additional loads on grain bin sidewalls, roofs and floors. If high-moisture grain is loaded too deep and too fast, unstiffened bin walls can become overloaded. Observe the following installation and operation procedures if the bin is to be equipped with the stirring device.

1. Read owner’s manual for the stirring device and follow all instructions set forth by the manufacturer.

   IMPORTANT: *Install the switch for the stirring device near the roof manway opening so that the unit can be observed while stirring.*

2. Make sure there are no obstructions, such as protruding ladders.
3. After loading approximately 3' of grain, run the unit one complete revolution to determine if it is working properly.
4. If the unit is functioning properly, operate the stirring device continuously while filling and drying to avoid compacted grain around the vertical screws.
5. If it becomes necessary to stop a stirring device using laterally moving screws, try to stop it with the vertical screws nearest to the center of the bin, away from the sidewall. Should a device stop or stall for any reason and remain inoperable for any length of time, the auger carriage should be supported to the grain surface before restarting. The vertical auger should be turned by hand, with a pipe wrench, before power is applied.
6. For best results, fill the bin to one-half of the final intended depth. Dry grain to 16% and continue filling. Use filling rates specified by stirring device manufacturer. If necessary to fill to the top without stopping, reduce the filling rate and drying air temperature so that the stirring rate can keep up with the drying rate.
7. Do not overfill bin. Filling should be stopped at bottom of top ring or 30" below the track.

NOTE: *The above steps are only general instructions which apply to the majority of stirring devices. Since there are different manufacturers of these devices, it is important to read the operator’s manual thoroughly for specific instructions applicable to the machine.*

Guidelines for Placement of the Decal Sidewall Sheet

Use the following as a general guideline the proper decal sheet placement.

NOTE: *Refer to sidewall attachment detail and specific gauge sheet for the bin. The decal sheets are located in the third ring from the top. They are to be spaced evenly around the diameter of the bin.*

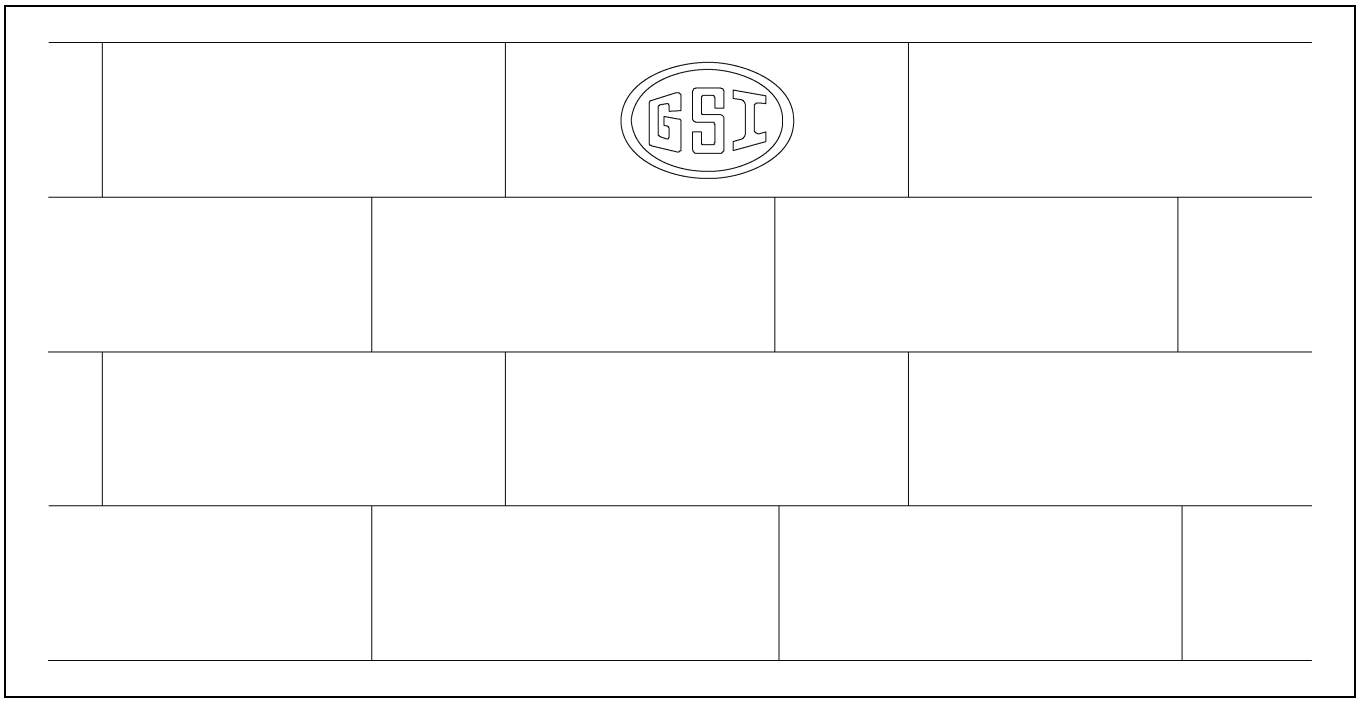


Figure 3B *Decal Sidewall Sheet*

Foundation Recommendations

These are general foundation recommendations. Site conditions, system requirements and other factors may create foundation construction requirements not covered by this manual.

Selecting the Proper Site Location

1. The selected site should be level, firm and free from underlying debris. The soil bearing capacity should be equal to or greater than required by the footing specifications.
2. The concrete foundation surface must be level. If fill is required, it should be watered and tamped thoroughly to prevent uneven settling from the weight of the bin.
3. The site should allow easy access for easy loading and unloading, as well as provide additional space for future units.
4. When selecting a bin site, also consider the positioning of handling equipment, fans, heaters, fuel lines and the availability of electricity.

Scribe the Diameter

1. Determine the center of the foundation site and drive a small 2 x 4 into the ground to mark it. Drive the stake into the ground so that it is the same height as the finished foundation will be.
2. Using one large spike, nail a straight 2 x 4 to the top of the center spike. This 2 x 4 should be approximately two feet (2') longer than the radius of the bin. The swiveling 2 x 4 will act as a compass, enabling you to scribe the correct diameter of the foundation and later locate the anchor and stiffener bolt locations. *(See Figure 4A.)*

   NOTE: *Making the 2 x 4 two feet (2') longer than the radius will allow the 2 x 4 to also be used as a leveling device and for pulling concrete.*

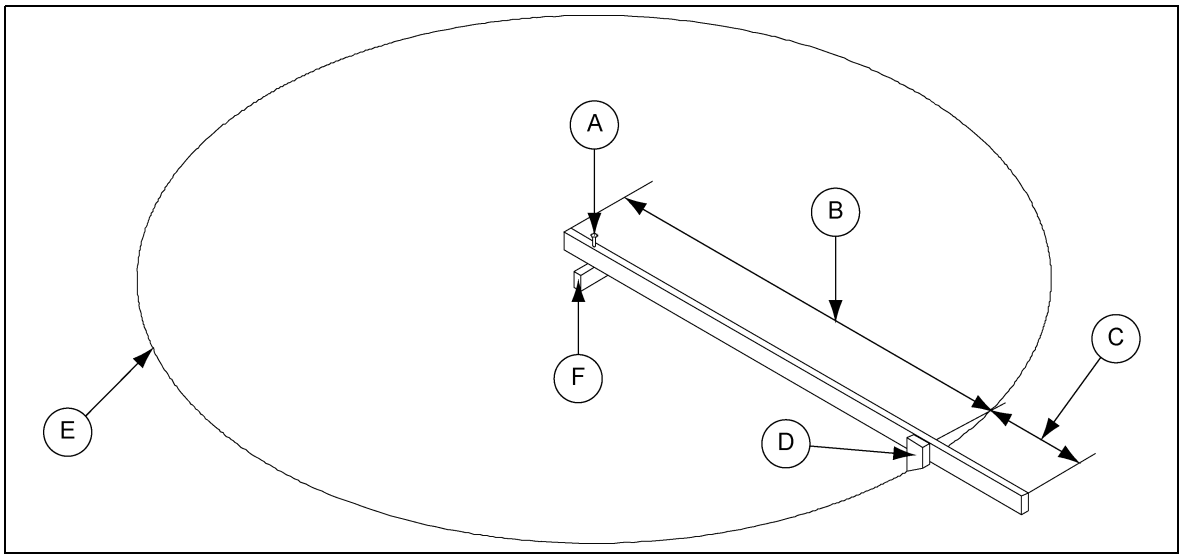


Figure 4A *Scribe the Diameter*

Ref #	Description
A	Spike
B	Foundation Radius
C	2'

Ref #	Description
D	Pointed Stake
E	Foundation Line
F	2 x 4 Center Stake

Foundation Forms

Circular foundation forms are commonly used for stiffened farm bins.

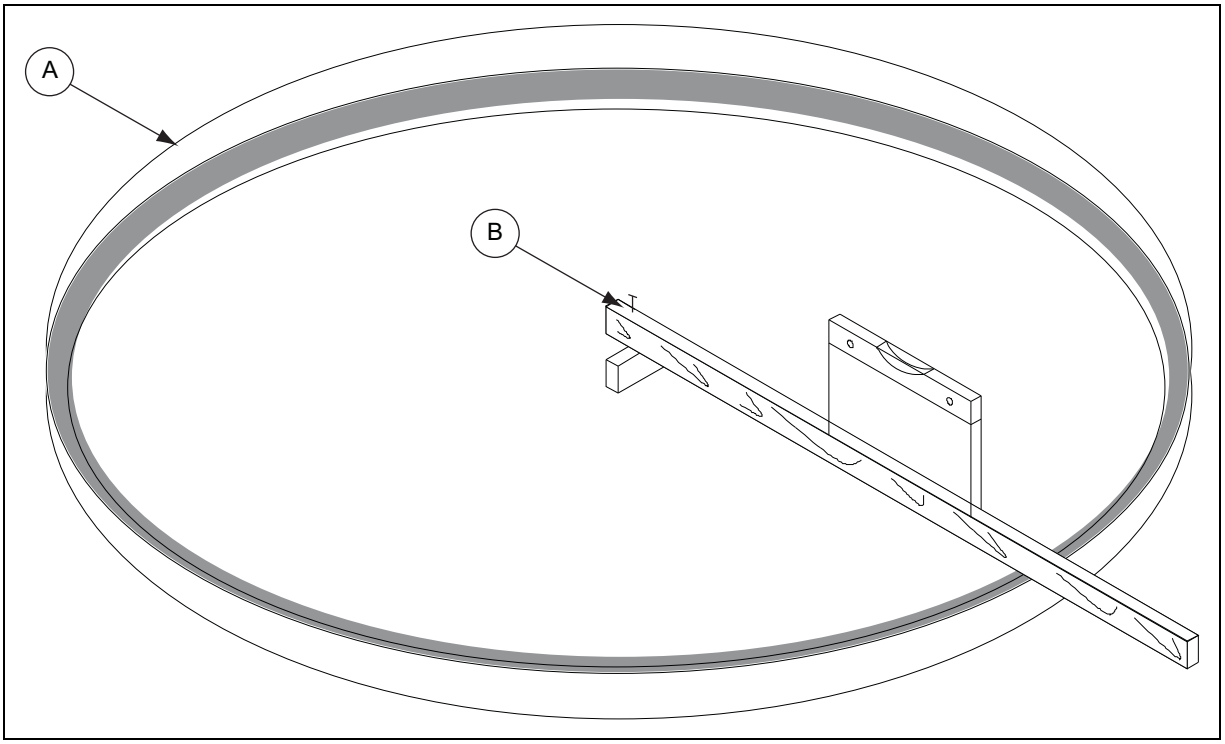


Figure 4B *Circular Form*

Ref #	Description
A	Footing Trench
B	Carpenter's Level

Preparing the Foundation Forms

1. Having scribed the diameter of the foundation, proceed by digging the foundation's footing, which consists of a large circular trench inside the foundation line.
2. Once the footing has been dug, you are ready to build the forms. The forms must be rigid enough to hold their shape against the poured concrete.
3. The foundation must be flat. Sloped floors cannot be used in drying bins. A carpenter's level placed on top of the compass 2 x 4 constructed earlier will enable you to set the top of the forms to match the top of the center stake.
4. Check the form work with a transit to ensure a uniform elevation for the entire foundation. The foundation should be level within 1/8" on non-stiffened tanks and within 1/4" on stiffened tanks at bin wall perimeter. Stiffened tanks must be shimmed level. Provisions for unloading system trenches, air ducts, etc., should be made as required by the particular material handling system used.

   NOTE: *All foundation specifications shall be construed as recommendations only. Because of the many variable conditions in an actual installation, manufacturer assumes no liability for results arising from the use of such recommendations.*

Placing the Reinforcement

1. Once the forms and trench have been prepared, begin placing the reinforcement rods and mesh in the foundation's footing. Make sure the reinforcement rods are properly lapped by wiring.
2. Place at least 2" of compacted sand on the inside section of the foundation to provide a good base for the concrete and to protect against rodents.
3. Cover the sand with 4 ml. polyethylene plastic, which will act as a moisture barrier.
4. Add two (2) layers of 6" x 6" wire mesh to the entire area of the foundation slab or the entire foundation for monolithic systems to complete the preparation of the bin's foundation.

Anchor Bolt Detail

The following is the minimum requirement for anchoring of standard tanks.

1. 5/8" Diameter anchor bolt (A) is the minimum allowed, 3/4" diameter anchor bolt (A) is the minimum with sidedraw flume system.
2. Exposed anchor bolt thread height (B) for 5/8" and 3/4" diameter anchor bolts are 3" (7.6 cm) and 5" (12.7 cm) respectively.
3. Overall anchor bolt length (C) for 5/8" and 3/4" diameter anchor bolts are 14" (35.56 cm) and 18" (45.72 cm) respectively. *(See Figure 4C.)*

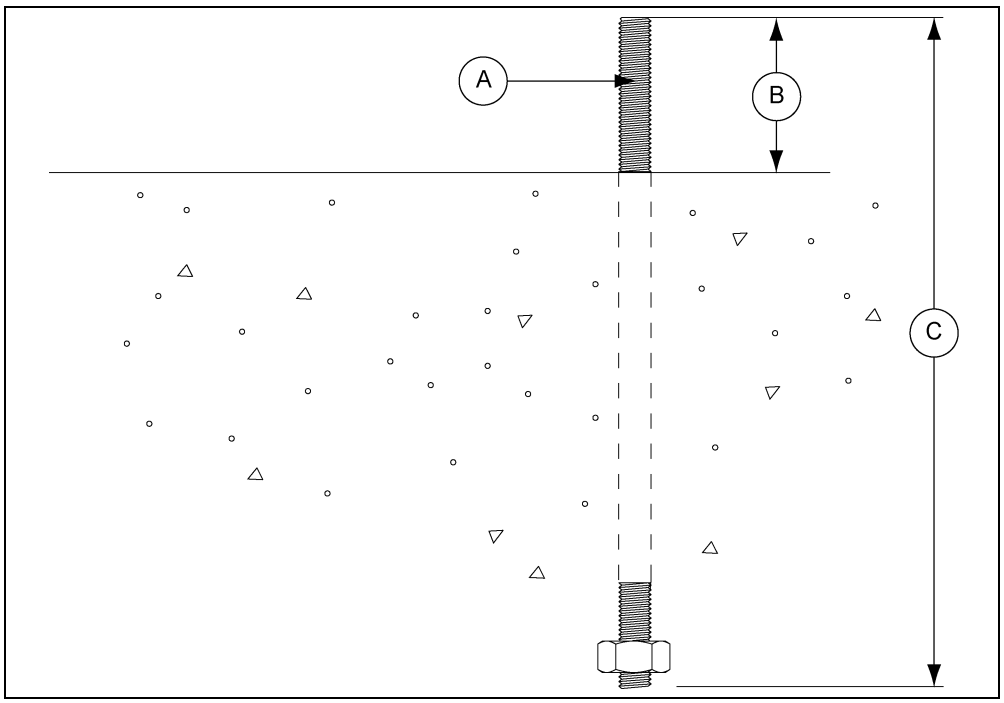


Figure 4C *Anchor Bolt Example (3/4" Diameter Anchor Bolt Shown)*

Ref #	Description
A	Anchor Bolt
B	Anchor Bolt Thread Height
C	Anchor Bolt Length

Anchor Bolt Charts

Prior to setting any anchor bolts, you must be sure to have the correct anchor bolt placement.

NOTE: *Refer to proper chart to find the anchor chord dimensions that correspond to the bin that is being built.*

Scribe the radius location of the anchor bolts by using a center stake and a straight 2 x 4. Along the scribed radius, start with one anchor bolt and work counterclockwise to locate one quarter of the anchor bolts then clockwise to locate another quarter of the anchor bolts. Working off of the last anchor bolts in each quarter, locate the remaining anchor bolts in the last two (2) quarters.

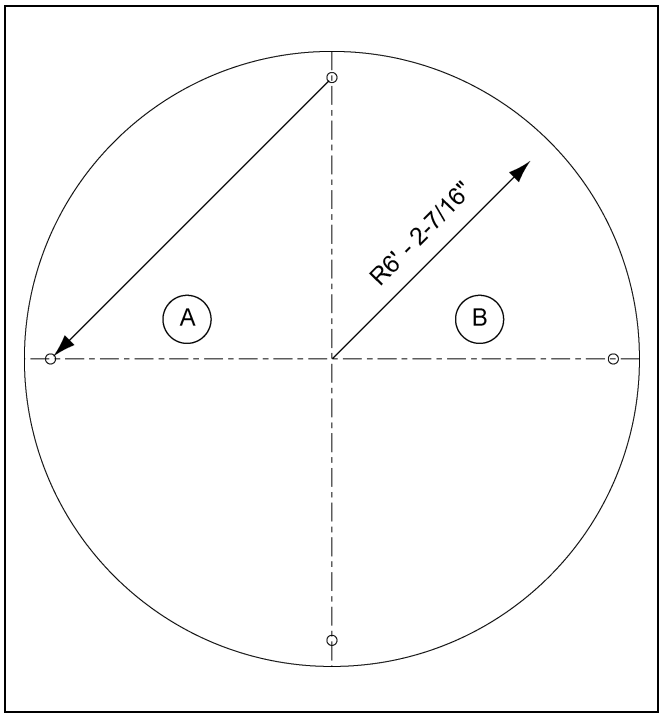


Figure 4D *Anchor Bolt Chords for 12' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

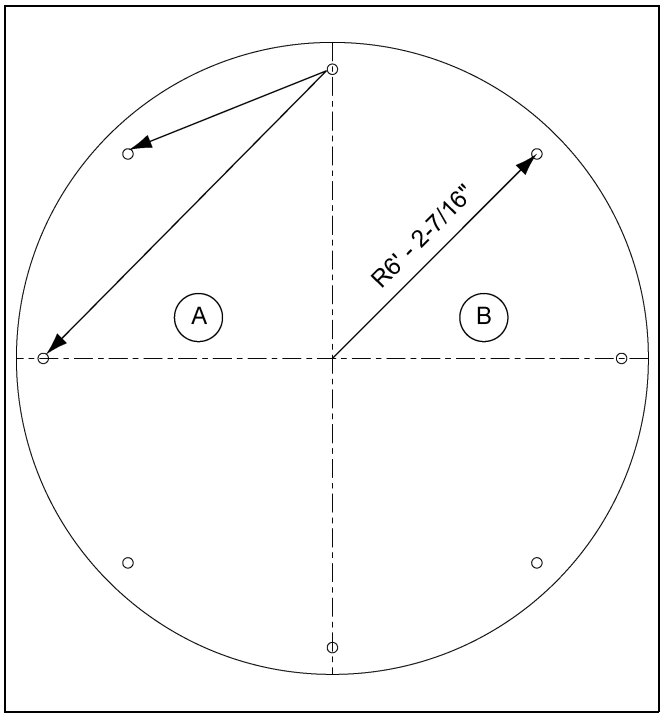


Figure 4E *Anchor Bolt Chords for 12' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	12'	
# of Anchors	4	
Bolt Radius	6' - 2-7/16"	1.89 m
Chord 1	8' - 9-1/4"	2.67 m

Diameter	12'	
# of Anchors	8	
Bolt Radius	6' - 2-7/16"	1.89 m
Chord 1	4'-9"	1.45 m
Chord 2	8 - 9-1/4"	2.67 m

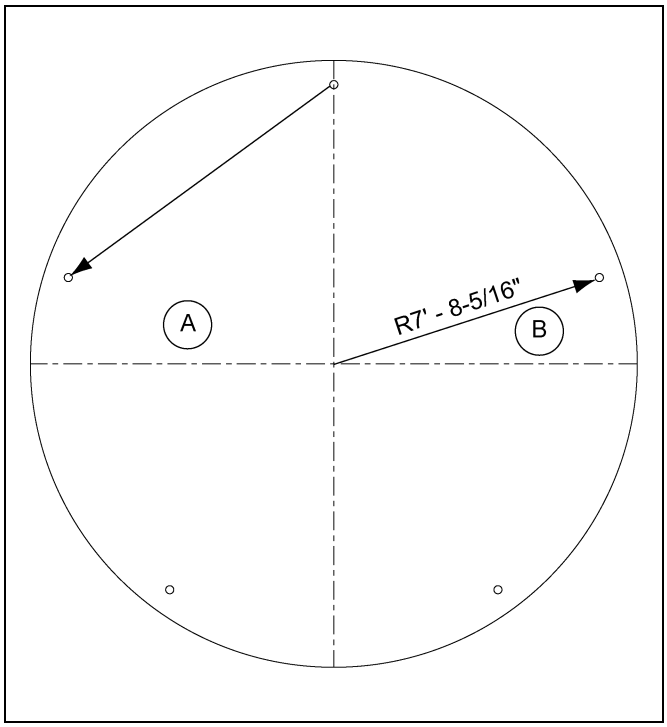


Figure 4F *Anchor Bolt Chords for 15' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	15'	
# of Anchors	5	
Bolt Radius	7' - 8-5/16"	2.35 m
Chord 1	9' - 0-1/2"	2.76 m

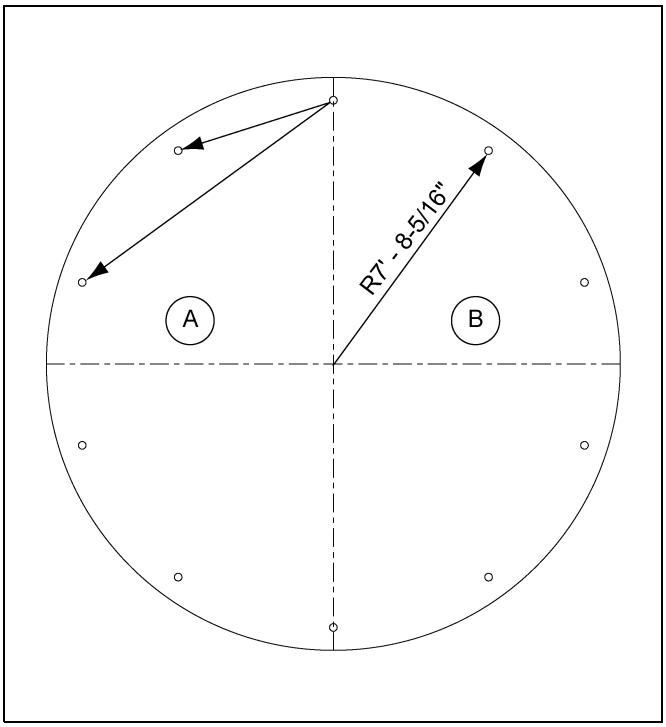


Figure 4G *Anchor Bolt Chords for 15' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	15'	
# of Anchors	10	
Bolt Radius	7' - 8-5/16"	2.35 m
Chord 1	4' - 9-1/16"	1.45 m
Chord 2	9' - 0-1/2"	2.76 m

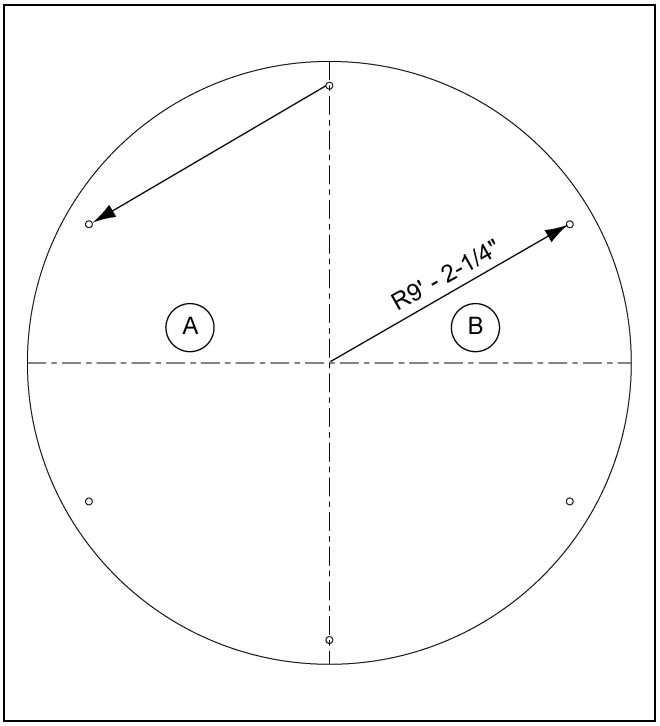


Figure 4H *Anchor Bolt Chords for 18' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

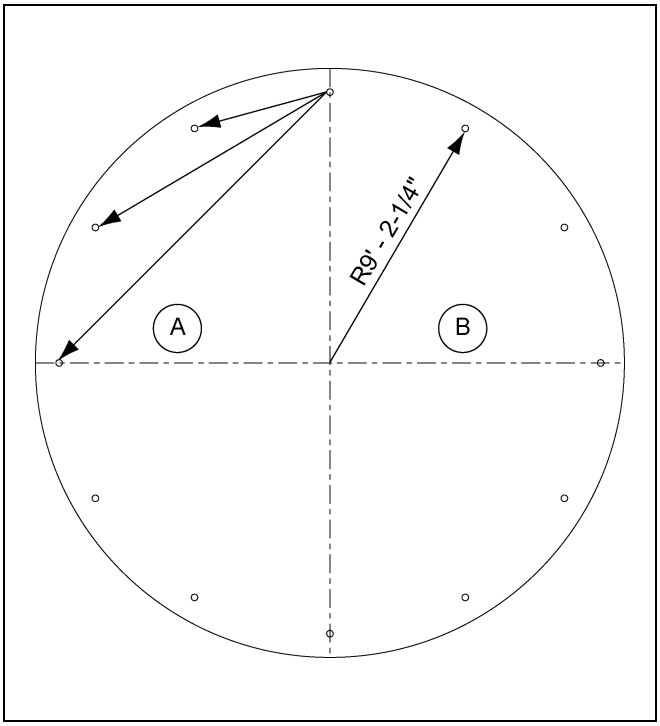


Figure 4I *Anchor Bolt Chords for 18' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	18'	
# of Anchors	6	
Bolt Radius	9' - 2-1/4"	2.80 m
Chord 1	9' - 2 -1/4"	2.80 m

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	18'	
# of Anchors	12	
Bolt Radius	9' - 2-1/4"	2.80 m
Chord 1	4' - 9-1/16"	1.45 m
Chord 2	9' - 2-1/4"	2.76 m
Chord 3	12' - 11-15/16"	3.96 m

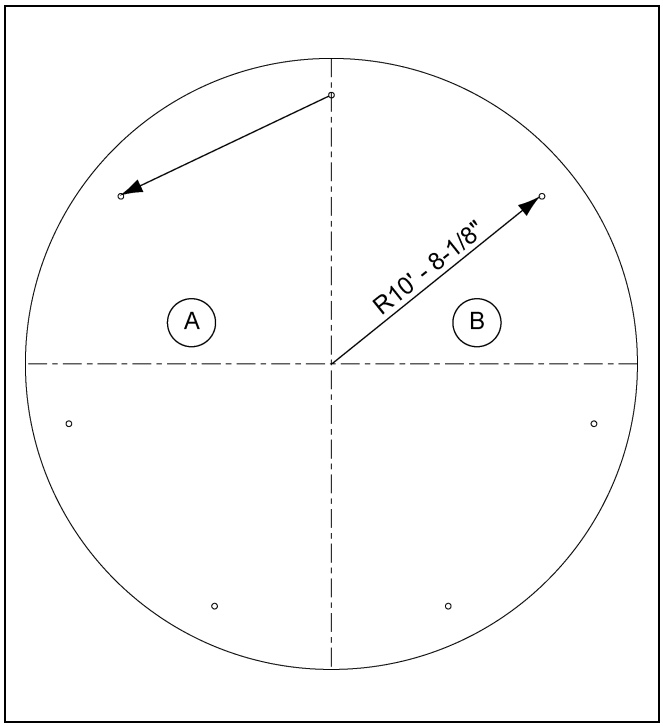


Figure 4J *Anchor Bolt Chords for 21' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	21'	
# of Anchors	7	
Bolt Radius	10' - 8-1/8"	3.25 m
Chord 1	9' - 3-3/16"	2.82 m

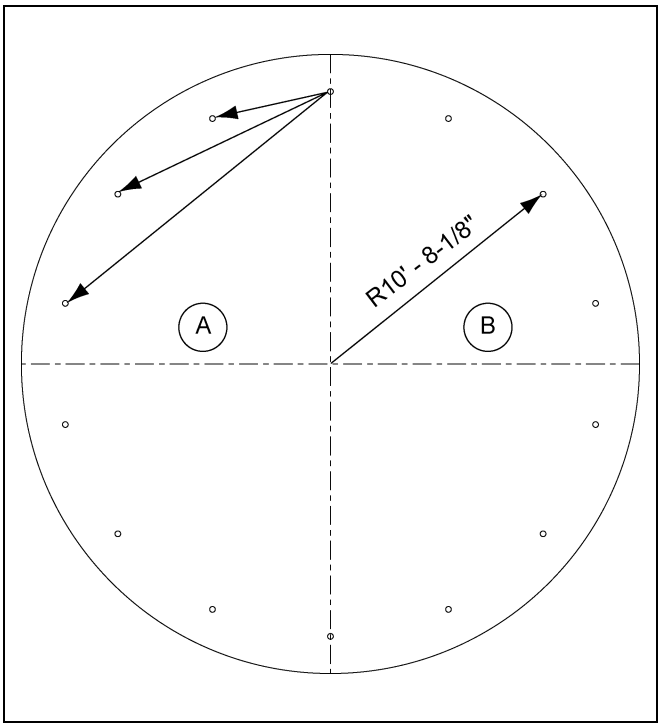


Figure 4K *Anchor Bolt Chords for 21' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	21'	
# of Anchors	14	
Bolt Radius	10' - 8-1/8"	3.25 m
Chord 1	4'-9"	1.45 m
Chord 2	9' - 3-3/16"	2.82 m
Chord 3	13' - 3-3/4"	4.04 m

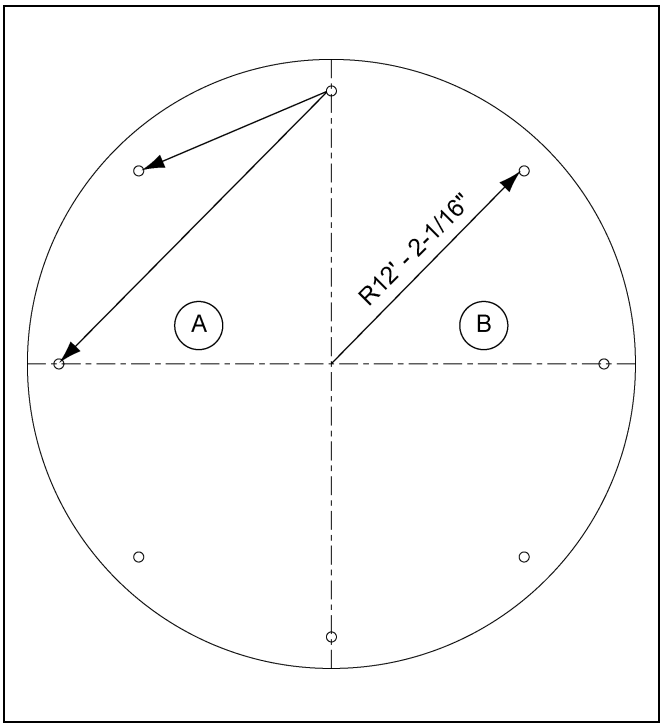


Figure 4L *Anchor Bolt Chords for 24' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

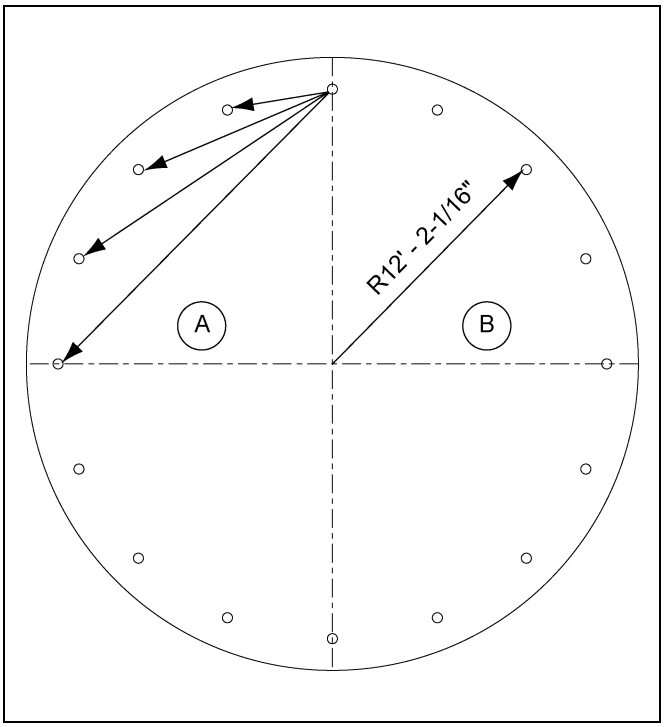


Figure 4M *Anchor Bolt Chords for 24' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	24'	
# of Anchors	8	
Bolt Radius	12' - 2-1/16"	3.71 m
Chord 1	9' - 3-13/16"	2.82 m
Chord 2	17' - 2-9/16"	5.25 m

Diameter	24'	
# of Anchors	16	
Bolt Radius	12' - 2-1/16"	3.71 m
Chord 1	4'-9"	1.45 m
Chord 2	9' - 3-13/16"	2.82 m
Chord 3	13' - 6-5/16"	4.12 m
Chord 4	17' - 2-9/16"	5.25 m

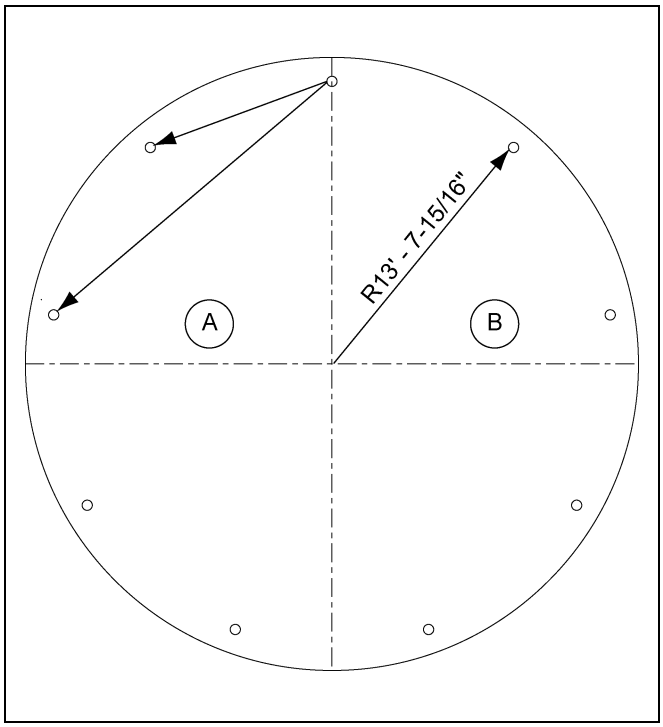


Figure 4N *Anchor Bolt Chords for 27' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

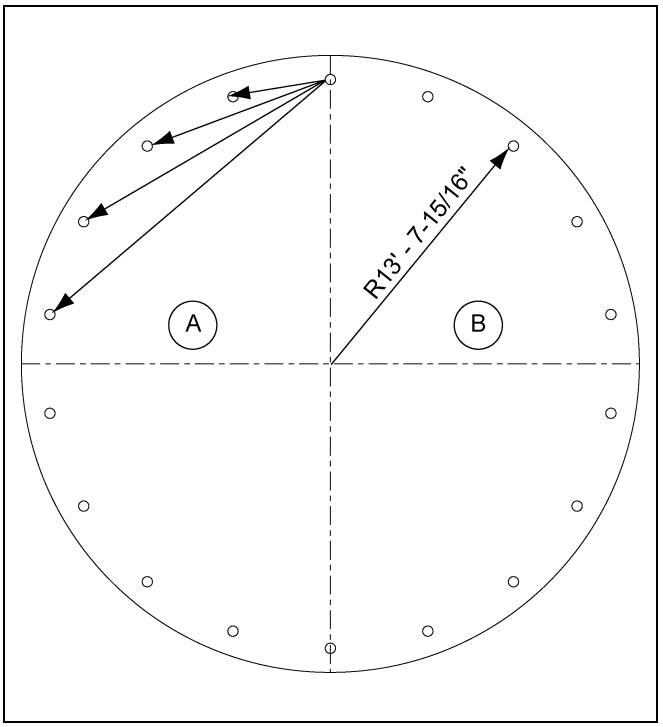


Figure 4O *Anchor Bolt Chords for 27' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	27'	
# of Anchors	9	
Bolt Radius	13' - 7-15/16"	4.15 m
Chord 1	9' - 4-1/8"	2.85 m
Chord 2	17' - 6-3/4"	5.35 m

Diameter	27'	
# of Anchors	18	
Bolt Radius	13' - 7-15/16"	4.15 m
Chord 1	4' - 8-15/16"	1.45 m
Chord 2	9' - 4-1/8"	2.85 m
Chord 3	13' - 7-15/16"	4.15 m
Chord 4	17' - 6-3/4"	5.35 m

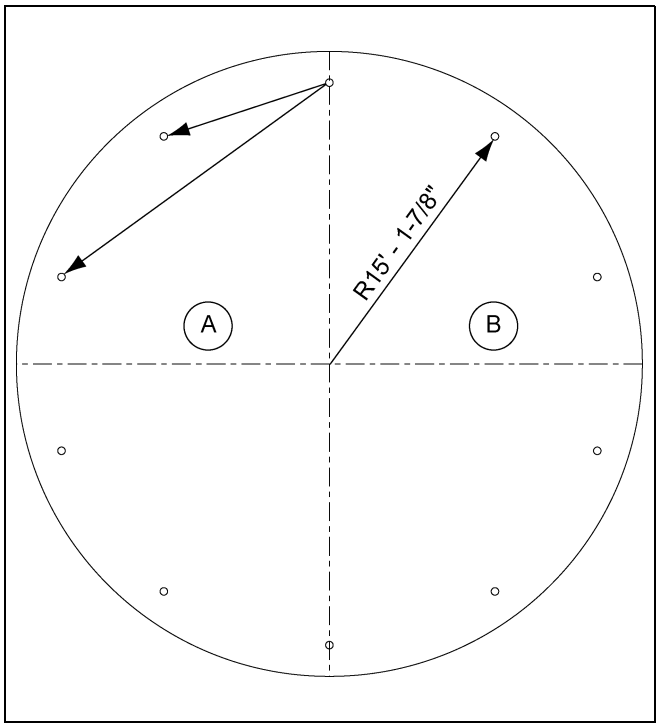


Figure 4P *Anchor Bolt Chords for 30' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

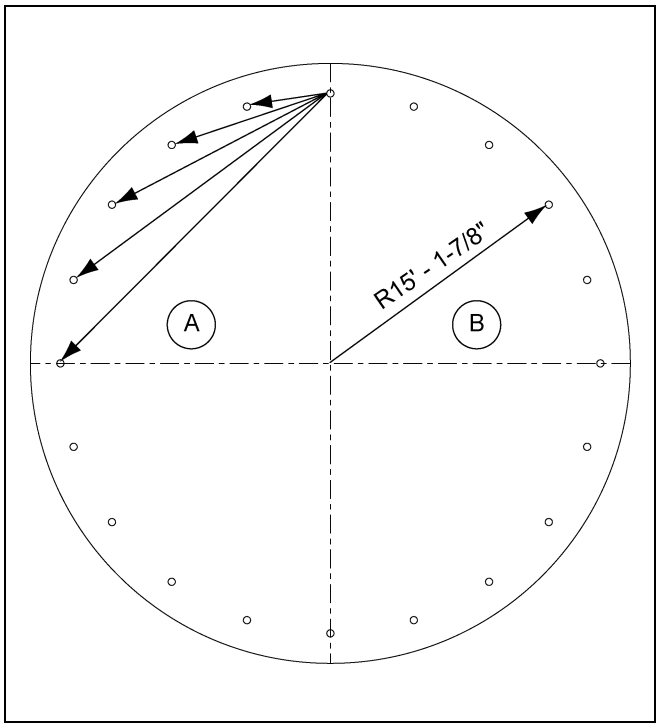


Figure 4Q *Anchor Bolt Chords for 30' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	30'	
# of Anchors	10	
Bolt Radius	15' - 1-7/8"	4.62 m
Chord 1	9' - 4-3/8"	2.85 m
Chord 2	17' - 9-13/16"	5.43 m

Diameter	30'	
# of Anchors	20	
Bolt Radius	15' - 1-7/8"	4.62 m
Chord 1	4' - 8-7/8"	1.45 m
Chord 2	9' - 4-3/8"	2.85 m
Chord 3	13' - 9-1/8"	4.19 m
Chord 4	17' - 9-13/16"	5.43 m
Chord 5	21' - 5-3/16"	6.55 m

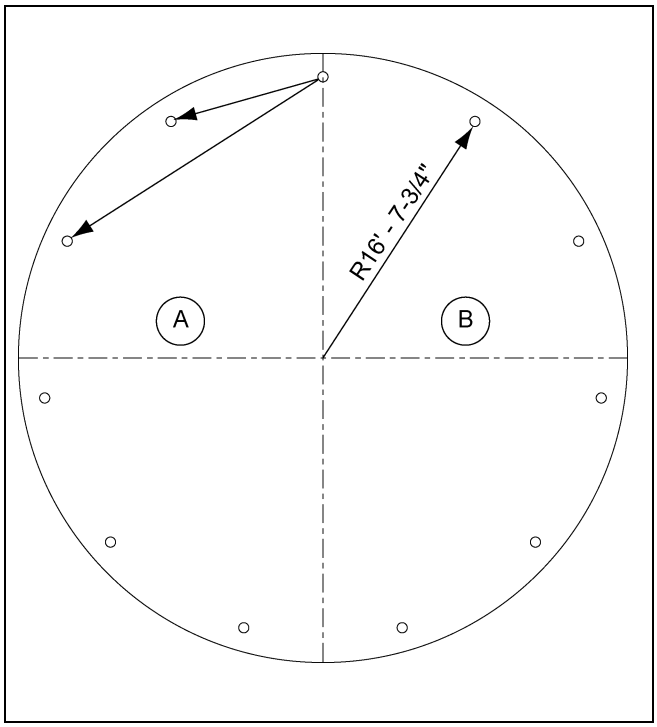


Figure 4R *Anchor Bolt Chords for 33' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

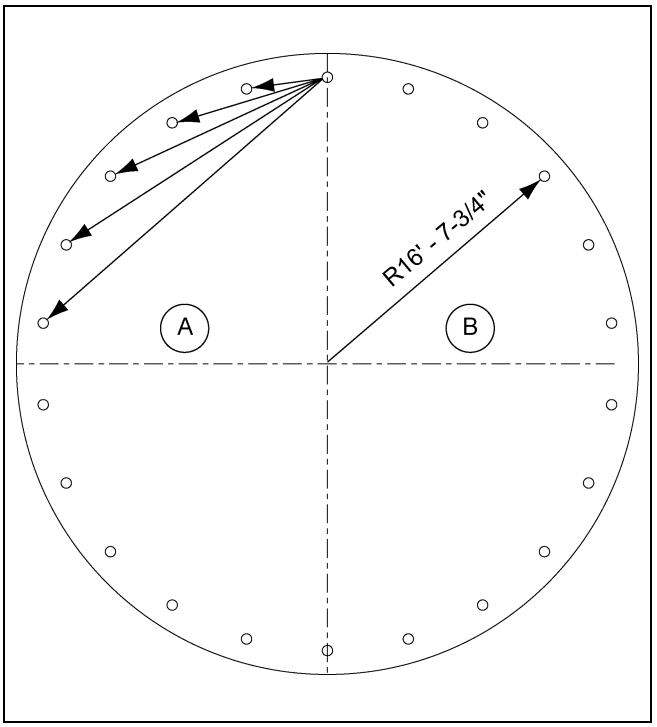


Figure 4S *Anchor Bolt Chords for 33' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	33'	
# of Anchors	11	
Bolt Radius	16' - 7-3/4"	5.07 m
Chord 1	9' - 4-9/16"	2.86 m
Chord 2	18'	5.49 m

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	33'	
# of Anchors	22	
Bolt Radius	16' - 7-3/4"	5.07 m
Chord 1	4' - 8-7/8"	1.45 m
Chord 2	9' - 4-9/16"	2.86 m
Chord 3	13' - 9-15/16"	4.22 m
Chord 4	18'	5.49 m
Chord 5	21' - 9-5/8"	6.65 m

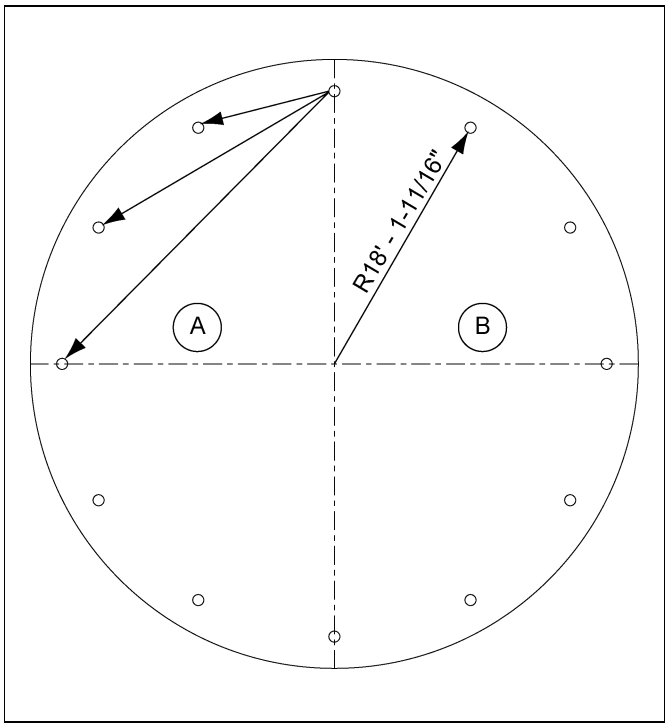


Figure 4T *Anchor Bolt Chords for 36' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

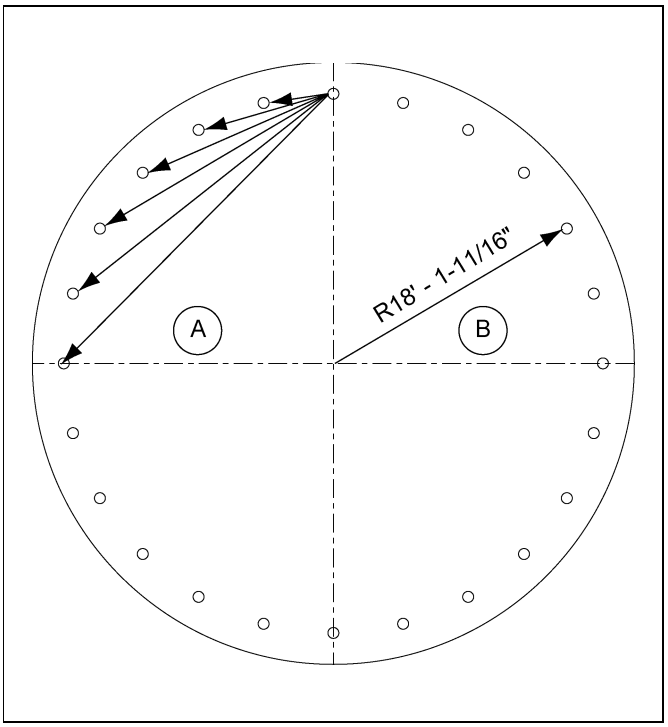


Figure 4U *Anchor Bolt Chords for 36' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	36'	
# of Anchors	12	
Bolt Radius	18' - 1-11/16"	5.53 m
Chord 1	9' - 4-11/16"	2.86 m
Chord 2	18' - 1-11/16"	5.73 m
Chord 3	25' - 7-7/8"	7.82 m

Diameter	36'	
# of Anchors	24	
Bolt Radius	18' - 1-11/16"	5.53 m
Chord 1	4' - 8-13/16"	1.42 m
Chord 2	9' - 4-11/16"	2.86 m
Chord 3	13' - 10-5/8"	4.23 m
Chord 4	18' - 11-1/16"	5.53 m
Chord 5	22' - 1-1/16"	6.73 m
Chord 6	25' - 7-7/8"	7.82 m

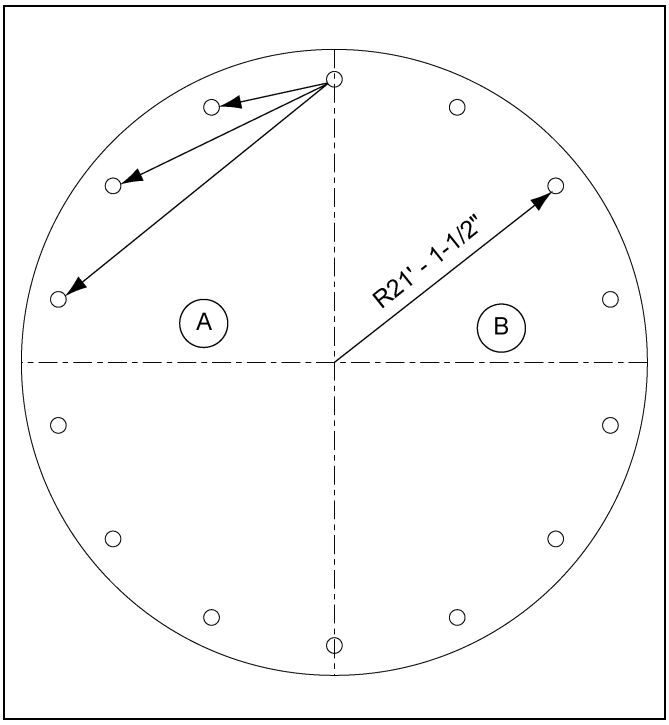


Figure 4V *Anchor Bolt Chords for 42' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

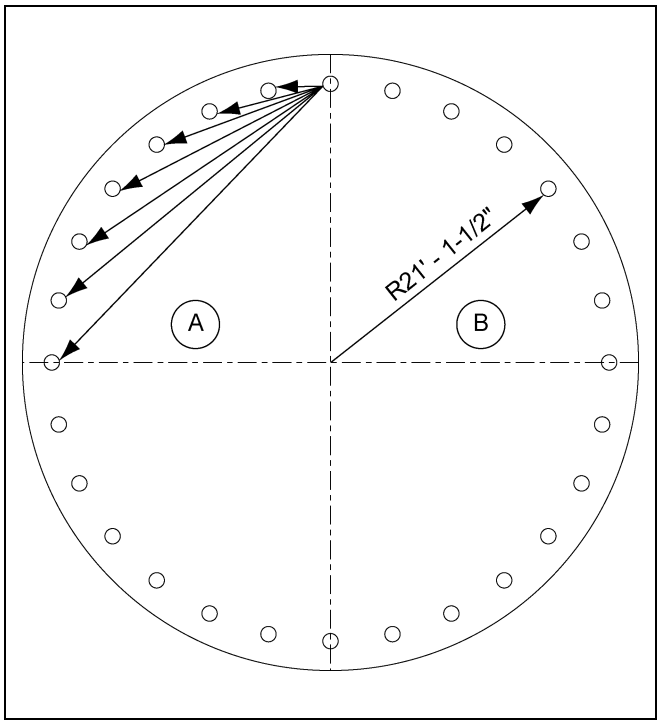


Figure 4W *Anchor Bolt Chords for 42' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	42'	
# of Anchors	14	
Bolt Radius	21' - 1-1/2"	6.44 m
Chord 1	9' - 4-13/16"	2.87 m
Chord 2	18'-4"	5.59 m
Chord 3	26' - 4-1/8"	8.03 m

Diameter	42'	
# of Anchors	28	
Bolt Radius	21' - 1-1/2"	6.44 m
Chord 1	4' - 8-3/4"	1.44 m
Chord 2	9' - 4-13/16"	2.87 m
Chord 3	13' - 11-7/16"	4.25 m
Chord 4	18'-4"	5.59 m
Chord 5	22' - 5-3/4"	6.85 m
Chord 6	26' - 4-1/8"	8.03 m
Chord 7	29' - 10-1/2"	9.11 m

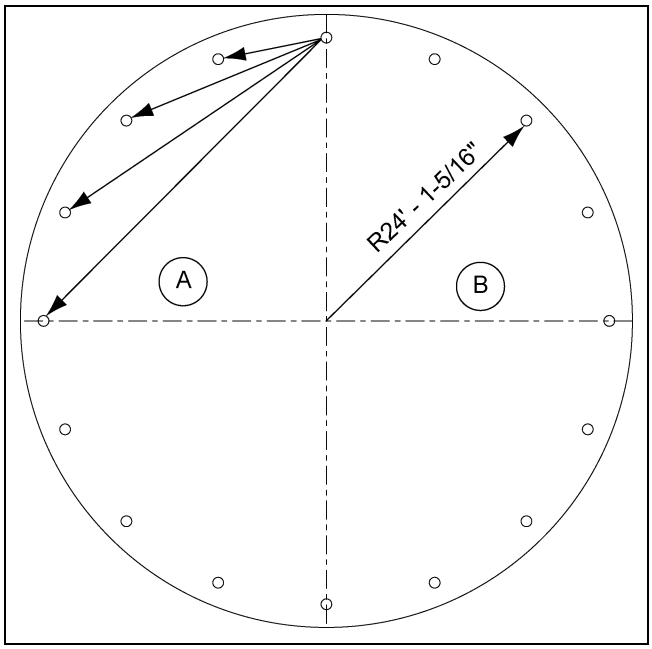


Figure 4X *Anchor Bolt Chords for 48' Diameter Unstiffened Bin (4" Corrugation) 3-9 Rings*

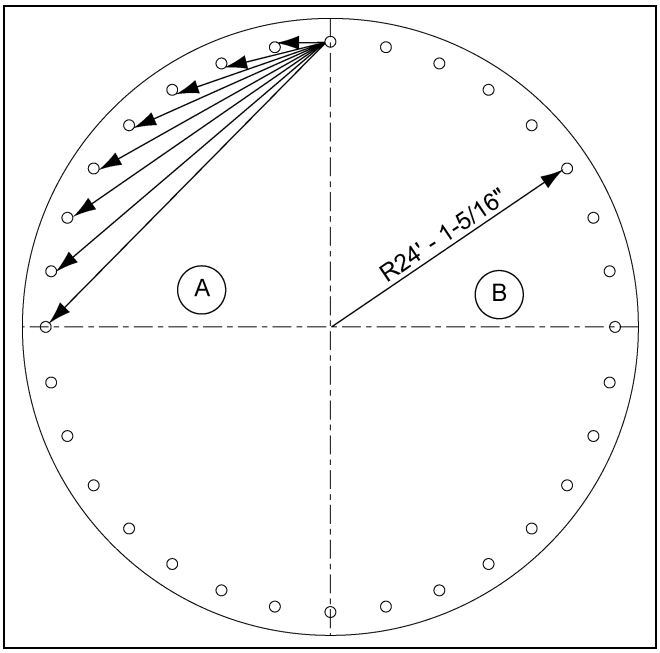


Figure 4Y *Anchor Bolt Chords for 48' Diameter Unstiffened Bin (4" Corrugation) 10 Rings*

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Ref #	Description
A	Anchor Chord Dimensions
B	Bolt Radius

Diameter	48'	
# of Anchors	16	
Bolt Radius	24' - 1-5/16"	7.35 m
Chord 1	9' - 4-7/8"	2.88 m
Chord 2	18' - 5-7/16"	5.63 m
Chord 3	26' - 9-7/16"	8.17 m
Chord 4	34' - 1-1/8"	10.39 m

Diameter	48'	
# of Anchors	32	
Bolt Radius	24' - 1-5/16"	7.35 m
Chord 1	4' - 8-11/16"	1.44 m
Chord 2	9' - 4-7/8"	2.88 m
Chord 3	13' - 11-15/16"	4.27 m
Chord 4	18' - 5-7/16"	5.63 m
Chord 5	22' - 8-3/4"	6.93 m
Chord 6	26' - 9-7/16"	8.17 m
Chord 7	30' - 7-1/16"	9.32 m
Chord 8	34' - 1-1/8"	10.39 m

Placement of the Vane Axial Fan Foundation

If a fan or fan and heater combination is to be installed, determine the concrete foundation size.

1. The top of the fan foundation should be level with the top of the bin's foundation.
2. Recommended foundation thickness is 4" minimum.
3. The front of the foundation should be perpendicular to the bin wall.
4. Concrete foundation for the heater is not required. If it is to be added, pour the concrete to cover the locations of both the heater and the fan. *(See Figure 4Z.)*

CAUTION

The foundation and fan must be level and smooth for proper operation. Improper leveling can cause vibration problems.

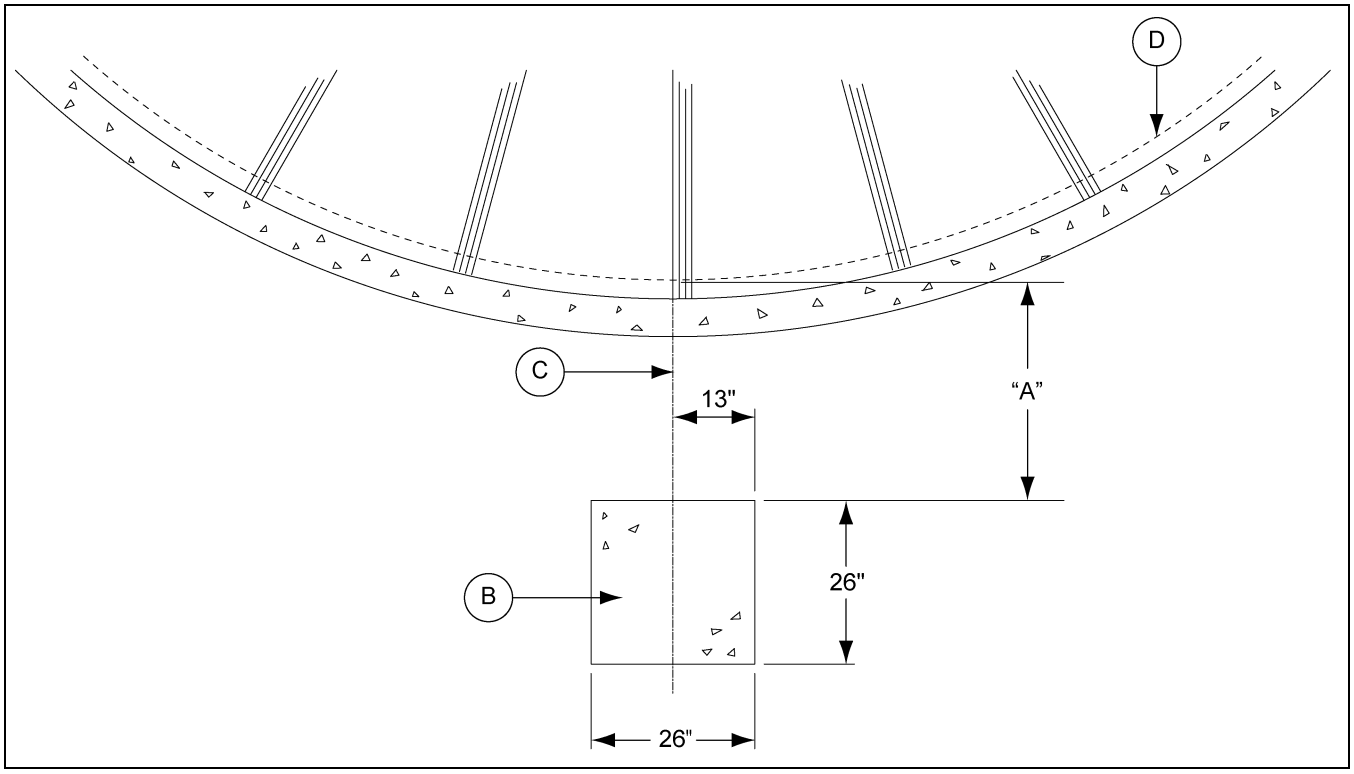


Figure 4Z *Vane Axial Fan Foundation*

Ref #	Description
B	Fan Foundation
C	Bin Center
D	Bin Wall

Transition	Distance between Fan Foundation and Bin Wall (A) for Fans without Heaters (in.)	Distance between Fan Foundation and Bin Wall (A) for Fans with Heaters (in.)
TR-4734	20	44
TR-6918 and TR-6919	32	55
TR-7048	45	69
TR-8006	46	70

Placement of the Centrifugal Fan Foundation

1. A correct fan foundation should be poured 2" below the top of bin foundation for all centrifugal fans.
2. A foundation for heaters is not required, but is recommended.
3. Recommended foundation thickness is 4".
4. If a downwind heater foundation is to be installed, the foundation width (F) should be 48" and extended towards the bin by 33".
5. The Fan discharge should be centered on the centerline of the bin.
6. The fan foundation should be perpendicular to the bin wall. *(See Figure 4AA.)*

CAUTION

The fan foundation and fan must be level and smooth for proper operation. Improper leveling can cause vibration problems.

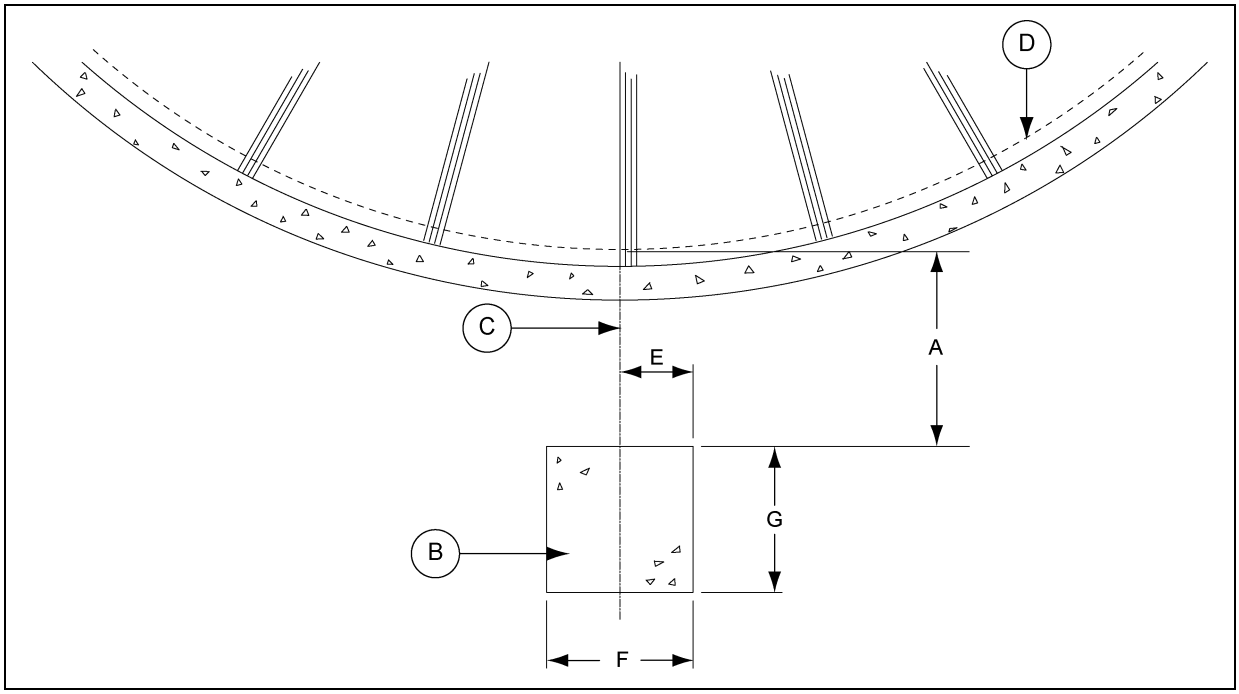


Figure 4AA *Centrifugal Fan Foundation*

Ref #	Description
B	Fan Foundation
C	Bin Center
D	Bin Wall

Transition	Distance between Fan Foundation and Bin Wall (A) for Fans without Heaters (in.)	Distance between Fan Foundation and Bin Wall (A) for Fans with Heaters (in.)	E (in.)	F (in.)	G (in.)
TR-4734	20	44	10	40	40
TR-7048	45	-	10	40	48
TR-6918 and TR-6919	32	65	13	48	52
TR-7049	45	78	13	48	52
TR-6207	42	75	13	48	60
TR-6958 (Double Inlet)	55	85	13	48	60
TR-6853 (Double Inlet)	54	88	28	100	60

Floating Monolithic Foundations for Bins (with up to 5 Rings)

The foundation design is based on a minimum allowable soil bearing capacity 3000 PSF. Bearing capacity of the soil should be determined by geotechnical investigation and be of uniform bearing capacity.

1. All reinforcement must meet the requirements of ASTM A615 grade 60 deformed bars.
2. Concrete must have a minimum compressive strength of 4000 PSI at 28 days, 6% to 8% air entrainment and 4" slump.
3. The foundation site must be free of vegetation and debris and well drained.
4. The foundation must be founded below the frost line or placed on non expansive frost free fill.
5. Lap all circumferential bars 35 bar diameters and stagger all laps in plans 3'.

   NOTE: *Estimates do not include end laps.*
6. All material used for backfill inside the ring wall should be clean, well graded, crushed rock or a sand and gravel mixture. Backfill should be placed in 6" lifts, 95% compaction. *(See Figure 4AB.)*

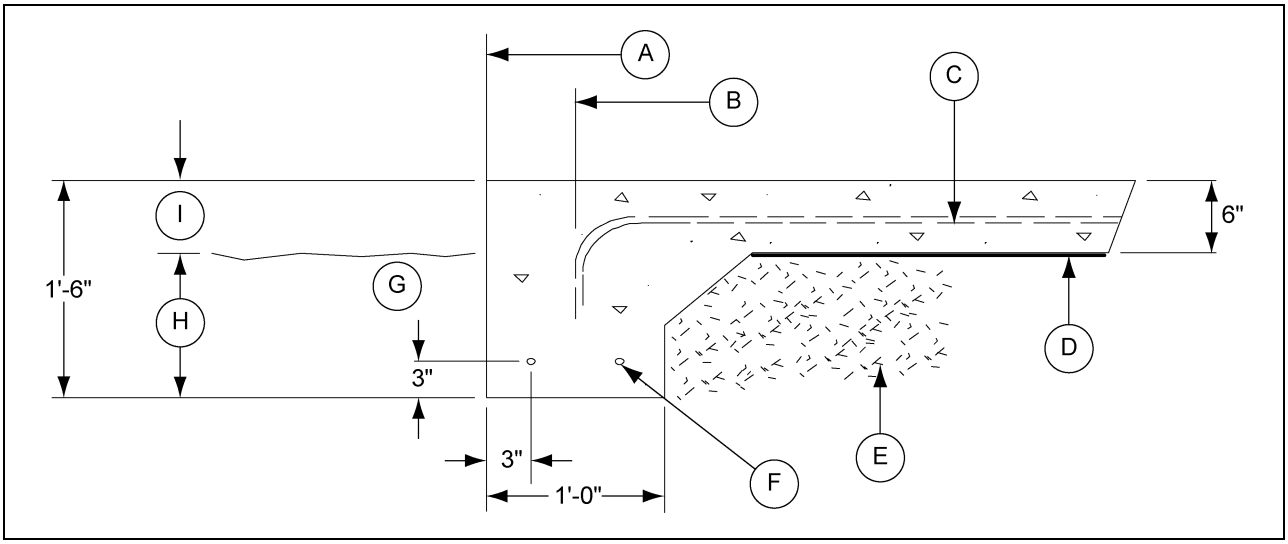


Figure 4AB *Floating Monolithic Foundations*

Ref #	Description
A	Outside Radius
B	Anchor Bolt Circle Radius
C	Two Layers 6 x 6 - 6/6 Wire Mesh
D	Vapor Barrier
E	Well Compacted Fill

Ref #	Description
F	2 - #6 Bars
G	Grade
H	1'-0" Minimum
I	6" Maximum

NOTE: *All foundation specifications are recommendations only. Due to many variable conditions in actual installation, the manufacturer assumes no liability for results arising from the use of such recommendations.*

NOTE: *Make sure to contact the manufacturer's engineering department for additional information for heights more than 6".*

NOTE: *The optional #4 rebar grid can be substituted for the wire mesh in most cases. Place the #4 bars in the foundation at 18" center to center each way.*

Bin Diameter	Outside Radius	Anchor Bolt Radius	Anchor Chord	# of Anchors	Total Cu. Yds. Concrete	Sq. Ft. Mesh	Length #6 Bar (ft.)	Optional #4 Grid (ft.)
12'	6'-9"	6' - 3-1/4"	4' - 9-5/8"	8	4.5	300	100	200
15'	8'-4"	7' - 10-1/8"	4' - 10-3/16"	10	6	500	100	300
18'	9'-10"	9' - 3-1/16"	4' - 9-1/2"	12	8	700	200	400
21'	11'-4"	10' - 8-15/16"	4' - 9-3/8"	14	10	900	200	600
24'	12'-10"	12' - 2-7/8"	4' - 9-5/16"	16	12.5	1100	200	700
27'	14'-4"	13' - 8-3/4"	4' - 9-3/16"	18	15	1200	200	900
30'	15'-10"	15' - 2-11/16"	4' - 9-3/16"	20	18	1600	200	1100
33'	17'-4"	16' - 8-9/16"	4' - 9-1/16"	22	21.5	1800	300	1500
36'	18'-9"	18' - 2-1/2"	4' - 9-1/16"	24	25	2300	300	1500

Frost Free Foundation Recommendations

The foundation design is based on a minimum allowable soil bearing capacity 3000 PSF. Bearing capacity of the soil should be determined by geotechnical investigation and be of uniform bearing capacity.

1. All reinforcement must meet the requirements of ASTM A615 grade 60 deformed bars.
2. Concrete must have a minimum compressive strength of 4000 PSI at 28 days, 6% to 8% air entrainment and 4" slump.
3. The foundation site must be free of vegetation and debris and well drained.
4. The foundation must be founded below the frost line or placed on non expansive frost free fill.
5. Lap all circumferential bars 35 bar diameters and stagger all laps in plans 3'.

   NOTE: *Estimates do not include end laps.*
6. All material used for backfill inside the ring wall should be clean, well graded, crushed rock or a sand and gravel mixture. Backfill should be placed in 6" lifts, 95% compaction. *(See Figure 4AC.)*

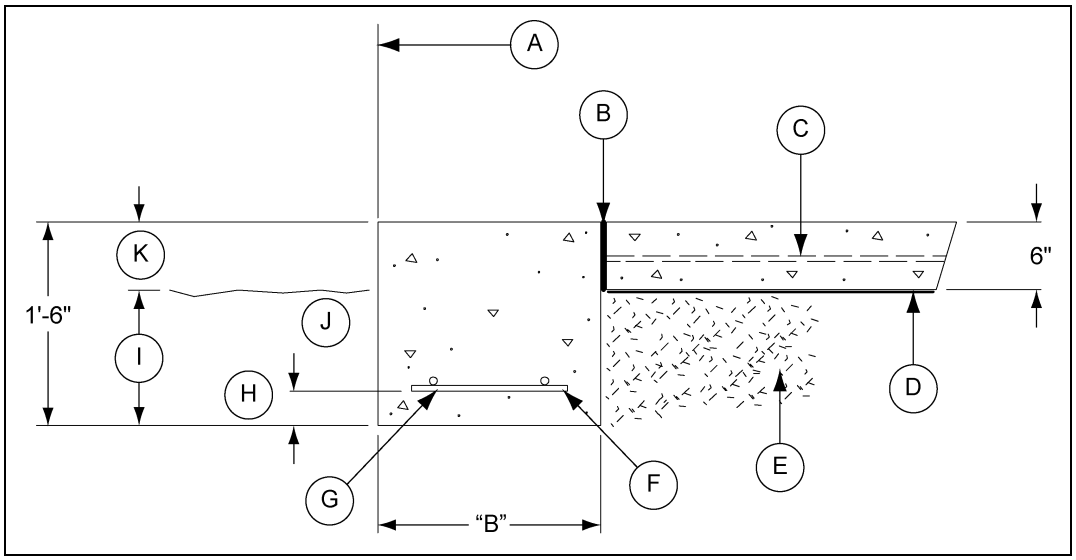


Figure 4AC *Frost Free Foundation*

Ref #	Description
A	Outside Radius
B	1/2" Expansion Joint
C	Two (2) Layers 6 x 6 - 6/6 Wire Mesh
D	Vapor Barrier
E	Well Compacted Fill
F	"N" #6 Bars Evenly Spaced
G	#6 Bars at 12" c/c Required Only if "B" is Greater than 2'-0"
H	3" Cl.
I	1'-0" Minimum
J	Grade
K	6" Maximum

NOTE: *All foundation specifications are recommendations only. Due to many variable conditions in actual installation, the manufacturer assumes no liability for results arising from the use of such recommendations.*

NOTE: *Make sure to contact the manufacturer's engineering department for additional information for heights more than 6".*

NOTE: *The optional #4 rebar grid can be substituted for the wire mesh in most cases. Place the #4 bars in the foundation at 18" center to center each way.*

Specifications for 18' Diameter Bin

Ring	B	N	Outside Radius	Sq. Ft. Mesh	Optional 18" x 18" Grid (ft.)	Length #6 Bar (ft.)	Total Cu.Yds. Concrete
6	1'-0"	2	9'-9"	500	400	200	8
7, 8	1'-7"	2	9'-9"	500	400	200	9
9	2'-0"	2	10'-1"	500	400	200	11

Specifications for 21' Diameter Bin

Ring	B	N	Outside Radius	Sq. Ft. Mesh	Optional 18" x 18" Grid (ft.)	Length #6 Bar (ft.)	Total Cu.Yds. Concrete
6	1'-1"	2	11'-3"	700	500	200	11
7, 8	1'-7"	2	11'-3"	700	500	200	12
9	2'-0"	2	11'-6"	700	500	200	13

Specifications for 24' Diameter Bin

Ring	B	N	Outside Radius	Sq. Ft. Mesh	Optional 18" x 18" Grid (ft.)	Length #6 Bar (ft.)	Total Cu.Yds. Concrete
6	1'-1"	2	12'-9"	900	600	200	13
7, 8	1'-9"	2	12'-9"	900	600	200	15
9, 10	2'-6"	3	13'-2"	900	600	400	18

Specifications for 27' Diameter Bin

Ring	B	N	Outside Radius	Sq. Ft. Mesh	Optional 18" x 18" Grid (ft.)	Length #6 Bar (ft.)	Total Cu.Yds. Concrete
6	1'-2"	2	14'-3"	1100	800	200	16
7, 8	1'-10	2	14'-4"	1100	800	200	18
9, 10	2'-7"	3	14'-7"	1100	800	500	21

Specifications for 30' Diameter Bin

Ring	B	N	Outside Radius	Sq. Ft. Mesh	Optional 18" x 18" Grid (ft.)	Length #6 Bar (ft.)	Total Cu.Yds. Concrete
6	1'-2"	2	15'-9"	1400	900	200	19
7, 8	1'-10"	2	15'-10"	1400	900	200	21
9, 10	2'-8"	3	16'-1"	1400	900	500	25
11, 12	3'-8"	4	16'-5"	1400	900	700	29

Specifications for 33' Diameter Bin

Ring	B	N	Outside Radius	Sq. Ft. Mesh	Optional 18" x 18" Grid (ft.)	Length #6 Bar (ft.)	Total Cu.Yds. Concrete
6	1'-3"	2	17'-3"	1700	1100	300	23
7, 8	1'-11"	2	17'-4"	1700	1100	300	25
9, 10	2'-9"	3	17'-6"	1700	1100	600	29
11, 12	3'-10"	4	18'-0"	1700	1100	800	34

Specifications for 36' Diameter Bin

Ring	B	N	Outside Radius	Sq. Ft. Mesh	Optional 18" x 18" Grid (ft.)	Length #6 Bar (ft.)	Total Cu.Yds. Concrete
6	1'-3"	2	18'-9"	2000	1300	300	26
7, 8	2'-0"	2	18'-11"	2000	1300	400	30
9, 10	2'-10"	3	19'-0"	2000	1300	600	33
11, 12	3'-11"	4	19'-6"	2000	1300	900	39
13	4'-10"	5	19'-9"	2000	1300	1100	43

Specifications for 42' Diameter Bin

Ring	B	N	Outside Radius	Sq. Ft. Mesh	Optional 18" x 18" Grid (ft.)	Length #6 Bar (ft.)	Total Cu.Yds. Concrete
6	1' 4"	2	21' 8"	2600	1800	300	34
7, 8	2' 1"	3	21' 11"	2600	1800	700	39
9	3' 1"	4	22' 2"	2600	1800	900	44
10, 11	4' 2"	5	22' 7"	2600	1800	1200	50
12, 13	4' 10"	5	22' 11"	2600	1800	1300	54
14	5' 6"	6	23' 2"	2600	1800	1500	66

Specifications for 48' Diameter Bin

Ring	B	N	Outside Radius	Sq. Ft. Mesh	Optional 18" x 18" Grid (ft.)	Length #6 Bar (ft.)	Total Cu.Yds. Concrete
6	1' 5"	2	24' 8"	3400	2300	400	44
7, 8	2' 3"	3	24' 11"	3400	2300	800	49
9	3' 3"	4	25' 2"	3400	2300	1100	55
10, 11	4' 5"	5	25' 8"	3400	2300	1400	63
12, 13	5' 1"	5	25' 11"	3400	2300	1500	67
14	5' 8"	6	26' 2"	3400	2300	1700	72

Inverted “T” Foundation (3000 PSF Soil Bearing Capacity)

1. Determine bearing capacity of soils by using geotechnical investigations. Found all footings on soils of uniform bearing capacity.
2. All bins with a diameter of 60' or larger must use ASTM A615 grade 60 deformed bars for concrete reinforcement. Bins with a diameter less than 60' must use ASTM A615 grade 40 deformed bars.
3. Concrete must have a minimum compressive strength of 4000 PSI at 28 days.
4. The foundation site should be free of vegetation and debris and be well drained.
5. The foundation must be founded below the frost line or founded on non-frost susceptible soils.
6. Lap all circumferential bars 35 bar diameters and stagger all laps in plans 3'.

   NOTE: *Estimates do not include end laps.*

7. All material used for backfill inside the ring wall should be a clean, well graded, crushed rock or a sand and gravel mixture. Backfill should be placed in 6" lifts, 95% compaction. *(See Figure 4AD on Page 40.)*

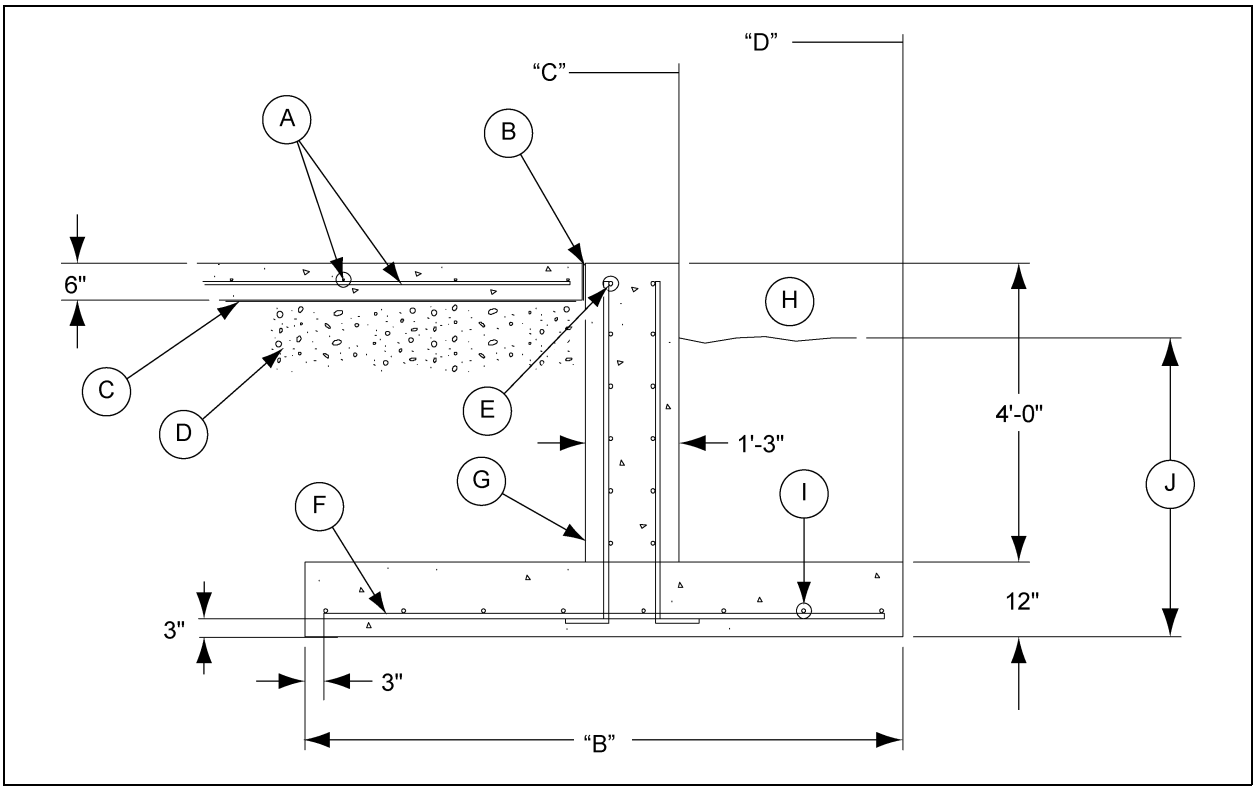


Figure 4AD *Inverted “T” Foundation*

Ref #	Description
A	#4 Bars at 18" c/c Each Way
B	1/2" Expansion Joint
C	Vapor Barrier
D	Well Compacted Fill
E	“M” Bars Spaced Evenly Each Face

Ref #	Description
F	“P” Bars Spacing at Center of Footing
G	#4 Bars at 12" c/c Each Face (Overall Length = 63")
H	Grade
I	“N” #5 Bars Spaced Evenly
J	4'-0" or Below Frost Line, use Greater Value

NOTE: *All foundation specifications are recommendations only. Due to many variable conditions in actual installation, the manufacturer assumes no liability for results arising from the use of such recommendations.*

Specifications for 18' Diameter Bin

Ring	B	C	D	M	N	P (Center to Center)	#4 Bar (ft.)	#5 Bar (ft.)	Cu. Yds. Concrete
6	1'-3"	9'-8"	9'-8"	5 #4's	2 #5's	#5 at 14" c/c	1600	300	18
7, 8	1'-7"	9'-8"	9'-10"	5 #4's	2 #5's	#5 at 14" c/c	1600	300	19
9, 10	2'-2"	9'-8"	10'-1"	5 #4's	3 #5's	#5 at 14" c/c	1600	300	20
11, 12	2'-4"	9'-8"	10'-2"	5 #4's	3 #5's	#5 at 14" c/c	1600	300	21

Specifications for 21' Diameter Bin

Ring	B	C	D	M	N	P (Center to Center)	#4 Bar (ft.)	#5 Bar (ft.)	Cu. Yds. Concrete
6	1'-3"	11'-2"	11'-2"	5 #4's	2 #5's	#5 at 14" c/c	2000	300	22
7, 8	1'-8"	11'-2"	11'- 4"	5 #4's	2 #5's	#5 at 14" c/c	2000	300	23
9, 10	2'-3"	11'-2"	11'- 7"	5 #4's	3 #5's	#5 at 14" c/c	2000	400	25
11, 12	2'-6"	11'-2"	11'-8"	5 #4's	3 #5's	#5 at 14" c/c	2000	400	27

Specifications for 24' Diameter Bin

Ring	B	C	D	M	N	P (Center to Center)	#4 Bar (ft.)	#5 Bar (ft.)	Cu. Yds. Concrete
6	1'-3"	12'-8"	12'-8"	5 #4's	2 #5's	#5 at 14" c/c	2300	300	26
7, 8	1'-9"	12'-8"	13'-1"	5 #4's	2 #5's	#5 at 14" c/c	2300	300	27
9	2'-5"	12'-8"	13'-2"	5 #4's	3 #5's	#5 at 14" c/c	2300	500	29
10, 11	2'-8"	12'-8"	13'-4"	5 #4's	3 #5's	#5 at 14" c/c	2300	500	31

Specifications for 27' Diameter Bin

Ring	B	C	D	M	N	P (Center to Center)	#4 Bar (ft.)	#5 Bar (ft.)	Cu. Yds. Concrete
6	1'-3"	14'-2"	14'-2"	5 #4's	2 #5's	#5 at 14" c/c	2600	300	31
7, 8	1'-10"	14'-2"	14'-5"	5 #4's	2 #5's	#5 at 14" c/c	2600	400	33
9	2'-6"	14'-2"	14'-8"	5 #4's	3 #5's	#5 at 14" c/c	2600	500	35
10, 11	3'-4"	14'-2"	15'-1"	5 #4's	4 #5's	#5 at 14" c/c	2600	700	37

Specifications for 30' Diameter Bin

Ring	B	C	D	M	N	P (Center to Center)	#4 Bar (ft.)	#5 Bar (ft.)	Cu. Yds. Concrete
6	1'-3"	15'-8"	15'-8"	5 #4's	2 #5's	#5 at 14" c/c	3000	300	36
7, 8	1'- 11"	15'-8"	16'-0"	5 #4's	2 #5's	#5 at 14" c/c	3000	400	39
9, 10	2'-7"	15'-8"	16'-3"	5 #4's	3 #5's	#5 at 14" c/c	3000	500	42
11, 12	3'-6"	15'-8"	16'-10"	5 #4's	4 #5's	#5 at 14" c/c	3000	700	44
13	3'-11"	15'-8"	17'-0"	5 #4's	4 #5's	#5 at 14" c/c	3000	700	46

Specifications for 33' Diameter Bin

Ring	B	C	D	M	N	P (Center to Center)	#4 Bar (ft.)	#5 Bar (ft.)	Cu. Yds. Concrete
6	1'-4"	17'-1"	17'-1"	5 #4's	2 #5's	#5 at 14" c/c	3400	400	40
7, 8	1'-11"	17'-1"	17'-4"	5 #4's	2 #5's	#5 at 14" c/c	3400	500	42
9, 10	2'-8"	17'-1"	17'-8"	5 #4's	3 #5's	#5 at 14" c/c	3400	600	45
11, 12	3'-8"	17'-1"	18'-2"	5 #4's	4 #5's	#5 at 14" c/c	3400	800	48
13	4'-2"	17'-1"	18'-7"	5 #4's	4 #5's	#5 at 14" c/c	3400	900	51

Specifications for 36' Diameter Bin

Ring	B	C	D	M	N	P (Center to Center)	#4 Bar (ft.)	#5 Bar (ft.)	Cu. Yds. Concrete
6	1'-4"	18'-7"	18'-7"	5 #4's	2 #5's	#5 at 14" c/c	3800	400	44
7, 8	2'-0"	18'-7"	18'-11"	5 #4's	2 #5's	#5 at 14" c/c	3800	500	47
9, 10	2'-10"	18'-7"	19'-3"	5 #4's	3 #5's	#5 at 14" c/c	3800	700	50
11, 12	3'-9"	18'-7"	19'-8"	5 #4's	4 #5's	#5 at 14" c/c	3800	1000	55
13	4'-4"	18'-7"	20'-3"	5 #4's	4 #5's	#5 at 14" c/c	3800	1200	58

Specifications for 42' Diameter Bin

Ring	B	C	D	M	N	P (Center to Center)	#4 Bar (ft.)	#5 Bar (ft.)	Cu. Yds. Concrete
6	1'-5"	21'-7"	21'-8"	5 #4's	2 #5's	#5 at 14" c/c	4700	500	56
7, 8	2'-2"	21'-7"	22'-0"	5 #4's	3 #5's	#5 at 14" c/c	4700	600	60
9	3'-0"	21'-7"	22'-4"	5 #4's	3 #5's	#5 at 14" c/c	4700	700	64
10, 11	4'-0"	21'-7"	22'-9"	5 #4's	4 #5's	#5 at 14" c/c	4700	1000	69
12, 13	4'-6"	21'-7"	23'-3"	5 #4's	4 #5's	#5 at 14" c/c	4700	1200	71

Specifications for 48' Diameter Bin

Ring	B	C	D	M	N	P (Center to Center)	#4 Bar (ft.)	#5 Bar (ft.)	Cu. Yds. Concrete
6	1'-6"	24'-7"	24'-8"	5 #4's	2 #5's	#5 at 14" c/c	5600	600	68
7, 8	2'-3"	24'-7"	25'-0"	5 #4's	3 #5's	#5 at 14" c/c	5600	800	72
9	3'-2"	24'-7"	25'-5"	6 #4's	3 #5's	#5 at 14" c/c	5800	900	77
10, 11	4'-2"	24'-7"	25'-10"	6 #4's	4 #5's	#5 at 14" c/c	5800	1200	84
12, 13	4'-10"	24'-7"	26'-5"	6 #4's	4 #5's	#5 at 14" c/c	6300	1300	87

Base Angle Installation

A bolt on the base angle is standard on 8 gauge unstiffened base ring sheets and all Farm-Com base rings. Install base angle on 8 gauge base ring as shown in *Figure 4AE* below.

1. Once the door frame has been placed and secured, continue adding necessary side wall ring(s).
2. To the lower edge of the 8 gauge bottom ring, attach the base angle. Bolt on the base angle where applicable. Before lowering the bin, apply mastic sealer to the entire underneath side of the base angle. *(See Figure 4AE.)*
3. Next, lower the bin onto the foundation and check for an adequate seal.
4. Sealing the base of the bin after final construction is done by various methods and materials. However, provisions should be made to seal the base of the bin to prevent moisture from coming into the bin.

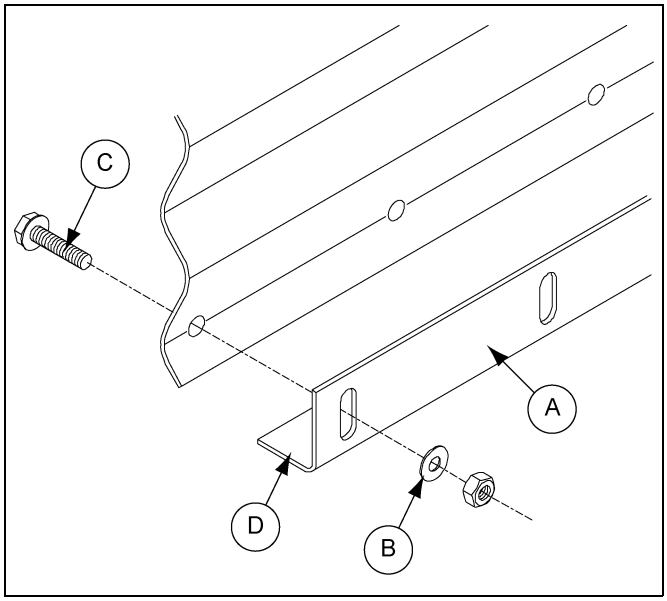


Figure 4AE

Ref #	Part #	Description
A	B-6753	Base Angle
B	S-248	Washer
C	S-7483	5/16" x 1-1/4" Bin Bolt
D		Mastic Sealer Underneath (Optional, not Provided with Bin)

Bolt and Nut Pairings

This chart lists the correct nut to use with each size of bolt.

Nut Part #	Nut Size	Type	Hex or Flanged	Bolt Size	Bolt Part #
S-396	5/16"	YDP	Hex	5/16" x 1"	S-10260
				5/16" x 1-1/4"	S-7483
S-3611	5/16"	YDP	Flanged	5/16" x 1"	S-10260
				5/16" x 1-1/4"	S-7483
S-456	3/8"	YDP	Hex	3/8" x 1"	S-7487
S-9426	3/8"	JS	Flanged	3/8" x 1"	S-7485

Hardware for Unstiffened Sidewall Sheets on 4" Corrugation Bins 12' to 48' Diameter

Refer to chart for hardware requirements for unstiffened sidewall sheet connections on bins 12' to 48' diameter.

Gauge	Horizontal Seam Bolt Size (Quantity)	Vertical Seam Bolt Size (Quantity)	Overlap Seam Bolt Size (Quantity)
20	5/16" x 1" (10)	5/16" x 1" (21)	5/16" x 1" (2)
19	5/16" x 1" (10)	5/16" x 1" (21)	5/16" x 1" (2)
18	5/16" x 1" (10)	5/16" x 1" (21)	5/16" x 1" (2)
17	5/16" x 1" (10)	5/16" x 1" (21)	5/16" x 1" (2)
16	5/16" x 1" (10)	5/16" x 1" (21)	5/16" x 1" (2)
15	5/16" x 1" (10)	5/16" x 1" (21)	5/16" x 1" (2)
14	5/16" x 1" (22)	5/16" x 1" (42)	5/16" x 1" (2)
13	5/16" x 1" (22)	5/16" x 1" (42)	5/16" x 1" (2)
12	3/8" x 1" (22)	3/8" x 1" (42)	3/8" x 1" (2)
11	3/8" x 1" (22)	3/8" x 1" (42)	3/8" x 1" (2)
10	3/8" x 1" (22)	3/8" x 1" (42)	3/8" x 1" (2)
9	3/8" x 1" (22)	3/8" x 1" (42)	3/8" x 1" (2)
8	3/8" x 1" (22)	3/8" x 1" (42)	3/8" x 1" (2)

NOTE: *Use 5/16" bolts and nuts when joining 13 to 12 gauge on horizontal seams.*

Bolt Torque Specifications

The specification torque table *below* will help the installer determine how tight a specific bolt must be. A bolt that has been over tightened can be just as dangerous as one that has not been tightened enough.

IMPORTANT: *Bolts should not be tightened in excess of the torque specifications chart listed below.*

Bolt	Minimum Torque				Maximum Torque			
	Sealing Joints (Joints with Sealing Washers)		Structural Joints (Joints without any Sealing Washers)		Sealing Joints (Joints with Sealing Washers)		Structural Joints (Joints without any Sealing washers)	
	ft./lbs.	N-m	ft./lbs.	N-m	ft./lbs.	N-m	ft./lbs.	N-m
5/16"-18 JS Grade 8 with Seal	20	27	-	-	25	34	-	-
3/8"-16 JS Grade 8 with Seal	30	41	-	-	35	47	-	-
7/16"-14 JS Grade 8 with Seal	50	68	-	-	60	81	-	-
3/8"-16 YDP Grade 8 Flanged	-	-	40	54	-	-	45	61
7/16"-14 YDP Grade 8 Flanged	-	-	65	88	-	-	72	97
1/2"-13 YDP Grade 8 Flanged	-	-	100	135	-	-	110	149

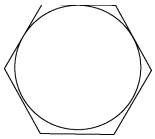
Identifying Bolt Grades

Bolts are identified by grade (or hardness), the grade can be identified by the markings on the head of the bolt. These markings will be in the form of slash marks and patterns. Use the following as a guide to determine the correct bolt grade.

CAUTION ***Under no condition shall any other bolts be substituted for those supplied by GSI.***

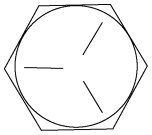
Grade 2 Bolts

Grade 2 bolts are designated with a plain head and are not used in GSI grain bins.



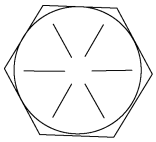
Grade 5 Bolts

Grade 5 bolts are designated by three (3) slash marks on the head. All 5/16" diameter bolts are to be grade 5 or higher.



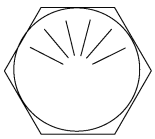
Grade 8 Bolts

Grade 8 bolts are designated by six (6) slash marks evenly spaced out around the head of the bolt. All 3/8", 7/16" and 1/2" diameter bolts are to be grade 8 or grade 8.2.



Grade 8.2 Bolts

Grade 8.2 bolts are designated by six (6) slash marks on the head in a sunrise pattern. All 3/8", 7/16" and 1/2" diameter bolts are to be grade 8 or grade 8.2.



NOTE: *Refer to 4.00" commercial tank bolting requirements for complete bolt usage.*

Bolt Identification

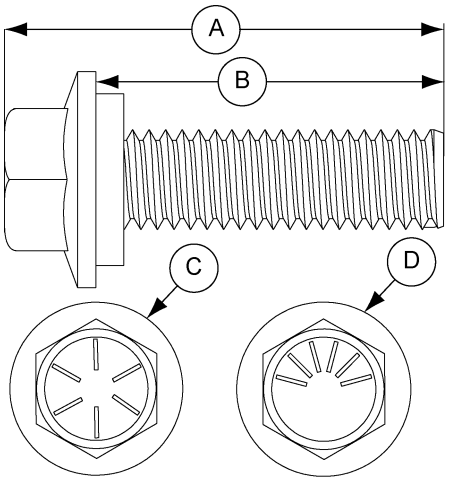
Use the following information to identify the bolts and where each must be used during installation.

Bolt (S-10260)

An S-10260 is a 5/16" x 1" JS bolt that is pre-assembled with a sealing washer.

Bolt (S-10260) is used in the following locations:

1. Use to connect horizontal, vertical and overlap seams on 13 gauge to 20 gauge sidewall connections.
2. Use to connect roof panels together where they overlap.
3. Use when connecting eave angle to sidewall sheet.
4. The color of the bucket lid is lime green.
5. Use to connect eave clip to sidewall sheet on bins that are 48' diameter and smaller.
6. Use to attach roof panels to flashing on bins that are 48' diameter and smaller.
7. Use in hold-down bracket to sidewall connection.



A	1.300" (3.30 cm)
B	1.000" (2.54 cm)

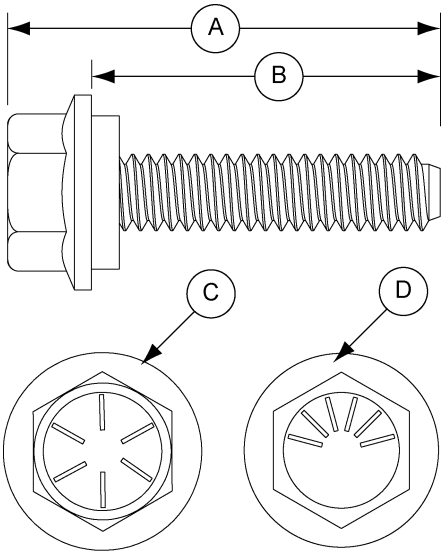
C	Grade 8
D	Grade 8.2

Bolt S-7483

An S-7483 is a 5/16" x 1-1/4" JS bolt pre-assembled with a sealing washer.

Bolt (S-7483) is used in the following locations:

1. Use in base angle to sidewall connection.
2. Use in flashing to sidewall connection.
3. The color of the bucket lid is black.
4. Use in accessories.



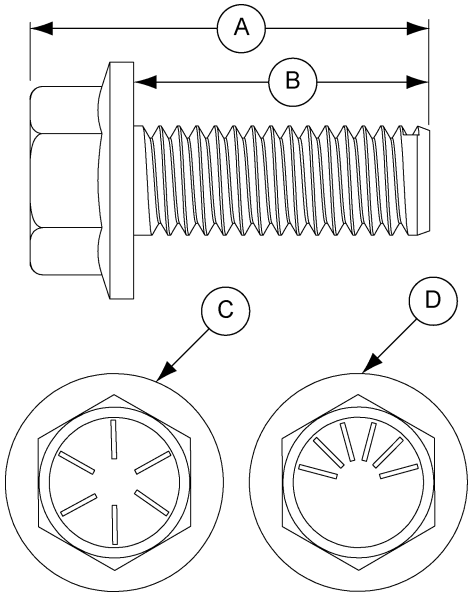
A	1.437" (3.64 cm)
B	1.250" (3.17 cm)
C	Grade 8
D	Grade 8.2

Bolt (S-7485)

An S-7485 is a 3/8" x 1" JS hex bolt with flanged head and without a sealing washer.

Bolt (S-7485) is used in the following locations:

1. Use in 48' farm roof only.
2. The color of bucket lid is light green.



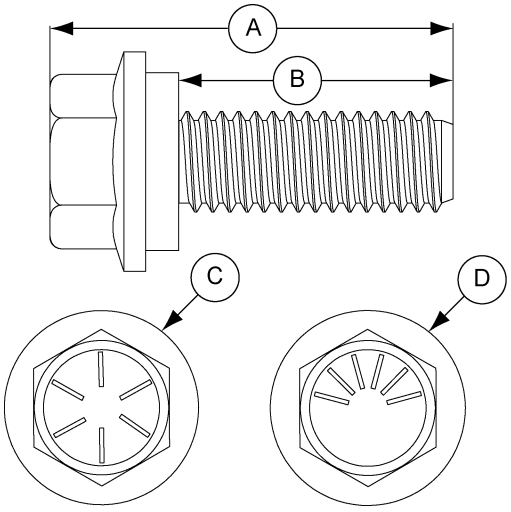
A	1.350" (3.43 cm)
B	1.000" (2.54 cm)
C	Grade 8
D	Grade 8.2

Bolt (S-7487)

An S-7487 is a 3/8" x 1" JS bolt that is pre-assembled with a sealing washer.

Bolt (S-7487) is used in the following locations:

1. Use in all sidewall connections for 12 gauge through 8 gauge sidewall to sidewall sheets.
2. The color of bucket lid is light grey.



A	1.350" (3.43 cm)
B	1.000" (2.54 cm)
C	Grade 8
D	Grade 8.2

Color Chart for Bin Hardware Bucket Lids

For ease of identification, hardware is separated and identified by buckets with color coded lids. Use the following chart to help identify the correct hardware.

Part #	Color	Bucket Count	Lid Color	Description
S-10260	*Lime Green*	1250		5/16" x 1" Bolt pre-assembled with sealing washer
S-7483	*Black*	1000		5/16" x 1-1/4" Bolt pre-assembled with sealing washer
S-396	*Red*	5000		5/16" Hex nut
S-3611	*Gold*	NA		5/16" Flange nut
S-7487	*Grey*	850		3/8" x 1" Bolt pre-assembled with sealing washer
S-7485	*Light Green*	1000		3/8" x 1" Flanged bolt without sealing washer
S-9426	*Dark Purple*	2500		3/8" Hex flanged nut

Sidewall Gauges

4.00" Standard Bin Sidewall Gauges

UNDERLINE Denotes 2 ring door location

Model #	Bin Diameter	# Rings	1-	2-	3-	4-	5-	6-	7-	8-	9-	10-
4004	15	3	16	20	20							
4004	15	4	16	18	20	20						
4004	15	5	16	17	18	20	20					
4004	18	3	16	20	20							
4004	18	4	16	17	20	20						
4004	18	5	15	16	18	20	20					
4004	18	6	13	14	16	17	18	20				
4004	18	7	12	13	14	16	17	18	20			
4004	18	8	12	12	13	14	16	17	18	20		
4004	18	9	11	12	12	13	14	16	17	18	20	
4004	21	3	16	18	20							
4004	21	4	15	17	20	20						
4004	21	5	14	16	17	20	20					
4004	21	6	13	14	16	17	20	20				
4004	21	7	12	13	14	16	17	18	20			
4004	21	8	12	12	13	14	16	17	18	20		
4004	21	9	11	12	12	13	14	16	17	18	20	
4004	24	3	16	18	20							
4004	24	4	16	17	20	20						
4004	24	5	14	15	17	20	20					
4004	24	6	13	14	15	17	20	20				
4004	24	7	12	13	14	15	17	18	20			
4004	24	8	11	12	13	14	15	17	18	20		
4004	24	9	11	11	12	13	14	15	17	18	20	
4004	27	3	16	17	20							
4004	27	4	14	16	17	20						
4004	27	5	14	15	17	18	20					
4004	27	6	13	14	15	17	18	20				
4004	27	7	12	13	14	15	17	17	18			
4004	27	8	11	12	13	14	15	17	17	18		
4004	27	9	11	11	12	13	14	15	17	17	18	
4004	30	4	14	16	17	20						
4004	30	5	14	14	17	18	20					
4004	30	6	13	13	14	16	17	18				
4004	30	7	12	13	13	14	15	17	18			
4004	30	8	11	12	13	13	14	15	17	18		
4004	30	9	11	11	12	13	13	14	15	17	18	
4004	33	4	14	15	17	20						
4004	33	5	14	14	17	17	20					
4004	33	6	13	13	14	16	17	18				
4004	33	7	12	13	13	14	15	17	18			
4004	33	8	11	12	13	13	14	15	17	18		
4004	33	9	10	11	12	13	13	14	15	17	18	
4004	36	4	14	15	17	18						
4004	36	5	14	14	17	17	18					
4004	36	6	13	13	14	16	17	18				
4004	36	7	12	13	13	14	15	17	18			
4004	36	8	11	12	13	13	14	15	17	18		
4004	36	9	10	11	12	13	13	14	15	17	18	
4004	36	10	08	10	11	12	13	13	14	15	17	18
4004	42	4	14	15	17	18						
4004	42	5	13	14	15	17	18					
4004	42	6	12	13	14	15	17	18				
4004	42	7	11	12	13	14	15	17	18			
4004	42	8	11	11	12	13	14	15	17	18		
4004	42	9	10	11	11	12	13	14	15	17	18	
4004	42	10	08	10	11	11	12	13	14	15	17	18
4004	48	4	14	14	17	17						
4004	48	5	13	14	14	17	17					
4004	48	6	12	13	14	14	17	17				
4004	48	7	11	12	13	14	14	17	17			
4004	48	8	10	11	12	13	14	14	17	17		
4004	48	9	08	10	11	12	13	14	14	17	17	
4004	48	10	08	08	10	11	12	13	14	14	17	17

4.00" Heavy Bin Sidewall Gauges

UNDERLINE Denotes 2 ring door location

Model #	Bin Diameter	# Rings	1-	2-	3-	4-	5-	6-
4004-0XXYYH	18	5	14	16	17	18	20	
4004-0XXYYH	18	6	13	14	16	17	18	20
4004-0XXYYH	21	5	14	16	17	18	20	
4004-0XXYYH	21	6	13	14	16	17	18	20
4004-0XXYYH	24	5	14	15	17	18	20	
4004-0XXYYH	24	6	13	14	15	17	18	20
4004-0XXYYH	27	5	14	15	16	17	20	
4004-0XXYYH	27	6	13	14	15	16	17	20
4004-0XXYYH	30	5	14	14	15	17	18	
4004-0XXYYH	30	6	13	13	14	15	17	18
4004-0XXYYH	33	5	13	14	15	17	18	
4004-0XXYYH	33	6	12	13	14	15	17	18
4004-0XXYYH	36	5	13	14	15	17	18	
4004-0XXYYH	36	6	12	13	14	15	17	18

4.00" Re-Circulating Bin Sidewall Gauges

UNDERLINE Denotes 2 ring door location

Model #	Bin Diameter	# Rings	1-	2-	3-	4-	5-	6-
4004-0XXYYR	18	5	13	14	16	18	20	
4004-0XXYYR	18	6	12	13	14	16	18	20
4004-0XXYYR	21	5	13	14	16	18	20	
4004-0XXYYR	21	6	12	13	14	16	18	20
4004-0XXYYR	24	5	13	14	15	17	20	
4004-0XXYYR	24	6	12	13	14	15	17	18
4004-0XXYYR	27	5	13	14	15	17	20	
4004-0XXYYR	27	6	12	13	14	15	17	18
4004-0XXYYR	30	5	13	14	15	17	18	
4004-0XXYYR	30	6	12	13	14	15	17	18
4004-0XXYYR	33	5	13	14	14	17	18	
4004-0XXYYR	33	6	12	12	13	14	17	18
4004-0XXYYR	36	5	13	14	14	17	18	
4004-0XXYYR	36	6	12	12	13	14	17	18
4004-0XXYYR	42	5	12	13	14	15	17	
4004-0XXYYR	42	6	11	12	13	14	15	17
4004-0XXYYR	48	5	11	12	13	15	17	
4004-0XXYYR	48	6	10	11	12	13	15	17

Guidelines for Constructing Sidewall Sheets

1. Before bolting the sidewall sheets together, check for the proper gauge of steel for the first ring. Higher gauge numbers denote the thinner materials. (For example, 20 gauge material is thinner than 14 gauge.)
2. In erecting most grain bins, the thinnest material usually goes on top, therefore the first sidewall ring you assemble will be the top ring of the bin.
3. Check the various gauges of the bin with the color code chart and begin building accordingly.
4. Assemble the top ring first.

NOTE: *The decal is orientated correctly.*

Color Codes for Sidewall Gauge Identification

Use this chart to interpret the color code painted on the corners of the sidewall sheets.

Color Codes for Sidewall Gauges

Sidewall Gauge	Color Code
20	Red
19	Black and Yellow
18	Orange
17	Light Blue and Pink
16	Blue
15	Red and Brown
14	Green
13	Blue and Yellow
12	Black
11	Pink
10	Light Blue
9	Blue and Orange
8	Yellow and Purple

Orientation Detail for Top Sidewall Sheets

To avoid the misalignment of the holes, it is necessary to use the correct orientation of the sidewall sheet during installation. *(See Figure 7A.)*

NOTE: *Always assemble the top sidewall sheets with the orientation shown.*

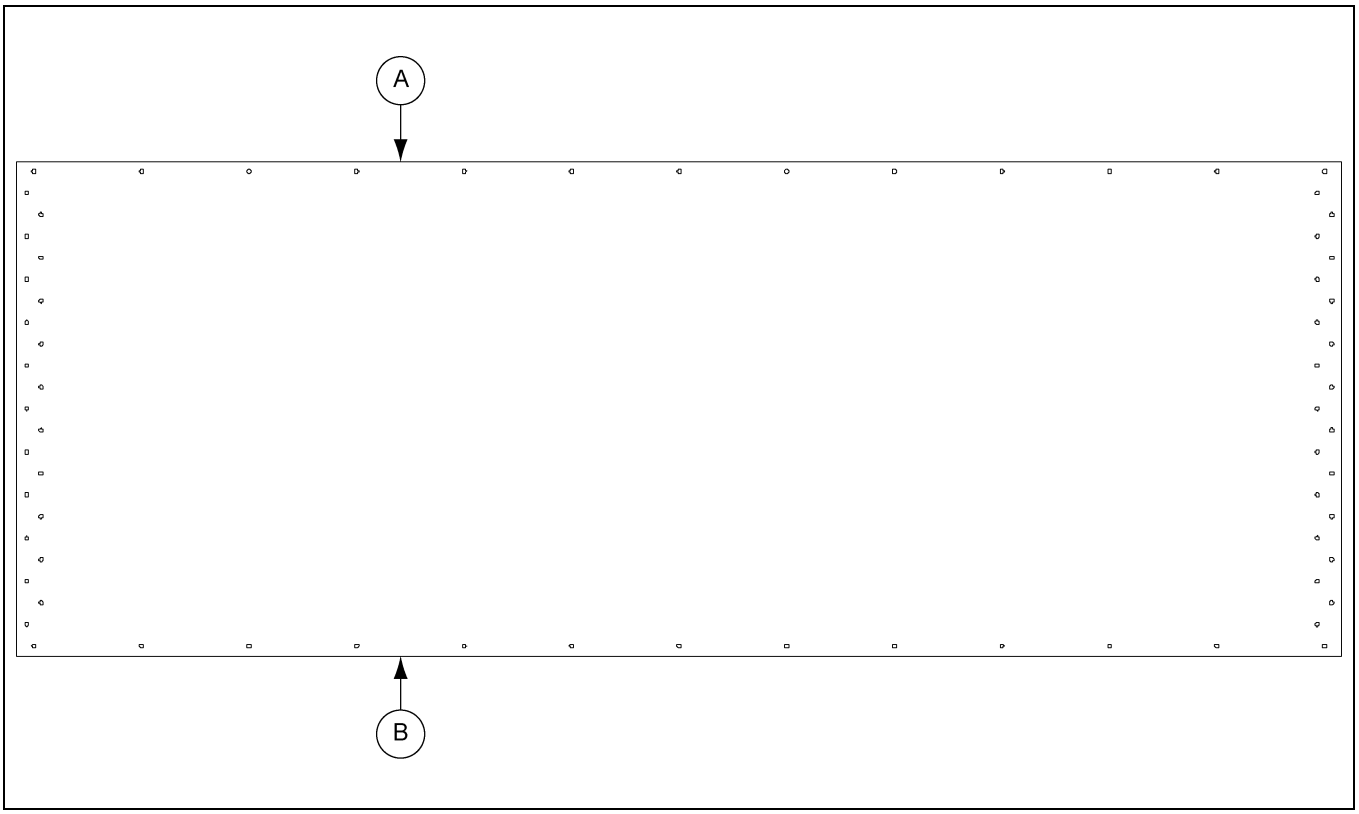


Figure 7A *Top Sidewall Sheet Orientation (Viewed from Outside of the Bin)*

Ref #	Description
A	Top of the Top Sidewall Sheet
B	Bottom of the Top Sidewall Sheet

Caulking and Bolting Detail for Standard Sidewall Sheets

To keep out moisture from overlapping the sheets, it is necessary to apply caulk to each sheet prior to installing. *(See Figure 7B.)*

NOTE: *Always assemble the sidewall sheets with the overlap in the same direction.*

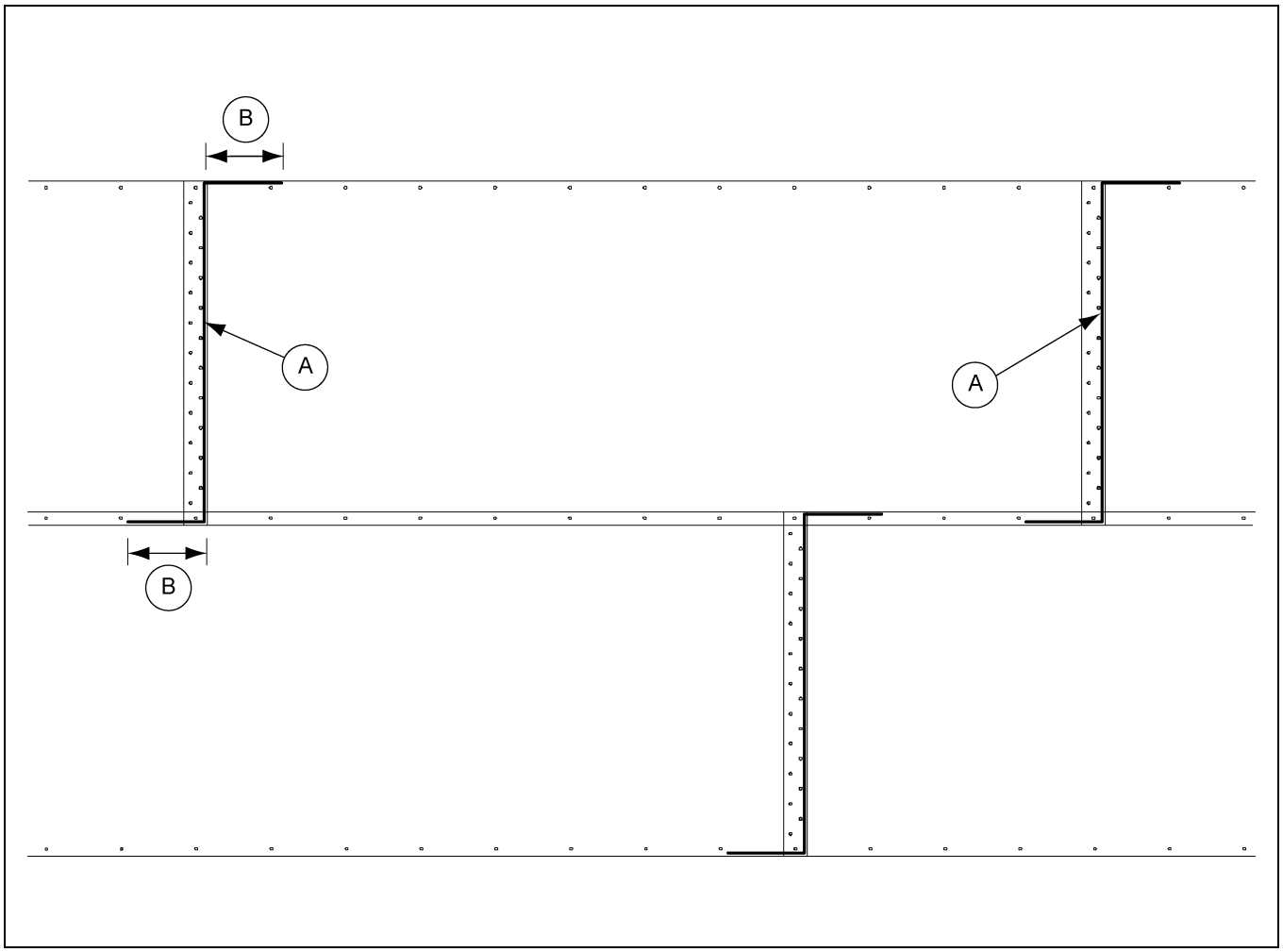


Figure 7B *Standard Sidewall Sheets as Viewed from the Outside of the Bin*

Ref #	Description
A	Vertical Strip of Caulk
B	10" (25.4 cm) Horizontal Strip of Caulk

Caulking and Bolting Detail for Standard Sidewall Sheets (Continued)

1. Apply a strip of caulk (A) near the outside edge of the outer sheet and between the outer two (2) rows of bolts (A), then apply a strip of caulk 10" (25.4 cm) long along the horizontal seams, as shown in *Figure 7C*.

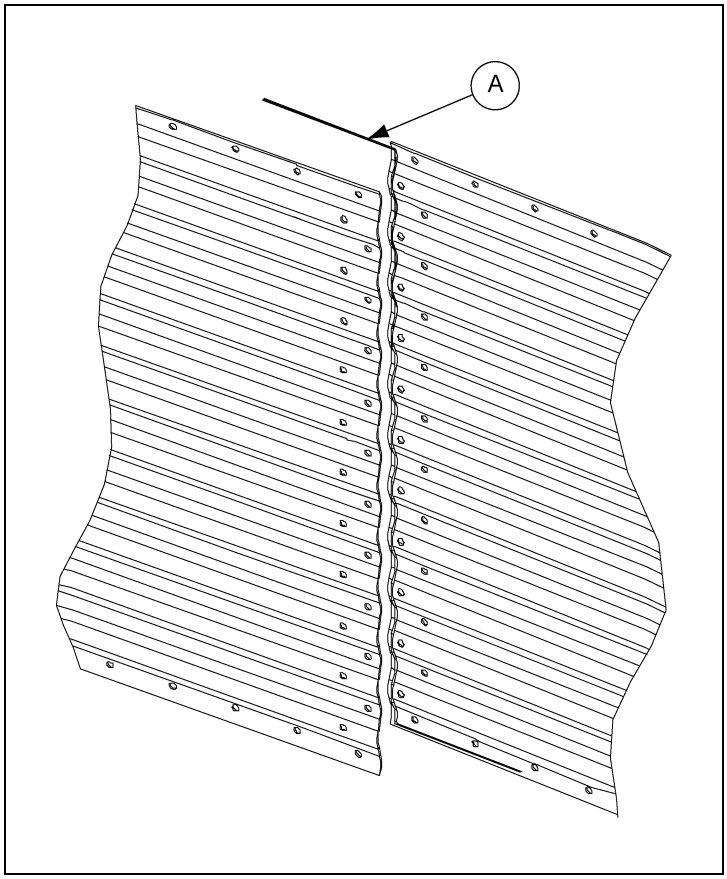


Figure 7C *Caulking and Bolting Details (Viewed from Inside of the Bin)*

Ref #	Description
A	Strip of Caulk

2. Start assembling the sidewall sheets end to end (overlapping the same way throughout), until the ring is completed.
3. Install the correct size bin bolts with the bolt head and its neoprene washer to the outside and the nut on the inside of the bin.

   NOTE: *Do not tighten bolts until all the sheets are assembled and form a complete ring.*

4. Tighten the bolts in sequence, starting from the center to the edge in both directions. This allows the sidewall sheets to draw-up evenly.

   NOTE: *Tighten from the nut side.*

Door Placement

Consider the location of the door and other accessories before starting the bin. Proper placement of lifting jacks in relationship to the anchor bolts could make a difference on odd or even ring bins. *(See Figure 8A and Figure 8B.)*

NOTE: *The walk-through diameter door must be centered between two (2) anchor bolts. The sidewall sheets are staggered 1/3 from end to end.*

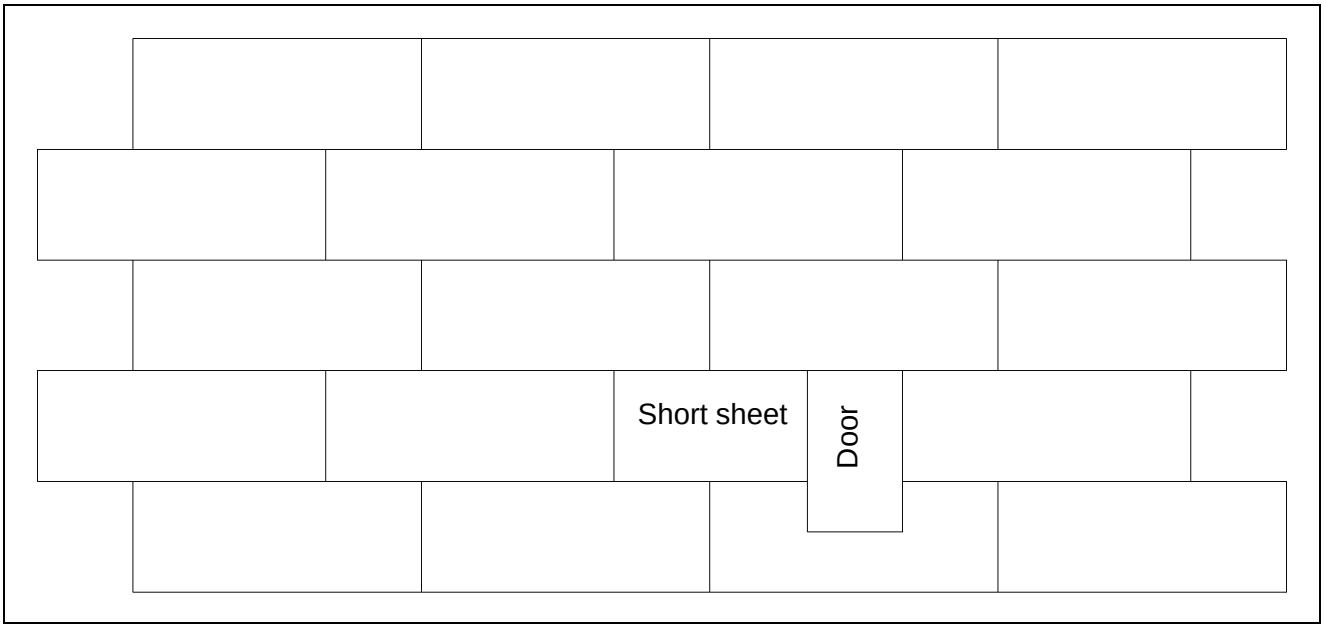


Figure 8A *Odd Number of Rings (As Viewed from Outside of Bin)*

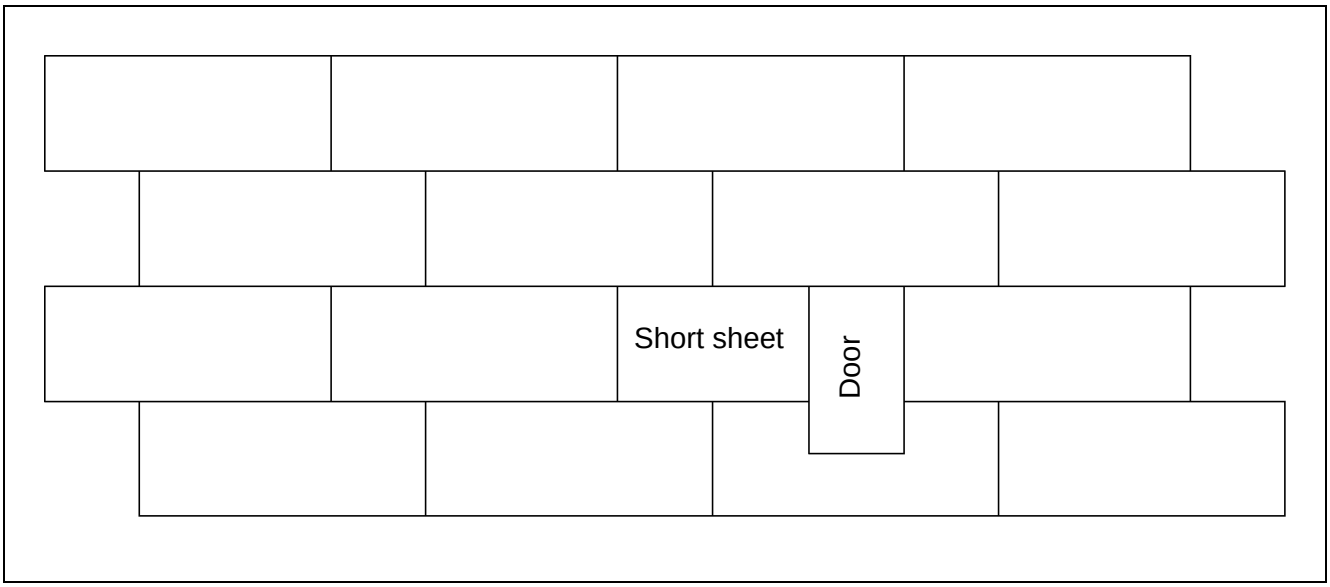


Figure 8B *Even Number of Rings (As Viewed from Outside of Bin)*

2 Ring Door Installation

Before You Begin

Before starting to install, be sure the correct door has been received. Note that one ring doors are standard with some sizes of bins/silos. Refer to round access door installation instructions.

General Information

1. The commercial two ring door is installed in the bottom two rings.
2. The door should normally be placed in line with the conveyor. An intermediate discharge well should be located near the wall to clear grain from the area of the access door (as with any access door).
3. The door should be located either between two (2) stiffeners on a commercial tank or between two (2) anchor bolts on a farm tank.

4.00" Corrugation	
WD-6241	12'-27' Bins/Silos
WD-6245	
WD-6242	30'-42' Bins/Silos - Maximum height of 9 rings
WD-6246	48'-Maximum height of 8 rings
WD-6244	48'-Bins/Silo - 9 rings
WD-6248	
Optional Auger Hood - 2 Ring	
WD-6243	12'-24' Bins/Silos - with auger hood panel
WD-6247	

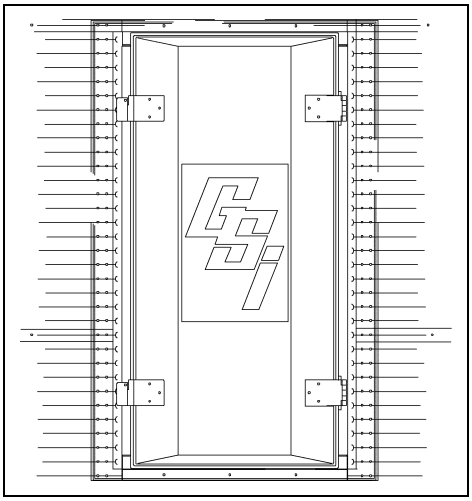


Figure 8C *2 Ring Door Installed*

Assemble the Top and Bottom Inner Door

1. Install the reinforcement angles (G) on the top door panel with the flange bolts and flange nuts (H).
2. On the right hand side of the inner top door panel, install the three (3) inner door hinges (I) with bolts and nuts (J).

   NOTE: *Make sure that the bolt heads and the hinges are installed on door panels as shown for all connections.*

3. Install the right and left hand panel latches (A and B) to the inside of the reinforcement angles (G) with the latch bushings (D), flange bolts, and lock nuts (C).
4. Install the latch bar (E) to the right hand and left hand panel latches (A and B) with four (4) bolts and nuts (F).
5. After all parts are installed, tighten all hardware to the recommended torque specifications. See bolt torque specifications, *on Page 45.*

   NOTE: *Use flat washers on all slotted connections.*
6. Repeat the procedure to assemble the bottom inner door.

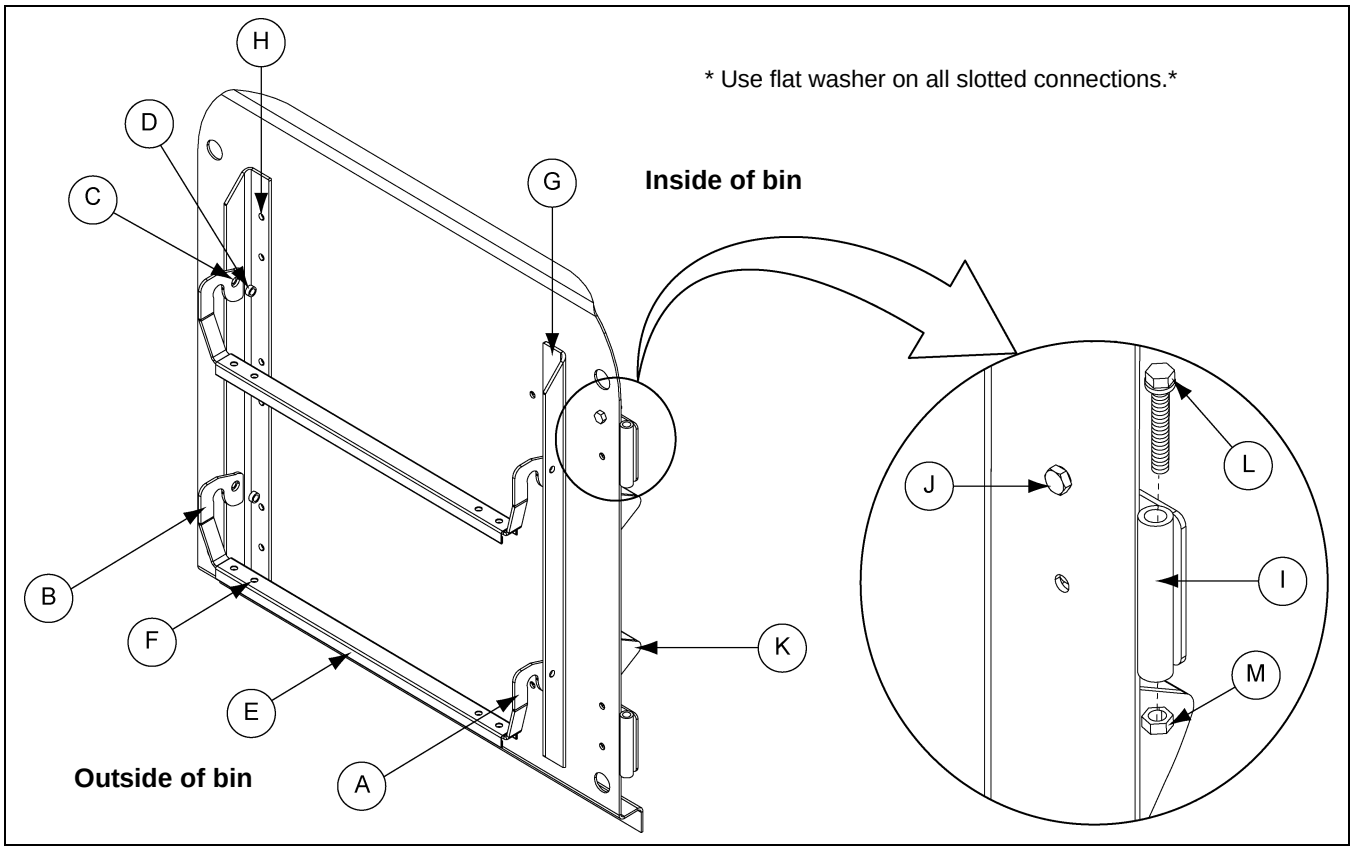


Figure 8D *Top Inner Door Panel*

Ref #	Part #	Description
A	WD-6037	Inside Panel Latch Right Hand
B	WD-6038	Inside Panel Latch Left Hand
C		5/16" x 1" Flange Bolt with Sealing Washer (S-10260) and Lock Nut (S-5220)
D	WD-6040	Latch Bushing
E	NCWT0299	Latch Bar
F		5/16" x 3/4" Slotted Truss Head Bolts (S-4303) and 5/16" Flange Nuts (S-3611)
G	NCWT0298	Reinforcement Angle
H		5/16" x 1" Flange Bolt with Sealing Washer (S-10260) and 5/16" Flange Nut (S-3611)
I		Inner Door Hinges
J		5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
K		Reinforcement Ribs (Must face inside of bin.)
L	S-1443	Bolt, HHCS 3/8"-16 x 4-1/2" ZN Grade 2
M	S-8235	Lock Nut 3/8"-16 ZN Grade 5 Deformed

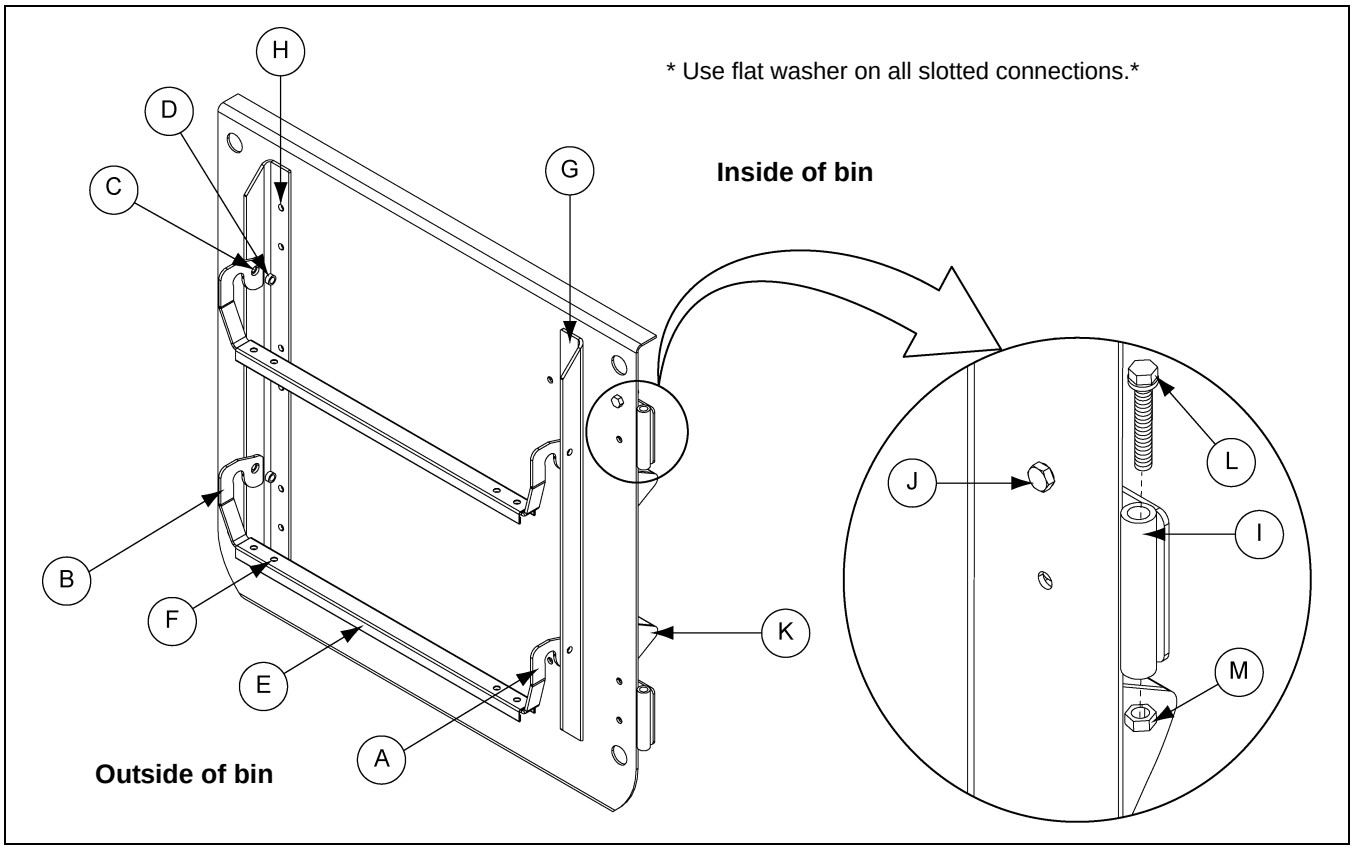


Figure 8E *Bottom Inner Door Panel*

Ref #	Part #	Description
A	WD-6037	Inside Panel Latch Right Hand
B	WD-6038	Inside Panel Latch Left Hand
C		5/16" x 1" Flange Bolt with Sealing Washer (S-10260) and Lock Nut (S-5220)
D	WD-6040	Latch Bushing
E	NCWT0299	Latch Bar
F		5/16" x 3/4" Slotted Truss Head Bolts (S-4303) and 5/16" Flange Nuts (S-3611)
G	NCWT0298	Reinforcement Angle
H		5/16" x 1" Flange Bolt with Sealing Washer (S-10260) and 5/16" Flange Nut (S-3611)
I		Inner Door Hinges
J		5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
K		Reinforcement Ribs (Must face inside of bin.)
L	S-1443	Bolt, HHCS 3/8"-16 x 4-1/2" ZN Grade 2
M	S-8235	Lock Nut 3/8"-16 ZN Grade 5 Deformed

Assemble the Outer Cover

1. Install the reinforcement channels (B) to the outer cover (A) with bolts (C).
2. On the right hand side of the outer cover (A), install the outer door hinges (D) with bolts (C).
3. On the left hand side of the outer cover (A), install the latch (E) with bolts (C).

   NOTE: *Make sure to place sealing washer between outer cover (A) and latch (E)*

4. Install the decals (F, G and H) on the outside of the outer cover (A) as shown.

   IMPORTANT: *Outer cover decals must be in place upon door installation. DC-GBC-1A and DCGBC-1S must be placed on the inner side of the outer cover. DC-GBC-2A, DC-GBC-2S and DC-1754 must be placed on the outer side of the outer cover. If these decals are absent or damaged call GSI for free replacement.*

5. After all parts are installed, tighten all hardware to the recommended torque specifications. See bolt torque specifications, *on Page 45.*

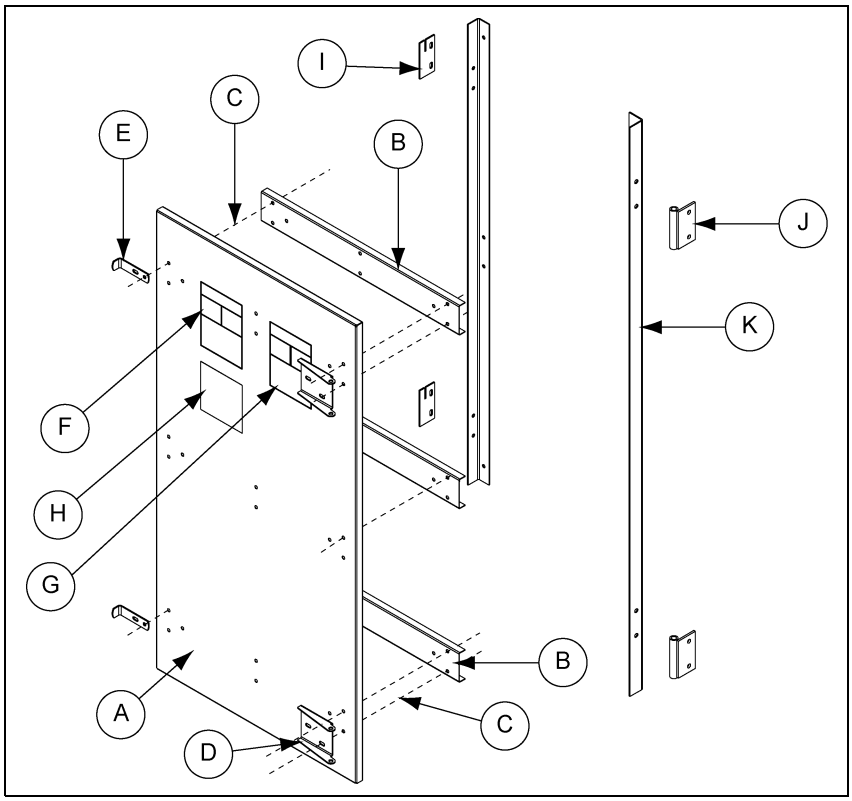


Figure 8F *Outer Cover Assembly*

Ref #	Part #	Description
A	NCWT0203	Outer Cover
B	NCWT0204	Reinforcement Channel
C	S-10260	5/16 x 1" Flange Bolt with Sealing Washer
D	NCWT0170	Outer Door Hinges
E	WD-033	Latch
F	DC-GBC-2A	Outer Door Decal (English)

Ref #	Part #	Description
G	DC-GBC-2S	Outer Door Decal (Spanish)
H	DC-1754	Caution Decal NCWT Door
I	NCWT0166	Latch Bracket
J	NCWT0165	Hinge Weldment
K	NCWT0205	Outer Cover Angle

2 Ring Door Installation

Before starting to install, make sure the correct door has been received.

1. Assemble the sidewall sheets as shown. The notched door sheets (B) and special short door sheets (C) must be installed as shown for the door to fit properly.
2. The door consists of a door weldment (D), top inner door assembly (E), bottom inner door assembly (F) and outer cover assembly.
3. Apply sidewall caulk all around the door weldment (D) opening prior to installing the door weldment.

   NOTE: *Seal strip indicates top of door weldment.*
4. Install the door weldment (D) to the notched opening in the sidewall with the bin bolts (O).

   NOTE: *In certain cases 5/16 x 1" bin bolts (O) may be used if the surrounding sidewall is 14 gauge or thinner.*

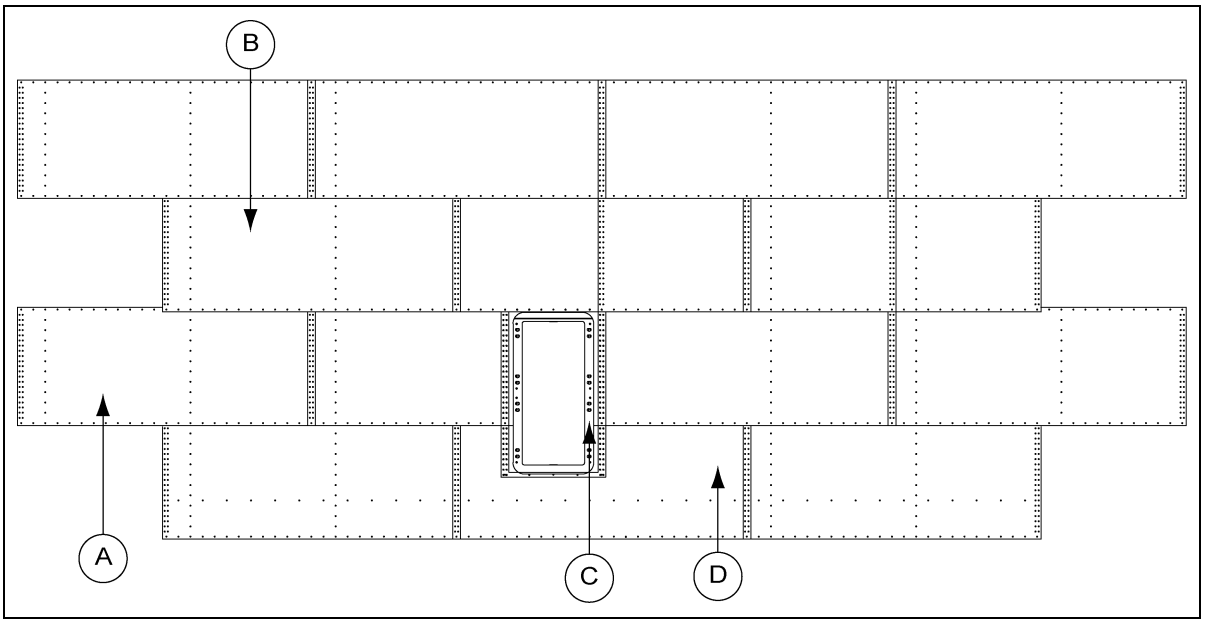


Figure 8G *Two Ring Door Installation*

Ref #	Description
A	Standard Sidewall Sheet
B	Notched Door Sheet
C	Special Short Sidewall Sheet
D	Door Weldment (WD-6252-XX)

5. Install the bearing pins (G) to the door weldment (D) with the bolts (H).
6. Install the latch bar holders (I) to the door weldment (D) with the bolts (J), flat washers (K), lock washers (L), and nut (M).

   NOTE: *Use flat washers (K) to adjust the position of the latch bar holders (I).*

   NOTE: *Do not fully tighten bearing pins (G) or latch bar holders (I) until the inner door panels have been installed and adjusted*.
7. Install the frame hinge bracket (N) to the door weldment (D) with the bolts (O).

   NOTE: *Bolt head must be on the inside of the tank for all hinge connection. Do not use washers.*

8. Place the assembled top and bottom inner doors and install the door panel hinges to the frame hinge bracket (N) with the bolts and lock nuts (P).

9. Adjust hinges as necessary to allow door panels to open and close smoothly.

   NOTE: *The bearing pins should be adjusted to fit the door panel holes.*

10. Adjust the latch bar holders (I) as necessary until inner panel latches operate smoothly.

    IMPORTANT: *Inner panels must seat on bearing pins and lock over latch bar holders for the door panels to shut properly. Do not fill tank until the door panels have been properly adjusted.*

11. Once the inner doors have been installed and adjusted, apply a foam seal strip all along the door frame to seal inner panels.

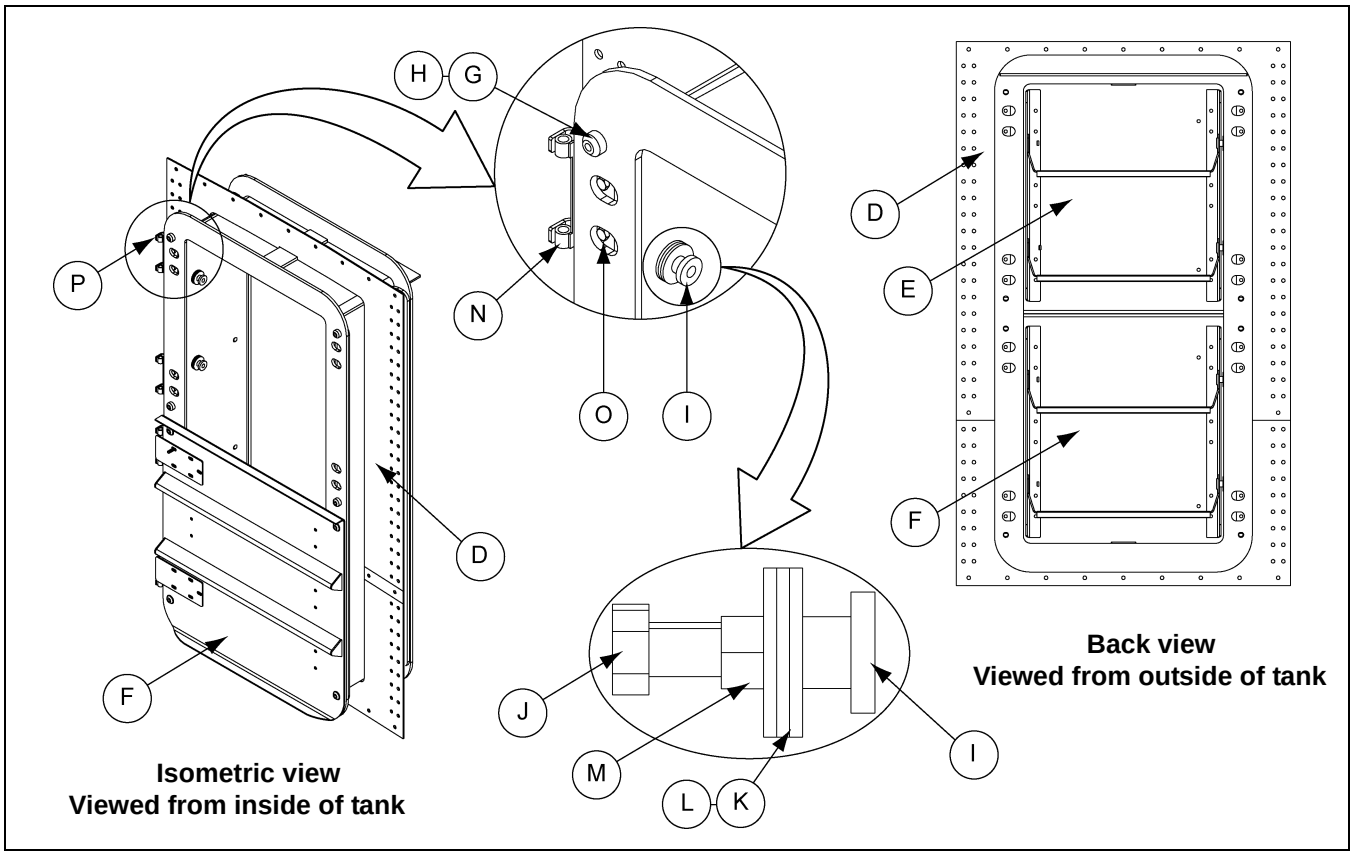


Figure 8H *Inner Door Assembly Installation*

Ref #	Description
D	Door Weldment (WD-6252-XX)
E	Top Inner Door Assembly
F	Bottom Inner Door Assembly
G	Bearing Pin
H	5/16" x 2" Grade 5 Bolt (S-7877)
I	Latch Bar Holder (WD-6234)
J	1/2"-13 x 2-1/4" Grade 8 Bolt (S-7894)

Ref #	Description
K	1/2" Flat Washers (S-2120)
L	1/2" Lock Washer (S-236)
M	1/2"-13 Grade 5 Hex Nut (S-3729)
N	Frame Hinge Bracket
O	5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
P	3/8" x 6" Grade 2 Bolts (S-7248) and 3/8" Lock Nuts (S-8235)

12. Apply sidewall caulking to the door weldment (D) and attach the outer cover angles (Q) to the door weldment (D) with bin bolts (R).

    NOTE: *Use a flat washer on all slotted connections.*

13. Install the latch brackets (S) and hinge weldments (T) to the outer cover angles (Q).

14. Place the outer cover in position and install the outer cover hinges to the hinge weldments (T).

15. Adjust the latches and hinges as necessary to allow outer cover to open and close smoothly.

16. Once the outer cover is installed and adjusted, apply foam seal strip (U) all along the outer surface of frame weldment to seal outer cover.

17. Fill all open holes with bin bolts (R). Caulk around door frame as necessary to seal door and sidewall.

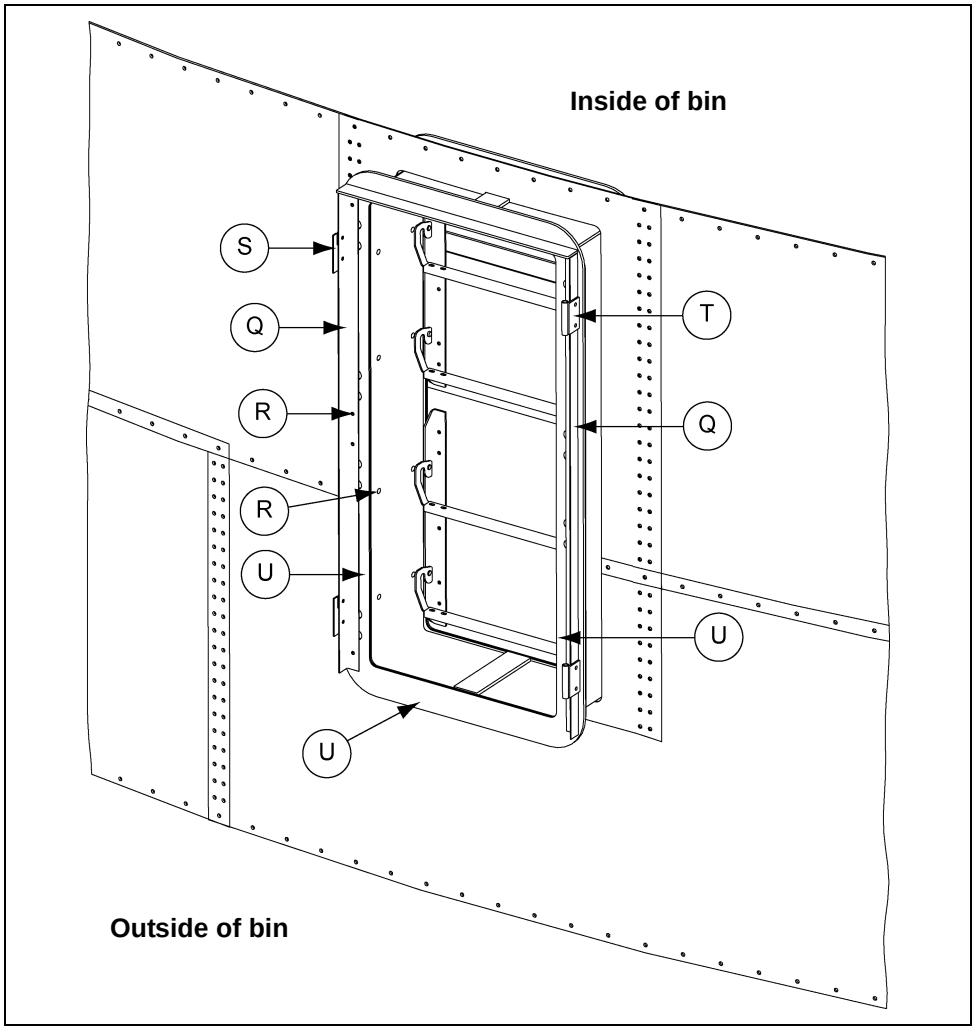


Figure 8I *Outer Cover Installation*

Ref #	Description
Q	Outer Cover Angles (NCWT0205)
R	5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
S	Latch Brackets (NCWT0160)

Ref #	Description
T	Hinge Weldments (NCWT0165)
U	Foam Seal Strip

Standard and Heavy 2 Ring Door Installation

Before You Begin

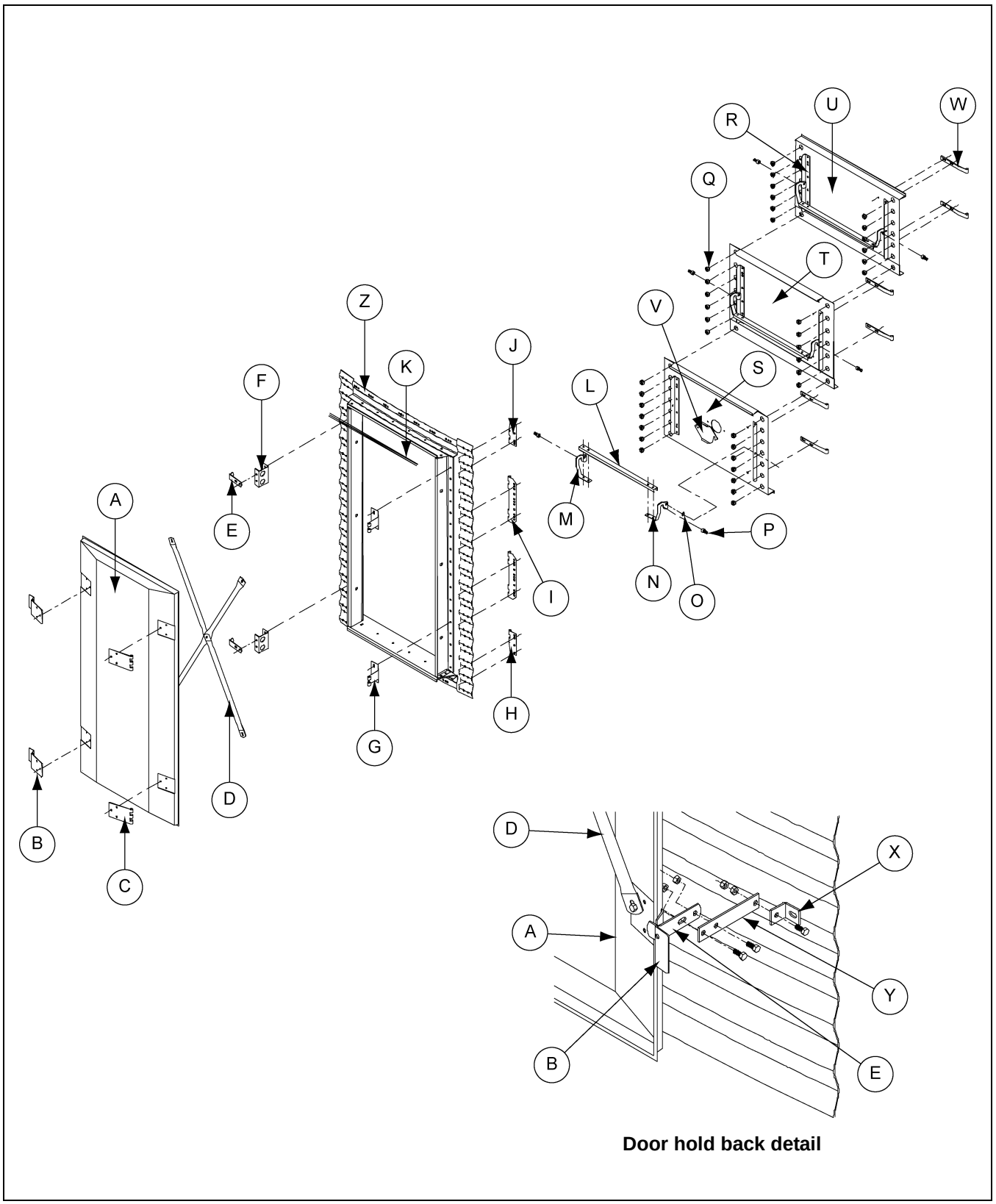
Before starting to install, make sure the correct door has been received.

1. Remove the inner door panels (S, T and U) and outer door cover (A) from the door assembly.
2. Apply two (2) rows of rope caulk around all four door flanges: On vertical flanges, one row of caulk should be applied between the two (2) vertical rows of bolts and the other row of caulk should be applied between the door frame and the first row of vertical bolts. On the horizontal flanges, a row of caulk should be applied on each side of the row of bolts.
3. With the inner door panels (S, T and U) and outer door cover (A) removed, set door frame (Z) into sidewall opening. Insert a bolt at the four (4) corners of door frame and sidewall, but do not tighten until completing *Step 4*.

   NOTE: *Place the top of the door frame to the inside of the sidewall and the bottom of the door frame to the outside of the sidewall. Therefore, depending upon the location and overlap, caulk will be applied on either the inside or the outside of the door flanges.*
4. Re-install the inner door panels (S, T and U) at original locations. Close latch bars (L) to lock panels in place. Make sure that panels are fully seated over all bearing pins (Q). Install the inner panel hinge (H, I and J) assemblies as per illustration instructions with hinges.

   NOTE: *Do not distort door frame with use of alignment or drift punches - if necessary, drill or ream holes to insert bolts in door frame. Now tighten frame bolts starting at center and working toward top and bottom on each side.*
5. Keep inner panels (S, T and U) latched and loosen all bearing pin bolts. Re-tighten all bearing pin bolts. This makes loading on pins uniform for easier operation of panels.
6. If some latch bars are loose or require excessive force to lock, loosen hex socket cap screws and adjust in or out until latch bars operate smoothly. Check that the panels are fully seated over all bearing pins.
7. Re-install outer door cover (A). Adjust outer door hinges and latches as required.
8. Assemble door hold back (X and Y) as shown. Open door cover (A) until it approaches the bin wall. Hook the retaining bracket over lower latch mount and position the door hold back bracket against bin wall in a valley. Drill a 3/8" hole through the bin wall and bolt the door hold back bracket to the bin. If needed, install the door hold back extension to door hold back bracket.

NOTE: ***12'-27' Diameter bins (WD-6241 and WD-6245)***
30'-42' Diameter bins (WD-6242 and WD-6246)
48' Diameter bins up to 8 rings



Door hold back detail

Figure 8J *Standard 2 Ring Door*

Ref #	Part #	Description	Qty
A	WD-039	Outer Door Cover	1
B	WD-2854	Outer Cover Latch Bracket	2
C	WD-225	Outer Cover Hinge Bracket	2
D	WD-035	Door Cover Brace Section	4
E	WD-033	Door Retainer	3
F	WD-6124	Outer Cover Latch Mount Base	2
G	WD-6066	Outer Cover Hinge Base	2
H	WD-6055	Bottom Inner Door Hinge	1
I	WD-6056	Middle Inner Door Hinge	1
J	WD-6054	Top Inner Door Hinge	1
K	S-4380	Rubber Trim Seal Strip	2-1/4"
L	WD-6039	Latch Bar	3
M	WD-6037	Inner Panel Latch - Right Hand	3
N	WD-6038	Inner Panel Latch - Left Hand	3
O	WD-6040	Latch Bushing	6
P	S-7160	1/2" x 1" Hex Socket Cap Screw	6
Q	WD-6079	Long Bearing Pin	38
R	WD-6125	Inner Panel Reinforcing Angle	6
S	WD-6128	Bottom Inner Door Panel	1
T	WD-6127	Middle Inner Door Panel	1
U	WD-6126	Top Inner Door Panel	1
V	WD-6028	Bottom Inner Door Port Hole Cover	1
W	WD-6053	Inner Door Hinge Strap	6
X	WD-1302	Door Hold Back Bracket	1
Y	WD-6110	Door Hold Back Extension	1
Z		Door Frame Assembly	

NOTE: ***48' Diameter Bins 9 rings (WD-6244 and WD-6248)***

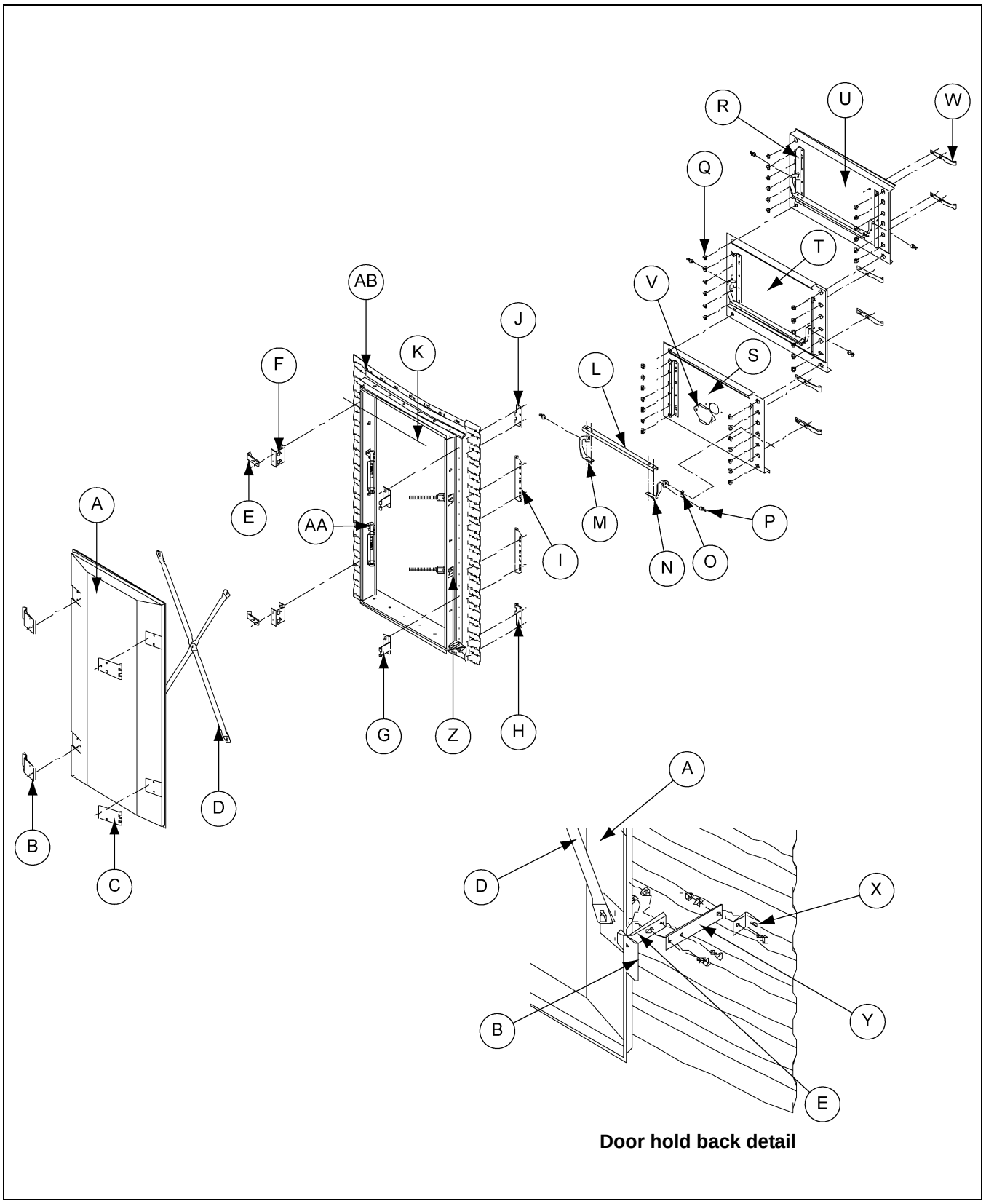


Figure 8K *Heavy 2 Ring Door*

Ref #	Part #	Description	Qty
A	WD-039	Outer Door Cover	1
B	WD-2854	Outer Cover Latch Bracket	2
C	WD-225	Outer Cover Hinge Bracket	2
D	WD-035	Door Cover Brace Section	4
E	WD-033	Door Retainer	3
F	WD-6124	Outer Cover Latch Mount Base	2
G	WD-6066	Outer Cover Hinge Base	2
H	WD-6055	Bottom Inner Door Hinge	1
I	WD-6056	Middle Inner Door Hinge	1
J	WD-6054	Top Inner Door Hinge	1
K	S-4380	Rubber Trim Seal Strip	2-1/4"
L	WD-6039	Latch Bar	3
M	WD-6037	Inner Panel Latch - Right Hand	3
N	WD-6038	Inner Panel Latch - Left Hand	3
O	WD-6040	Latch Bushing	6
P	S-7160	1/2" x 1" Hex Socket Cap Screw	6
Q	WD-6079	Long Bearing Pin	38
R	WD-6125	Inner Panel Reinforcing Angle	6
S	WD-6140	Bottom Inner Door Panel	1
T	WD-6141	Middle Inner Door Panel	1
U	WD-6139	Top Inner Door Panel	1
V	WD-6028	Bottom Inner Door Port Hole Cover	1
W	WD-6053	Inner Door Hinge Strap	6
X	WD-1302	Door Hold Back Bracket	1
Y	WD-6110	Door Hold Back Extension	1
Z	WD-6147	Turnbuckle Latch Weldment	4
AA	D32-003	Turnbuckle 5/8" x 9"	2
AB		Special Heavy Door Frame Assembly	

Options for Two Ring Door - Inner Door Auger Hood (For 12'-24' Diameter Bins)

1. Remove bolts, lock washers and nuts along each side of large square opening on the inner door panel (B).
2. Position auger shield (E) as shown and bolt to the underside of the upper angle (C) and the lower angle (D).
3. Re-install bolts, lock washers and nuts through the inner door panel (B) and auger shield (E) with bolt heads under the shield (E).
4. Attach the inner door panel (B) to the inner bin door and the outer door panel (F) to the outer bin door.

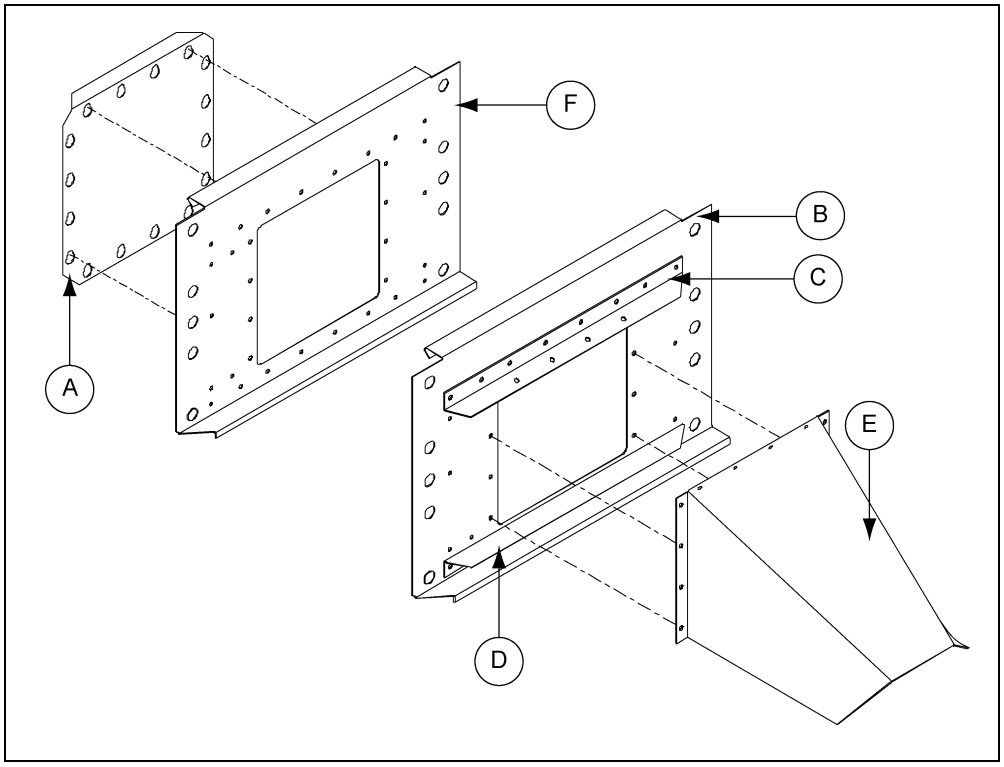


Figure 8L *Bin Step*

Ref #	Part # #	Description
A	WD-6086	Outer Cover
B	WD-6082	Inner Door Panel
C	WD-6085	Upper Angle
D	WD-6084	Lower Angle
E	WD-6083	Auger Shield
F	WD-6082	Outer Door Panel

Options for 2 Ring Door - Bin Step

1. Attach the left and right sides (B and C) to the sides of the bin door step (D) using bolts (E) and nuts (G).
2. Center the assembled step under the bin door and use it as a template to field drill the holes (F) in the sidewall sheet on the ridges of the corrugation.
3. Install the bin step (A) to the sidewall sheet using bolts (E) and nuts (G). *(See Figure 8M.)*

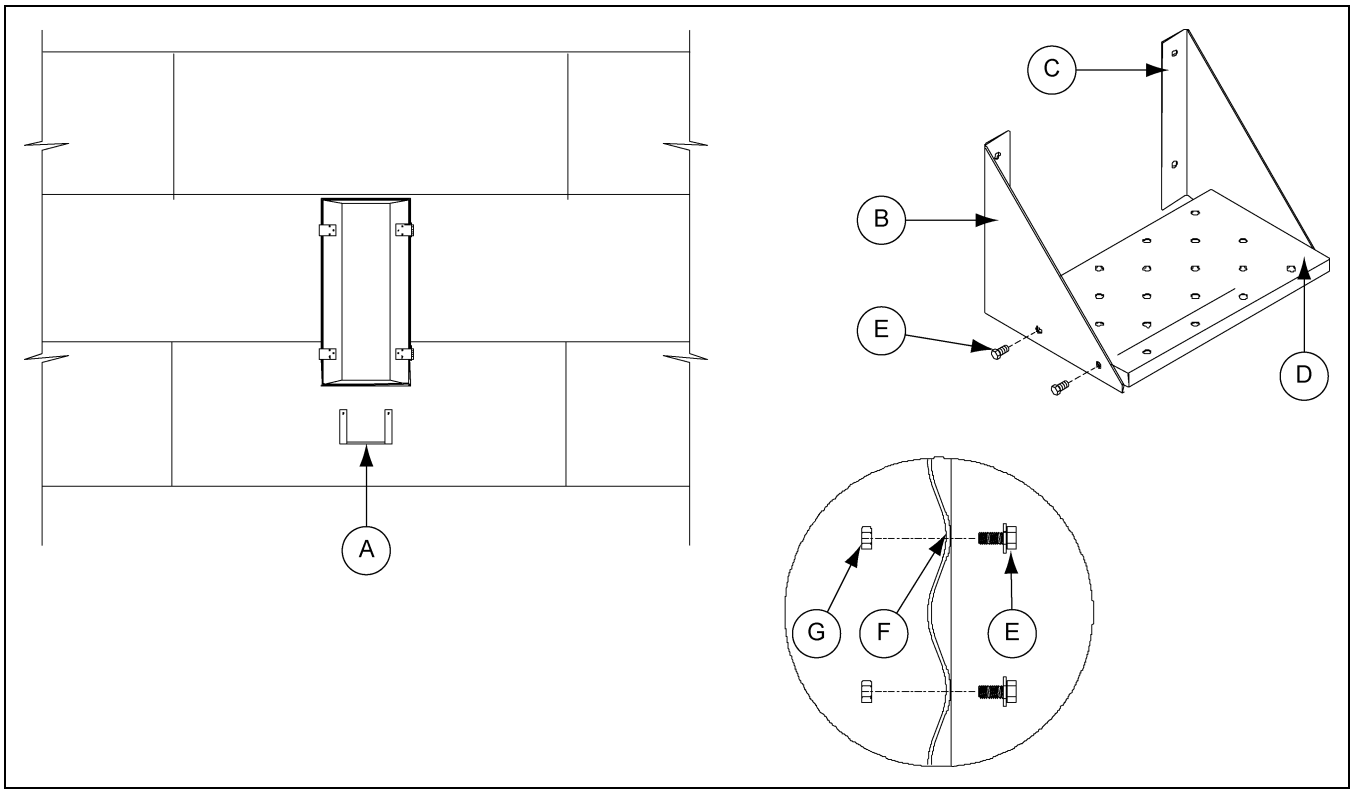


Figure 8M *Bin Step*

Ref #	Description
A	Center Bin Step Under Door
B	Left Side (WD-041-1)
C	Right Side (WD-041-2)
D	Bin Door Step (WD-1984)

Ref #	Description
E	5/16" x 1" Hex Head Bolt
F	Field drill holes in sidewall sheet on the ridge of corrugation.
G	5/16" Nut

Unloading from a Bin Door (For 12'-24' Diameter Bins)

CAUTION

Improperly unloading grain through door opening may cause grain bin failure.

1. Unloading from the door opening should be done only with the use of an auger hood and having the auger inserted through the opening all the way to the center of the grain bin.
2. Unloading directly from the door opening should be limited to grain bins no larger than 24' in diameter and grain depths no greater than 18' total.

Roof Assembly Instructions

IMPORTANT: *Maximum weight to be supported and/or suspended from the roof is to be 6000 pounds for 12'-48' bin (non-trussed) only.*

1. After completing the first sidewall ring, begin with the center collar sections.
2. For convenience in opening and closing the center cover, the roof ladder and manhole sheet should be placed directly opposite the two (2) slide rod holes in the center collar.
3. Build a roof center support to hold the peak in place at the proper height.
4. Position the center support directly in the center of the bin.
5. Attach the eave angles or eave clips inside the bin wall.

The following dimensions are approximate distances used in bin roof construction. Adjusting the center support height will ease roof erection. *(See Figure 9A.)*

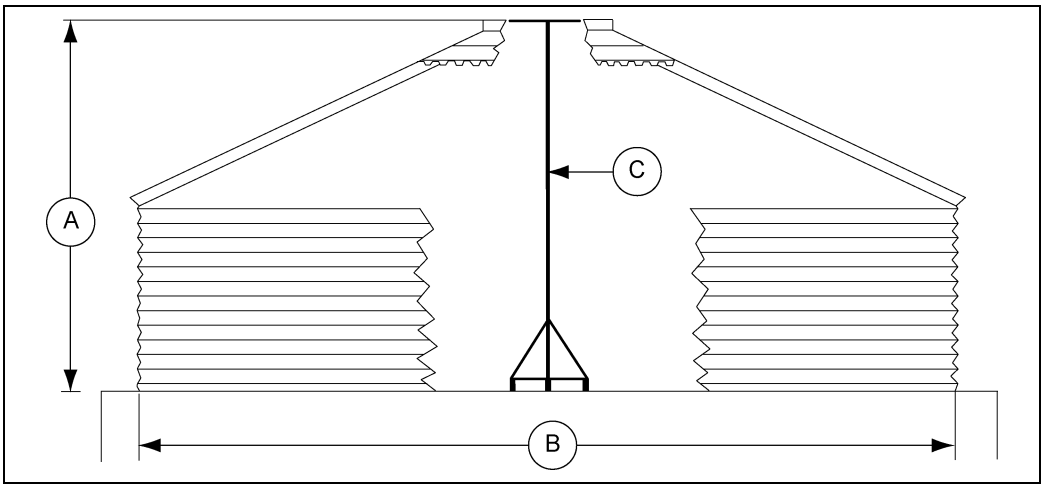


Figure 9A *Center Support*

Ref #	Description
A	Bin Height
B	Bin Diameter
C	Center Support Pole

Bin Diameter	Use with 1 Ring of 4.00" Corrugated Sidewall
	"A"
12'	7'-2"
15'	8'-0"
18'	8'-10"
21'	9'-8"
24'	10'-7"
27'	11'-6"
30'	12'-5"
33'	12'-5"
36'	13'-3"
42'	15'-1"
48'	16'-4"

NOTE: ***For 12'-30' diameter bins, the height (A) is measured to the top of the center collar.***

NOTE: ***For 33'-48' diameter bins, the height (A) is measured to the top of the intermediate center collar.***

Assembling Center Collar

The standard roof with a dome cap lid will have a center collar assembled from three (3) pieces. The dome cap will mount onto it as well as the flashing. The dome cap is standard on all 12'-48' 40-Series bins.

Assemble the three (3) center collar (A) pieces together using flange bolts (B) and flange nuts (C). *(See Figure 9B.)*

This center collar will be the upper center collar for the 33'-48' diameter roof assembly.

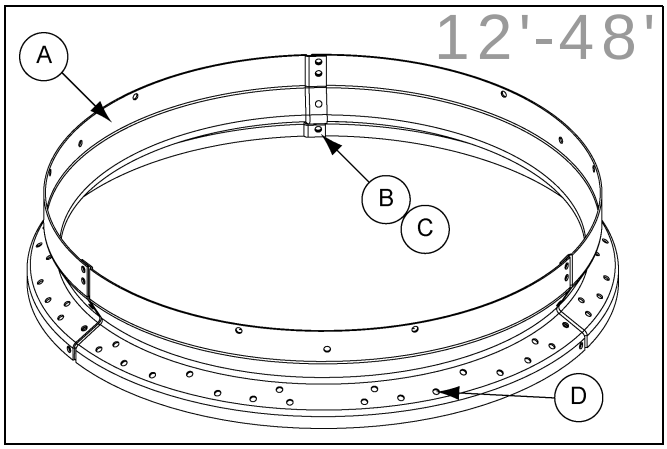


Figure 9B *Center Collar*

Ref #	Part #	Description
A	CRP-4608	Center Collar
B	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
C	S-3611	5/16" Flange Nut
D		**NOTE:** *The lower set of holes (D) in the center collar are not used.*

Bin Diameter	Center Collar Color Code
12'-48'	Red

Intermediate Center Collar (For 33'-48' Diameter Bins)

For 33'-48' diameter farm bins, an intermediate center collar (A) (also known as lower center collar) assembled from three (3) pieces will be used to align the flashing and the roof panels onto the center collar. *(See Figure 9C.)*

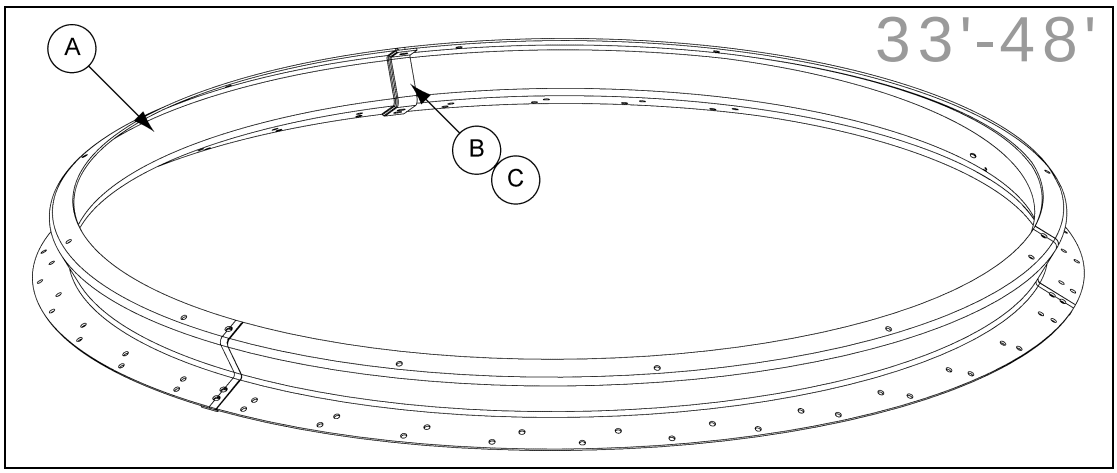


Figure 9C *Intermediate Center Collar*

Ref #	Part #	Description
A	CTR-0795	33', 36' Intermediate Center Collar
A	CTR-0796	42', 48' Intermediate Center Collar
B	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
C	S-3611	5/16" Flange Nut

Bin Diameter	Center Collar Color Code
33'-48'	Green

Roof Flashing (For 12'-30' Diameter Bins)

The roof flashing (C) will seal the area between the center collar (A) and the roof panels. The flashing pieces are assembled to the center collar (A) before attaching the roof panels to the flashing.

1. Prior to the assembly of the roof and center collar, position the flashing (C) to ensure the cap hold-down is in line with the roof ladder.
2. Apply caulking (B) to the center collar (A) where the flashing (C) will be placed.
3. Assemble the flashing (C) pieces together with the center collar (A) using flange bolts (D) and flange nuts (E). *(See Figure 9D.)*

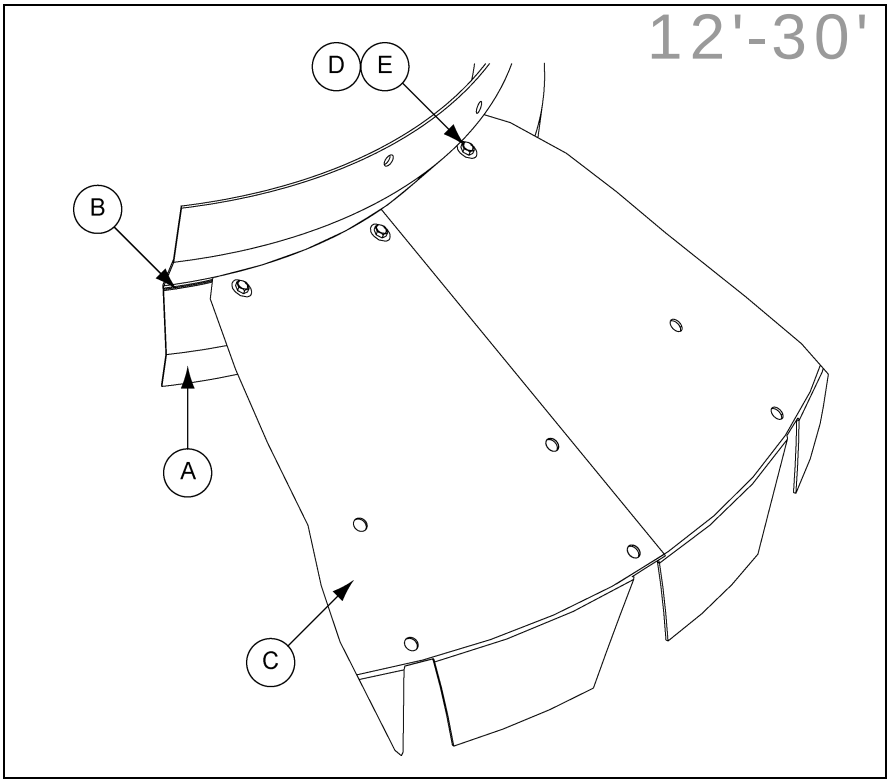


Figure 9D *Roof Flashing (for 12'-30' Diameter Bins)*

Ref #	Part #	Description
A	CRP-4608	Center Collar
B	S-4458	Caulking
C		Roof Flashing
D	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
E	S-3611	5/16" Flange Nut

Roof Flashing Part Numbers (C)	
Bin Diameter	**Part #**
12'	CTR-0637
15'	CTR-0638
18'	CTR-0639
21'	CTR-0640
24'	CTR-0641
27'	CTR-0642
30'	CTR-0643

Roof Flashing (For 33'-48' Diameter Bins)

The roof flashing (E) will seal the area between the center collar (A) and the roof panels. The flashing pieces are assembled to the center collar (A) after attaching the roof panels to the intermediate center collar (H).

1. After the assembly of the roof panels onto the intermediate center collar (H), the top center collar (A) and the flashing (E) should be positioned on top of the panels.
2. Position the flashing seam over the reinforcement angle (X) seam to ensure correct alignment.

   NOTE: *Improper positioning will result in holes and notches not aligning properly.The end of flashing must align with the splice in the lower center collar to align properly for the timing of tabs with the roof panels. Ensure to use flashing reinforcement angle at each flashing splice.*
3. Apply caulking (D) to the center collar (A) where the flashing will be placed.
4. Apply caulking (D) on each overlapping flashing (F).
5. Assemble the flashing (E) pieces together with the center collar (A) using flange bolts (B) and flange nuts (C).

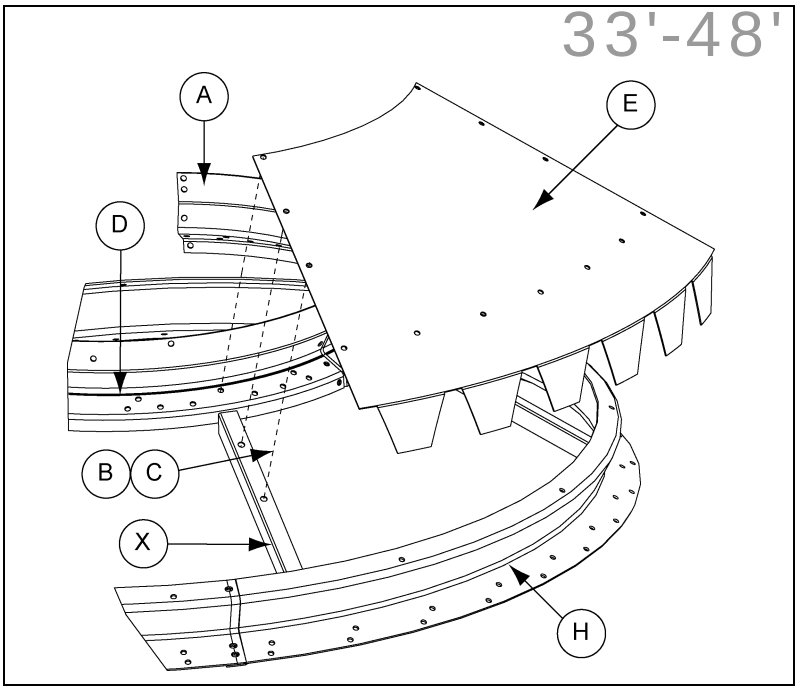


Figure 9E *Roof Flashing (for 33'-48' Diameter Bins)*

Ref #	Ref #	Description
A	CRP-4608	Center Collar
B	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
C	S-3611	5/16" Flange Nut
D	S-4458	Caulking
E		Roof Flashing
H	CTR-0795	33' and 36' Intermediate Center Collar
H	CTR-0796	42' and 48' Intermediate Center Collar
X	CRP-6188	Reinforcement Angle

Roof Flashing Part Numbers (E)	
Bin Diameter	**Part #**
33'	CRP-4979
36'	CRP-4684
42'	CRP-4685
48'	CRP-4686

Roof Panel Instructions (For 12'-48' Diameter Bins)

1. For better results in erecting the roof, install one roof panel (B) in three (3) places.
2. After these three (3) panels are in place, the peak assembly should be centered.
3. Install intermediate panels making sure to lap them counterclockwise until all panels are in place.

   NOTE: ***Do not tighten the bolts until the roof is completely assembled. Make sure to overlap the adjacent panels in counterclockwise direction as shown in Figure 9F.***

   NOTE: ***Do not install bolts onto the holes for roof ring locations until the roof rings are installed. See roof ring instructions on Page 91.***

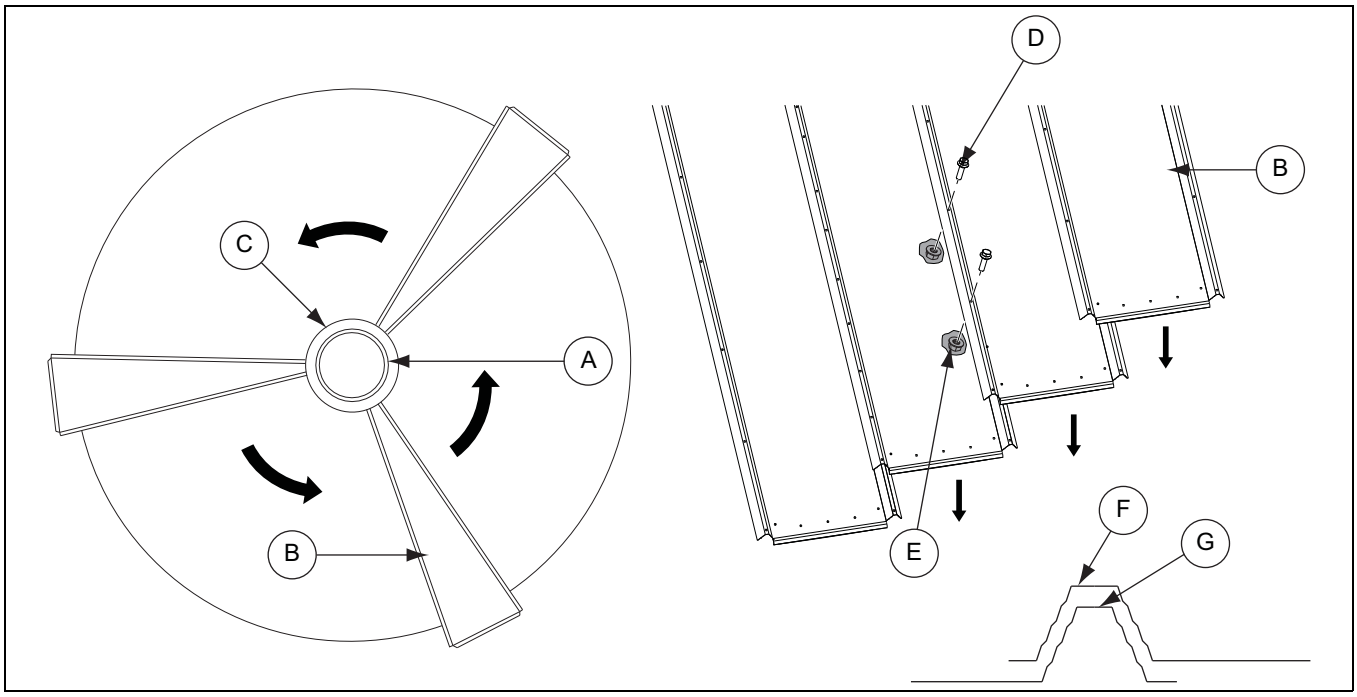


Figure 9F *Roof Panels Installation Direction*

Ref #	Part #	Description
A	CRP-4608	Center Collar
B		Roof Panel
C		Roof Flashing
D	S-10260	5/16" x 1" Flange Bolt with Sealing Washer

Ref #	Part #	Description
E	S-3611	5/16" Flange Nut
F		Upper Rib
G		Lower Rib

4. Install the eave clips (H) and intermediate eave angles (K) on the top sidewall with the bolts (D) and nuts (E).

   NOTE: *The intermediate eave angles (K) are installed between two (2) eave clips (H).*
5. Fasten the roof panels (B) to intermediate eave angles (K) on the eave end and to the roof flashing (C) on the peak end.
6. When installing the roof panels (B), take into consideration placing the manway for ease of access to the sidewall and roof steps (J).

   NOTE: *Make sure to install the roof steps (J) when assembling roof panels (B). When assembling the roof steps (J), use 5/16" x 1-1/4" bolts with a flat top washer on top of the slot and an extra neoprene washer (L) between the roof and the roof step (J). This will ensure a more protective seal against moisture.*

Roof Panel Instructions (Continued)

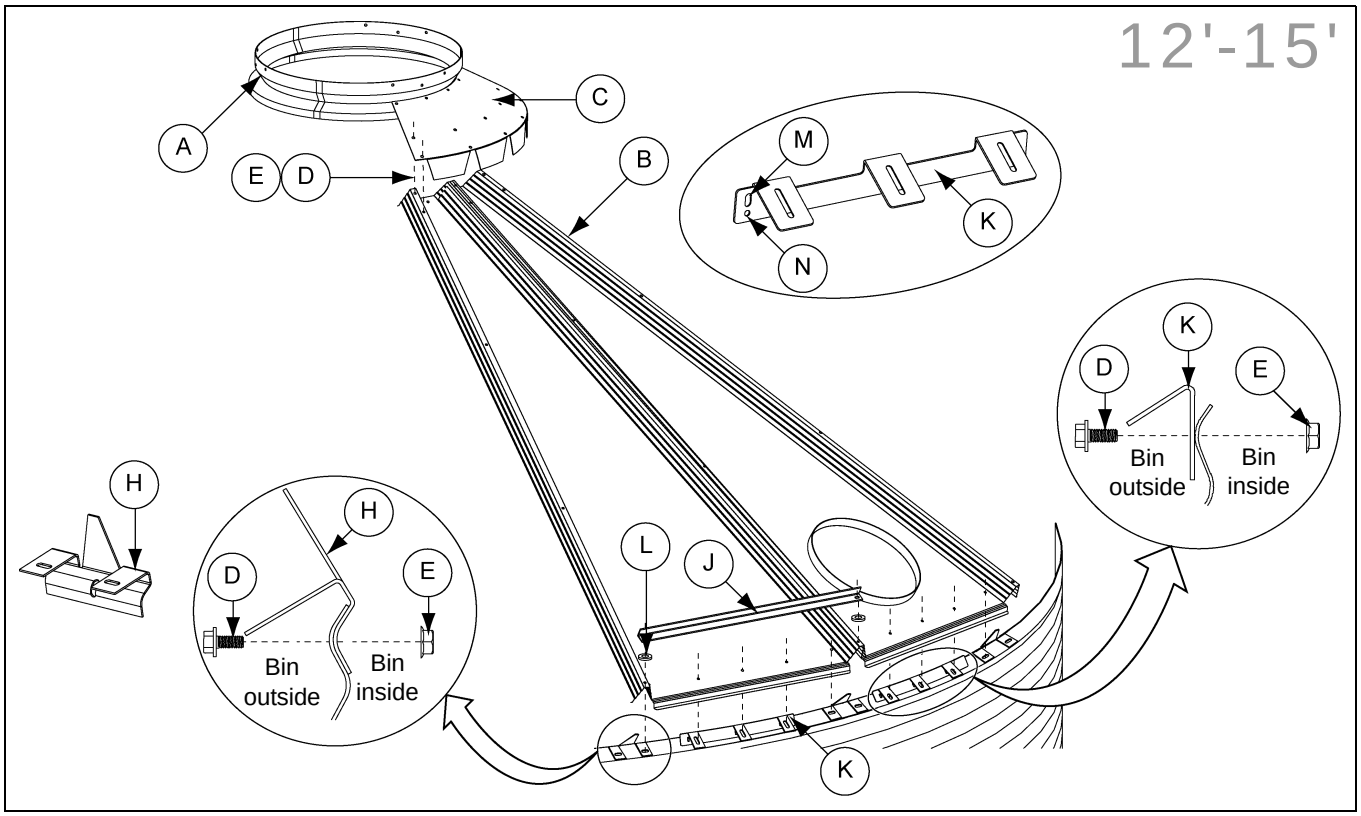


Figure 9G *Roof Panel Assembly (12'-15' Diameter Bins)*

Ref #	Description
A	Center Collar (CRP-4608)
B	Roof Panel
C	Roof Flashing
D	5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
E	5/16" Flange Nut (S-3611)
H	Standard Rolled - Eave Clip - 12'-15' (CTR-1201)

Ref #	Description
J	Roof Step
K	Intermediate Eave Angle (CTR-1183)
L	Steel Backed Neoprene Washer (S-1463)
M	Used with Standard Roofs
N	Used with TopDry Roofs

Roof Panel Information (B)				
Bin Diameter	**Part #**	**Roof Rib Holes**	**Rib Length**	**# of Panels**
12'	CTR-0378	5	68-1/2"	12
15'	CTR-0379	6	87-1/4"	15

Roof Panel Instructions (Continued)

NOTE: *For 18'-24' diameter bins, an additional roof channel (O) must be installed under the ribs of the roof panel (B) where the roof steps (J) are to be installed. Make sure to start roof channel (O) assembly from the second hole of bottom rib in the roof panel (B). (See Figure 9H.)*

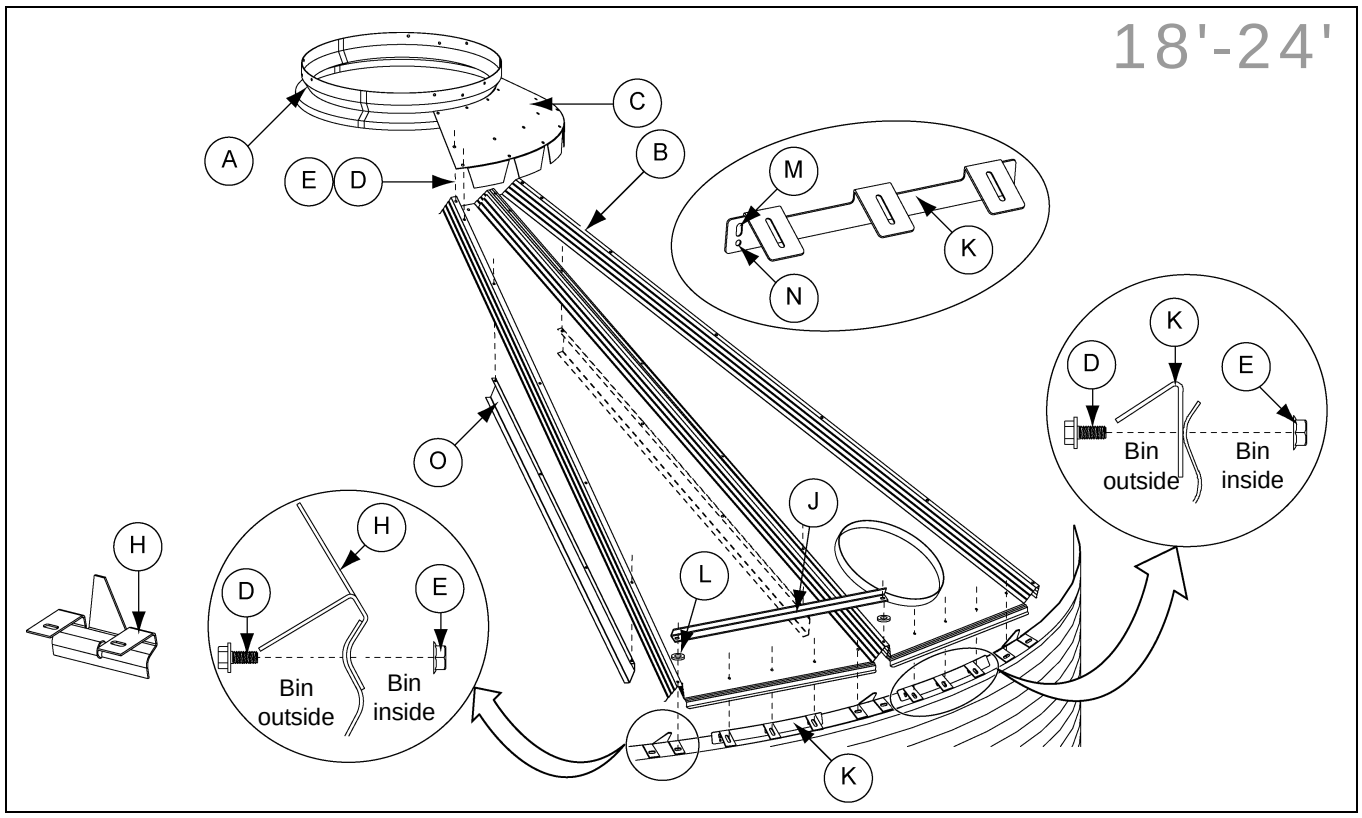


Figure 9H *Roof Panel Assembly (18'-24' Diameter Bins)*

Ref #	Description
A	Center Collar (CRP-4608)
B	Roof Panel
C	Roof Flashing
D	5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
E	5/16" Flange Nut (S-3611)
H	Standard Rolled - Eave Clip - 18'-24' (CTR-1201)
J	Roof Step

Ref #	Description
K	Intermediate Eave Angle (CTR-1183)
L	Steel Backed Neoprene Washer (S-1463)
M	Used with Standard Roofs
N	Used with TopDry Roofs
O	Roof Channel - 18' (CRP-4694)
O	Roof Channel - 21' and 24' (CRP-4693)

Roof Panel Information (B)				
Bin Diameter	**Part #**	**Roof Rib Holes**	**Rib Length**	**# of Panels**
18'	CTR-0380	7	101-7/8"	18
21'	CTR-0381	8	128-5/8"	21
24'	CTR-0382	9	149-1/8"	24

Roof Panel Instructions (Continued)

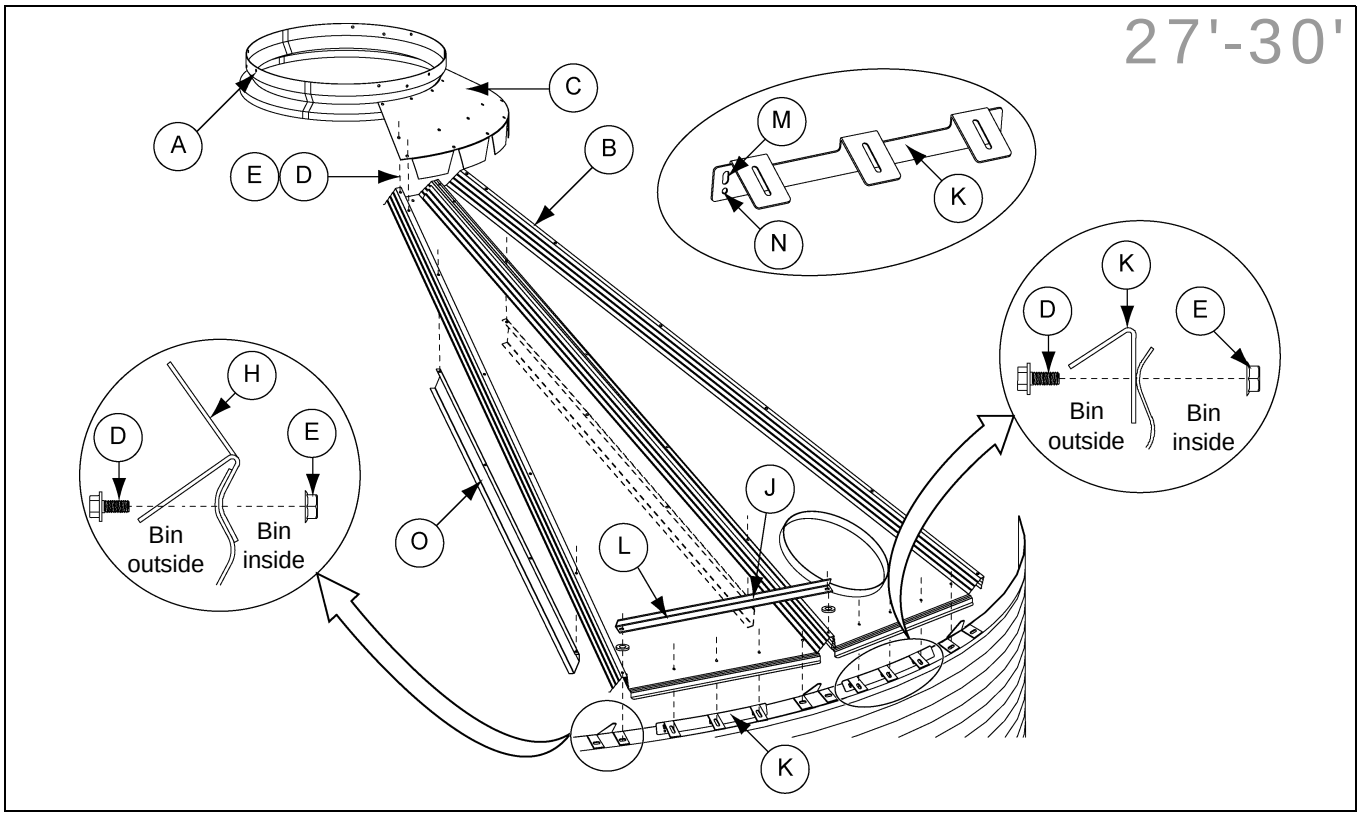


Figure 9I *Roof Panel Assembly (27'-30' Diameter Bins)*

Ref #	Description
A	Center Collar (CRP-4608)
B	Roof Panel
C	Roof Flashing
D	5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
E	5/16" Flange Nut (S-3611)
H	Standard Rolled - Eave Clip - 27'-30' (R-007-1)

Ref #	Description
J	Roof Step
K	Intermediate Eave Angle (CTR-1183)
L	Steel Backed Neoprene Washer (S-1463)
M	Used with Standard Roofs
N	Used with TopDry Roofs
O	Roof Channel (CRP-4692)

Roof Panel Information (B)				
Bin Diameter	**Part #**	**Roof Rib Holes**	**Rib Length**	**# of Panels**
27'	CTR-0383	10	169–5/8	27
30'	CTR-0384	11	189-5/8"	30

Roof Panel Instructions (Continued)

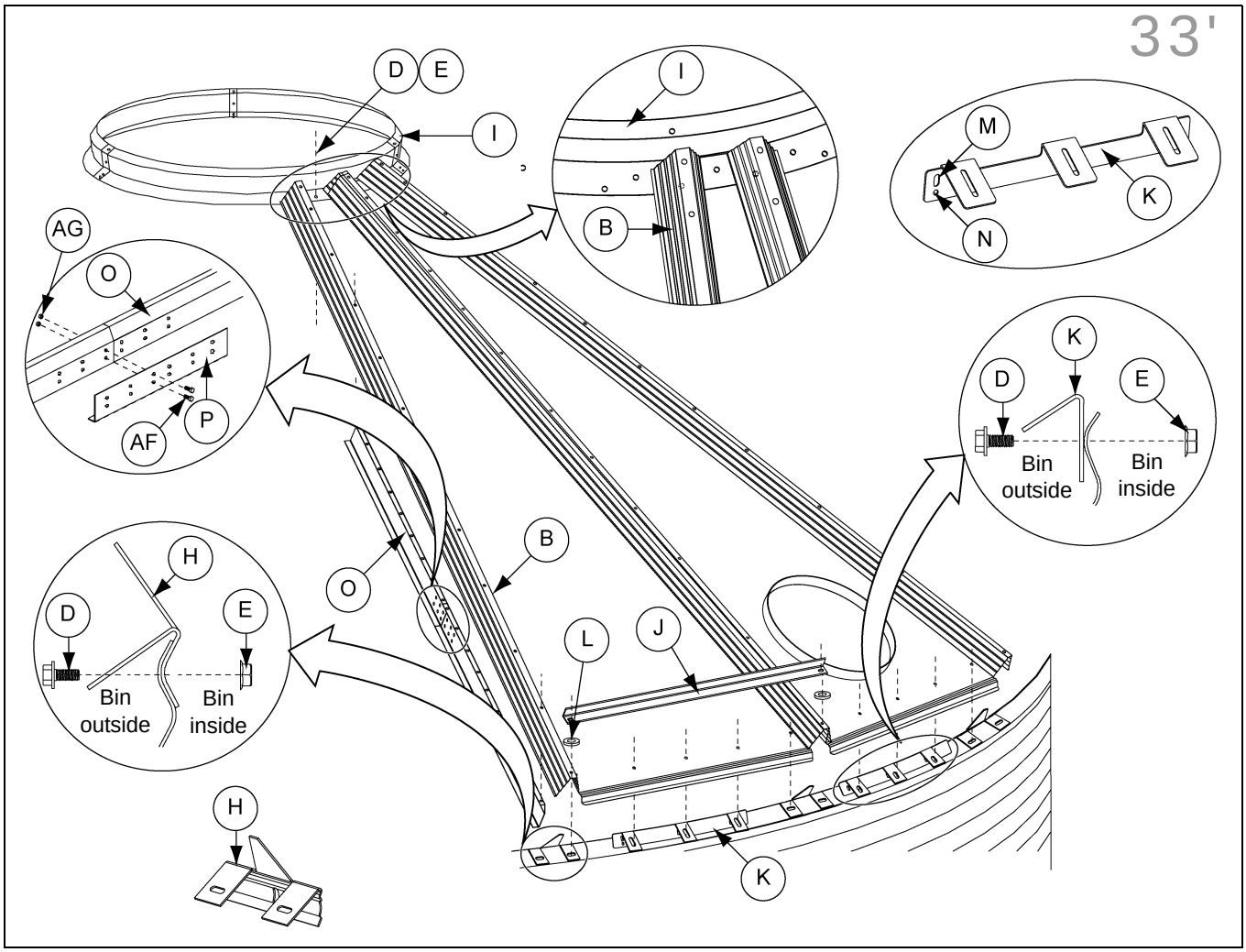


Figure 9J *Roof Panel Assembly (33' Diameter Bin)*

Ref #	Description
B	Roof Panel
D	5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
E	5/16" Flange Nut (S-3611)
H	Standard Rolled - Eave Clip - 33' (R-007-1)
I	Intermediate Center Collar (CTR-0795)
J	Roof Step
K	Intermediate Eave Angle (CTR-1183)

Ref #	Description
L	Steel Backed Neoprene Washer (S-1463)
M	Used with Standard Roofs
N	Used with TopDry Roofs
O	Roof Channel (CRP-4793)
P	Roof Channel Splice (CRP-5262)
AF	3/8" x 1" Flange Bolt (S-7485)
AG	3/8" Flange Nut (S-9426)

Roof Panel Information (B)				
Bin Diameter	**Part #**	**Roof Rib Holes**	**Rib Length**	**# of Panels**
33'	CTR-0385	11	198"	33

Roof Panel Instructions (Continued)

NOTE: *For 36' diameter bins, the gap between the intermediate center collar (I) and the roof panels (B) will be sealed with foam sealant (Q) around the center collar. (See Figure 9K.)*

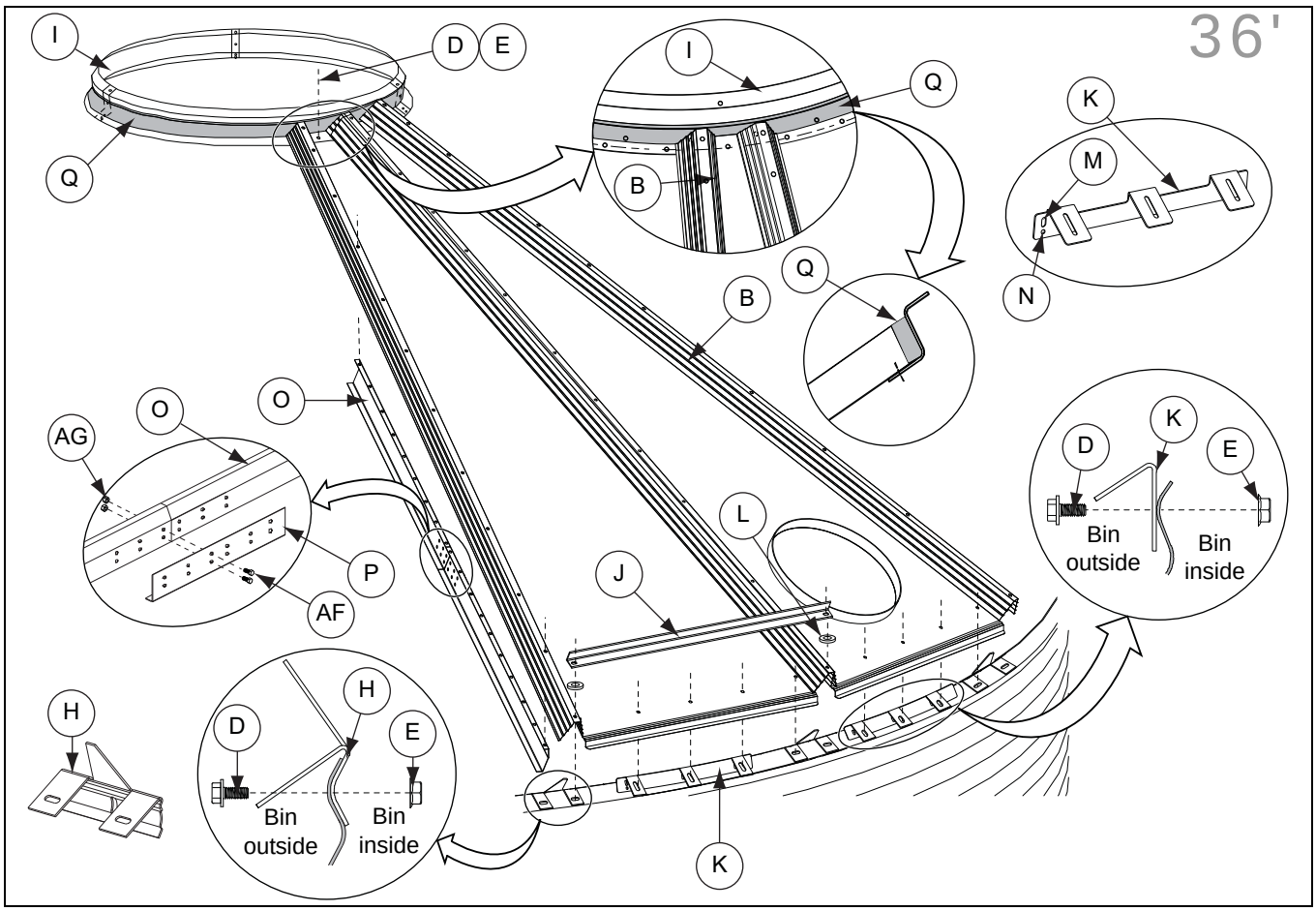


Figure 9K *Roof Panel Assembly (36' Diameter Bin)*

Ref #	Description
B	Roof Panel
D	5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
E	5/16" Flange Nut (S-3611)
H	Standard Rolled - Eave Clip - 36' (R-007-1)
I	Intermediate Center Collar (CTR-0795)
J	Roof Step
K	Intermediate Eave Clip (CTR-1183)
L	Steel Backed Neoprene Washer (S-1463)

Ref #	Description
M	Used with Standard Roofs
N	Used with TopDry Roofs
O	Roof Channel (CRP-4793)
P	Roof Channel Splice (CRP-5262)
Q	Foam Sealant - Z-Collar - 36' (S-10363)
AF	3/8" x 1" Flange Bolt (S-7485)
AG	3/8" Flange Nut (S-9426)

Roof Panel Information (B)				
Bin Diameter	**Part #**	**Roof Rib Holes**	**Rib Length**	**# of Panels**
36'	CTR-0386	12	218-1/8"	36

Roof Panel Instructions (Continued)

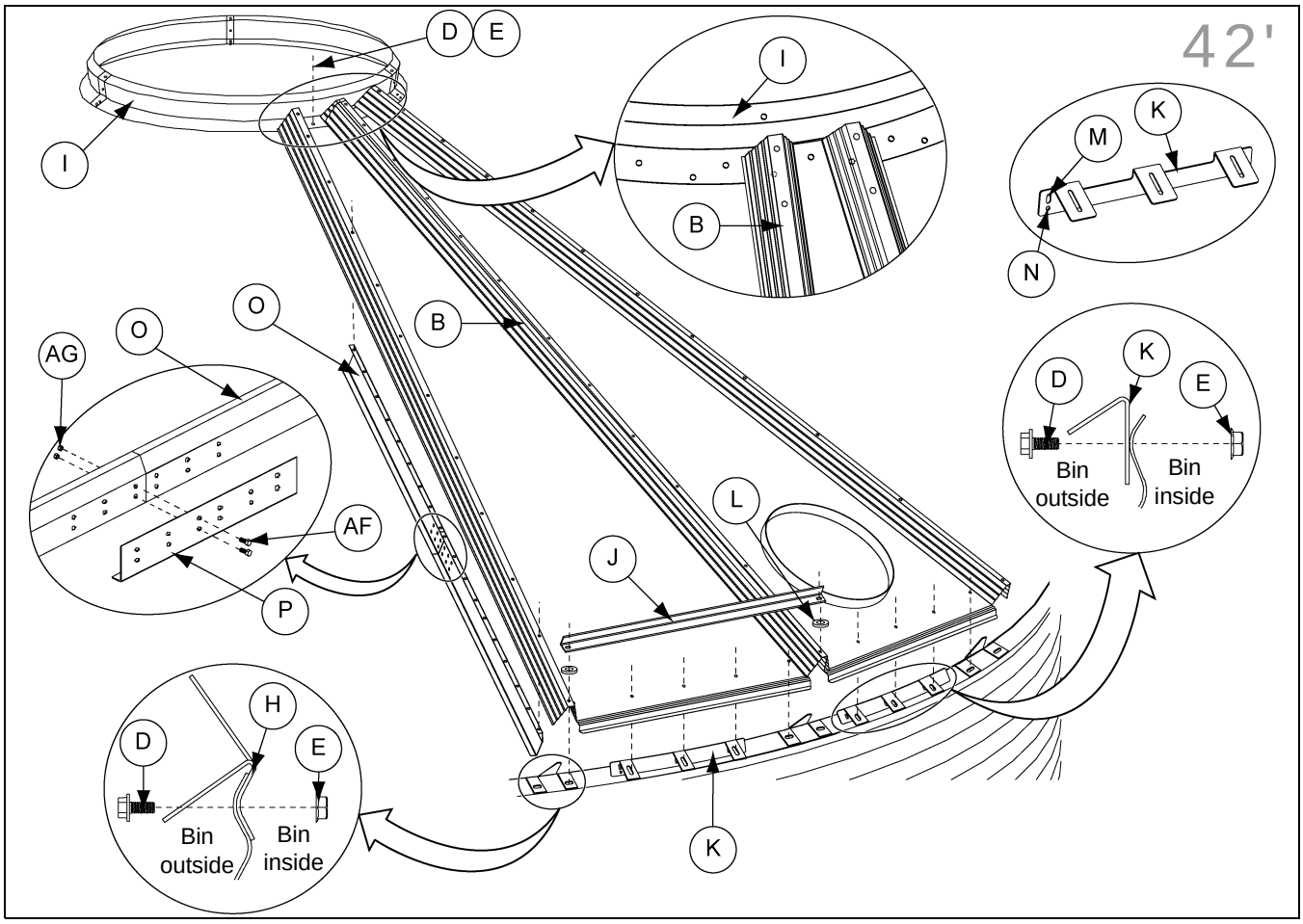


Figure 9L *Roof Panel Assembly (42' Diameter Bin)*

Ref #	Description
B	Roof Panel
D	5/16" x 1" Flange Bolt with Sealing Washer (S-10260)
E	5/16" Flange Nut (S-3611)
H	Standard Rolled - Eave Clip - 42' (R-007-1)
I	Intermediate Center Collar (CTR-0796)
J	Roof Step
K	Intermediate Eave Clip (CTR-1183)

Ref #	Description
L	Steel Backed Neoprene Washer (S-1463)
M	Used with Standard Roofs
N	Used with TopDry Roofs
O	Roof Channel (CRP-4793)
P	Roof Channel Splice (CRP-5262)
AF	3/8" x 1" Flange Bolt (S-7485)
AG	3/8" Flange Nut (S-9426)

Roof Panel Information (B)				
Bin Diameter	**Part #**	**Roof Rib Holes**	**Rib Length**	**# of Panels**
42'	CTR-0388	14	261-17/64"	42

Roof Panel Instructions (For 48' Diameter Bin Only)

7. Connect the two (2) roof channels (O) together with the roof channel splices (P and AC) with bolts (R) and nut (AD) as shown in *Figure 9M*.

8. Install the two (2) purlin clips (S) on the roof channel (O) with the bolts (R) and nuts (AD).

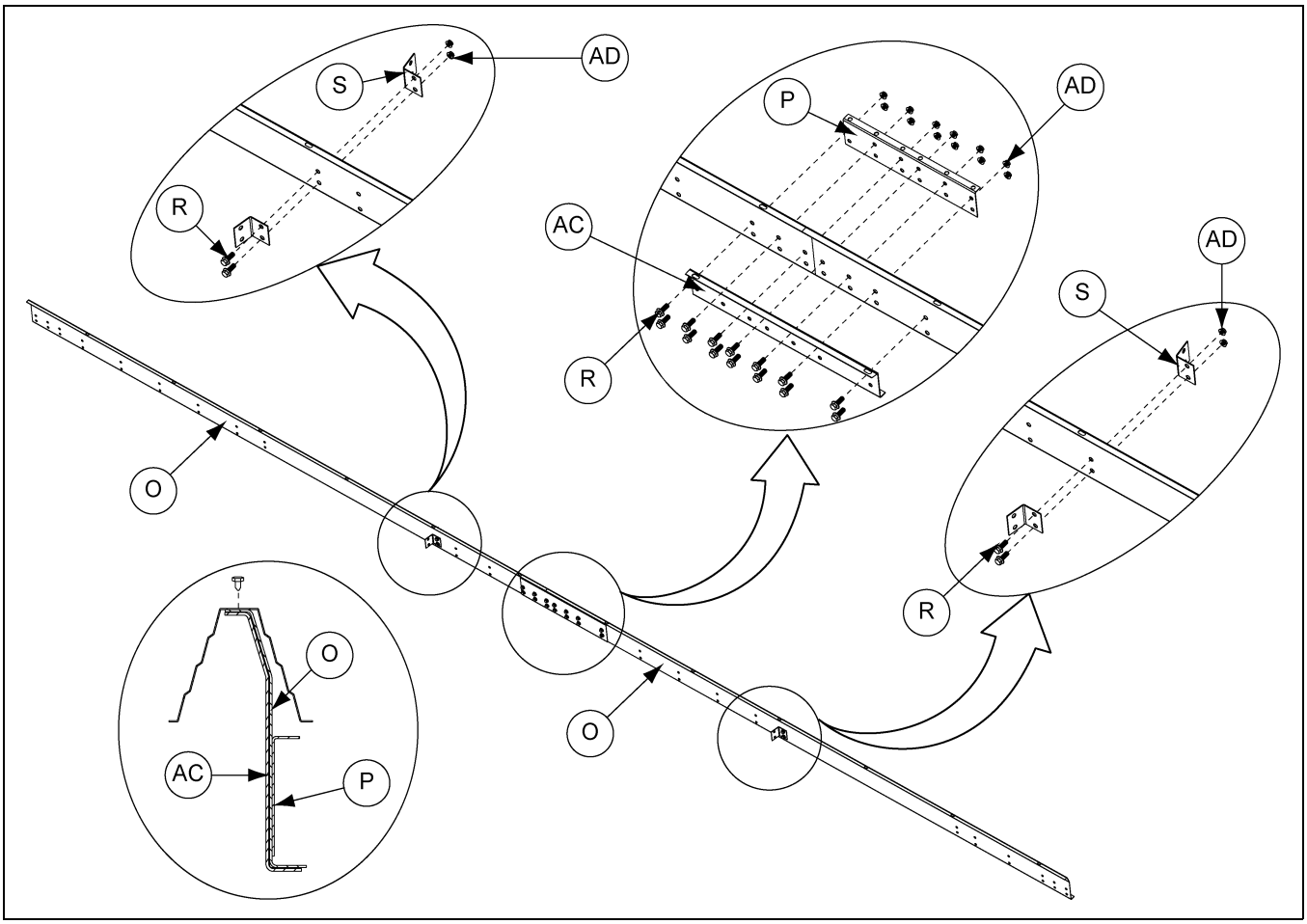


Figure 9M

Ref #	Part #	Description
O	CRP-7288	Roof Channel
P	CRP-6258	Roof Channel Splice
R	S-7485	Flange Bolt 3/8"-16 x 1" JS500 Grade 8 or Grade 8.2
S	CRP-6257	Purlin Clips
AC	CRP-7289	Inner Splice Plate
AD	S-9426	Flange Nut 3/8"-16 JS500 Grade 5

Roof Panel Instructions (For 48' Diameter Bin Only)

9. Install the roof channel (O) under the ribs of the roof panels (B). Make sure to start the roof channel assembly from the fourth hole from the bottom of the roof panel rib.
10. Install the purlins (U and AE) between the purlin clips with the bolts (D) and nuts (E) as shown in *Figure 9N*.

    NOTE: *For 48' diameter bins, the gap between the intermediate center collar (I) and the roof panels (B) will be sealed with foam sealant (Q) around the center collar. (See Figure 9N.)*

    NOTE: *Use the lower set of holes in the intermediate center collar (I) to attach the roof panels (B).*

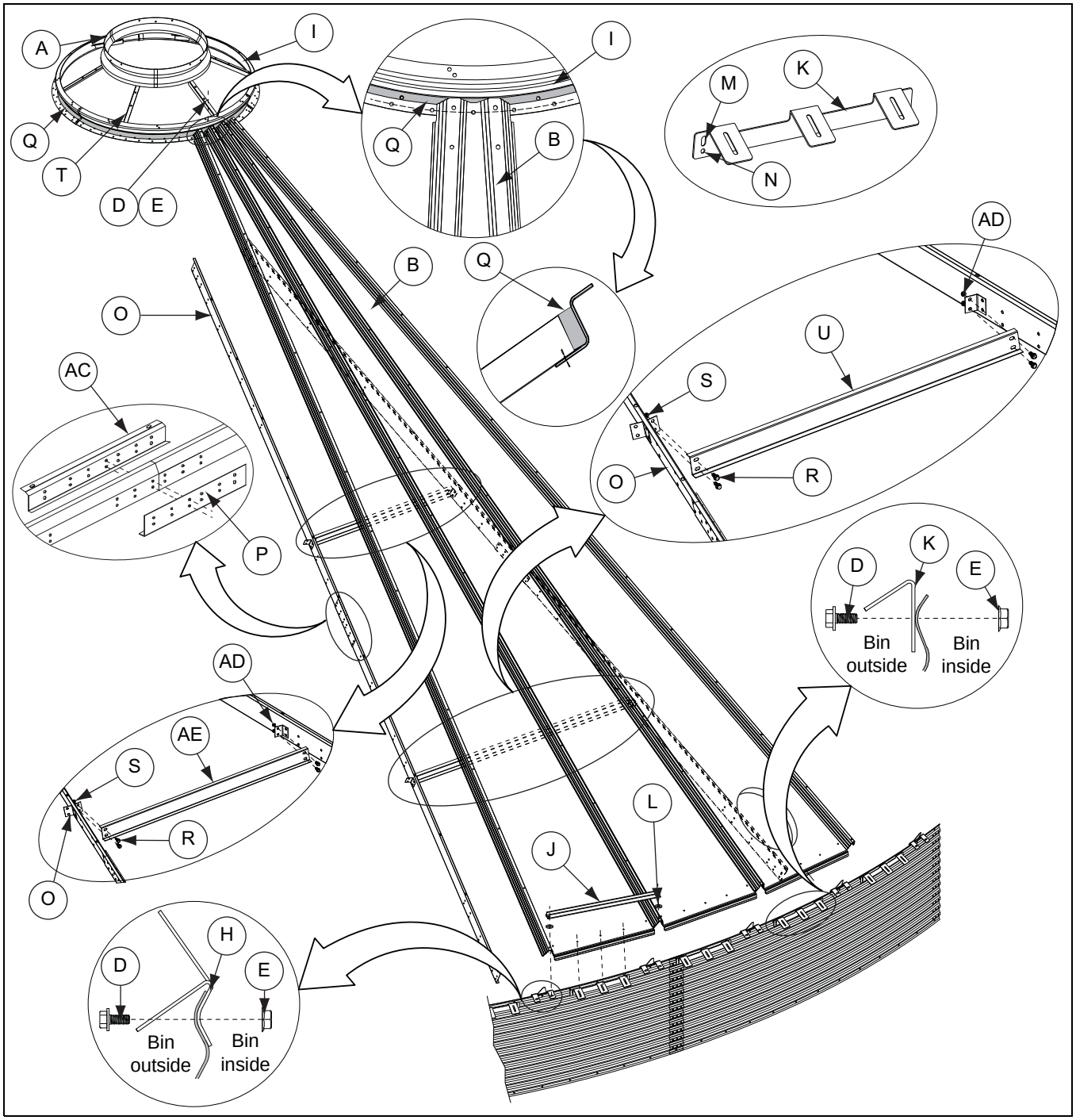


Figure 9N

Ref #	Part #	Description
A	CRP-4608	Center Collar
B	CTR-0390	Roof Panel
D	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
E	S-3611	5/16" Flange Nut
H	R-007-1	Eave Clip
I	CTR-0796	Intermediate Center Collar 48' Roof - Green (3)
J		Roof Step
K	CTR-1183	Intermediate Eave Clip
L	S-1463	Steel Backed Neoprene Washer
M		Used with Standard Roofs
N		Used with TopDry Roofs
O	CRP-7288	Roof Channel
P	CRP-6258	Roof Channel Splice
Q	S-10363	Foam Sealant - Z-Collar - 48'
R	S-7485	Flange Bolt 3/8"-16 x 1" JS500 Grade 8 or Grade 8.2
S	CRP-6257	Purlin Clips
T	CRP-6188	Reinforcement Angle
U	CRP-6256	Upper Purlin
AC	CRP-7289	Inner Splice Plate
AD	S-9426	Flange Nut 3/8"-16 JS500 Grade 5
AE	CRP-6255	Lower Purlin

Roof Panel Information (B)				
Bin Diameter	**Part #**	**Roof Rib Holes**	**Rib Length**	**# of Panels**
48'	CTR-0390	16	301-3/4"	48

11. To assemble slide rods (Z) and peak cap (V), insert the straight end of the slide rod through the center collar (A) and thread one 5/16" nut all the way down on the rod. Place the rod through the cap and put a washer (AA) and nut (E) on the outside.

    NOTE: *Do not tighten the nut.*

12. Insert another rod through the cap, then place the washer (AA) and nut (E) on the outside.

    NOTE: *Adjust and tighten nuts on straight end of rod.*

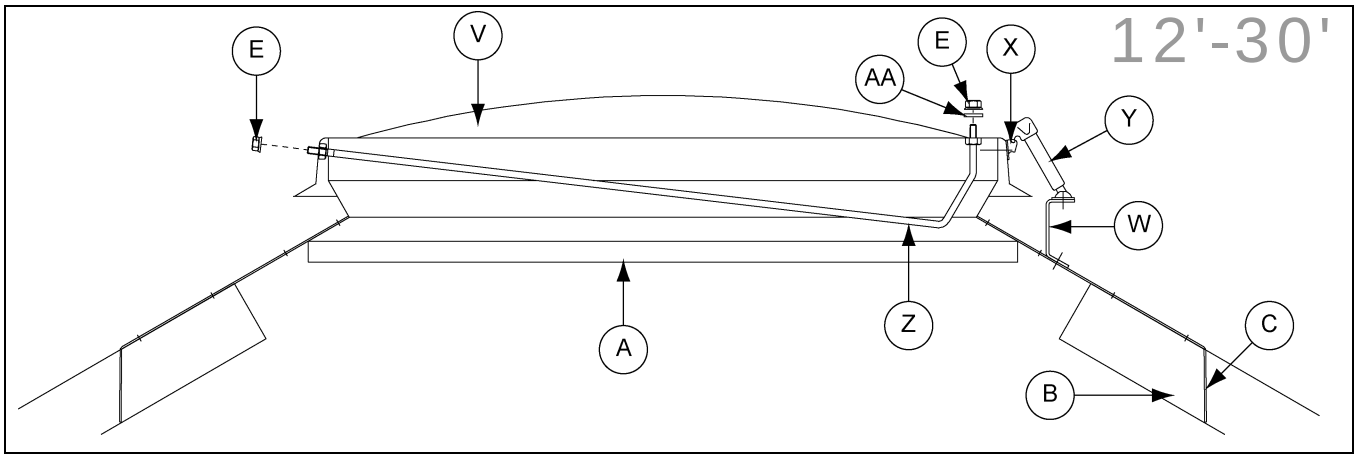


Figure 9O *Section through Center Collar (12'-30' Diameter Bins)*

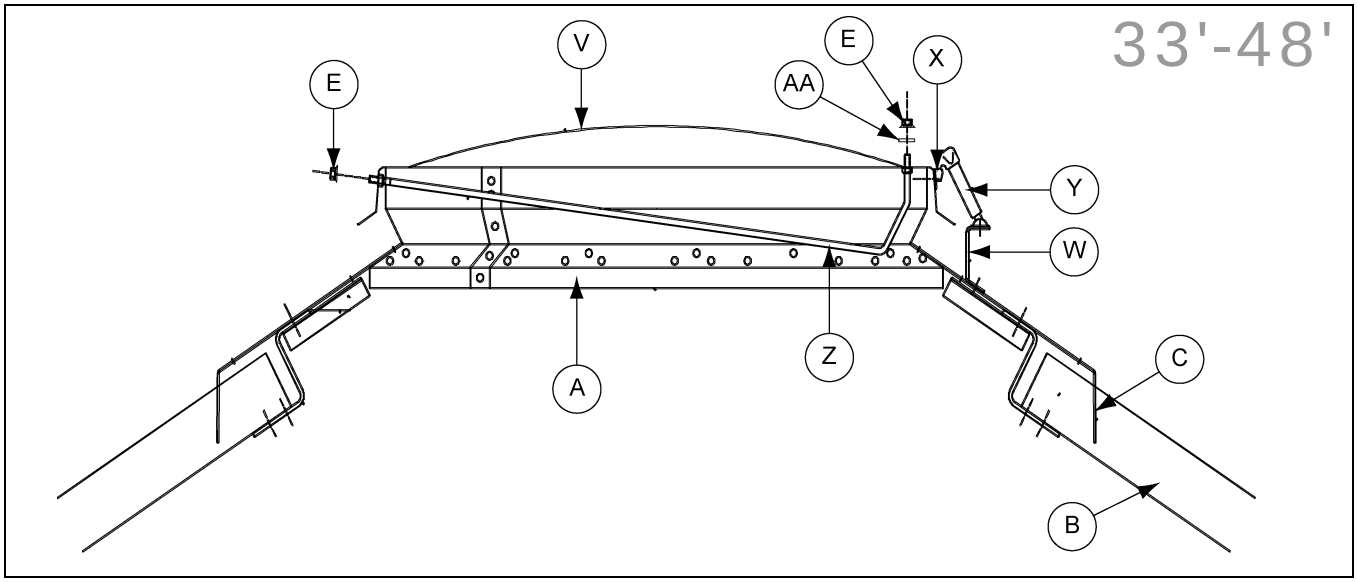


Figure 9P *Section through Center Collar (33'-48' Diameter Bins)*

Ref #	Part #	Description
A	CRP-4608	Center Collar
B		Roof Panel
C		Roof Flashing
E	S-3611	5/16" Flange Nut
V	CRP-4602	Peak Cap
W	CRP-4689	Cap Hold-Down Bracket
X	PR-331	Peak Cap Handle
Y	CRP-4654	Cap Hold-Down
Z	CRP-4606	Slide Rod
AA		Washer

13. After tightening, it may be necessary to spread the rods slightly to make them parallel. Maintain a 10" gap between the rods.

14. After all the roof panels (B) have been attached to the roof flashing (C), place the roof panel seal clip (AB) between the bottom of the flashing and the top of the roof ribs.

    NOTE: *Make sure to push the seal clip in as far as possible for maximum sealing.*

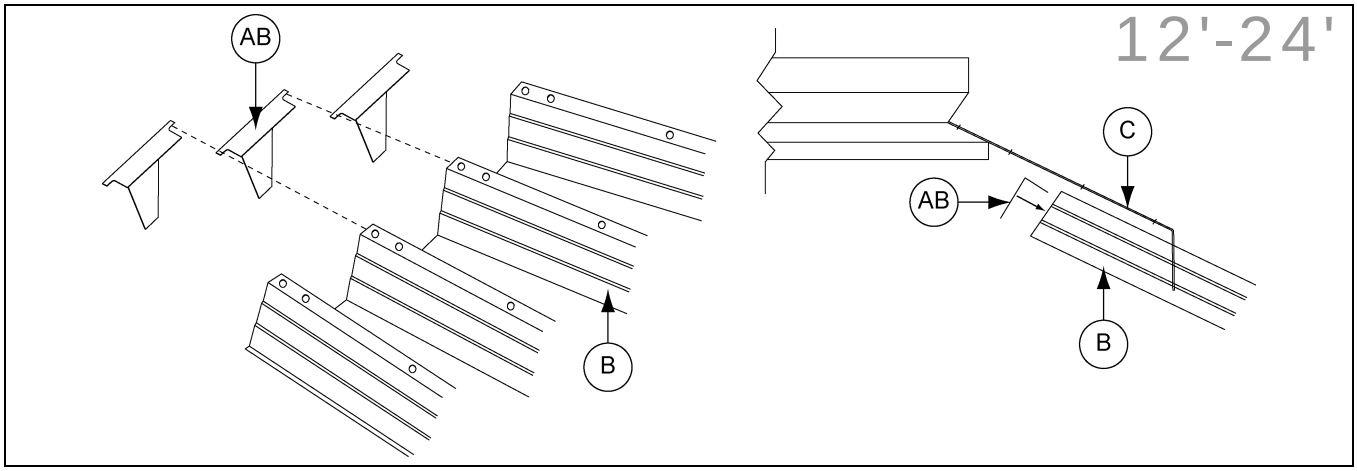


Figure 9Q *Roof Panel Seal Clip (12'-24' Diameter Bins)*

Ref #	Description
B	Roof Panel
C	Roof Flashing
AB	Roof Panel Seal

Roof Panel Seal Part Numbers (AB)	
Bin Diameter	**Part #**
12'	CTR-1180
15'	CTR-1166
18'	CTR-1181
21'	CTR-1182
24'	CTR-1165

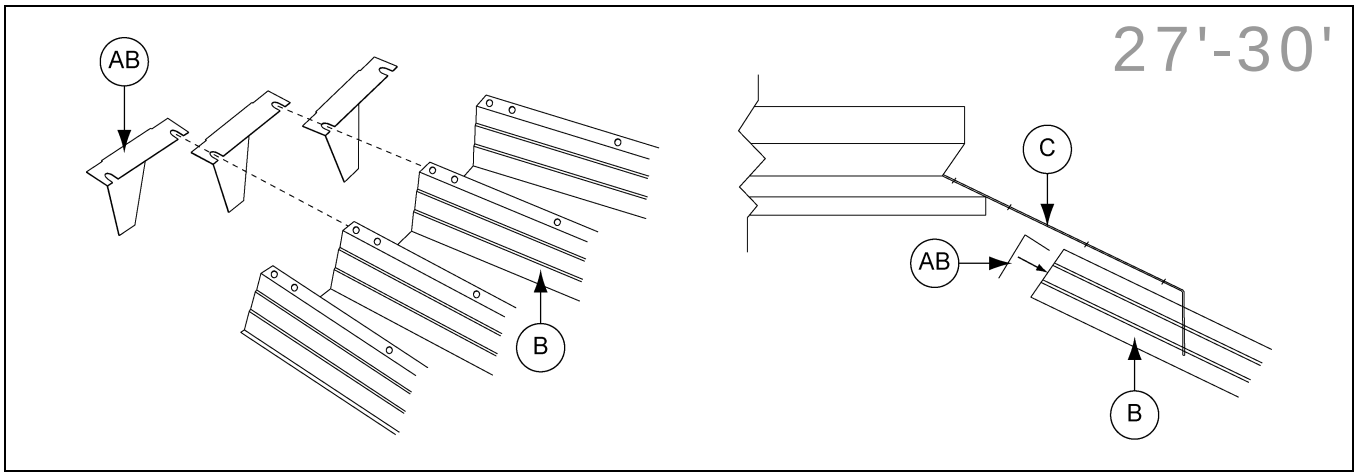


Figure 9R *Roof Panel Seal Clip (27' and 30' Diameter Bins)*

Ref #	Description
B	Roof Panel
C	Roof Flashing
AB	Roof Panel Seal

Roof Panel Seal Part Numbers (AB)	
Bin Diameter	**Part #**
27'	CTR-1556
30'	CRP-5324

Installing the Manway Cover

Installation of a manway cover is necessary if a manway hole is present.

Round manway cover details for bins 60' and smaller.

1. Apply caulking to the underside of the moisture diverter (J) and install to the manway roof panel (N).
2. Install the hinge base (A) to the moisture diverter (J) and install three (3) hex bolts (C) and nuts (F).
3. Install the handle gasket (E) and the handle (D) to the cover (L) and secure with two (2) #10 long bolts (K) and lock nuts (M).
4. Install the latch (G) to the handle (D) using a hex bolt (C) and nut (F).
5. Install the hinge leaf (B) to the manway cover (L) and secure all four (4) bolts (C) and nuts (F). Install the manway assembly to the hinge base (A) and secure with two (2) bolts (K) and nuts (M).

   NOTE: *When securing the hinge leaf (B) to the hinge base (A), double nut each hex bolt (H).*
6. Tighten the hardware.
7. Affix suffocation/flighting decals (not shown) to the underside of the manway cover.

   NOTE: *Suffocation/flighting decals replacement part numbers: English, DC-GBC-1A and Spanish, DC-GBC-1S.*
8. Snap the manway seal strip (I) onto the lip of the manway hole.
9. Make the necessary adjustments to the handle (D) and latch (G), creating a tight seal. *(See Figure 9S on Page 88.)*

Installing the Manway Cover (Continued)

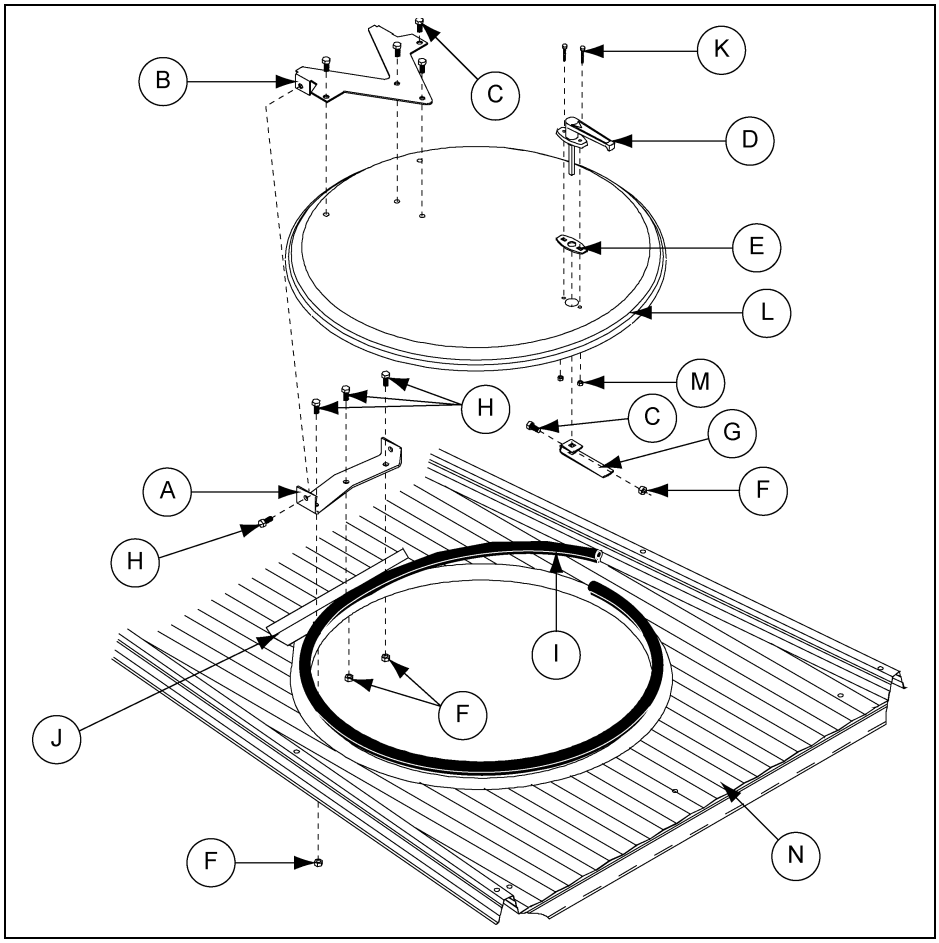


Figure 9S *Manway Cover*

Ref #	Ref #	Description
A	ACD-4506	Hinge Base
B	ACD-4505	Hinge Leaf
C	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
D	ACD-4513	Handle
E	CRP-5003	Handle Gasket
F	S-396	5/16" Flange Nut
G	ACD-4514	Latch

Ref #	Ref #	Description
H	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
I	CRP-4998	Manway Seal Strip
J	CRP-4999	Moisture Diverter
K	S-2009	#10-24 x 5/8" Long Bolt
L	ACD-4504	Manway Cover
M	S-2010	#10-24 Lock Nut
N		Manway Roof Panel

Manway Roof Panel Part Numbers (N)

Bin Diameter	Part #
12'	CTR-0644
15'	CTR-0646
18'	CTR-0648
21'	CTR-0650
24'	CTR-0652
27'	CTR-0655

Bin Diameter	Part #
30'	CTR-0657
33'	CTR-0659
36'	CTR-0752
42'	CTR-0754
48'	CTR-0756

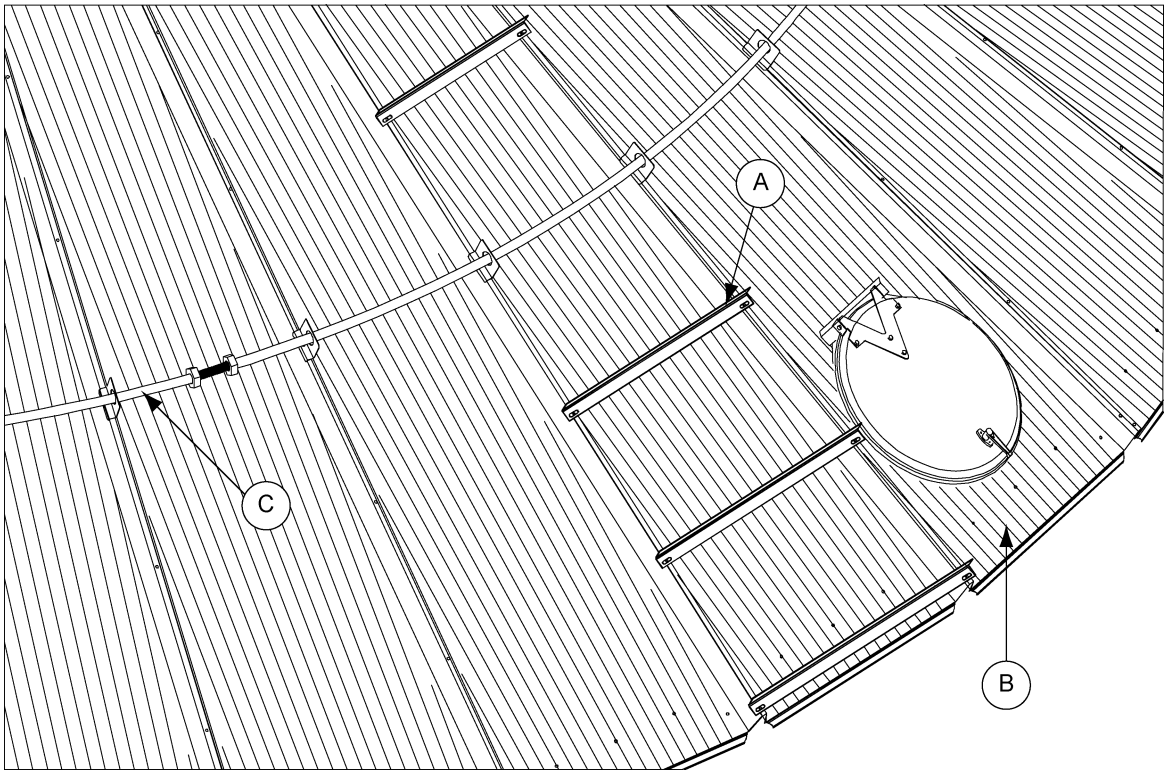
Roof Ring Locations

Two (2) support rings are standard for 12'-48' diameter bins.

IMPORTANT: *Maximum weight to be supported and/or suspended from the roof is to be 6000 pounds only.*

To determine the location of the roof rings, start at the wide or eave of the roof panel and count each hole. Having counted up the required distance, as described in the table on *Page 90*, install the appropriate brackets.

NOTE: *The last roof ring pipe will need to be cut to length.*



NOTE: *Image is graphical representation only. Use the below table to determine the roof ring location for your bin.*

Figure 9T *Roof Ring*

Ref #	Description
A	Roof Step
B	Roof Panel
C	Roof Ring

Roof Ring Pipe Part Number	Bin Diameter Roof Ring Location	Roof Ring Location from Eave End	Roof Ring Color Code	Number of Pipes per Ring
CRP-5363-15	15 (T)	3rd Hole	Yellow/White	3
CRP-5363-15	18 (T)	4th Hole	Yellow/White	3
CRP-5363-18	18 (B)	3rd Hole	Blue/White	4
CRP-5363-15	21 (T)	5th Hole	Yellow/White	3
CRP-5363-24	21 (B)	3rd Hole	Red/White	5
CRP-5363-15	24 (T)	6th Hole	Yellow/White	3
CRP-5363-24	24 (B)	4th Hole	Red/White	5
CRP-5363-18	27 (T)	6th Hole	Blue/White	4
CRP-5363-27	27 (B)	4th Hole	Ochre	6
CRP-5363-18	30 (T)	7th Hole	Blue/White	4
CRP-5363-30	30 (B)	4th Hole	Light Blue	7
CRP-5363-18	33 (T)	8th Hole	Blue/White	4
CRP-5363-36	33 (B)	4th Hole	Gold	8
CRP-5363-18	36 (T)	9th Hole	Blue/White	4
CRP-5363-36	36 (B)	5th Hole	Gold	8
CRP-6158	42 (T)	7th Hole	Fluorescent Green/Brown	8
CRP-6159	42 (B)	4th Hole	Fluorescent Green/Gold	11
CRP-6158	48 (T)	9th Hole	Fluorescent Green/Brown	8
CRP-6189	48 (B)	5th Hole	Fluorescent Green/Pink	12

Installing a Roof Ring

Quantity and part numbers of roof ring kits vary with the location placement and with the size of each bin. The following procedure will be similar for each kit.

1. Determine the quantity of roof ring clips (C) needed for the roof ring section (B) being installed.

   NOTE: *Each roof panel rib must have a roof ring clip installed.*

2. Install a flange bolt (A) to the roof ring clip (C) and install a sealing washer (E) to the underside of the roof ring clip (C).

3. Slide each assembled roof ring clip (C) onto a roof ring section (B) and position each roof ring clip (C) over each roof panel rib.

4. Install a flange nut (D) to each roof ring clip (C). *(See Figure 9U.)*

   NOTE: *Do not tighten hardware until all roof ring sections have been installed.*

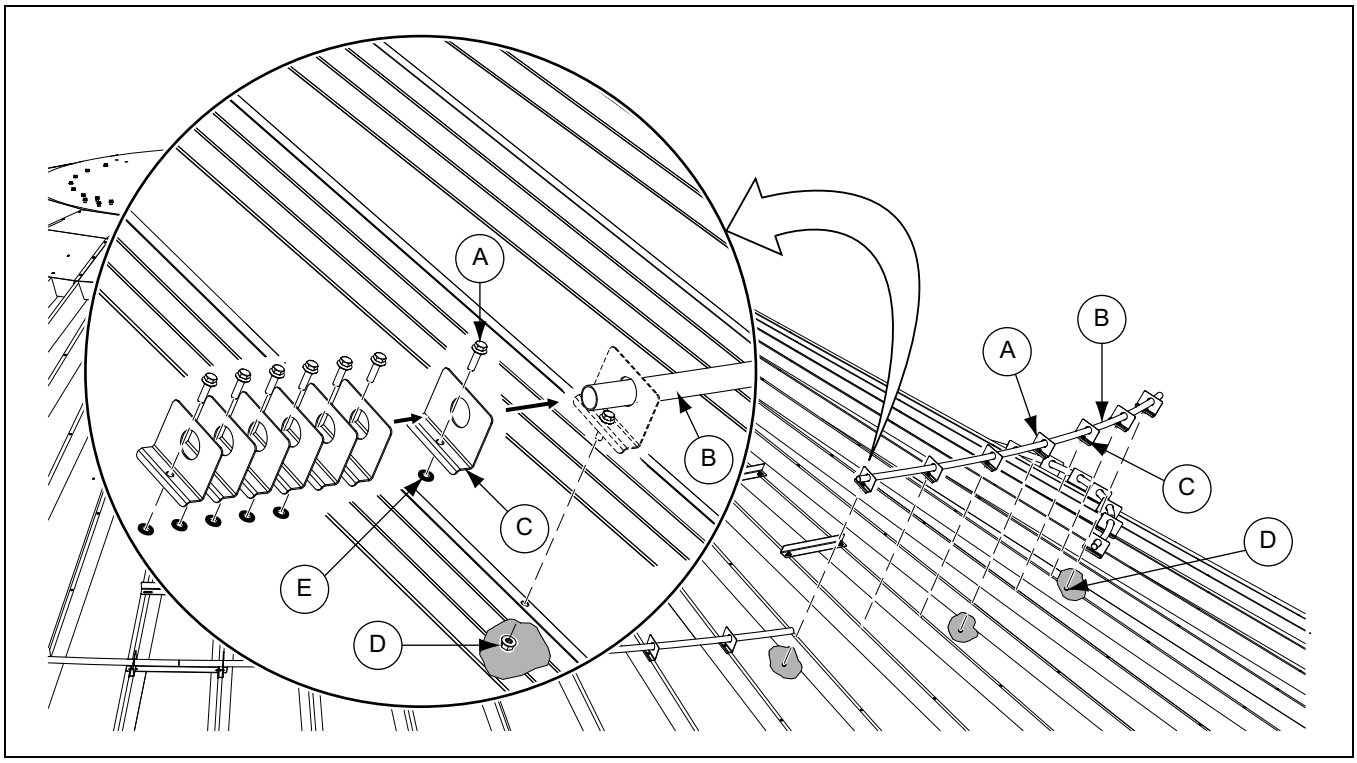


Figure 9U *Roof Ring Shown*

Ref #	Part #	Description
A	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
B		Roof Ring Section
C	R-997	Roof Ring Clip
D	S-3611	5/16" Flange Nut
E	S-10303	Sealing Washer

Installing a Roof Ring (Continued)

5. Locate a threaded stud (F) and install stud nuts (G) evenly and to the center of the threaded stud (F).
6. Install the threaded stud (F) with stud nuts (G) to the end of the roof ring section (B).

   NOTE: *Install the threaded stud (F) to the side where the next roof ring section will be installed.*
7. Repeat this process, installing each new roof ring section end onto the preceding threaded stud just installed.
8. When all roof ring sections are installed, tighten each roof ring clip (B).
9. Adjust each stud nut (G) outward, expanding each roof ring section. Continue this procedure evenly until the roof ring raises the roof, showing a slight crown.

   NOTE: *Expansion bolts should be fully contracted when assembling support rings. When you have completely assembled both rings, (but prior to expanding the bolts) tighten all roof bolts including eave clip bolts. Now extend expansion bolts by running the nut out on the threads. This procedure should be continued evenly around the roof until the ring raises the roof to show a slight crown.*

   NOTE: *Roof ring expansion bolts may become dislodged from the roof ring during the life of the bin due to the influence of wind or other factors. If one expansion bolt is dislodged, the entire ring will become ineffective. After expansion to the jam nuts final position, the nuts on the expansion bolt should be secured to prevent this. This may be done by staking the expansion bolt threads at the jam nut location, use of suitable thread locking compounds or other effective methods.* *(See Figure 9V.)*

   In addition, drilling holes through the support pipe and expansion bolt and connecting together with a 1/4" diameter bolt is an effective way to prevent the bolt from dislodging during certain wind and pressure conditions.

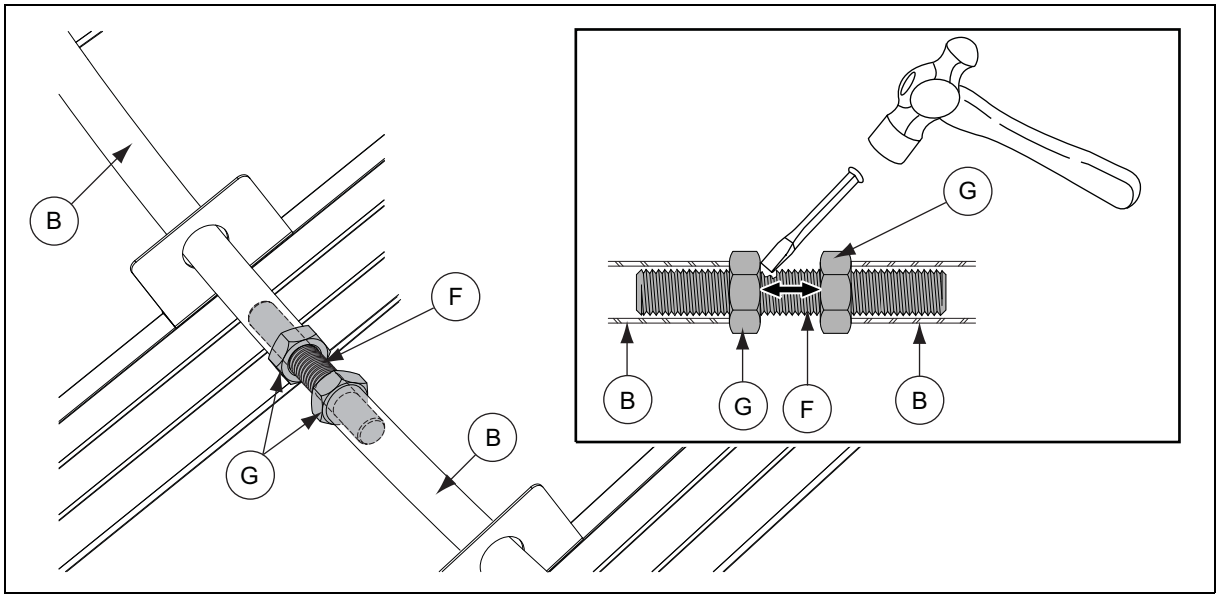


Figure 9V *Exploded View of Threaded Stud*

Ref #	Part #	Description
B		Roof Ring Section
F	S-8765	Threaded Stud

Ref #	Part #	Description
G	S-8926	Stud Nut

Ladder Section Assembly

NOTE: *With most installations, the ladder section installed to reach the ground will need to be cut to fit.*

Two (2) splice plates (A) are required to attach each ladder section (B). The head of the bolt should be to the inside of the ladder with the splice plate (A) on the outside as shown in *Figure 10A*. Use 5/16" x 1" bolts for all connections.

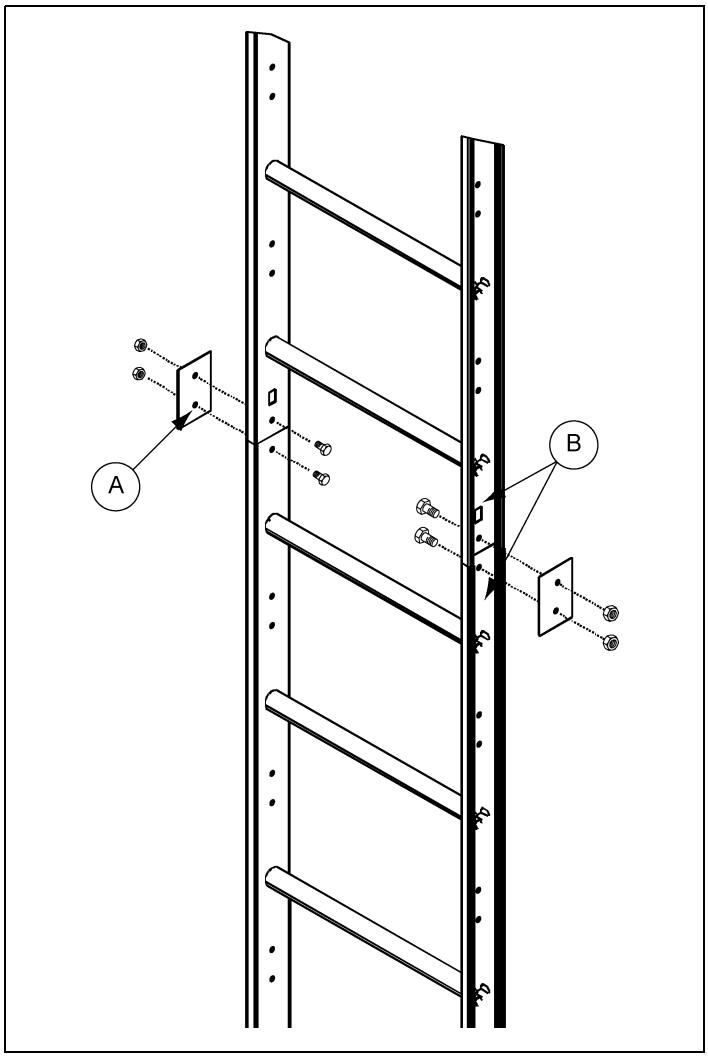


Figure 10A

Ref #	Description
A	Splice Plate (LDR-4317)
B	Ladder Sections

Platform Support Assembly

When starting the platform support, attach the mounting angle to the sidewall of the grain bin. Refer to the correct holes to be used by the platform. Attach the angle using 5/16" x 1" bolts and nuts, tighten at this time. Next, bolt the support angle to the mounting angle again using the proper holes. Attach the brace angle to the mounting angle as shown in *Figure 10B*. Use 5/16" x 1" bolts and nuts for all connections.

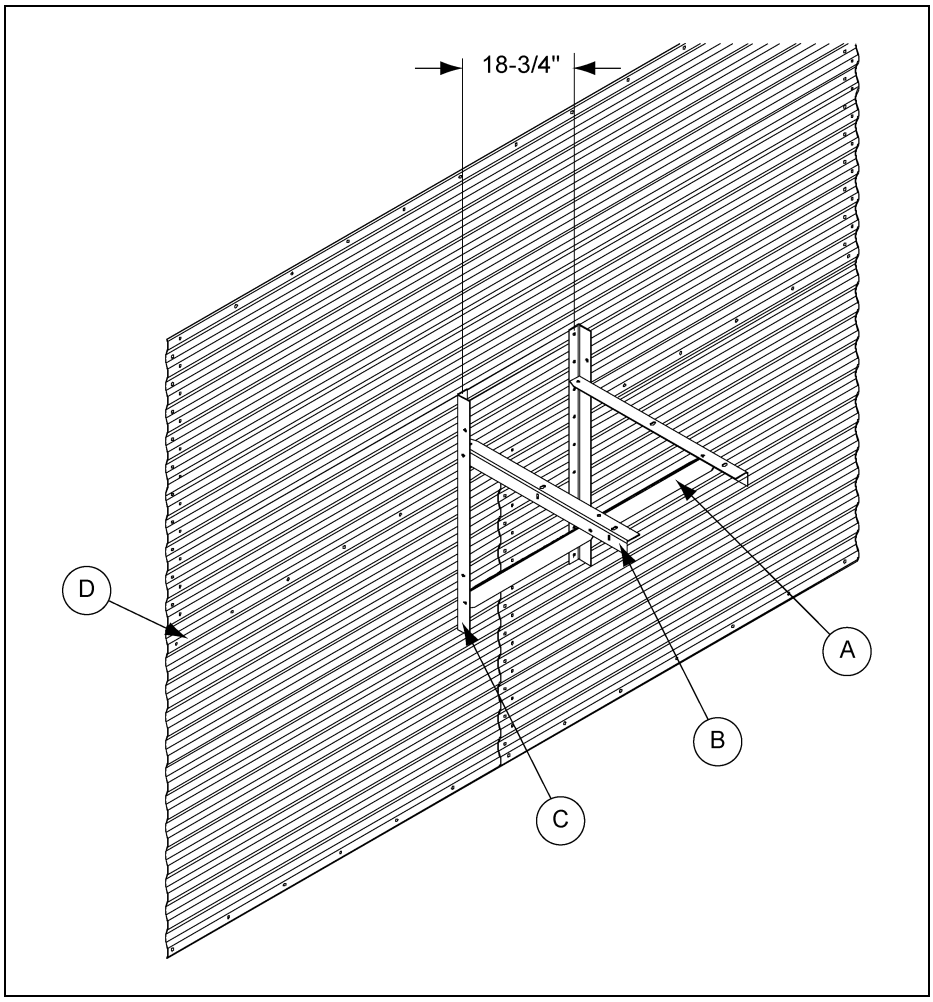


Figure 10B

Ref #	Part #	Description
A	LS-369	30-3/4" Brace Angle
B	LS-370	28" Support Angle
C	LS-6705	35" Mounting Angle
D		Horizontal Seam

Eave Adjustable Braces

The adjustable braces must be attached at this time. An eave adjustable brace is comprised of one large diameter tube and two (2) smaller diameter tubes. *(See Figure 10C.)* Slide the smaller tubes inside the larger tubes and attach one smaller tube to the top of the ladder extension rail. Adjust the other smaller tube so the bottom of the flattened tube reaches the roof panel. Field drill four (4) 5/16" holes through both large and small tubes and bolt together using 1/4" x 1-1/2" bolts and nuts. This will keep the adjustable braces from slipping.

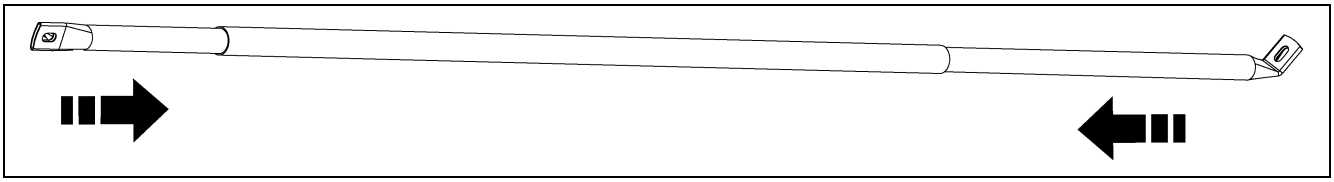


Figure 10C

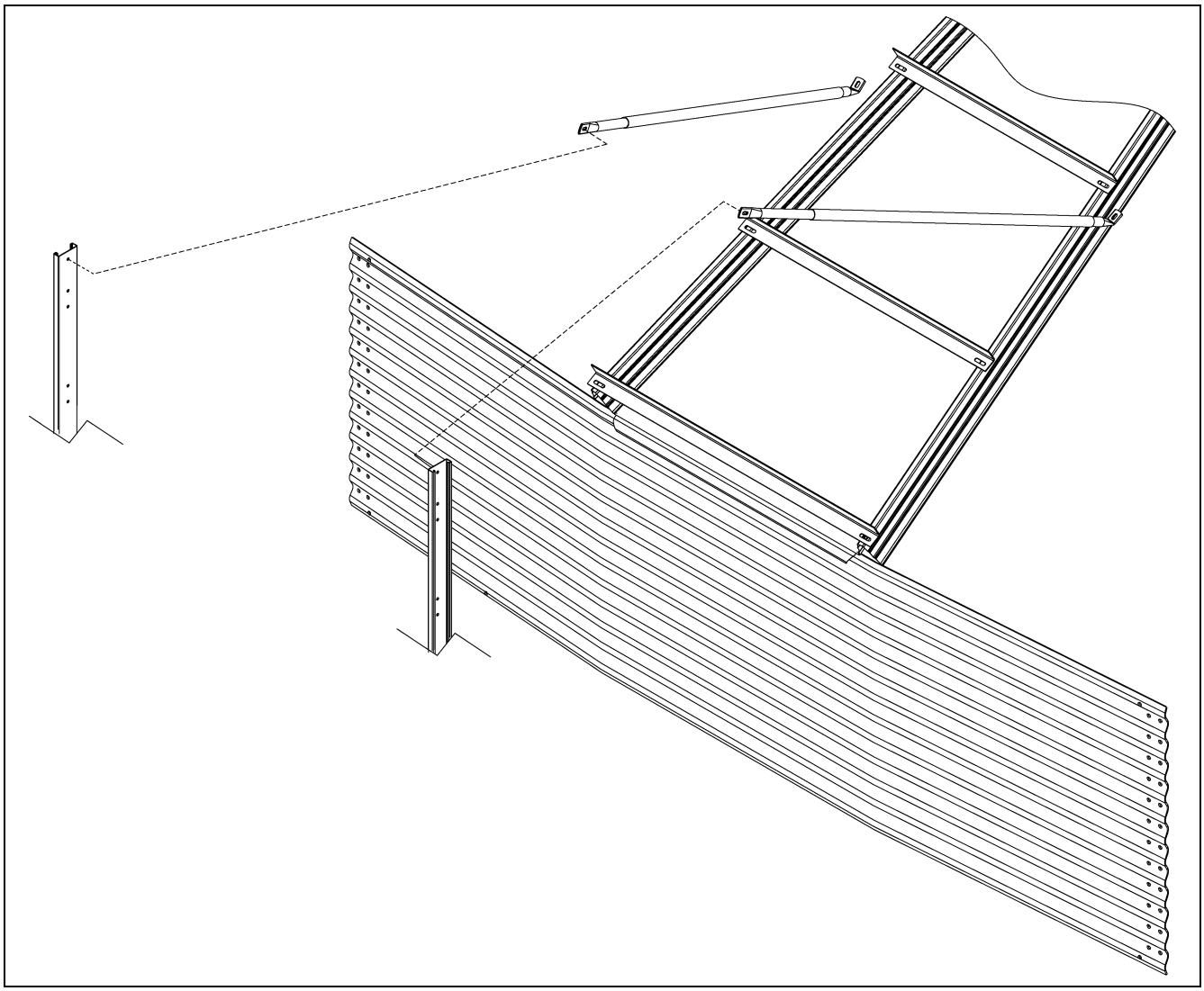


Figure 10D

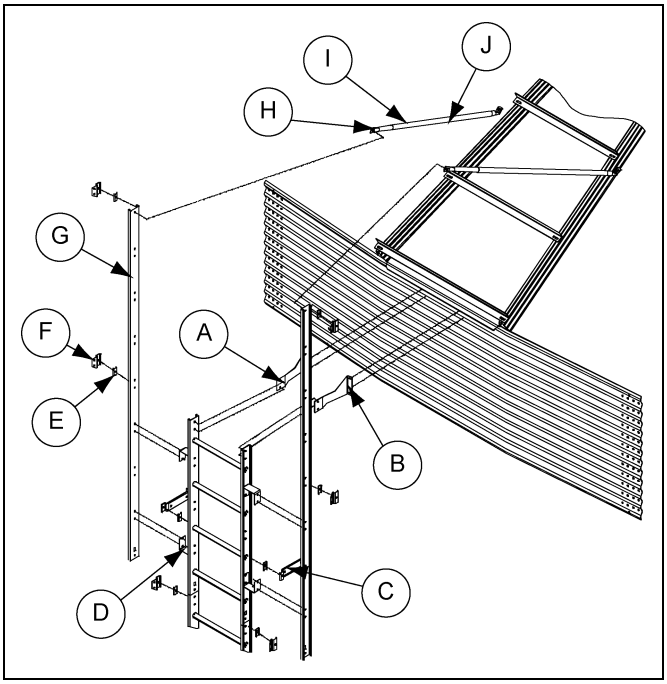


Figure 10E

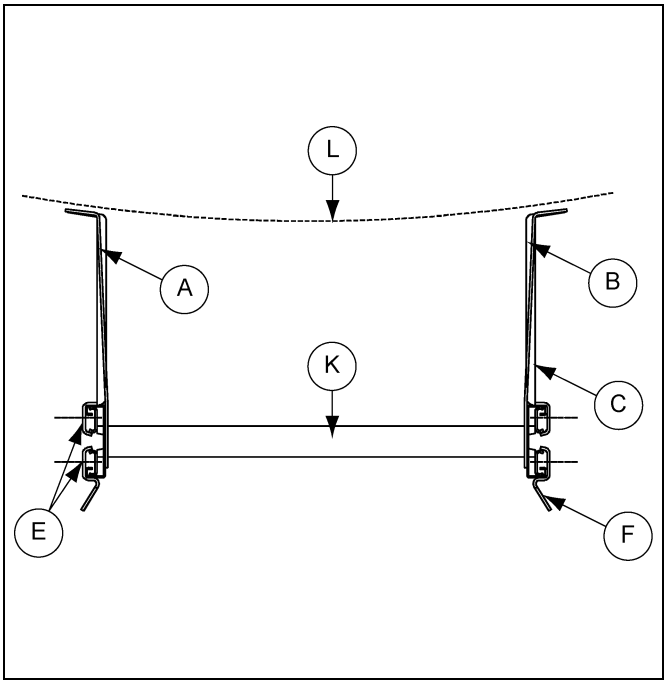


Figure 10F *Ladder and Brackets as Viewed from Top of Bin*

Ref #	Part #	Description
A	LDR-4346	L.H. Starter Bracket
B	LDR-4347	R.H. Starter Bracket
C	LDR-4314	Standoff Bracket
D	LDR-4403	Spacer Bracket
E	LDR-4198	Standoff Wedges
F	LDR-4199	Cage Hoop Bracket
G		8' Extension Rail
H	LS-6616	End Tube
I		Field Drill 5/16" Holes Four (4) per Brace
J	LS-6615	Center Tube
K	LDR-4345	Top Ladder Section
L		Bin

NOTE: *Refer to general detail section at the beginning of this manual for additional details for standoff bracket to ladder assembly and cage hoop bracket to ladder.*

Platform and Handrail Assembly

Start by attaching the platform to the platform support using 5/16" x 1" bolts and nuts. Place all the vertical angles in place, making sure to place the vertical entrance angle to the left front corner of the platform. After all vertical angles are in place, attach front and side handrails as shown in *Figure 10G*. Use 5/16" x 1" bolts and nuts in all connections.

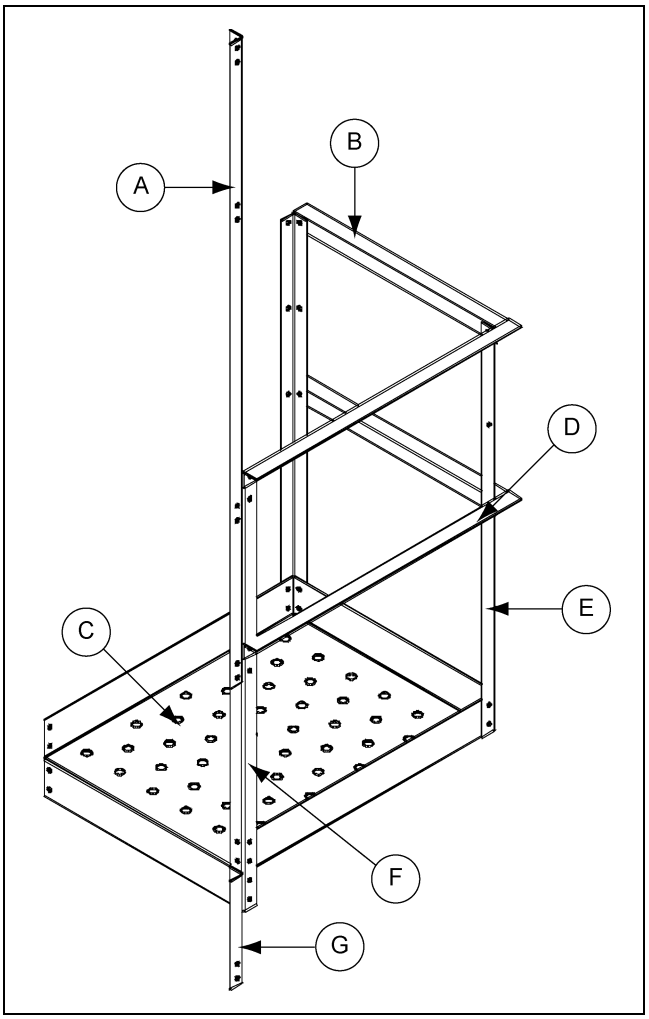


Figure 10G

Ref #	Part #	Description
A	LS-6775	Safety Cage Platform Extension Angle (67-1/2")
B	LS-294	Side Handrail (24-7/16")
C	LS-373	Platform
D	LS-295	Front Handrail (32-1/16")
E	LS-371	Platform Vertical Angle (Yellow) (42")
F	LS-6621	Vertical Entrance Angle (Orange) (46")
G	LS-6776	Safety Cage Hoop Adapter Angle (11-5/16")

Eave Safety Cage

Before attaching any pieces to the ladders of platform, some pre-assembly is required. Attach two (2) safety cage brackets to the ladder section. (*See Figure 10L on Page 101* for assembly details.) Bolt the safety cage hoop adjuster plates onto the extension angle as shown. Using the proper configuration based upon the diameter of the bin, bolt the safety cage hoop adapters together and attach to the safety cage hoop halves. Bolt the safety cage hoop adapters and safety cage hoop halves together using the proper holes based upon the diameter of the grain bin. Be sure to use the 5/16" x 1" bolt with the head of the bolt to the inside of the safety cage. Bolt these assemblies to the safety cage brackets and hoop adjuster plates, tightening the bolts as you go. The bottom assembly requires two (2) hoop halves and will be positioned just below the platform as shown. Use the safety cage hoop adapter angle to secure the two (2) hoop half assembly to the vertical entrance angle on the platform assembly.

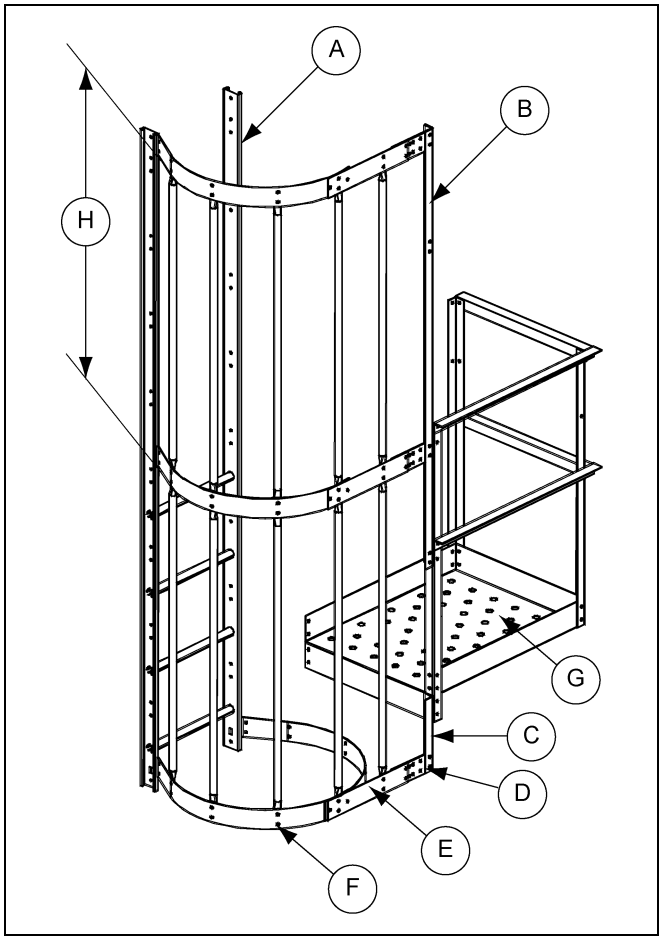


Figure 10H

Ref #	Part #	Description
A	LDR-4345	Top Ladder Section
B	LS-6775	Extension Angle (See extension angle hole detail for proper installation.) (67-1/2")
C	LS-6776	Safety Cage Hoop Adapter Angle
D	LS-5285	Safety Cage Hoop Adjuster Plate
E	LS-5284	Safety Cage Hoop Adapter
F	LS-4201	Safety Cage Hoop Half
G		Platform
H		48" Typ. Bottom to Bottom of Cage Hoops

Safety Cage Hoop Adapter Detail

18' Diameter through 21' Diameter Bins

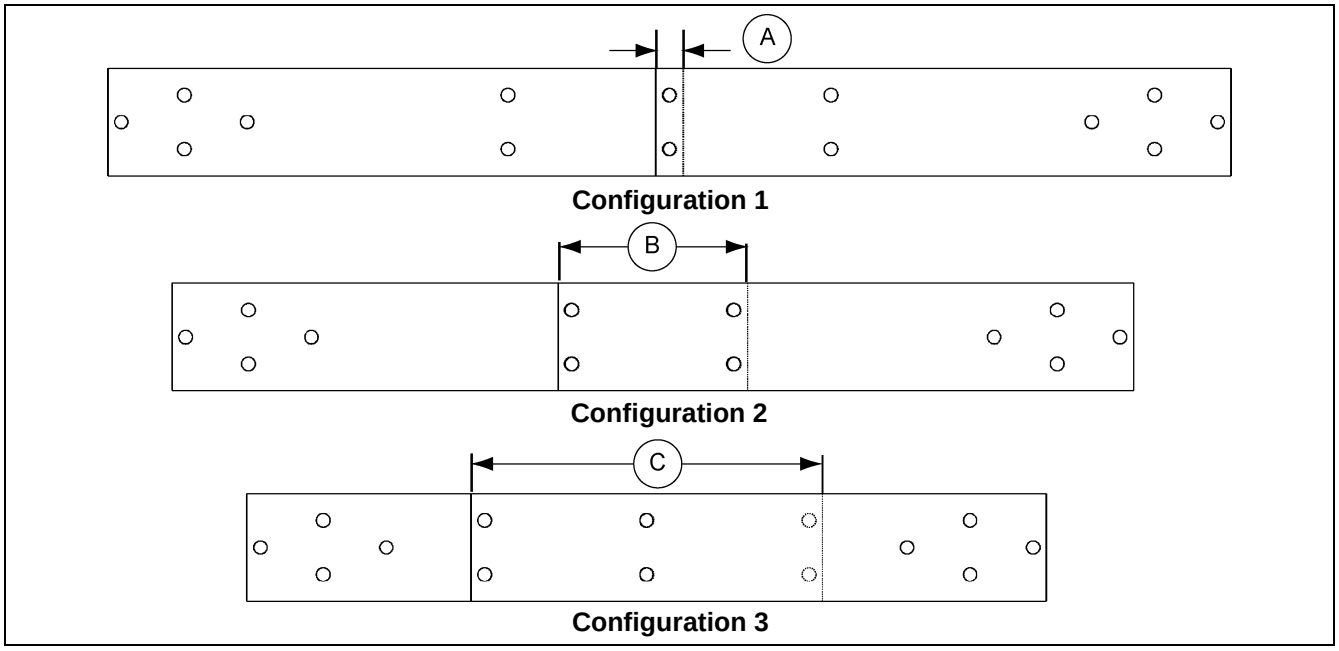


Figure 10I *18' Diameter through 21' Diameter Bins*

Ref #	Description
A	3/4" Overlap
B	5-1/4" Overlap
C	9-3/4" Overlap

Adjuster Plate Connection Detail

Use *Figure 10J* to determine the proper holes used when attaching the hoop adapter to the adjuster plate.

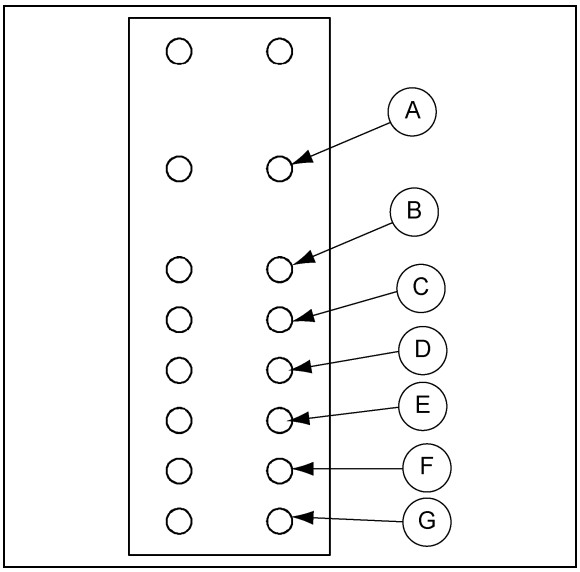


Figure 10J

Ref #	Description
A	90'/105' Bins
B	36'/72'/75'/78' Bins
C	33'/60' Bins
D	21'/30'/54' Bins
E	27'/48' Bins
F	42' Bins
G	18'/24'/39' Bins

Vertical Supports

After all three (3) hoop assemblies are in place, attach the 48" vertical supports from hoop assembly to hoop assembly as shown. This will require ten (10) supports, five (5) between each set of hoops. The 2nd set of vertical supports will need to be bent at the flat area to allow for the tapering of the bottom hoop assembly. Use 5/16" x 1" bolts (unless otherwise noted) with the head of the bolt to the inside of the safety cage. *(See Figure 10K.)*

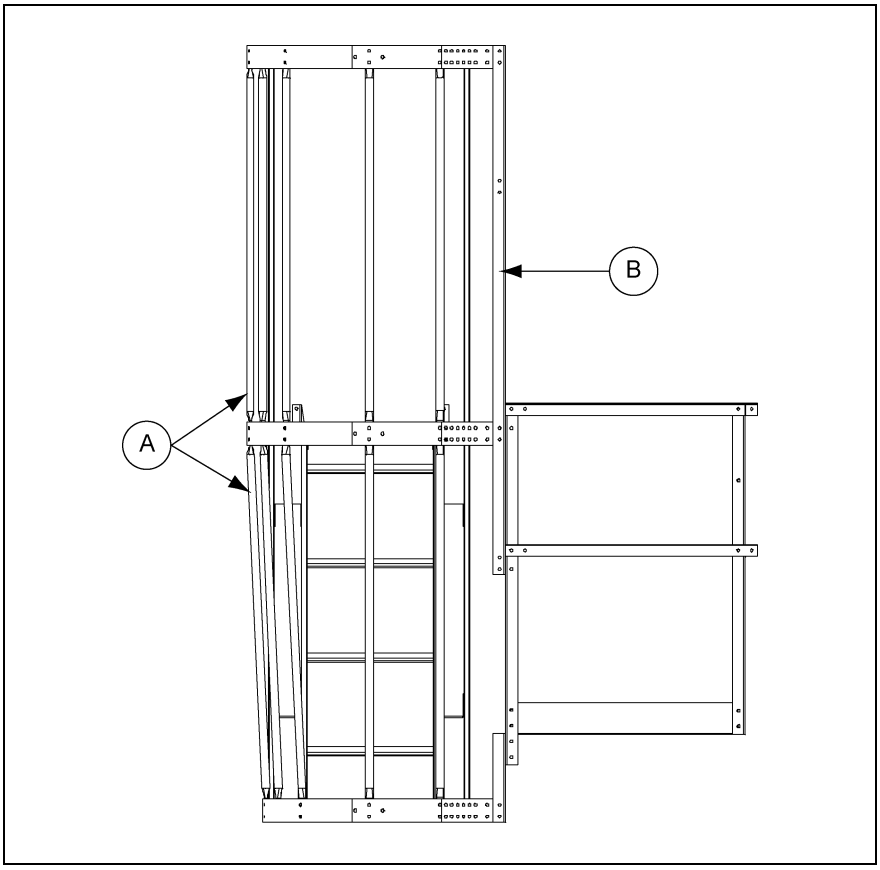


Figure 10K *Vertical Supports*

Ref #	Part #	Description
A	LS-6713	Safety Cage 48" Vertical Support
B		Use 5/16" x 1-1/4" bolts at hoop assembly overlap.

Safety Cage

Attach the vertical support pieces to the existing hoop halves above using the 5/16" x 1" bolts and nuts (with the heads on the inside of the cage). Fasten two (2) hoop halves together and bolt to other end of vertical supports. Attach cage hoop brackets to ladder as shown in *Figure 10L*. Once cage hoop brackets have been installed, attach cage hoop halves and tighten bolts. Repeat installation for each safety cage required.

NOTE: *Leave bolt loose until cage hoop half has been attached.*

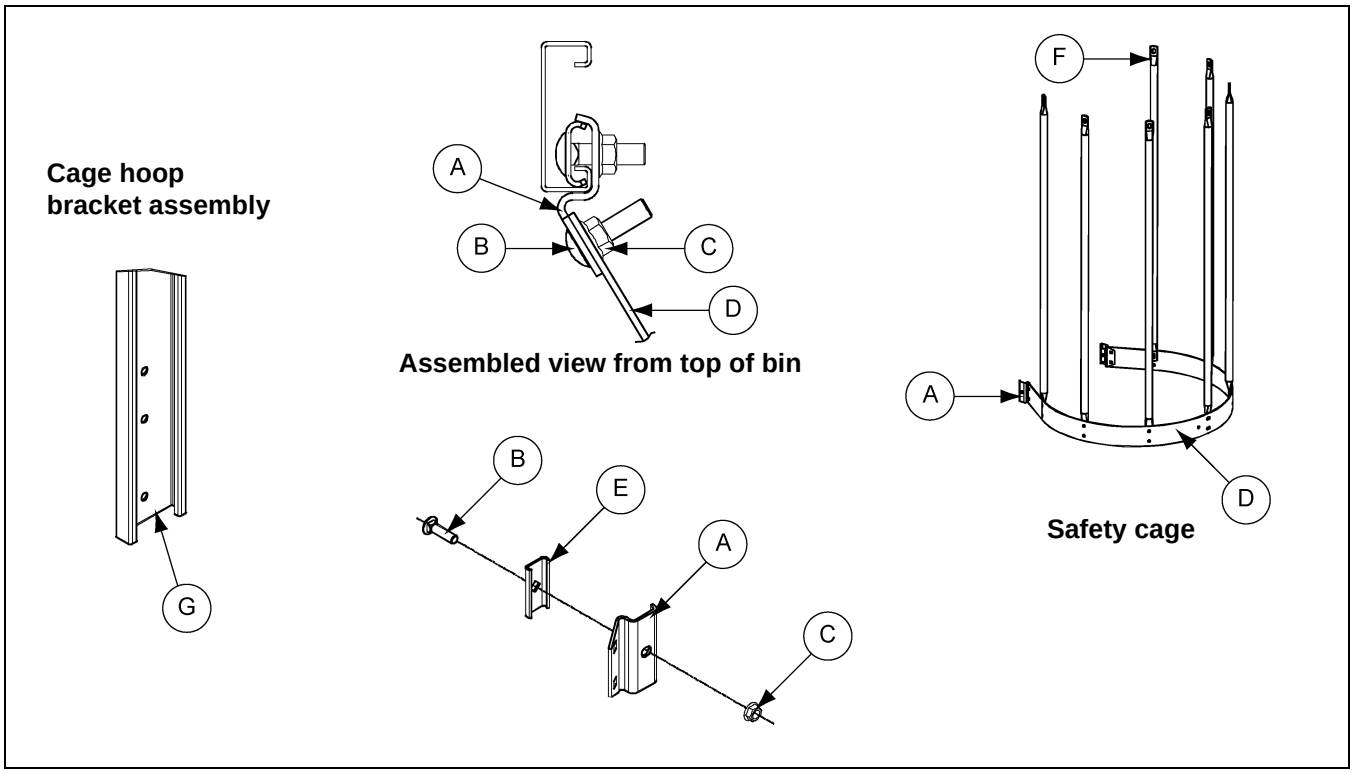


Figure 10L

Ref #	Part #	Description
A	LDR-4199	Cage Hoop Bracket
B	S-3550	5/16" x 1" Carriage Bolt
C	S-3611	5/16" Nut
D	LDR-4201	Safety Cage Hoop Half
E	LDR-4198	Standoff Wedge
F	LS-6713	Safety Cage 48" Vertical Support
G		Ladder

24" Safety Cage Bell Sections

Attach the vertical supports to the hoop half assembly from the final safety cage installation using 5/16" x 1" bolts and nuts (with the heads on the inside of the cage). Assemble the special bell safety cage hoop halves and attach to other end of vertical supports. The vertical support should be bent at the flat area to allow for the bell section angle. Attach the safety cage brackets to the ladder as shown in *Figure 10L on Page 101*. Once the safety cage brackets are installed, attach the bell safety cage hoop half assembly to the safety cage brackets and tighten bolts.

NOTE: *The safety cage bell section is to be used at the point of termination of the safety cage and should be just above the concrete (generally 7' to 8').*

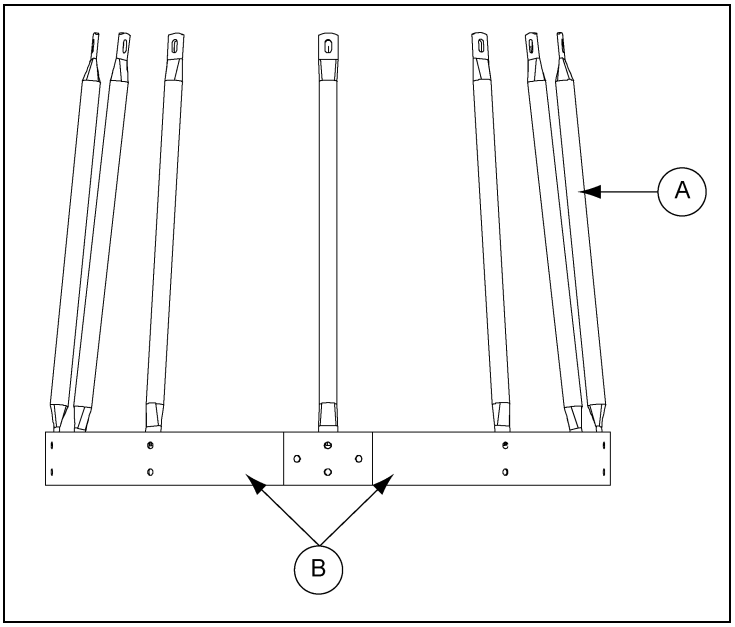


Figure 10M *24" Bell*

Ref #	Part #	Description
A	LS-6714	Safety Cage 24" Vertical Support
B	LDR-4202	Safety Cage Bell Hoop Halves

Temperature Cable Support Package Instructions for Eave Heights of 40'-5" (12.32 m) or Less (Optional)

For 27'-33' Diameter Bins

1. For 27' (8.23 m)-33' (10.06 m) diameter bins, the temperature cable support package shall span one roof panel.
2. The rafter support system (included in each package) will be necessary for the temperature cable installation in 27' (8.23 m)-33' (10.06 m) diameter bins that have an eave height less than 40'-5" (12.32 m).
3. One package should be provided for each cable in the tank with the exception of the center cable.
4. All packages include hanging angle and a cable support channel.
5. Each set of rafters should carry only one temperature cable.
6. Once the rafters are in place, field drill the holes to bolt the temperature support angles (A and B) into the roof channel (E) and attach with 3/8" bolts (G), washers (H) and nuts (I).
7. Install the support channel (D) onto the support angles (A and B) with 3/8" bolts.
8. Attach the cable attachment bracket (C) in the center of the support channel to hang the cable.

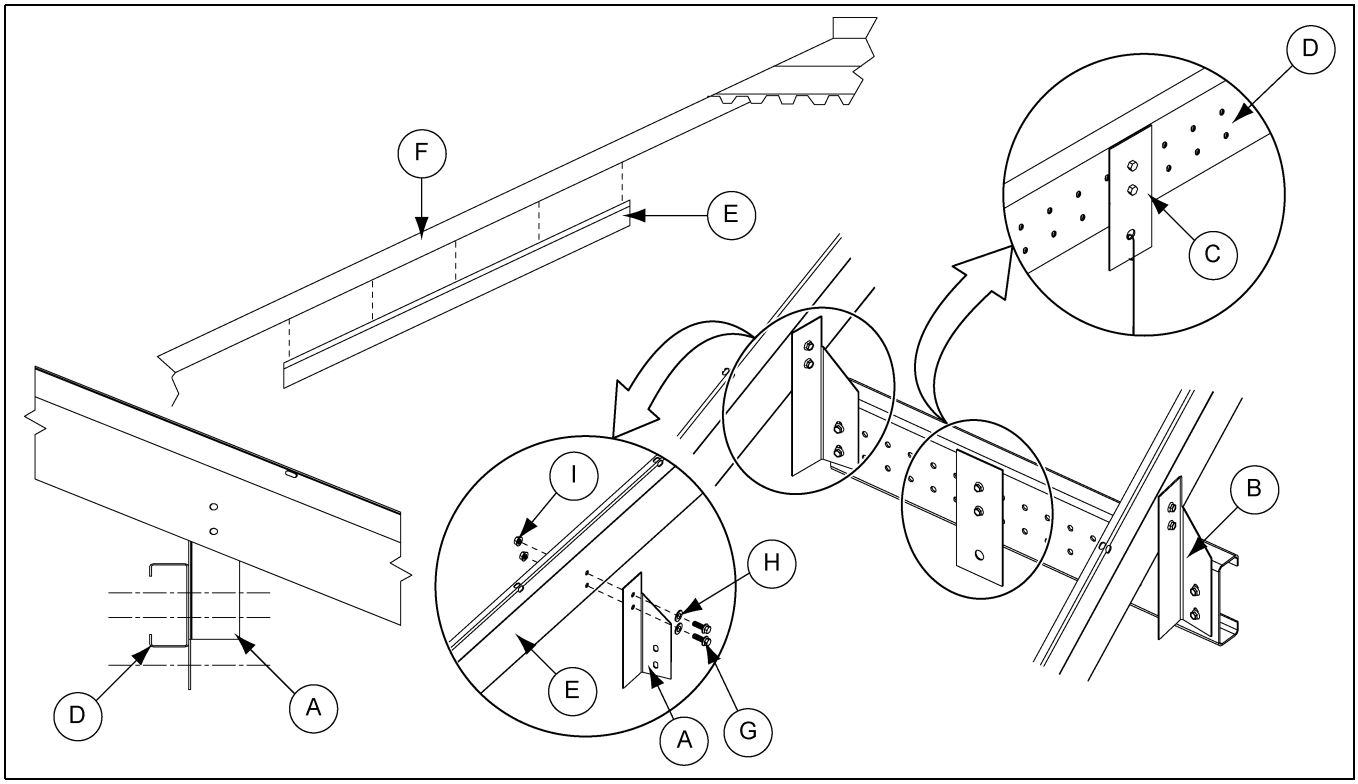


Figure 10N *Roof Truss Details (For 27'-33' Diameter Bins)*

Ref #	Part #	Description
A	CRP-5787	Left Temperature Cable Support Angle
B	CRP-5786	R.H. Temperature Cable Support Angle
C		Cable Attachment Bracket
D	CRP-5419	Support Channel
E		Roof Channel

Ref #	Part #	Description
F		Roof Panel
G	S-7485	3/8" x 1" Flange Bolt
H	S-248	3/8" Flat Washer
I	S-456	3/8" Hex Nut

9. No more than one cable should be supported from a pair of roof rafters.
10. If it is desired to support the cable from the flange of the support channel, it will be necessary to reinforce the flange with a 12" section of 3" x 3" x 3/16" angle.
11. Temperature cables are to be installed at the radii specified by the temperature cable manufacturer.
12. This package will allow a maximum radius of 11.84" (3.61 m) for a 27'-33' diameter bins.

    NOTE: *This radius represents the maximum radius that the cross members will span. These are not recommended installation locations.*

13. For a greater radius, a cross member adequate to support the cable must be provided (by others). However the rafter support system must be used.

For 36' and 42' Diameter Bins

Use these instructions for the temperature cable support package installation of 36' (10.97 m) and 42' (12.8 m) diameter bins.

1. For 36' (10.97 m) and 42' (12.8 m) diameter bins, the temperature cable support package shall span one roof panel.
2. The rafter support system (included in each package) will be necessary for the temperature cable installation in 36' (10.97 m) and 42' (12.8 m) diameter bins that have an eave height less than 40'-5" (12.32 m).
3. One package should be provided for each cable in the tank with the exception of the center cable.
4. All packages include hanging angle and a cable support channel.
5. Each set of roof channel should carry only one temperature cable.
6. The two (2) roof channel (F) sections are spliced together with roof channel splice (CRP-5262).
7. Field drill holes and install the reinforcement angle (E) to the outside of the roof channels (F).

   NOTE: *Locate the reinforcement angle along the roof channel (F) in location specified by temperature cable manufacturer. Place the reinforcement angle and drill eight (8) holes in the web and four (4) holes in the flange evenly distributed over the length of the roof channel (F).*

8. Once the rafters are in place, field drill the holes to bolt the temperature support angles (A and B) into the roof channel (F) and attach with 3/8" bolts (G), washers (H) and nuts (I).
9. Install the support channel (D) onto the support angles (A and B) with 3/8" bolts.
10. Attach the cable attachment bracket (C) in the center of the support channel (D) to hang the cable.

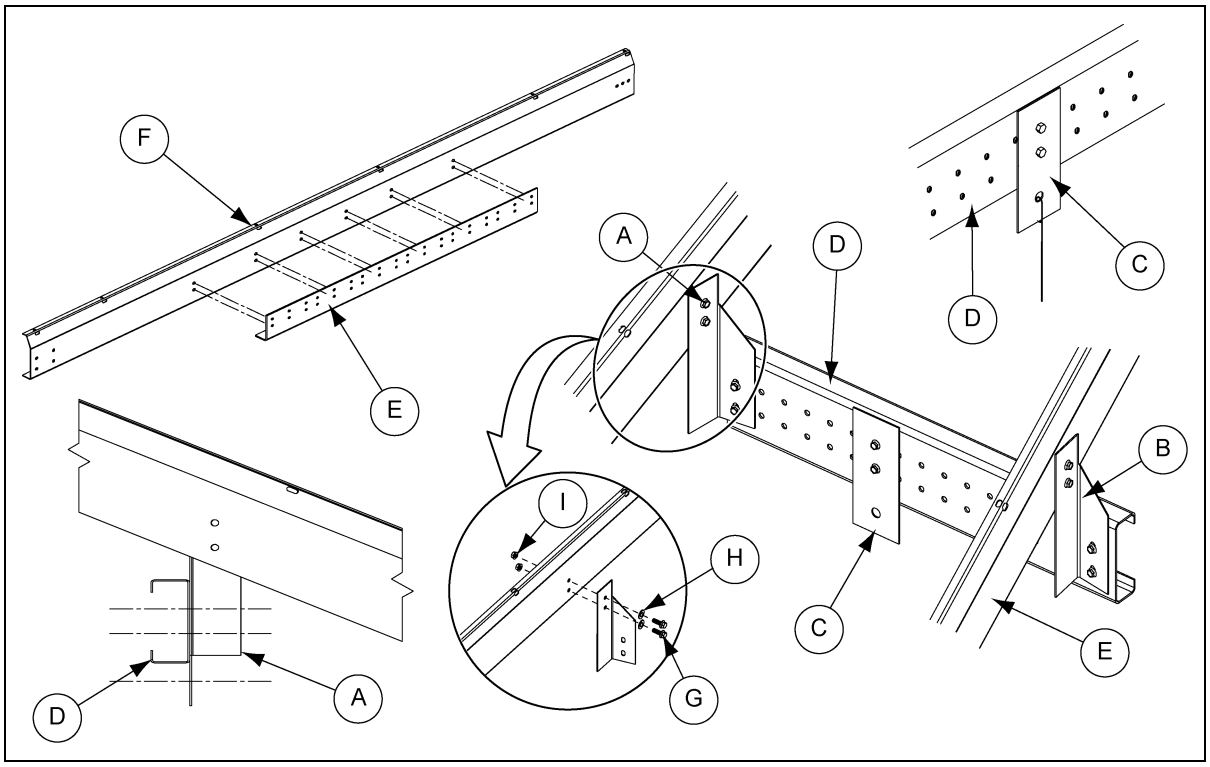


Figure 10O *(For 36' and 42' Diameter Bins)*

Ref #	Part #	Description
A	CRP-5787	L.H. Temperature Cable Support Angle
B	CRP-5786	R.H. Temperature Cable Support Angle
C		Cable Attachment Bracket
D		Support Channel
E	CRP-5422	Reinforcement Angle
F	CRP-4793	Roof Channel
G	S-7485	3/8" x 1" Flange Bolt
H	S-248	3/8" Flat Washer
I	S-456	3/8" Hex Nut

11. No more than one cable should be supported from a pair of roof rafters.
12. If it is desired to support the cable from the flange of the support channel, it will be necessary to reinforce the flange with a 12" section of 3" x 3" x 3/16" angle.
13. Temperature cables are to be installed at the radii specified by the temperature cable manufacturer.
14. This package will allow a maximum radius of 13.31' (4.06 m) for a 36' and 42' diameter bin.

    NOTE: *This radius represents the maximum radius that the cross members will span. These are not recommended installation locations.*

15. For a greater radius, a cross member adequate to support the cable must be provided (by others). However the rafter support system must be used.

For 48' Diameter Bins

Use these instructions for the temperature cable support package installation of 48' (14.63 m) diameter bins.

1. All 48' (14.63 m) packages shall span three (3) roof panels as shown in *Figure 10P*.
2. One package should be provided for each cable in the tank with the exception of the center cable.
3. The package includes bracing Z-channels for the roof rafters, hanging angle and cable support channel (F).
4. Each set of rafters should carry only one temperature cable.
5. Once the farm roof system has been installed, installation of the cable support packages may proceed as follows.
6. Remove the splice plate from outside of the rafters. Install the inner splice plate and place it to the inside of the rafter sections.
7. Install the Z reinforcement angle (A) to the outside and the splice plate to the inside of the rafters. Use 3/8" x 1" bolts and 3/8" nuts for all connections.

   NOTE: *Locate the reinforcement angle along the rafter in location specified by temperature cable manufacturer.*

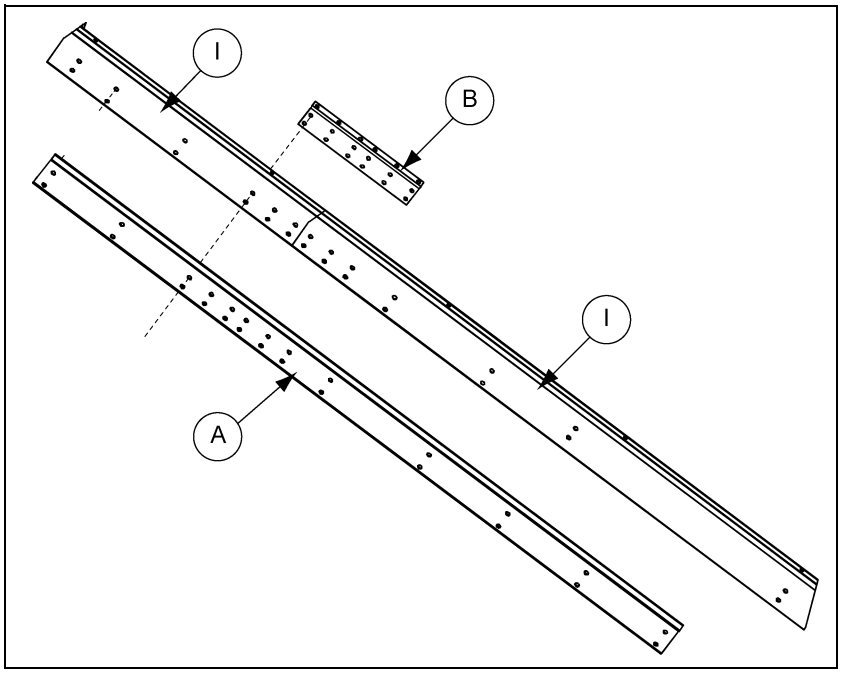


Figure 10P *(For 48' Diameter Bin)*

Ref #	Part #	Description
A	CRP-6262	Temperature Cable Z Reinforcement
B	CRP-6258	Splice Plate (Inverted)
I	CRP-7288	Roof Channel

8. Once the rafters are in place, install the temperature support angles (C and D) into the rafters and attach with 3/8" bolts.
9. Install the support channel (F) onto the support angles (C and D) with 3/8" bolts.

10. Attach the cable attachment bracket (E) in the center of the support channel (F) to hang the cable.

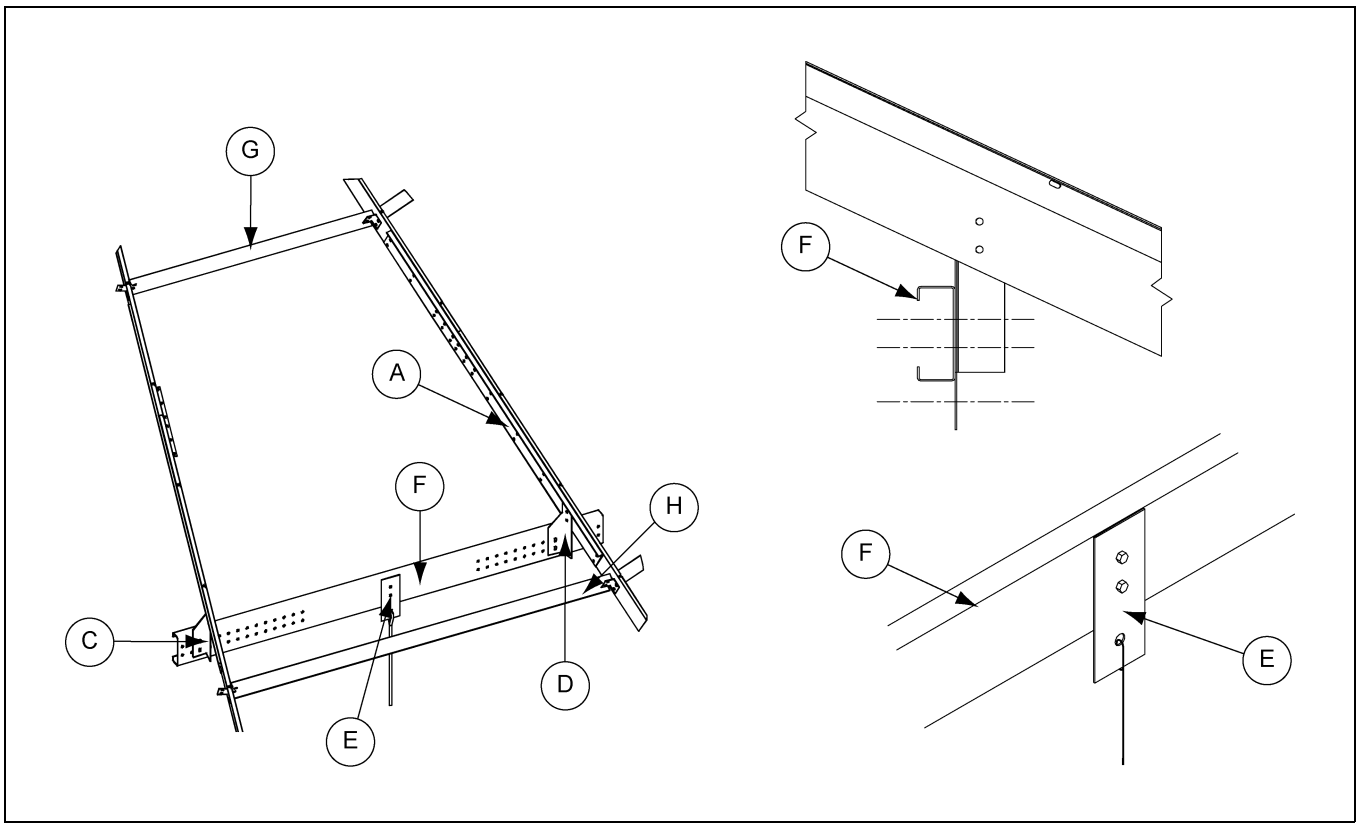


Figure 10Q *(For 48' Diameter Bin)*

Ref #	Part #	Description
A	CRP-6262	Temperature Cable Z Reinforcement
C	CRP-5787	L.H. Temperature Cable Support Angle
D	CRP-5786	R.H. Temperature Cable Support Angle
E	CRP-5213	Cable Attachment Bracket
F	CRP-5285	Support Channel
G	CRP-6256	Upper Purlin
H	CRP-6254	Lower Purlin

11. If it is desired to support the cable from the flange of the support channel (F), it will be necessary to reinforce the flange with a 12" section of 3" x 3" x 3/16" angle.

12. No more than one cable should be supported from a pair of roof rafters.

13. This package will allow a maximum radius of (48' equals 19.22') (14.63 m equals 5.86 m). This radius represents the maximum radius that the cross member will span. This is not a recommended installation location. Install according to the temperature cable manufacturer's recommendations. For a greater radius, the recommendation shown in this manual for temperature cable installation must be used (using field cut, hot rolled sections), however a rafter support package must still be used.

NOTES

GSI Group, LLC Limited Warranty

The GSI Group, LLC ("GSI") warrants products which it manufactures to be free of defects in materials and workmanship under normal usage and conditions for a period of 12 months after sale to the original end-user or if a foreign sale, 14 months from arrival at port of discharge, whichever is earlier. The end-user's sole remedy (and GSI's only obligation) is to repair or replace, at GSI's option and expense, products that in GSI's judgment, contain a material defect in materials or workmanship. Expenses incurred by or on behalf of the end-user without prior written authorization from the GSI Warranty Group shall be the sole responsibility of the end-user.

Warranty Extensions:

The Limited Warranty period is extended for the following products:

	Product	Warranty Period
AP Fans and Flooring	Performer Series Direct Drive Fan Motor	3 Years
	All Fiberglass Housings	Lifetime
	All Fiberglass Propellers	Lifetime
AP and Cumberland	Flex-Flo/Pan Feeding System Motors	2 Years
Cumberland Feeding/Watering Systems	Feeder System Pan Assemblies	5 Years **
	Feed Tubes (1-3/4" and 2.00")	10 Years *
	Centerless Augers	10 Years *
	Watering Nipples	10 Years *
Grain Systems	Grain Bin Structural Design	5 Years
Grain Systems Farm Fans Zimmerman	Portable and Tower Dryers	2 Years
	Portable and Tower Dryer Frames and Internal Infrastructure †	5 Years

* Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 25%
5 to 7 years - end-user pays 50%
7 to 10 years - end-user pays 75%

** Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 50%

† Motors, burner components and moving parts not included. Portable dryer screens included. Tower dryer screens not included.

GSI further warrants that the portable and tower dryer frame and basket, excluding all auger and auger drive components, shall be free from defects in materials for a period of time beginning on the twelfth (12^{th}) month from the date of purchase and continuing until the sixtieth (60^{th}) month from the date of purchase (extended warranty period). During the extended warranty period, GSI will replace the frame or basket components that prove to be defective under normal conditions of use without charge, excluding the labor, transportation, and/or shipping costs incurred in the performance of this extended warranty.

Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH ABOVE. SPECIFICALLY, GSI MAKES NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) PRODUCT MANUFACTURED OR SOLD BY GSI OR (II) ANY ADVICE, INSTRUCTION, RECOMMENDATION OR SUGGESTION PROVIDED BY AN AGENT, REPRESENTATIVE OR EMPLOYEE OF GSI REGARDING OR RELATED TO THE CONFIGURATION, INSTALLATION, LAYOUT, SUITABILITY FOR A PARTICULAR PURPOSE, OR DESIGN OF SUCH PRODUCTS.

GSI shall not be liable for any direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. The sole and exclusive remedy is set forth in the Limited Warranty, which shall not exceed the amount paid for the product purchased. This warranty is not transferable and applies only to the original end-user. GSI shall have no obligation or responsibility for any representations or warranties made by or on behalf of any dealer, agent or distributor.

GSI assumes no responsibility for claims resulting from construction defects or unauthorized modifications to products which it manufactured. Modifications to products not specifically delineated in the manual accompanying the equipment at initial sale will void the Limited Warranty.

This Limited Warranty shall not extend to products or parts which have been damaged by negligent use, misuse, alteration, accident or which have been improperly/inadequately maintained. This Limited Warranty extends solely to products manufactured by GSI.

Prior to installation, the end-user has the responsibility to comply with federal, state and local codes which apply to the location and installation of products manufactured or sold by GSI.

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This equipment shall be installed in accordance with the current installation codes and applicable regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

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