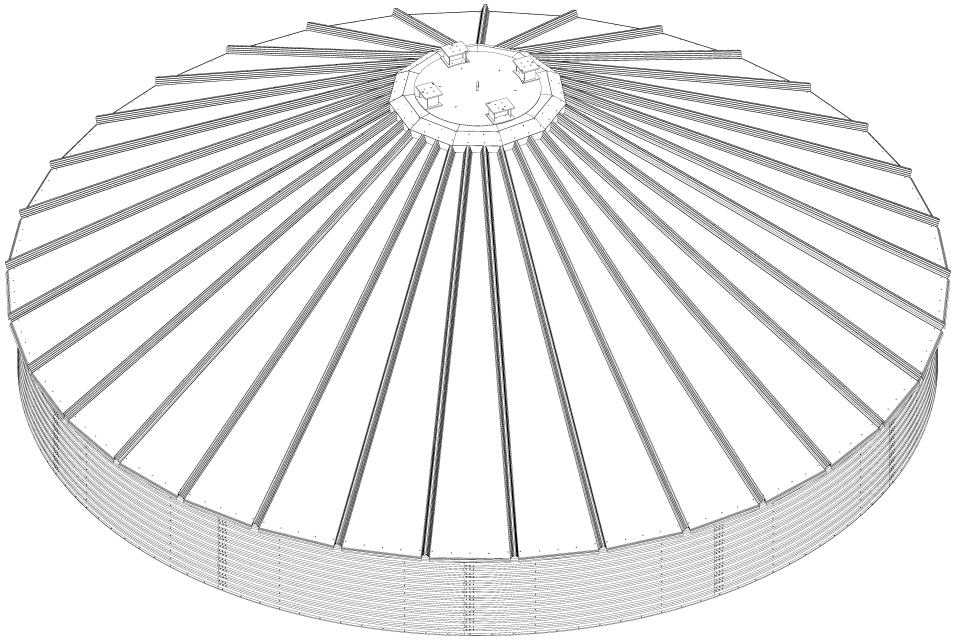


33' Beta Roof Assembly

Installation Manual

PNEG-2243

Version: 2.0

Date: 04-09-21

PNEG-2243

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

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. Read and save these instructions.

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-0001-4

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.**

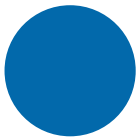
WARNING — This symbol indicates a potentially hazardous situation which, if not avoided, **can result in serious injury or death.**

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

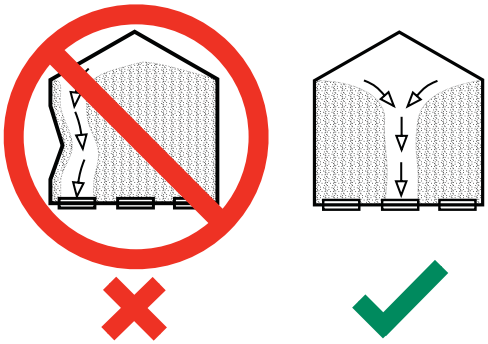
Prevent Roof Damage Due to Vacuum Pressure

- 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

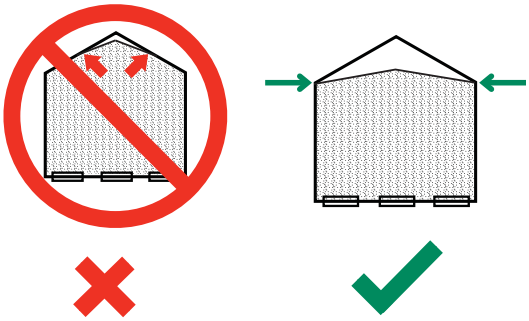
Stay Clear of Hoisted Equipment

- 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-0058-2

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.

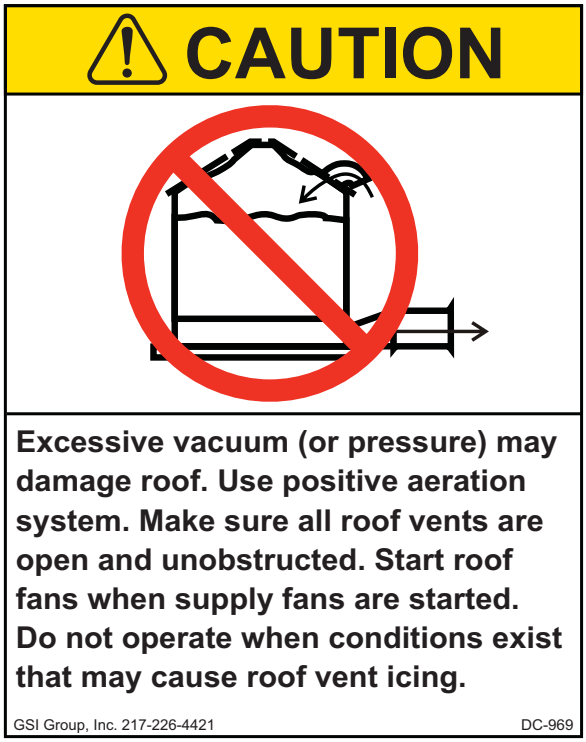
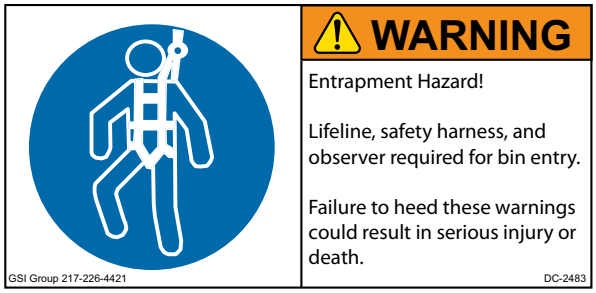
Date	*Employee Name*	*Supervisor Name*

ST-0007

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**
On bin doors and roof hatch covers	**DC-2483**		**Warning Entrapment Hazard**

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

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

Installing the Roof Rafter Bracket to the Top Outside Stiffener

The roof rafter bracket is the vertical member which supports the rafter. It is installed to the inside perimeter of the sidewall sheet at the same time as the top outside stiffener.

What You Should Know

NOTE: *Do not tighten the nuts (6) until all hardware has been installed and attaching the rafter bracket to the sidewall and the outside stiffener.*

1. From the inside perimeter of the sidewall, place the 3/8" x 1-1/2" flange bolt (1) to attach the rafter bracket (19) to located the top outside stiffener through the hole located approximately 4" down from the top of the sidewall sheet (47).

   NOTE: *Install the bolts (1) from the inside to the outside of the bin, passing through the rafter bracket (19), corrugation spacer (13), sealing washer (10), sidewall sheet (47), outside stiffener and flange nut (6).*

   NOTE: *Make sure to install the bolts (1) through every second hole from the top of the rafter bracket (19).*

2. On the inside perimeter, install a sealing washer (10), corrugation spacer (13) and rafter bracket (19).
3. On the outside perimeter, install the outside top ring stiffener.
4. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.* After tightening, repeat this process to install the remaining rafter brackets (19).

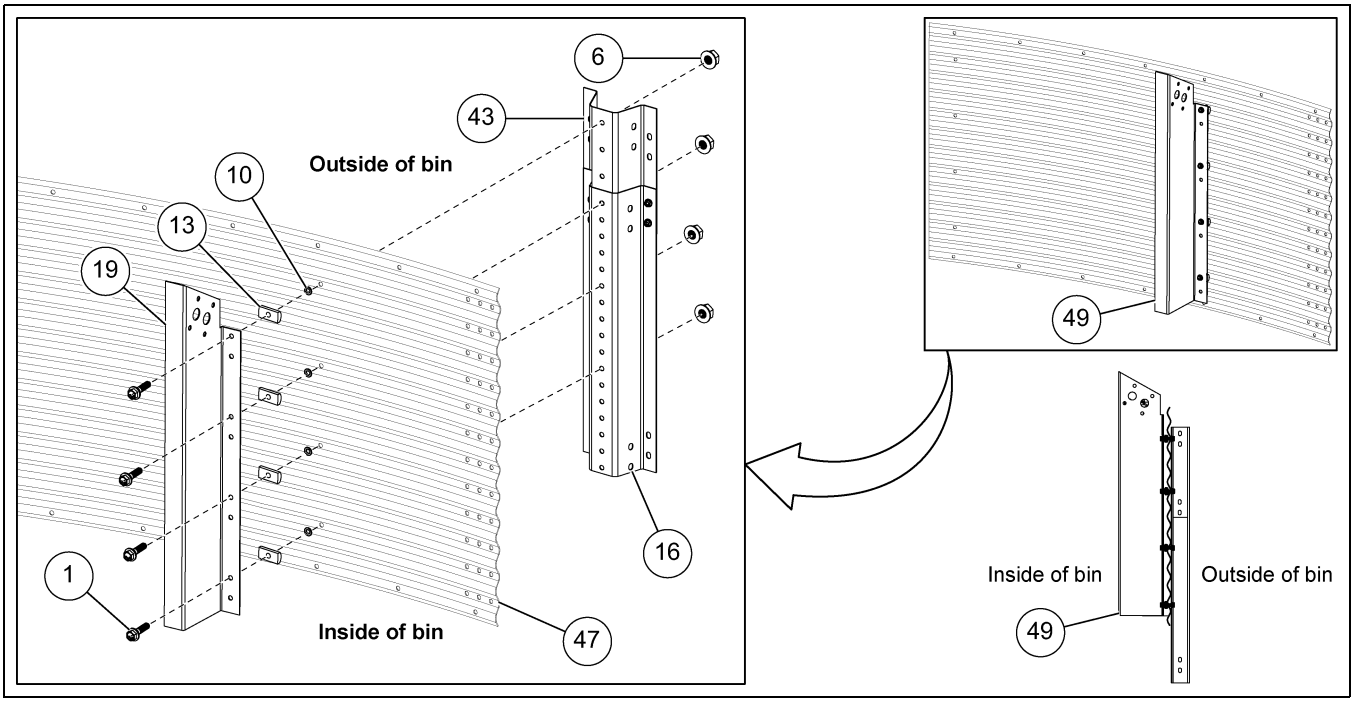


Figure 4A *Installing the Roof Rafter Bracket to the Top Outside Stiffener (Universal Stiffened Bins) - 2.66"*

Ref #	Part #	Description
1	S-7488	3/8" x 1-1/2" Flange Bolt with Sealing Washer
6	S-9426	3/8" Flange Nut
10	S-3558	Sealing Washer
13	S-7041	Corrugation Spacer
16	SS-7064XX	One Ring Offset Stiffener

Ref #	Part #	Description
19	CTR-1364	Roof Rafter Bracket
43	SS-7066XX	One Ring Top Stiffener
47		Sidewall Sheet
49		Assembled View

Installing the Roof Rafter Bracket to the Top Outside Stiffener (Continued)

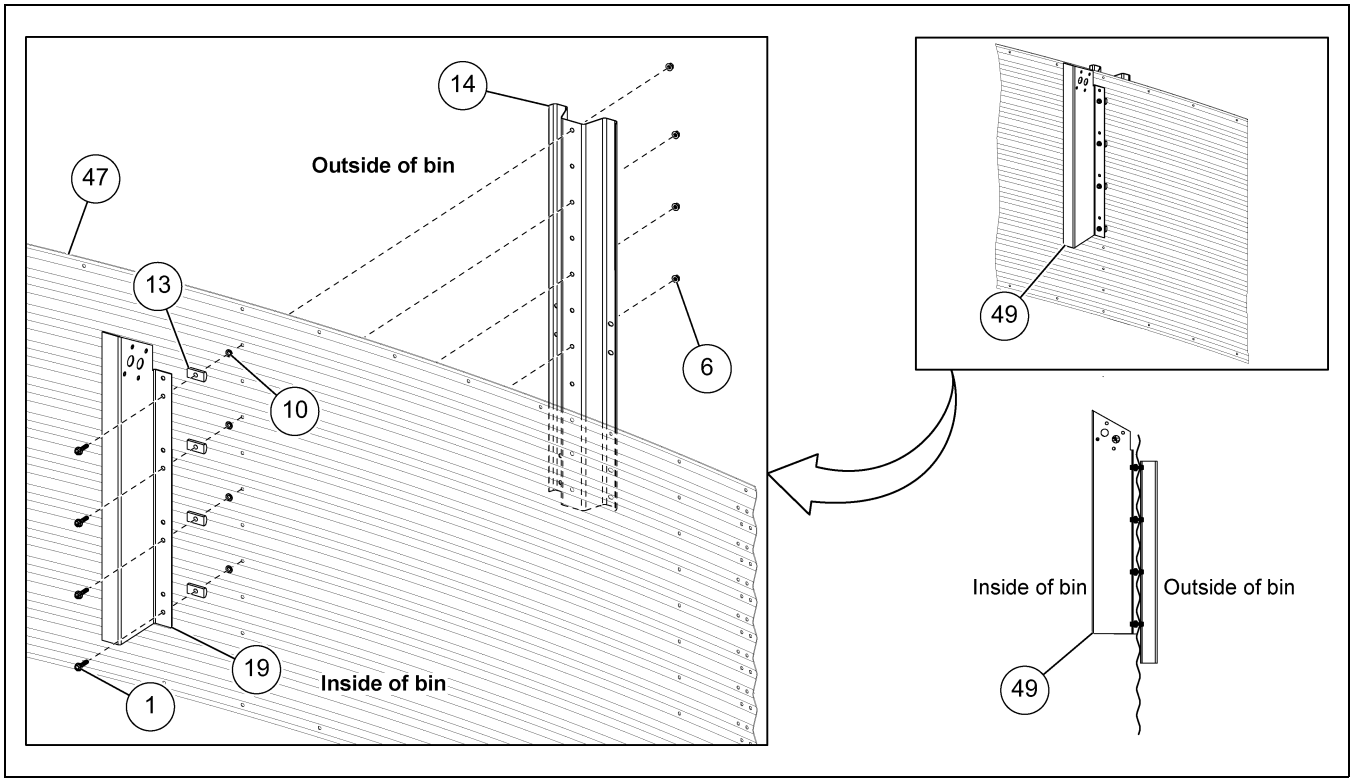


Figure 4B *Installing the Roof Rafter Bracket to the Top Outside Stiffener (FC Stiffened Bins) - 4.00"*

Ref #	Part #	Description
1	S-7488	3/8" x 1-1/2" Flange Bolt with Sealing Washer
6	S-9426	3/8" Flange Nut
10	S-3558	Sealing Washer
13	S-7041	Corrugation Spacer
14	FC-42066XX	One Ring Top Stiffener
19	CTR-1364	Roof Rafter Bracket
47		Sidewall Sheet
49		Assembled View

Installing the Roof Rafter Bracket to the Top Outside Stiffener (Continued)

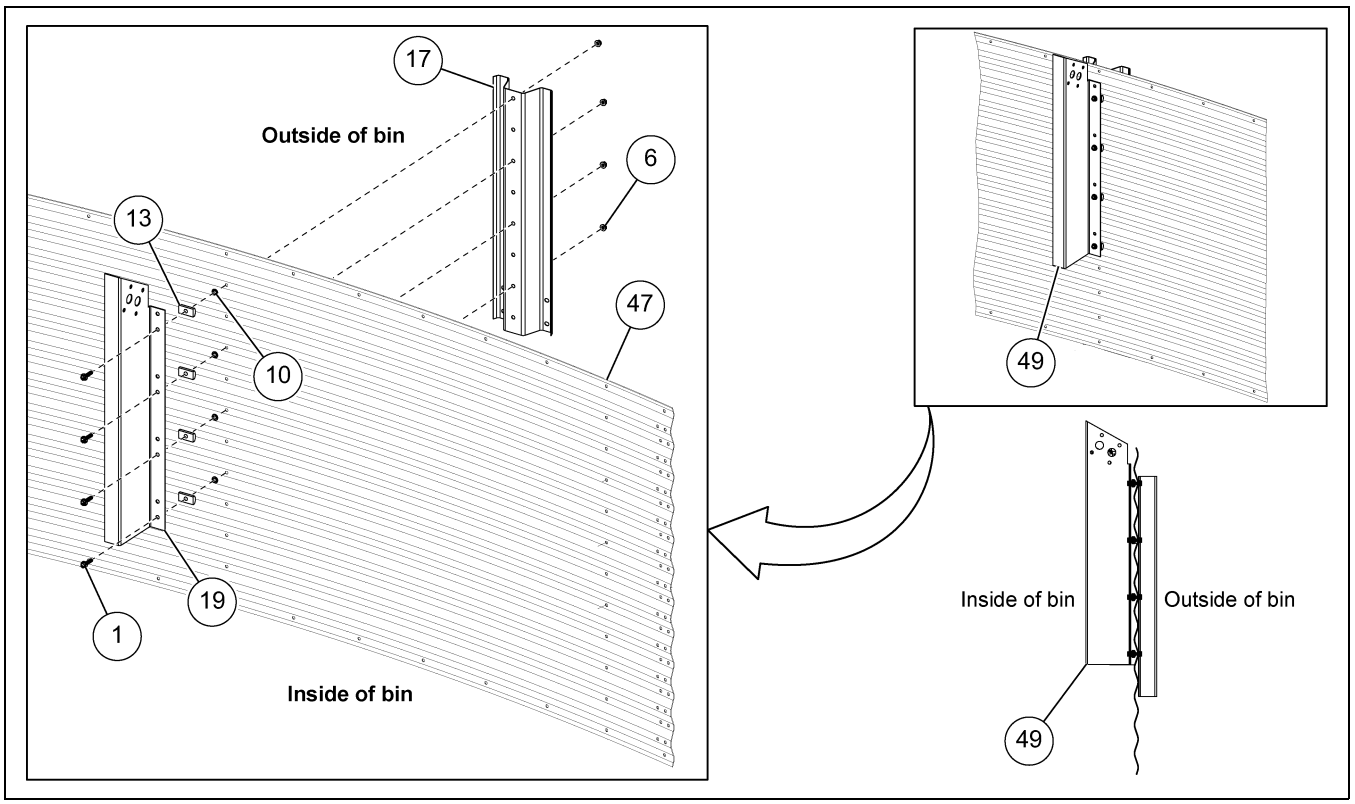


Figure 4C *Installing the Roof Rafter Bracket to the Top Outside Stiffener (40-Series Stiffened Bins) - 4.00"*

Ref #	Part #	Description
1	S-7488	3/8" x 1-1/2" Flange Bolt with Sealing Washer
6	S-9426	3/8" Flange Nut
10	S-3558	Sealing Washer
13	S-7041	Corrugation Spacer
17	CTS-4016XX	One Ring Top Stiffener
19	CTR-1364	Roof Rafter Bracket
47		Sidewall Sheet
49		Assembled View

Installing the Eave Clip and Intermediate Eave Angle to the Sidewall Sheet

The eave clips and intermediate eave angles are installed onto the sidewall sheet to assemble the roof panels.

1. Install the eave clips (44 or 45) to the sidewall sheet (47) with 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7).

   NOTE: *Make sure to install the eave clips (44 or 45) to the inside of the sidewall sheet (47).*

2. Install the intermediate eave angle (18) to the sidewall sheet (47) with 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7) between the two eave clips (44 or 45).

   NOTE: *Make sure to install the intermediate eave angle (18) to the inside of the sidewall sheet (47) for 2.66" bins.* *(See Figure 4D.)*

   NOTE: *Make sure to install the intermediate eave angle (18) to the outside of the sidewall sheet (47) for 4.00" bins.* *(See Figure 4E on Page 18.)*

3. Repeat this process to install the remaining eave clips (44 or 45) and intermediate eave angles (18).

4. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

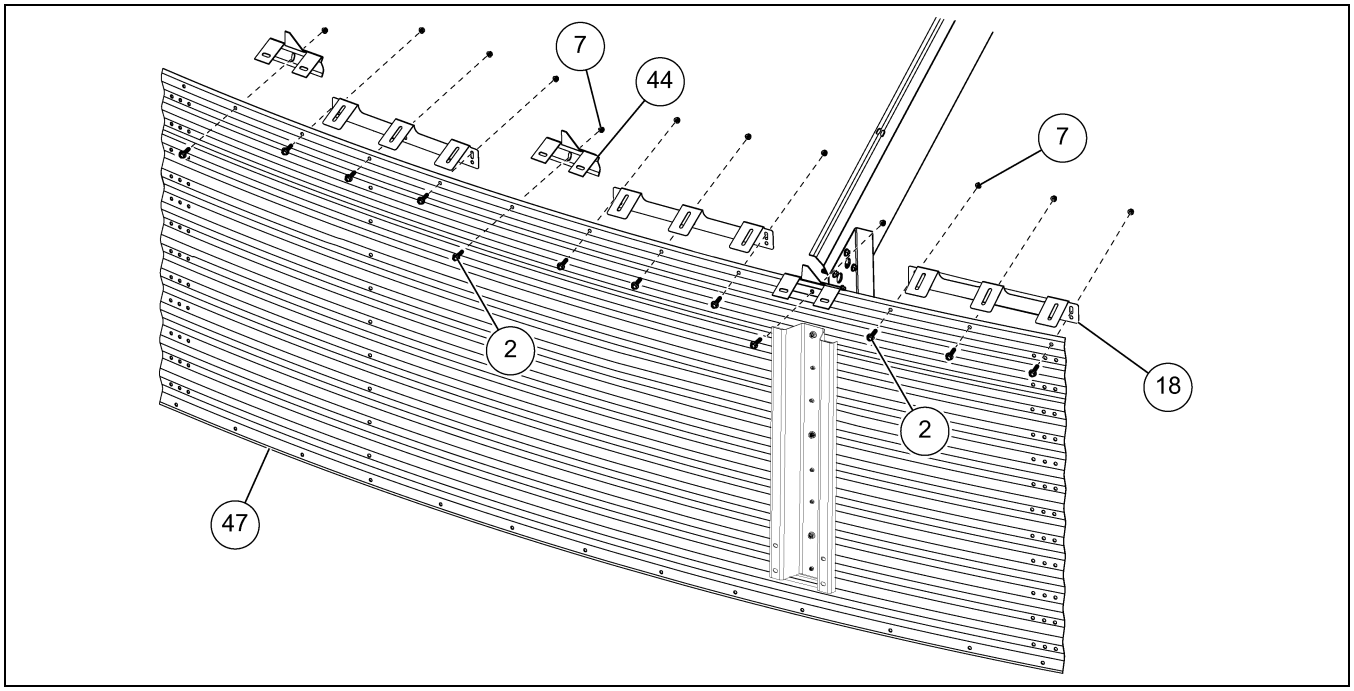


Figure 4D *Installing the Eave Clip and Eave Angle to the Sidewall Sheet (2.66")*

Ref #	Part #	Description
2	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
7	S-3611	5/16" Flange Nut
18	CTR-1183	Intermediate Eave Angle
44	CRP-5325	Reverse Rolled Eave Clip
47		Sidewall Sheet

Installing the Eave Clip and Intermediate Eave Angle to the Sidewall Sheet (Continued)

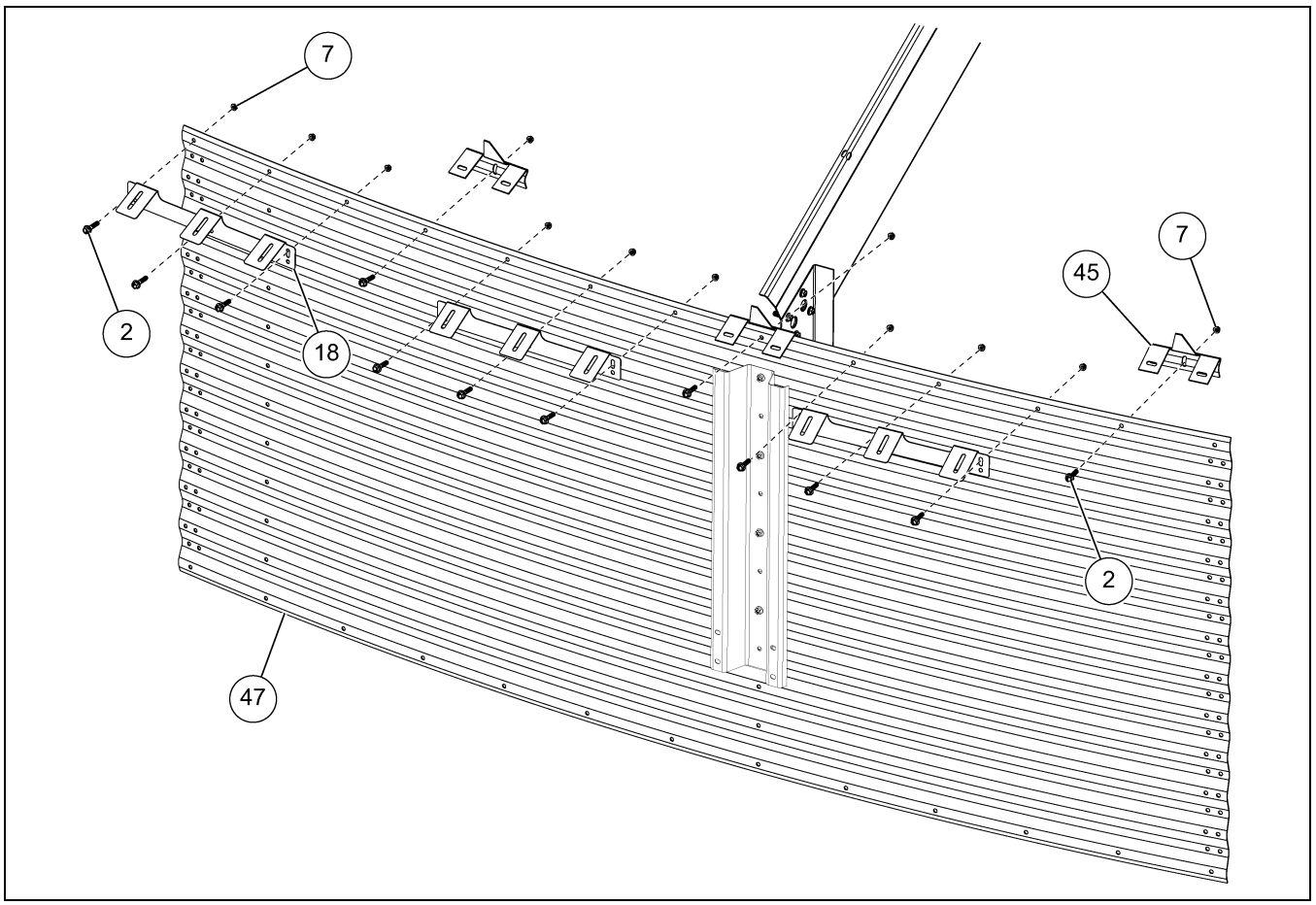


Figure 4E *Installing the Eave Clip and Eave Angle to the Sidewall (4.00")*

Ref #	Part #	Description
2	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
7	S-3611	5/16" Flange Nut
18	CTR-1183	Intermediate Eave Angle
45	R-007-1	Standard Rolled Eave Clip
47		Sidewall Sheet

Attaching the Eave Bracket to the Inside Stiffener

Eave brackets secure the roof rafter to the sidewall.

Before You Begin

Make sure all the inside stiffeners are installed to the sidewall.

1. Install the eave bracket (15) to the inside stiffener (12) flanges using 3/8" x 1-1/2" flange bolts (1) and 3/8" flange nuts (6). *(See Figure 4F.)*
2. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

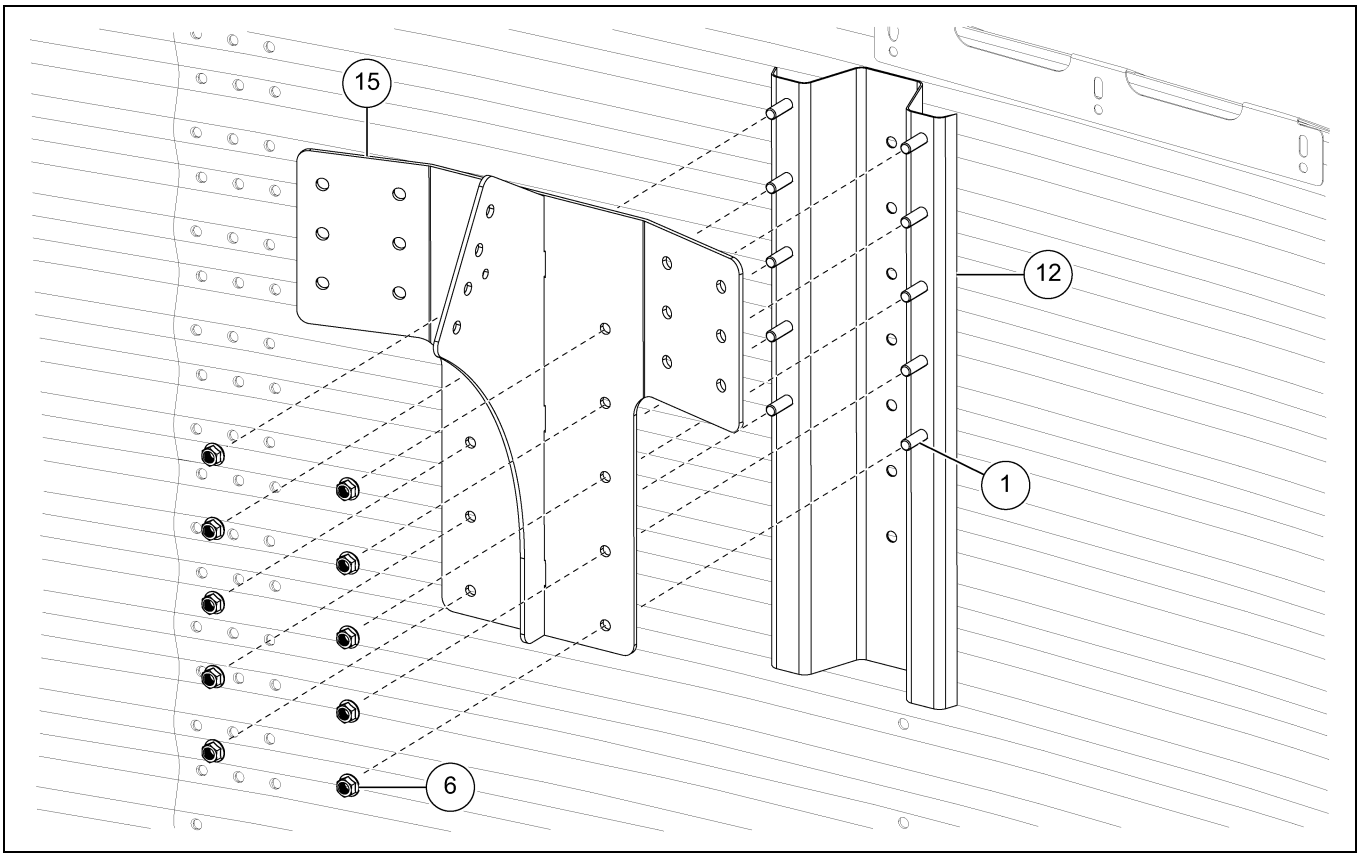


Figure 4F *Attaching the Eave Bracket to the Inside Stiffener*

Ref #	Part #	Description
1	S-7488	3/8" x 1-1/2" Flange Bolt with Sealing Washer
6	S-9426	3/8" Flange Nut
12	CTS-4012XX	Inside Stiffener
15	CTR-1380	Eave Bracket

After You Finish

Repeat this process for the remaining eave brackets.

Connecting the Compression Member to the Eave Bracket

Compression members are installed to the eave bracket around the inside of the bin.

Before You Begin

Ensure all eave clips, intermediate eave angle, inside stiffeners and eave brackets are installed before proceeding.

What You Should Know

IMPORTANT: *Install bolts with bolt head on the backside of the eave bracket as shown.*

1. Lift and support the compression member (20) against the outside mating surface of the eave bracket (15). *(See Figure 4G.)*
2. Install 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8) to each end of the compression member (20).
3. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

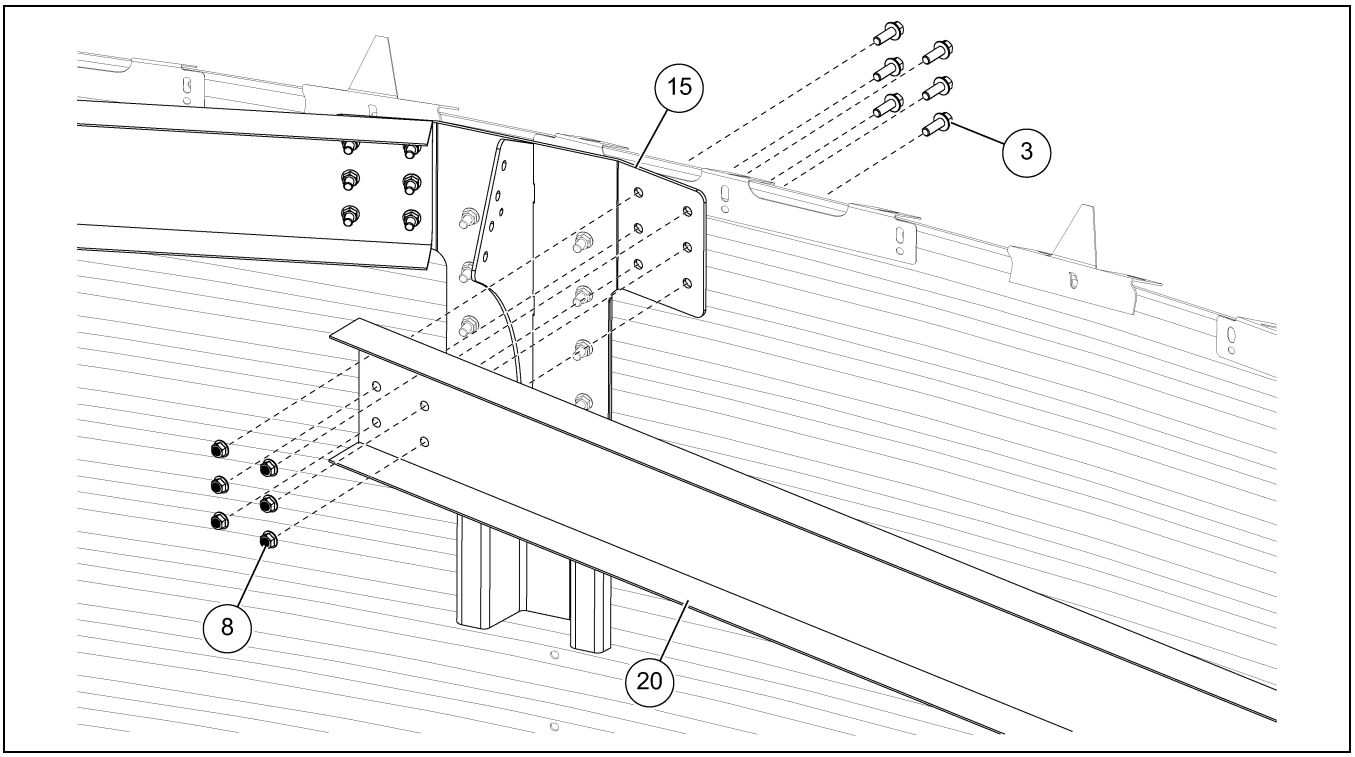


Figure 4G *Installing the Compressoin Member to the Eave Bracket*

Ref #	Part #	Description
3	S-10250	7/16" x 1-1/4" Flange Bolt
8	S-10251	7/16" Flange Nut
15	CTR-1380	Eave Bracket
20	CTR-1707	Compression Member

After You Finish

Repeat this process for the remaining compression members.

Attaching the Center Collar Rafter Clips to the Rafter

Center collar rafter clips secure the A-frame rafter sections to the center collar.

What You Should Know

Each roof rafter receives two center collar rafter clips, identified as the left center collar rafter clip (24) and the right center collar rafter clip (25).

1. Use the rafter (21) end with four holes for installing the center collar rafter clips (24 and 25).

   NOTE: *Make sure that the rafter is properly oriented, so that the roof panels holes in the rafter are at the top before installing the center collar rafter clips.*

2. Install the left center collar rafter clip (24) and right center collar rafter clip (25) to each side of the roof rafter (21) using four 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8). *(See Figure 4H.)*

   NOTE: *Install flange bolts only to the top two holes in the center collar rafter clips. Leave the bottom two holes to install the roof panel clips later.*

3. Tighten all the hardware to the recommended torque specification. See bolt torque specifications *on Page 13.*

   NOTE: *Make sure to install and tighten the bolts and nuts on the top two holes of the center collar clips securing the rafter. The bottom two holes will be bolted when the roof panel clips are assembled on the roof.*

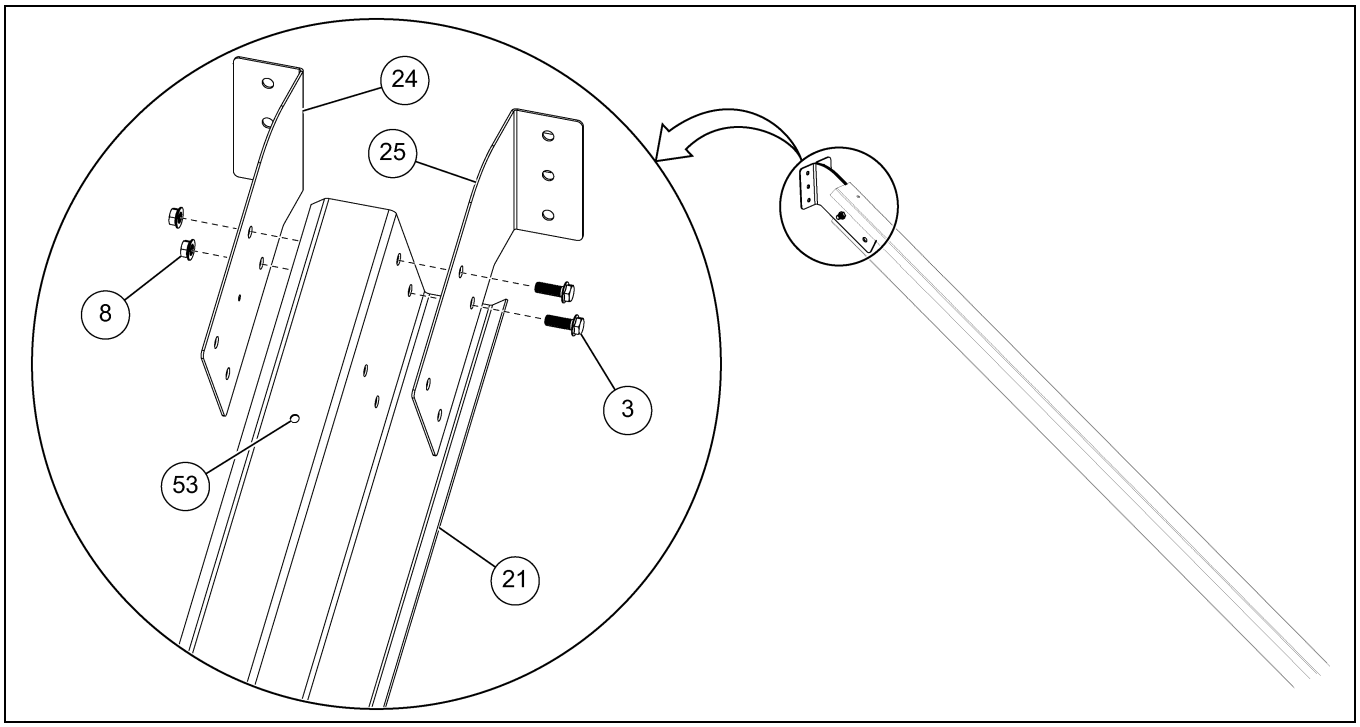


Figure 4H *Installing the Center Collar Rafter Clips to the Rafter*

Ref #	Part #	Description
3	S-10250	7/16" x 1-1/4" Flange Bolt
8	S-10251	7/16" Flange Nut
21	CTR-1708	Roof Rafter

Ref #	Part #	Description
24	CTR-1455	Left Center Collar Rafter Clip
25	CTR-1456	Right Center Collar Rafter Clip
53		Roof Panel Hole

After You Finish

Repeat this process to install the center collar rafter clips to the remaining roof rafters.

Assembling the Mounting Brackets to the Center Collar

There will be six mounting brackets that are needs to be assembled to the center collar before it is lifted onto the roof with the center pole. The center cap plate will be installed onto these mounting brackets later.

1. Locate a set of four holes on the bottom flange of the center collar (26) and place the mounting bracket (27) to the underside of the center collar.
2. Install 3/8" x 1-1/2" flange bolts (4) and 3/8" flange nuts (6) to secure the mounting bracket (27) with the center collar (26). *(See Figure 4I.)*
3. Repeat the procedure to continue installing all the remaining mounting brackets (27) to the center collar (26).
4. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

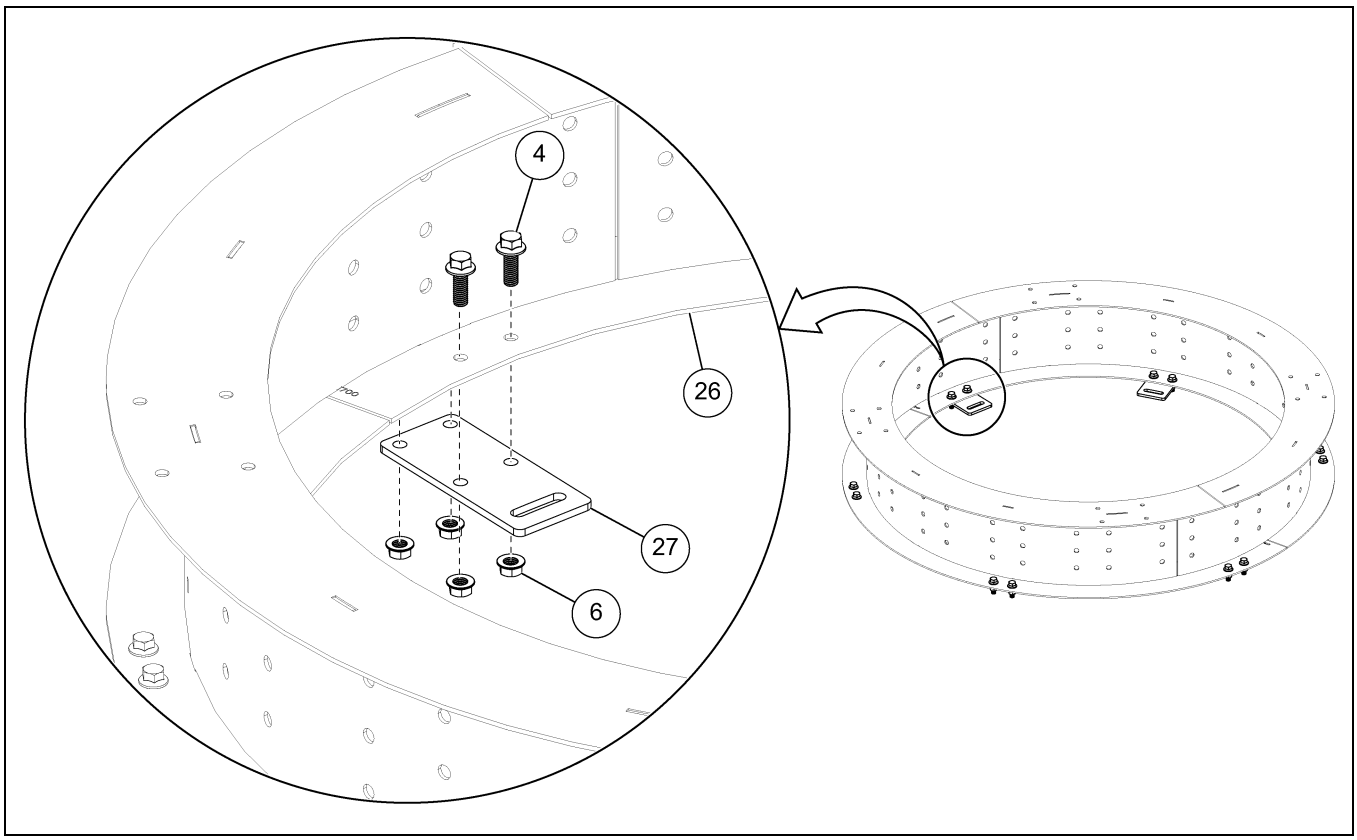


Figure 4I *Assembling the Mounting Brackets to the Center Collar*

Ref #	Part #	Description
4	S-7486	3/8" x 1-1/2" Flange Bolt
6	S-9426	3/8" Flange Nut
26	CTR-1717	Center Collar
27	CTR-1525	Mounting Bracket

Center Collar Placement

See Figure 4J gives the approximate height needed to install the center collar.

With one sidewall ring in place, use the center support and position the center collar at the height specified, measuring from the bottom of the center collar to the bottom of the sidewall sheet as shown in *Figure 4J*. If additional rings are required for construction purposes, add 44" for each additional ring.

NOTE: *It is better to set the center collar a little too high. Do not set the center collar too low.*

NOTE: *Make sure the center pole is adjustable up and down.*

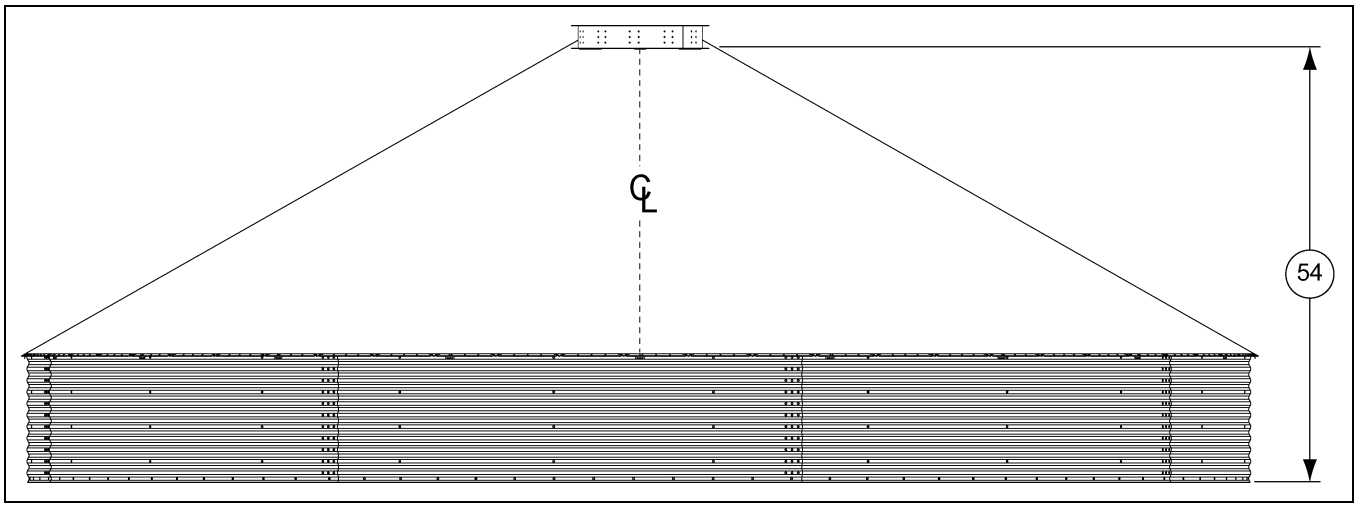


Figure 4J *Center Collar Placement*

Ref #	Description
54	139" (11' - 7") (353.06 cm) from foundation to the bottom of the center collar on 33' diameter bin

Attaching the Rafter Assembly to the Center Collar

The upper portion of the roof rafter assembly must be installed to the center collar, so that it supports the center collar and the main roof structure.

Before You Begin

Make sure that the rafter assemblies are installed to the roof rafter bracket. Read and understand the safe and proper lifting procedures needed to install the rafters.

1. Carefully lift the rafter assembly (55) into position and align with the proper holes on the center collar (26).
2. Install 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8) to securing the rafter assembly (55) to the center collar (26). *(See Figure 4K.)*
3. Before continuing with the remaining rafter assemblies, secure the rafter (55) to the eave bracket. See attaching the rafter to the eave bracket *on Page 25.*
4. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

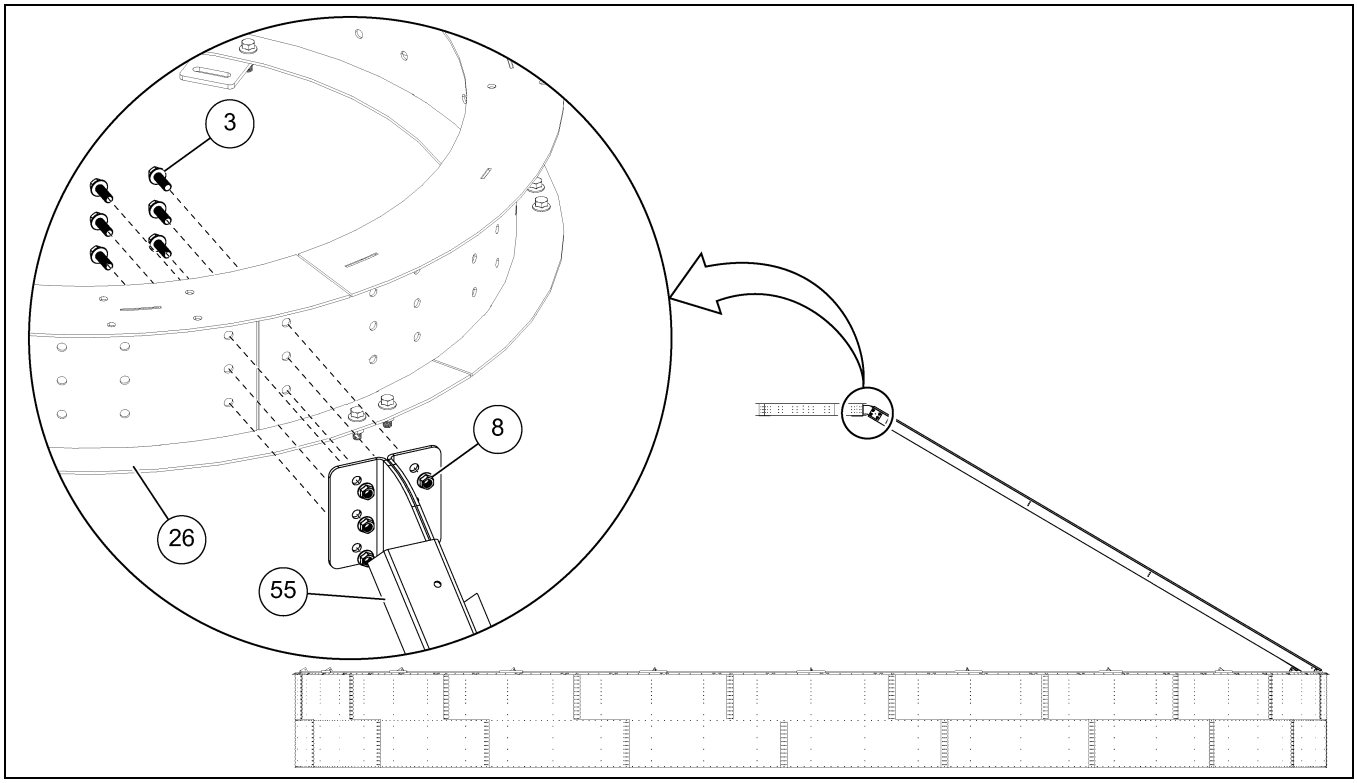


Figure 4K *Attaching the A-Frame to the Center Collar*

Ref #	Part #	Description
3	S-10250	7/16" x 1-1/4" Flange Bolt
8	S-10251	7/16" Flange Nut
26	CTR-1717	Center Collar
55		Rafter Assembly

Attaching the Rafter to the Eave Bracket

Install the lower portion of the rafter assembly to the eave bracket.

1. Align the holes in the end of the rafter assembly with the holes in the eave bracket. *(See Figure 4L.)*

   NOTE: *Use the alignment hole (56) in the rafter to help align the holes with a punch tool.*

2. Install 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8) to securing the rafter assembly (55) to the eave bracket (15).

3. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

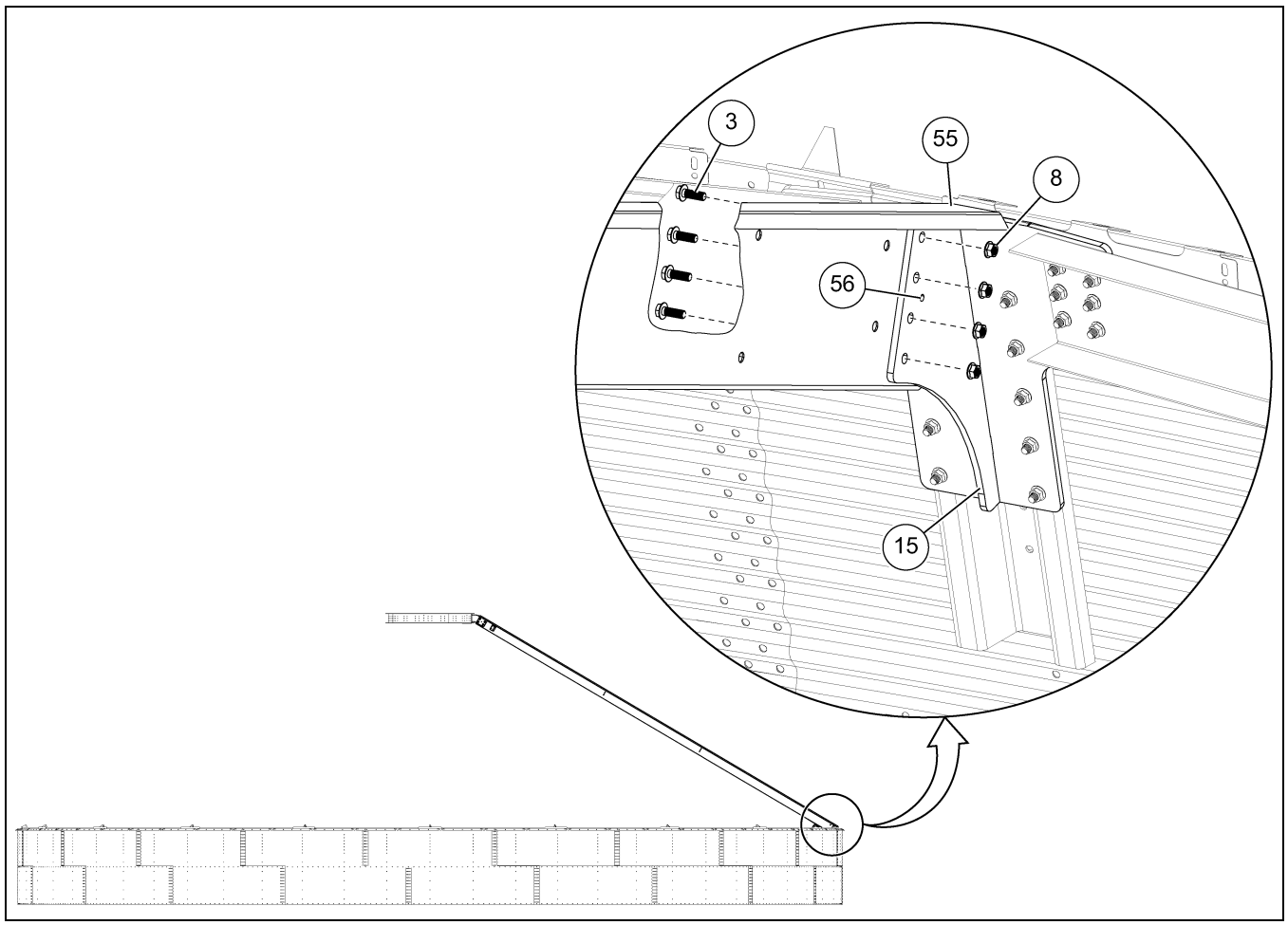


Figure 4L *Attaching the Rafter to the Eave Bracket*

Ref #	Part #	Description
3	S-10250	7/16" x 1-1/4" Flange Bolt
8	S-10251	7/16" Flange Nut
15	CTR-1380	Eave Bracket

Ref #	Description
55	Rafter Assembly
56	Hole for Alignment Tool

After You Finish

Continue to install the next rafter assembly to the center collar and then to the eave bracket until all the rafter assemblies are installed.

Installing the Lower Purlin

Purlins are horizontal members between the rafters that give support to the roof structure. The length of the purlin determines its location on the rafter assembly. Lower purlin is located first from the eave.

Before You Begin

All the rafter assemblies must be installed and secured to both the center collar and eave bracket.

What You Should Know

Purlins are installed between two rafters.

There are also two different purlin clips, a left purlin clip (31) and a right purlin clip (30). The left purlin clip has seven holes when compared to the right, which has six holes along the purlin and purlin clip mating surface.

IMPORTANT: *Do not drill any additional holes on the purlin. Install the flange bolts and flange nuts based on the number of holes in the purlins.*

NOTE: *The seventh hole located in the center of the left purlin clip (31) is for identification purposes only. No hardware is used in this location.*

1. Attach a right purlin clip (30) and a left purlin clip (31) to the right side roof rafter (23) using three 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8).
2. Attach a right purlin clip (30) and a left purlin clip (31) to the left side roof rafter (22) using three 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8). *(See Figure 4M on Page 27.)*
3. Position the purlin (28) between the roof rafters (22 and 23) and install to the left and right purlin clips (30 and 31) using eight 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8).

   NOTE: *Make sure that the roof panel holes in the purlin are at the top and the notch in the purlin is facing the right side roof rafter (23).*
4. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

Installing the Lower Purlin (Continued)

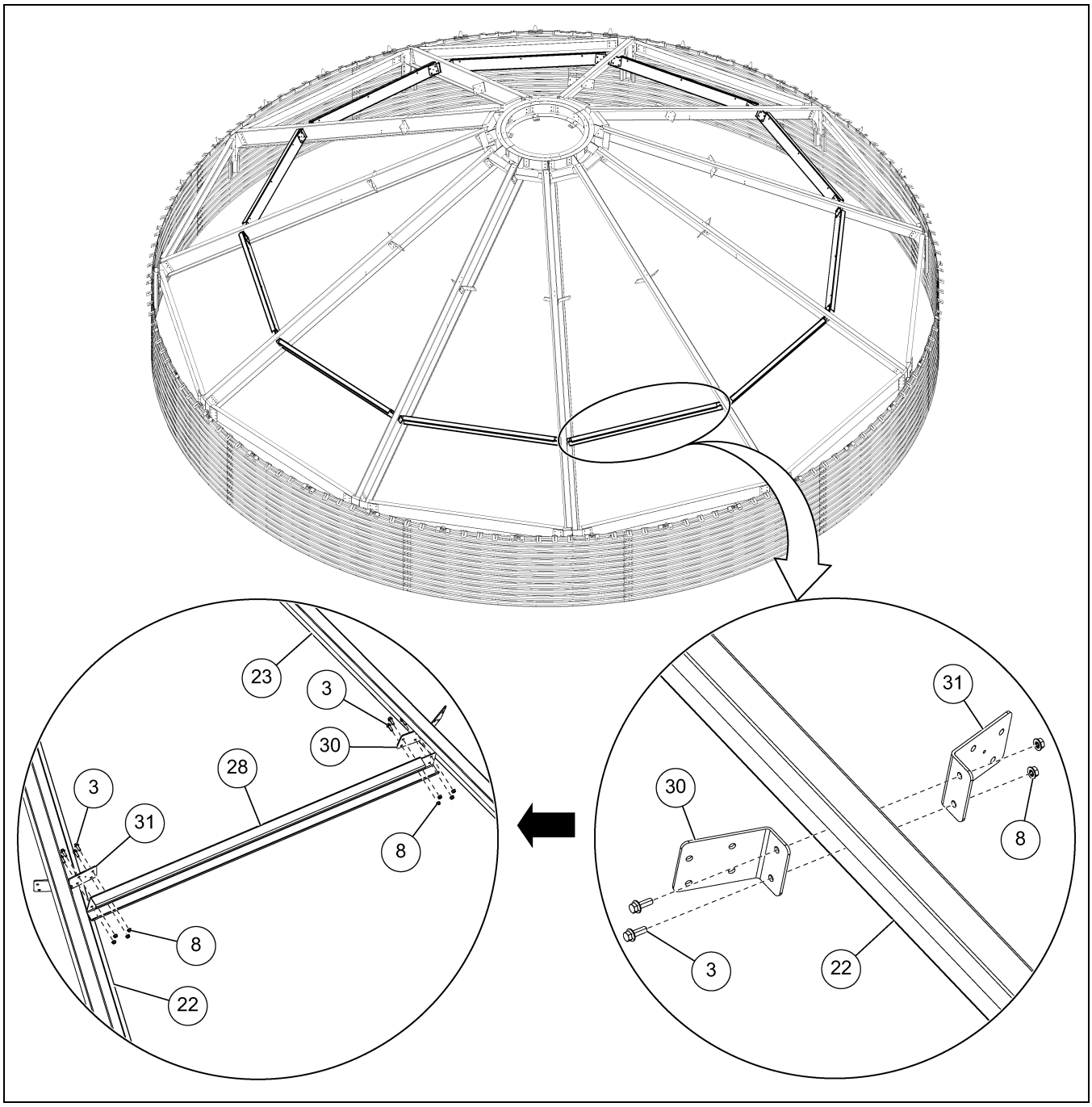


Figure 4M *Installing the Lower Purlin*

Ref #	Part #	Description
3	S-10250	7/16" x 1-1/4" Flange Bolt
8	S-10251	7/16" Flange Nut
22	CTR-1708	Left Side Roof Rafter
23	CTR-1708	Right Side Roof Rafter

Ref #	Part #	Description
28	CTR-1709	Lower Purlin
30	CTR-1714	Right Purlin Clip
31	CTR-1715	Left Purlin Clip

Installing the Upper Purlin

Purlins are horizontal members between the rafters that give support to the roof structure. The length of the purlin determines its location on the rafter assembly. Upper purlin is located second from the eave.

Before You Begin

All the rafter assemblies must be installed and secured to both the center collar and eave bracket.

What You Should Know

Purlins are installed between two rafters.

There are also two different purlin clips, a left purlin clip (31) and a right purlin clip (30). The left purlin clip has seven holes when compared to the right, which has six holes along the purlin and purlin clip mating surface.

IMPORTANT: *Do not drill any additional holes on the purlin. Install the flange bolts and flange nuts based on the number of holes in the purlins.*

NOTE: *The seventh hole located in the center of the left purlin clip (31) is for identification purposes only. No hardware is used in this location.*

1. Attach a right purlin clip (30) and a left purlin clip (31) to the right side roof rafter (23) using three 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8).
2. Attach a right purlin clip (30) and a left purlin clip (31) to the left side roof rafter (22) using three 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8). *(See Figure 4N on Page 29.)*
3. Position the purlin (29) between the roof rafters (22 and 23) and install to the left and right purlin clips (30 and 31) using eight 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8).

   NOTE: *Make sure that the roof panel holes in the purlin are at the top and the notch in the purlin is facing the right side roof rafter (23).*
4. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

Installing the Upper Purlin (Continued)

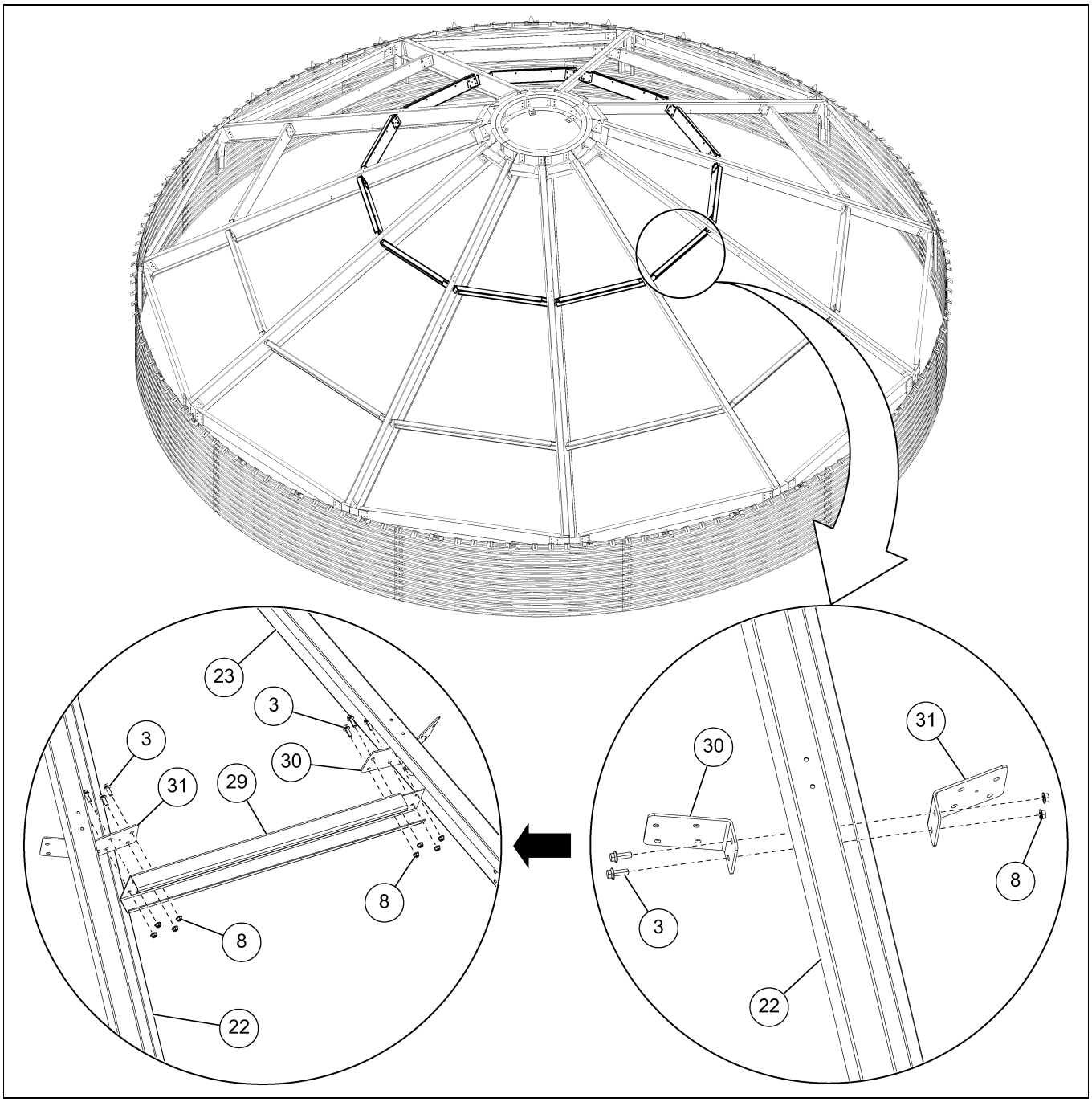


Figure 4N *Installing the Upper Purlin*

Ref #	Part #	Description
3	S-10250	7/16" x 1-1/4" Flange Bolt
8	S-10251	7/16" Flange Nut
22	CTR-1708	Left Side Roof Rafter
23	CTR-1708	Right Side Roof Rafter

Ref #	Part #	Description
29	CTR-1710	Upper Purlin
30	CTR-1714	Right Purlin Clip
31	CTR-1715	Left Purlin Clip

Assembling the Roof Panel Clips

The roof panel clips provide support to the roof panels at the peak and are installed nearest to the center collar.

Before You Begin

Make sure all the rafter assemblies are installed and secured to both the center collar and roof rafter bracket.

What You Should Know

Roof panel clips are installed between the two rafter assemblies.

1. Attach one roof panel clip (32) to each side of the left side roof rafter (22) using two 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8).
2. Attach the next roof panel clip (32) to the right side of the right side roof rafter (23) along with the roof panel clip (32) on the left using 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8). *(See Figure 4O.)*

   NOTE: *Make sure that the roof panel holes in the roof panel clip are at the top and the notch in the roof panel clip is facing the right side roof rafter.*
3. Continue to install the remaining roof panel clips to each side of the roof rafters.
4. Tighten all the hardware to the recommended torque specifications only after the roof panels are installed. See bolt torque specifications *on Page 13.*

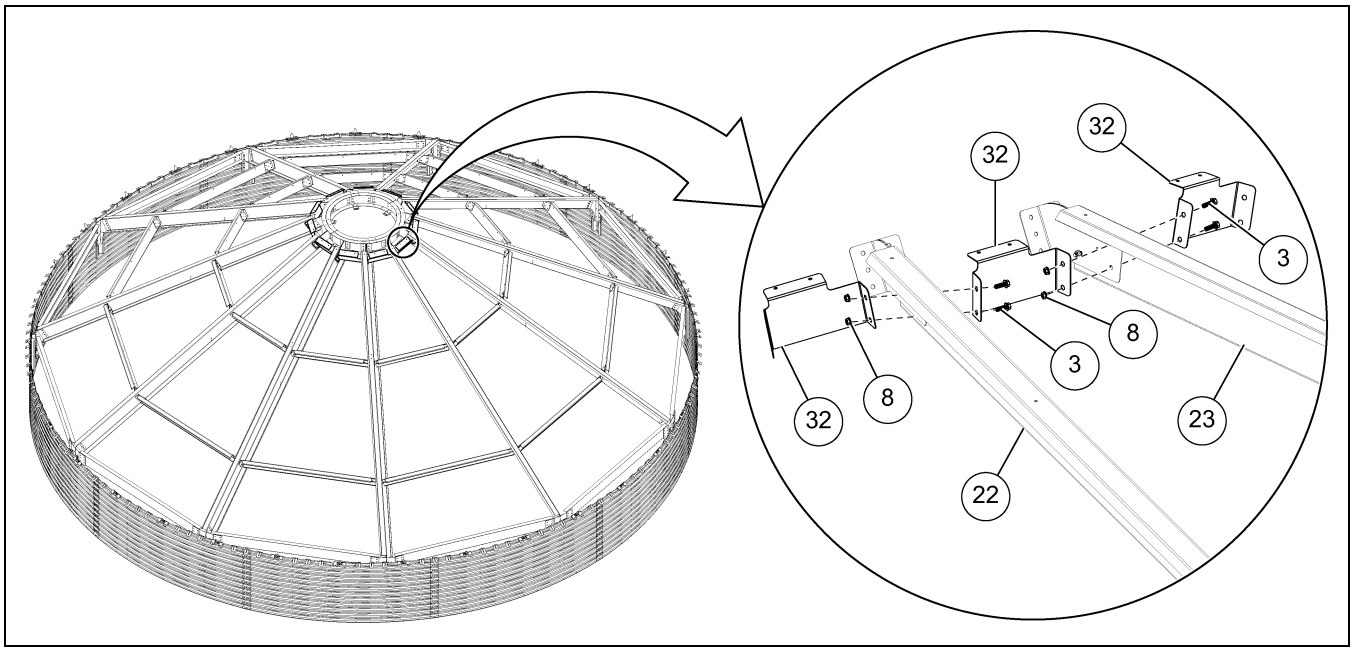


Figure 4O *Installing the Roof Panel Clip to the Rafter Assembly*

Ref #	Part #	Description
3	S-10250	7/16" x 1-1/4" Flange Bolt
8	S-10251	7/16" Flange Nut
22	CTR-1708	Left Side Roof Rafter

Ref #	Part #	Description
23	CTR-1708	Right Side Roof Rafter
32	CTR-1711	Roof Panel Clip

After You Finish

Repeat this procedure for the remaining roof panel clips.

Installing the Roof Panel Support Clips

The roof panel clips provide support to the roof panels.

What You Should Know

The roof panel support clips are installed to the purlins before installing the roof panels.

1. Install the roof panel support clip (33) to the outer surface of the lower purlin (28) using 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8).

   NOTE: *Make sure the roof panel holes in the roof panel support clips are at the top.*

2. Install the roof panel support clip (34) to the outer surface of the upper purlin (29) using 7/16" x 1-1/4" flange bolts (3) and 7/16" flange nuts (8). *(See Figure 4P.)*

   NOTE: *Make sure the roof panel holes in the roof panel support clips are at the top.*

3. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

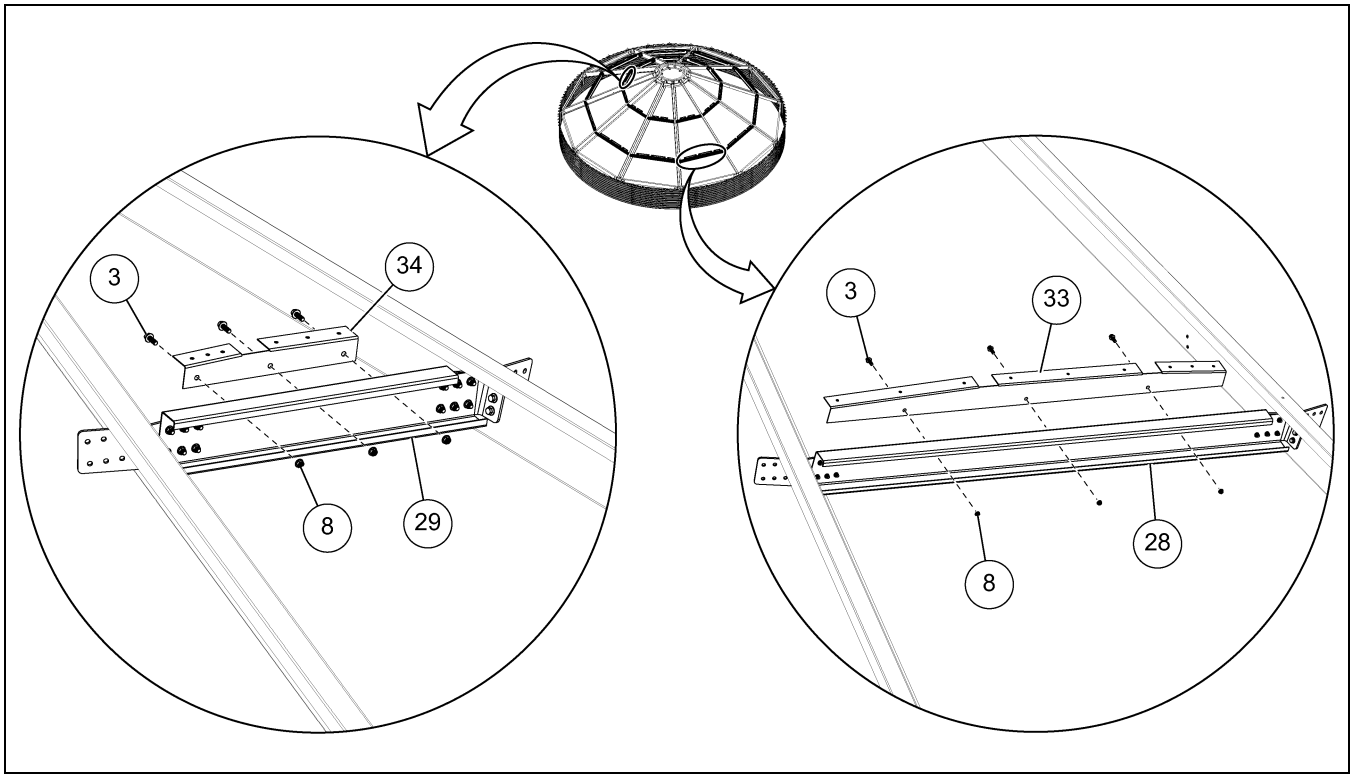


Figure 4P *Installing the Roof Panel Support Clips to the Purlins*

Ref #	Part #	Description
3	S-10250	7/16" x 1-1/4" Flange Bolt
8	S-10251	7/16" Flange Nut
28	CTR-1709	Lower Purlin

Ref #	Part #	Description
29	CTR-1710	Upper Purlin
33	CTR-1712	Roof Panel Support Clip
34	CTR-1713	Roof Panel Support Clip

After You Finish

Repeat this procedure for installing all the remaining roof panel support clips.

Installing the Temperature Cable Support Brackets (Optional)

Before You Begin

This information is provided solely for the purpose of facilitating proper support bracket placement. It is fully the responsibility of the dealer, customer, contractor or said agent of such parties to confirm the details of the system to be used. GSI is not responsible for the effectiveness or performance of any temperature cable monitoring system or layout.

NOTE: *All temperature cables must end above any unload equipment and should be secured properly with twines. Do not allow the cables to become tangled in the unload equipment.*

What You Should Know

The temperature cable support channels and temperature cable brackets can be installed after the rafters and purlins are installed onto the roof. The temperature cable support channels are installed between two rafter assemblies.

1. Attach a left temperature cable support angle (36) to the left side rafter (21) and a right temperature cable support angle (41) to the right side rafter (21) as shown using 3/8" x 1-1/2" flange bolts (1) and 3/8" flange nuts (6).
2. Attach the temperature cable support channel (35) to the temperature cable support angles (36 and 41) using 3/8" x 1-1/2" flange bolts (1) and 3/8" flange nuts (6).
3. Install the temperature cable hanging bracket (37) to the center of the temperature cable support channel (35) using 3/8" x 1-1/2" flange bolts (1) and 3/8" flange nuts (6) as shown in *Figure 4Q.*

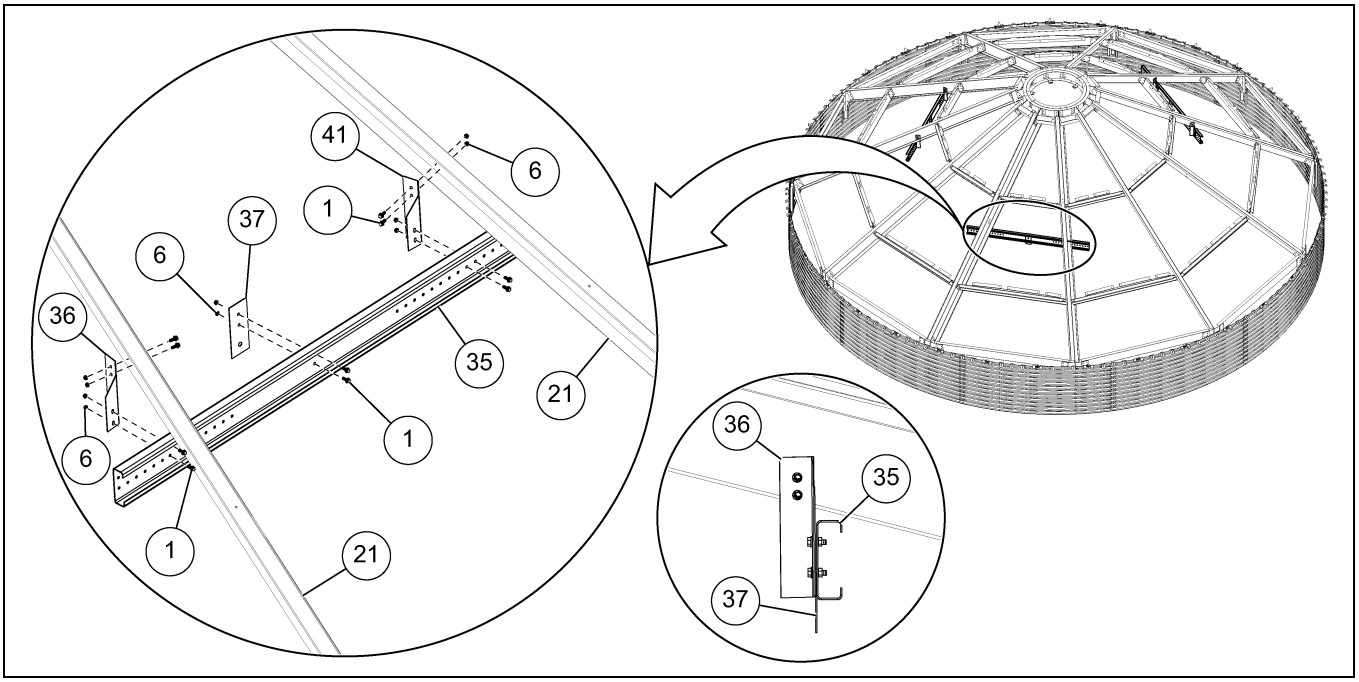


Figure 4Q *Installing the Temperature Cable Support Channel*

Ref #	Part #	Description
1	S-7488	3/8" x 1-1/2" Flange Bolt with Sealing Washer
6	S-9426	3/8" Flange Nut
21	CTR-1708	Roof Rafter
35	CRP-5285	Temperature Cable Support Channel

Ref #	Part #	Description
36	CRP-5786	Left Temperature Cable Support Angle
37	CRP-5213	Temperature Cable Hanging Bracket
41	CRP-5787	Right Temperature Cable Support Angle

4. Install a quick link (57) to each temperature cable hanging bracket (37) to support the temperature cables. *(See Figure 4R.)*

IMPORTANT: *Do not attach weights to the temperature cables; secure the bottom of cables to the floor with light twine. No roof rafter shall support more than one cable.*

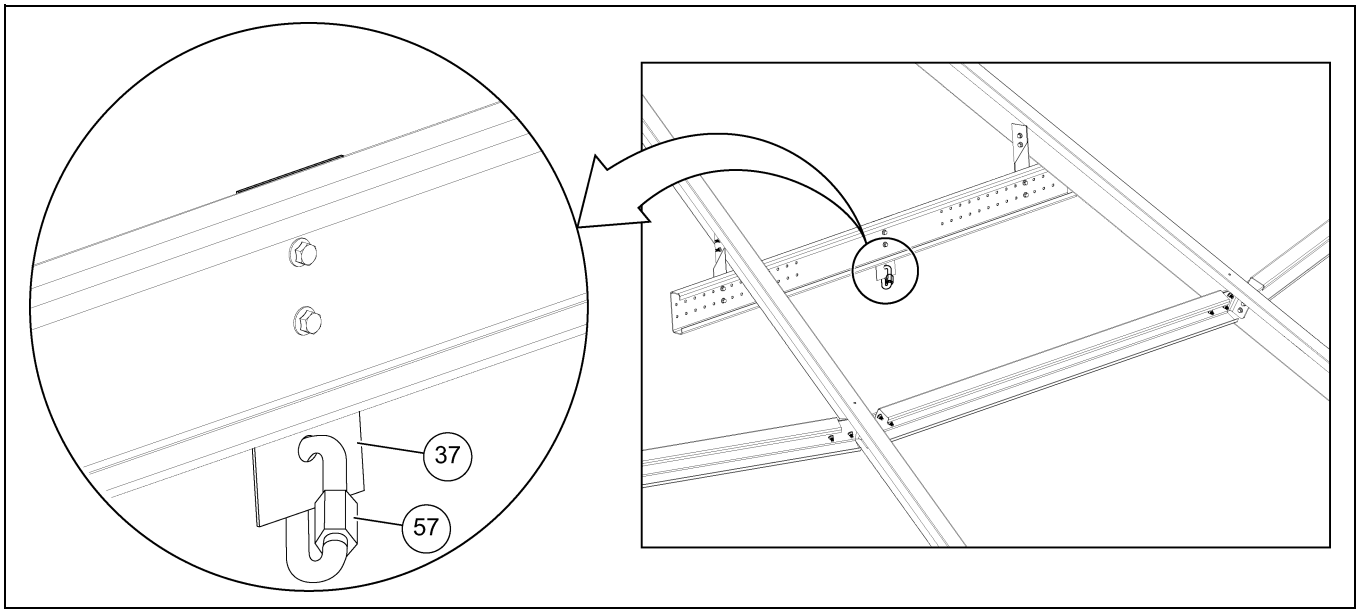


Figure 4R *Installing the Supplier Quick Link to the Hanging Bracket*

Ref #	Part #	Description
37	CRP-5213	Temperature Cable Hanging Bracket
57		Supplier Quick Link

5. Locate the cable hole in the bottom flange of the center collar assembly and install a supplier link (57), allowing for the installation of a temperature cable at this location. *(See Figure 4S.)*

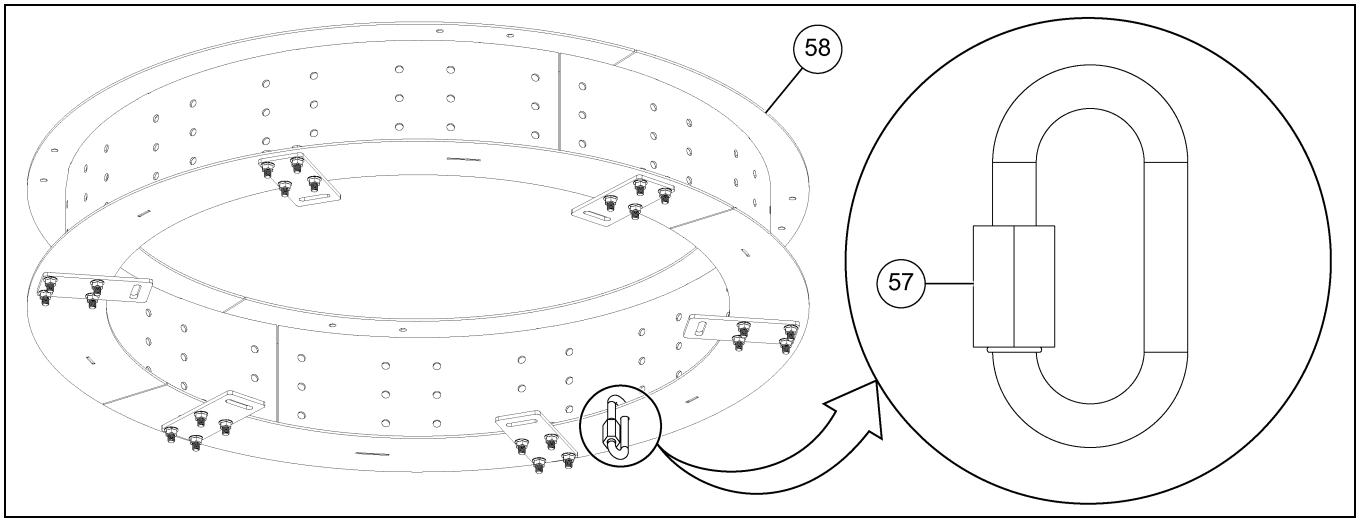


Figure 4S *Supplier Quick Link on the Center Collar (View from Bottom Side of the Center Collar)*

Ref #	Description
57	Supplier Quick Link

Ref #	Description
58	Outer Center Collar

Attaching the Roof Panels

Roof panels overlap the previous roof panel, giving protection from the outside elements.

Before You Begin

Make sure all the roof rafter assemblies, purlins are installed and properly tightened. Pre-determine the manway access location. Also, make sure that roof panel support clips are installed to the purlins before installing the roof panels.

What You Should Know

For adjustment purposes and better results, roof panels will be installed to each rafter assembly first, causing exposed gaps between each installed roof panel. *(See Figure 4T.)*

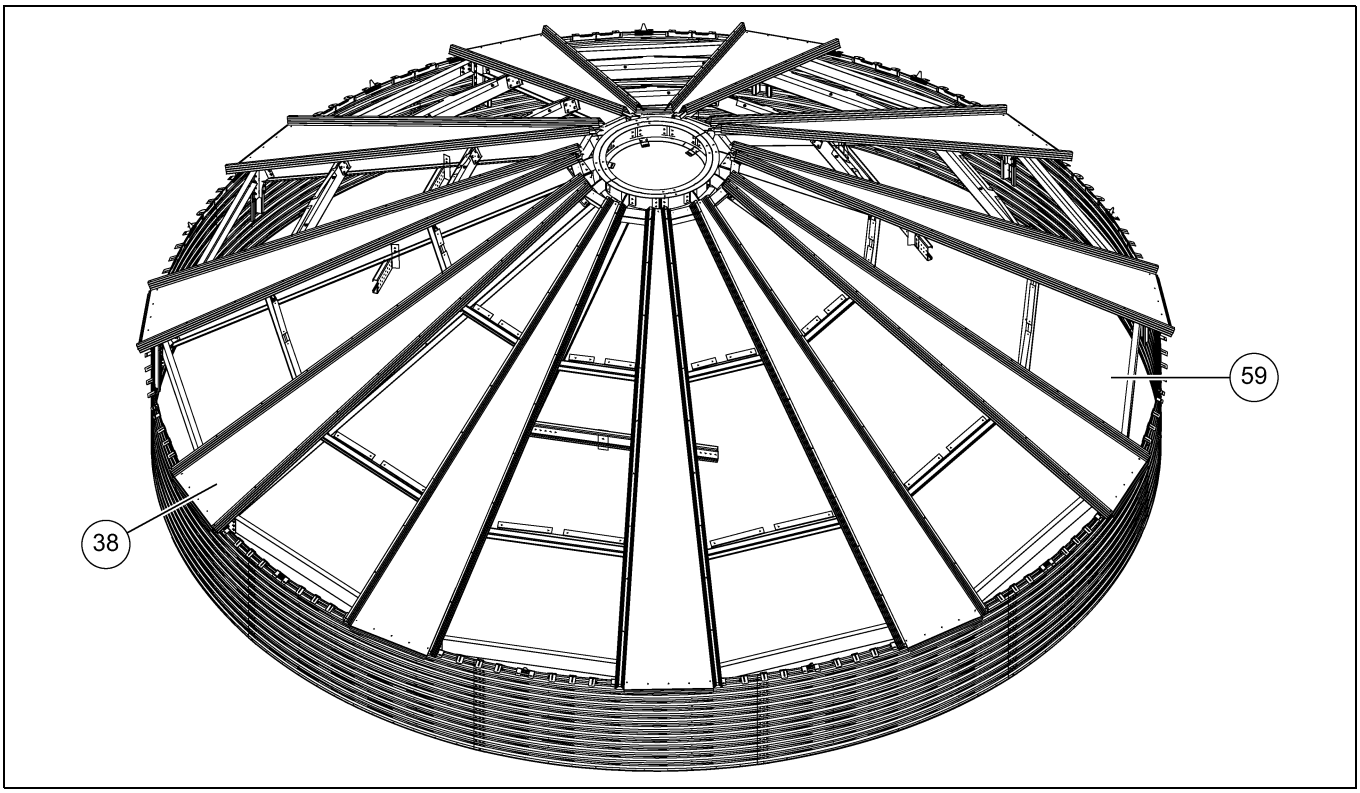


Figure 4T *Roof Panel Overview*

Ref #	Part #	Description
38	CTR-0385	Roof Panel
59		Exposed Gap

1. With assistance, position a roof panel (38) onto the roof rafter (60) and install 5/16" x 1" flange bolt (2) and 5/16" flange nut (7), securing the upper portion of the roof panel (38) to the roof panel support clip.
2. Install five 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7) to the lower portion of the roof panel (38), securing the roof panel to the eave angle.
3. Working in a clockwise direction, continue installing the roof panels (38) to each roof rafter (60), leaving an exposed gap (59) between each installed roof panel.

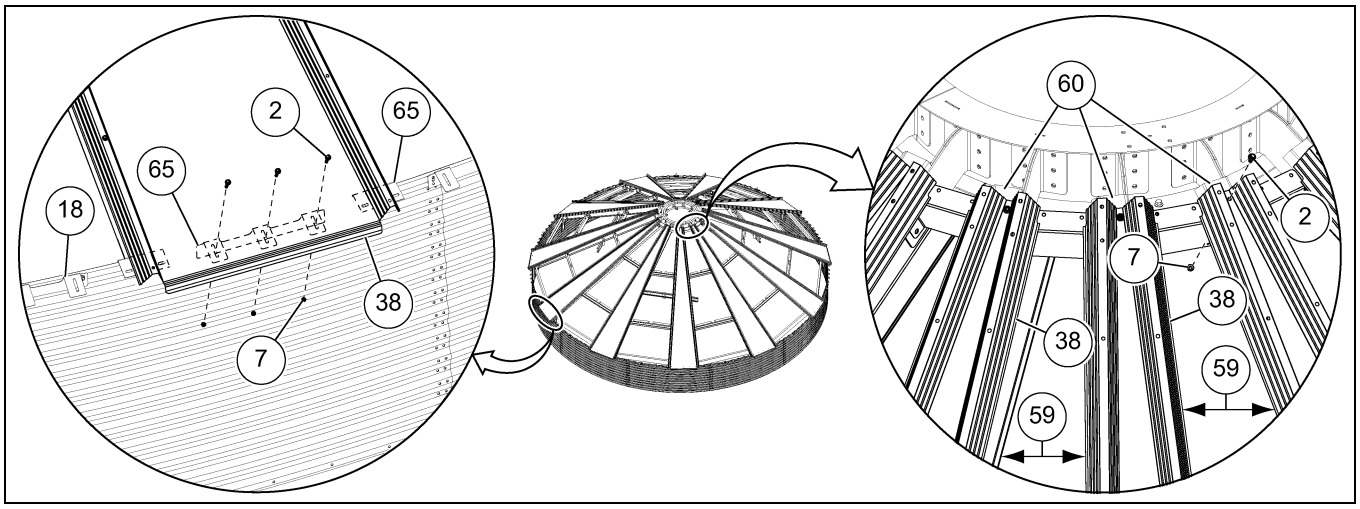


Figure 4U *Installing the Roof Panels*

Ref #	Part #	Description
2	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
7	S-3611	5/16" Flange Nut
18	CTR-1183	Intermediate Eave Angle
38	CTR-0385	Roof Panel

Ref #	Description
59	Exposed Gap
60	Roof Rafter Assembly
65	Eave Clip

4. When the initial roof panels (38) are installed, fill in the exposed gaps (59). Working in a **counterclockwise direction**, install two additional roof panels (as shown in *Figure 4U*), overlapping each roof panel on the left. Adjust the roof panels as needed.

   NOTE: *You will need to tuck one roof panel per gap under the previously installed roof panel, by slightly lifting the side rib and allowing the new adjacent roof panel to be tucked under the previously installed roof panel.*

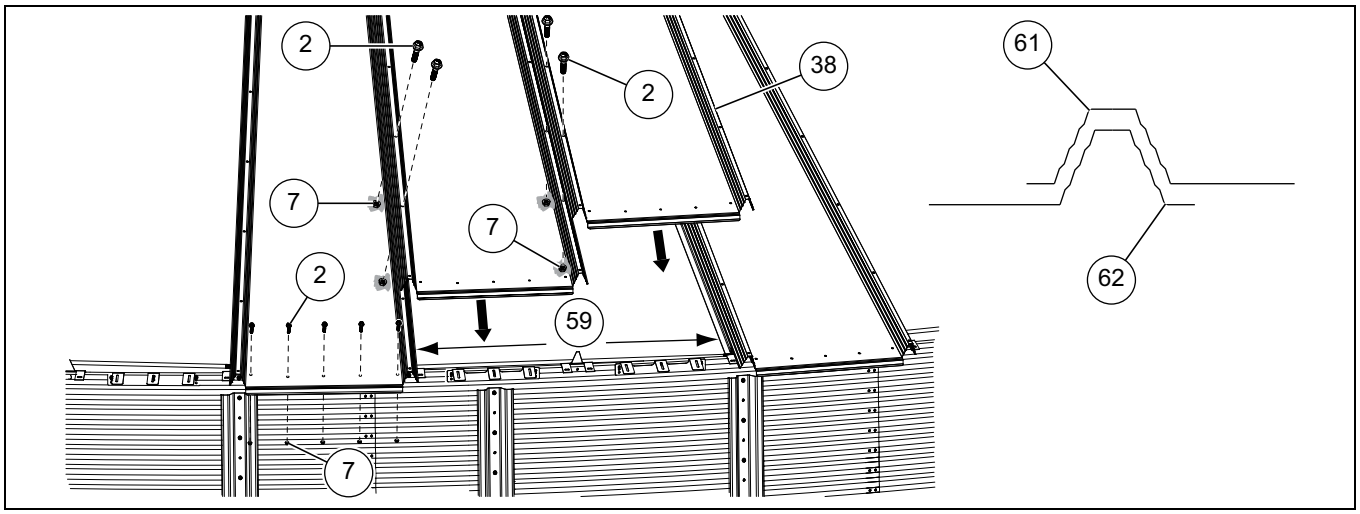


Figure 4V *Installing the Roof Panels into Exposed Gaps*

Ref #	Part #	Description
2	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
7	S-3611	5/16" Flange Nut
38	CTR-0385	Roof Panel

Ref #	Description
59	Exposed Gap
61	Upper Rib
62	Lower Rib

5. When all the roof panels (38) within a gap are in place, install 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7) to secure the top portion of the roof panels (38) to the roof panel clips and the bottom portion to the eave clip and intermediate eave angle.
6. Also, install 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7) along the ribs of each roof panel (38) and tighten all the hardware to the recommended torque specification. See bolt torque specifications *on Page 13.*
7. Field drill holes (63) in the roof panels (38) through the holes in the top flange of the roof panel support clips. Secure the panels to the roof panel support clips using 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7).

   NOTE: *Make sure that the holes are drilled from the inside of the bin.*
8. Field drill holes (64) in the roof panels (38) through the holes in the top flange of the rafters (21). Secure the roof panels (38) to the rafters using 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7).

   NOTE: *Make sure that the holes are drilled from the inside of the bin.*

   IMPORTANT: *Failure to properly secure the roof panel to the roof panel support clip and the rafter will constitute a modification to the product not specifically delineated in this manual and will void the limited warranty.*

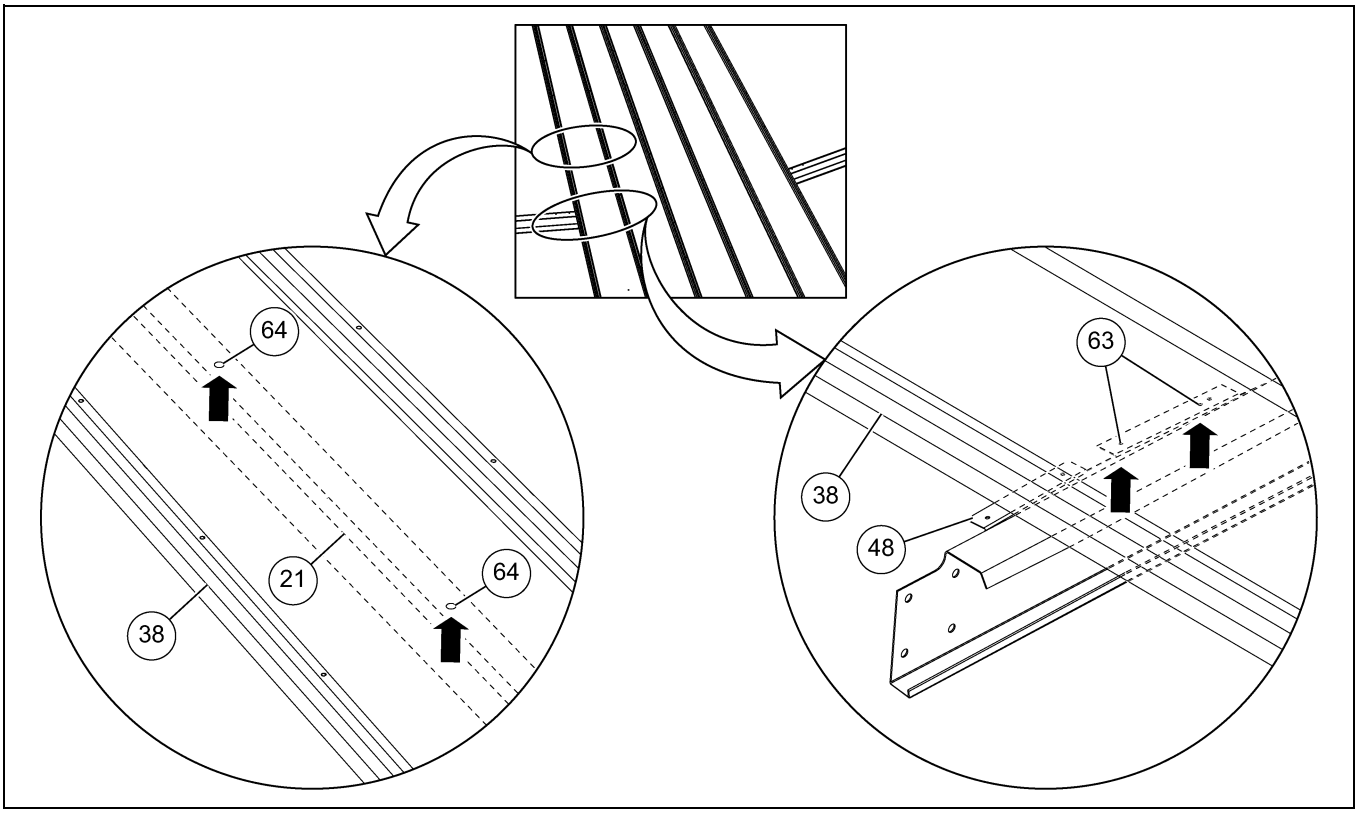


Figure 4W *Installing the Roof Panels to the Roof Panel Support Clips and Roof Rafters*

Ref #	Part #	Description
21	CTR-1708	Roof Rafter
38	CTR-0385	Roof Panel
48		Purlin
63		Roof Panel Holes (Drilled Through Roof Panel Support Clips)
64		Roof Panel Holes (Drilled Through Rafter)

Installing the Roof Flashing

The roof flashing will seal the area between the center collar and the roof panels.

What You Should Know

Each roof flashing section overlaps and bolts together with the previously installed roof flashing section.

1. Install the first roof flashing section (39) onto the roof panel and align the holes on the roof flashing with the roof panel. *(See Figure 4X.)*
2. Install 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7), securing the first roof flashing section (39) to the roof panel ribs.

   NOTE: *Only the first roof flashing section is installed using four of the required flange bolts and nuts. Any remaining unfilled holes will be filled when the adjacent and last roof flashing section is installed.*

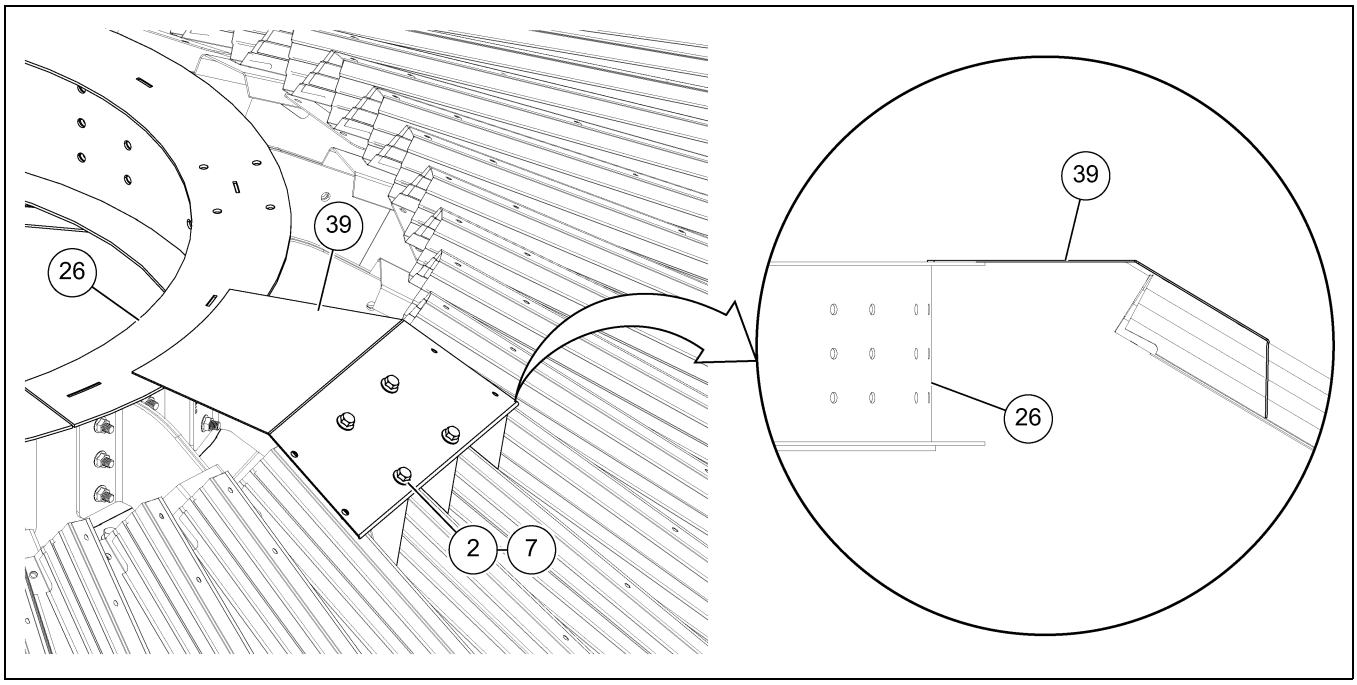


Figure 4X *Installation of the First Roof Flashing Section*

Ref #	Part #	Description
2	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
7	S-3611	5/16" Flange Nut
26	CTR-1717	Center Collar
39	CTR-1719	Roof Flashing

3. Place a strip of rope caulk (50) along the edge of the installed roof flashing (39) where the next roof flashing will overlap.
4. Align the holes along the edge of the next roof flashing (39) with the previously installed roof flashing holes.
5. Install 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7), securing the two roof flashing sections (39) together.

Installing the Roof Flashing (Continued)

6. Install six 5/16" x 1" flange bolts (2) and 5/16" flange nuts (7), securing the roof flashing section (39) to the roof panel ribs.
7. Continue installing the remaining flashing until the gap between the center collar and roof panels are covered. *(See Figure 4Y.)*

   NOTE: *Remember to place caulk between the overlap of the last two panels.*

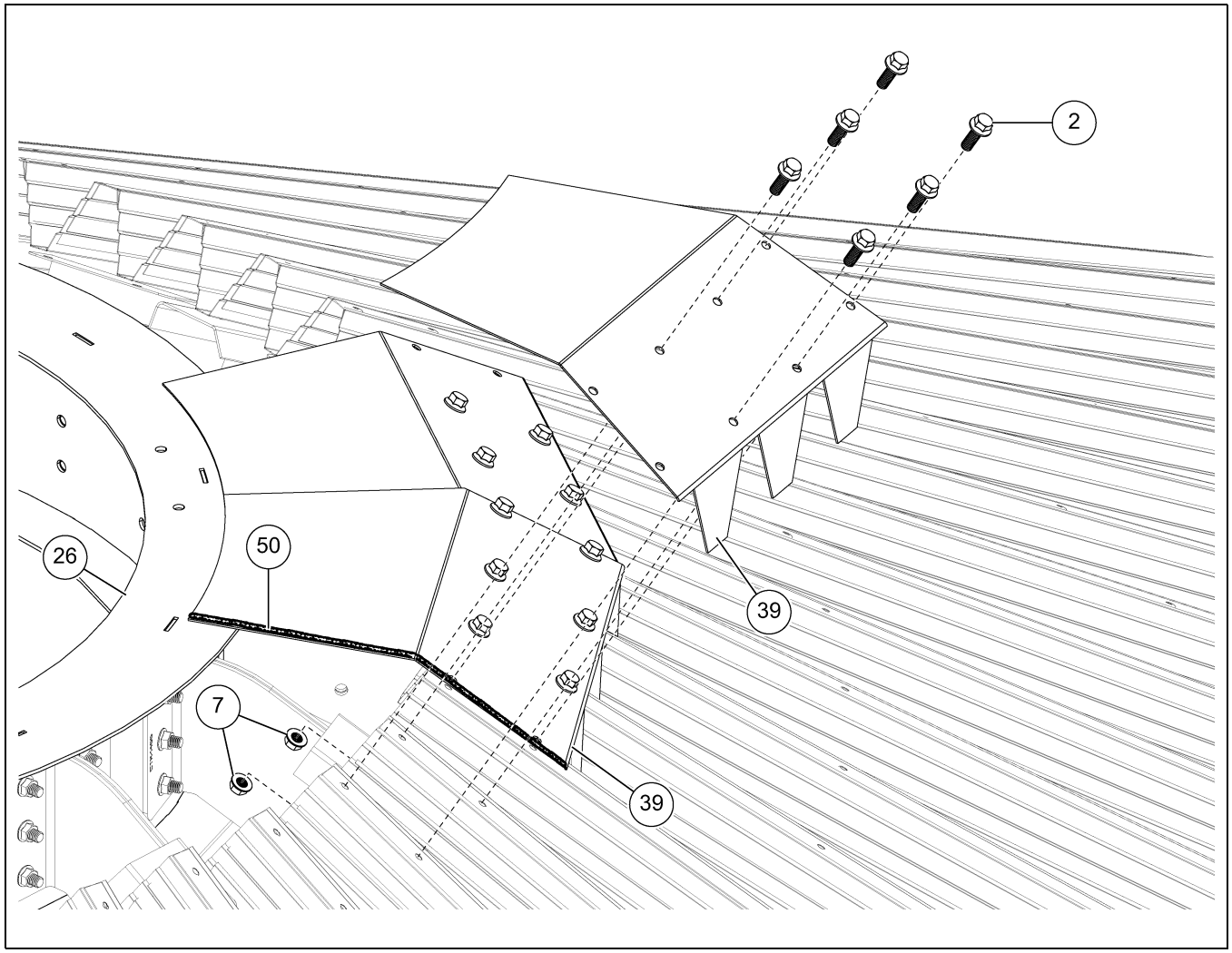


Figure 4Y *Installation of Remaining Roof Flashing Sections*

Ref #	Part #	Description
2	S-10260	5/16" x 1" Flange Bolt with Sealing Washer
7	S-3611	5/16" Flange Nut
26	CTR-1717	Center Collar

Ref #	Part #	Description
39	CTR-1719	Roof Flashing
50		Rope Caulk

After You Finish

NOTE: *If roof exhausters will be installed, see roof accessories, preparation for roof exhauster installation.*

Installing the Center Cap Plate

Center cap plate will need to be installed on top of the roof flashings.

1. Place a continuous strip of caulk (9) on the mating surface of the cap plate with the roof flashing (39).
2. Attach the appropriate lifting chain (51) to the hook in the center cap plate (40).
3. Attach the appropriate lifting device (52) to the lifting chain (51).
4. Use the qualified personnel to hoist the center cap plate (40) into place.
5. Align the six holes in the angle plates welded to the center cap plate (40) with the holes in the mounting bracket (27) assembled to the center collar (26) and fasten them together 7/16" x 2" flange bolts (5) and 7/16" flange nuts (8). *(See Figure 4Z.)*

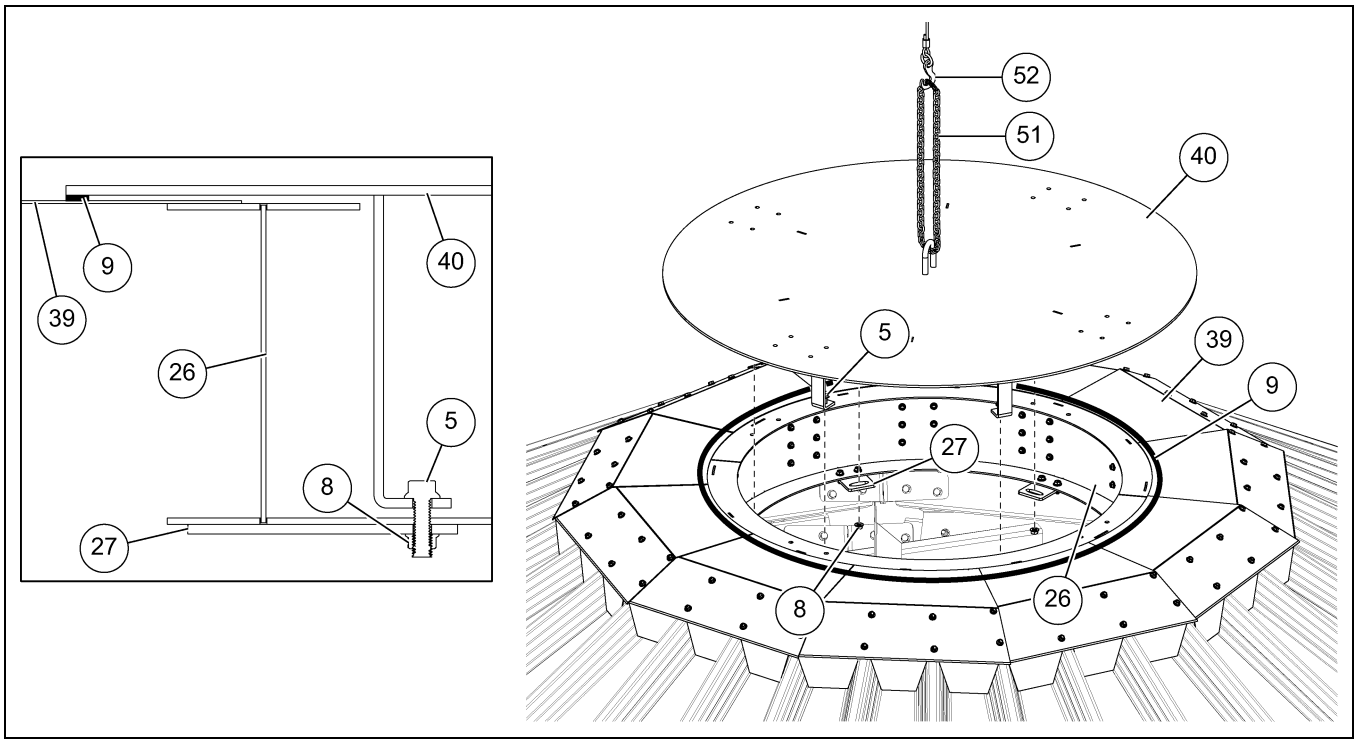


Figure 4Z *Lifting and Installing the Center Cap Plate*

Ref #	Part #	Description
5	S-10381	7/16" x 2" Flange Bolt
8	S-10251	7/16" Flange Nut
9	S-10319	3/8" x 1" Caulk
26	CTR-1717	Center Collar
27	CTR-1525	Mounting Bracket

Ref #	Part #	Description
39	CTR-1719	Roof Flashing
40	CTR-1510	Center Cap Plate
51		Lifting Chains
52		Lifting Device

6. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

After You Finish

NOTE: *Do not cut a hole in the center cap plate larger than 26" in diameter.*

Installing the Stand-Off Plates

Four stand-off plates are attached to the roof flashing and center cap plate as a standard option. If catwalk system has to be installed, replace the stand-off plates with the conveyor support brackets.

1. Locate the four sets of four holes in the center cap plate (40), and place a gasket (11) over each set of four holes, where the stand-off plates (42) will be installed.

   NOTE: *Field drill the holes in the roof flashing through the center cap plate (40) where the stand-off plates (42) will be installed before aligning the gaskets (11).*

2. Position one stand-off plate (42) over each gasket (11) and align the holes.

3. Install 3/8" x 1-1/2" flange bolts (1) and 3/8" flange nuts (6) to secure the stand-off plates (42) and gaskets (11) with the center cap plate (40) and the roof flashing. *(See Figure 4AA.)*

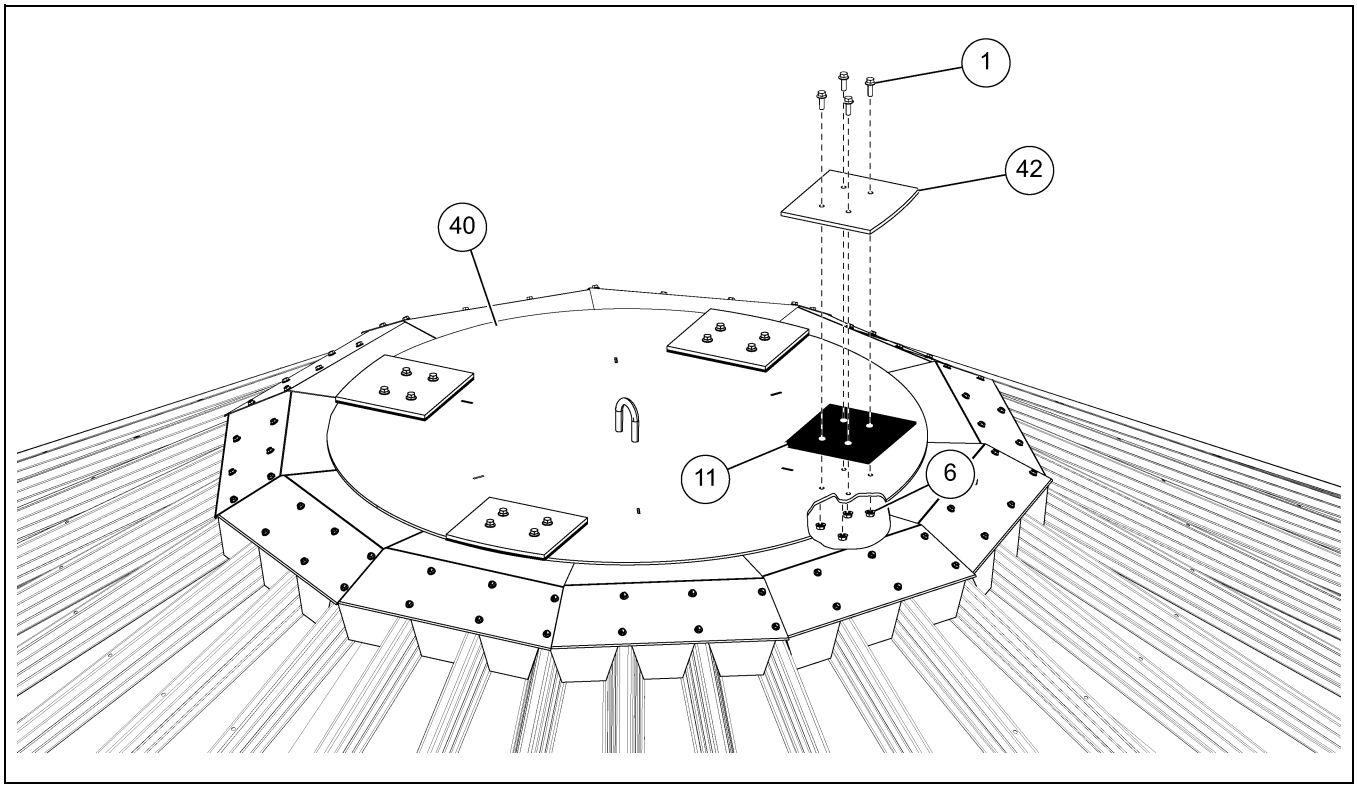


Figure 4AA *Installing the Stand-Off Support Plates*

Ref #	Part #	Description
1	S-7488	3/8" x 1-1/2" Flange Bolt with Sealing Washer
6	S-9426	3/8" Flange Nut
11	S-10387	Gasket

Ref #	Part #	Description
40	CTR-1510	Center Cap Plate
42	CTR-0181	Stand-Off Plates

4. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

Installing the Conveyor Support Brackets (Optional)

Four conveyor support brackets are attached to the roof flashing and center cap plate as an option, if catwalk system has to be installed.

1. Locate the four sets of four holes in the center cap plate (40), and place a gasket (11) over each set of four holes, where the conveyor support brackets (46) will be installed.

   NOTE: *Field drill the holes in the roof flashing through the center cap plate (40) where the conveyor support brackets (46) will be installed before aligning the gaskets (11).*

2. Position one conveyor support bracket (46) over each gasket (11) and align the holes.

3. Install 3/8" x 1-1/2" flange bolts (1) and 3/8" flange nuts (6) to secure the conveyor support brackets (46) and gaskets (11) with the center cap plate (40) and the roof flashing. *(See Figure 4AB.)*

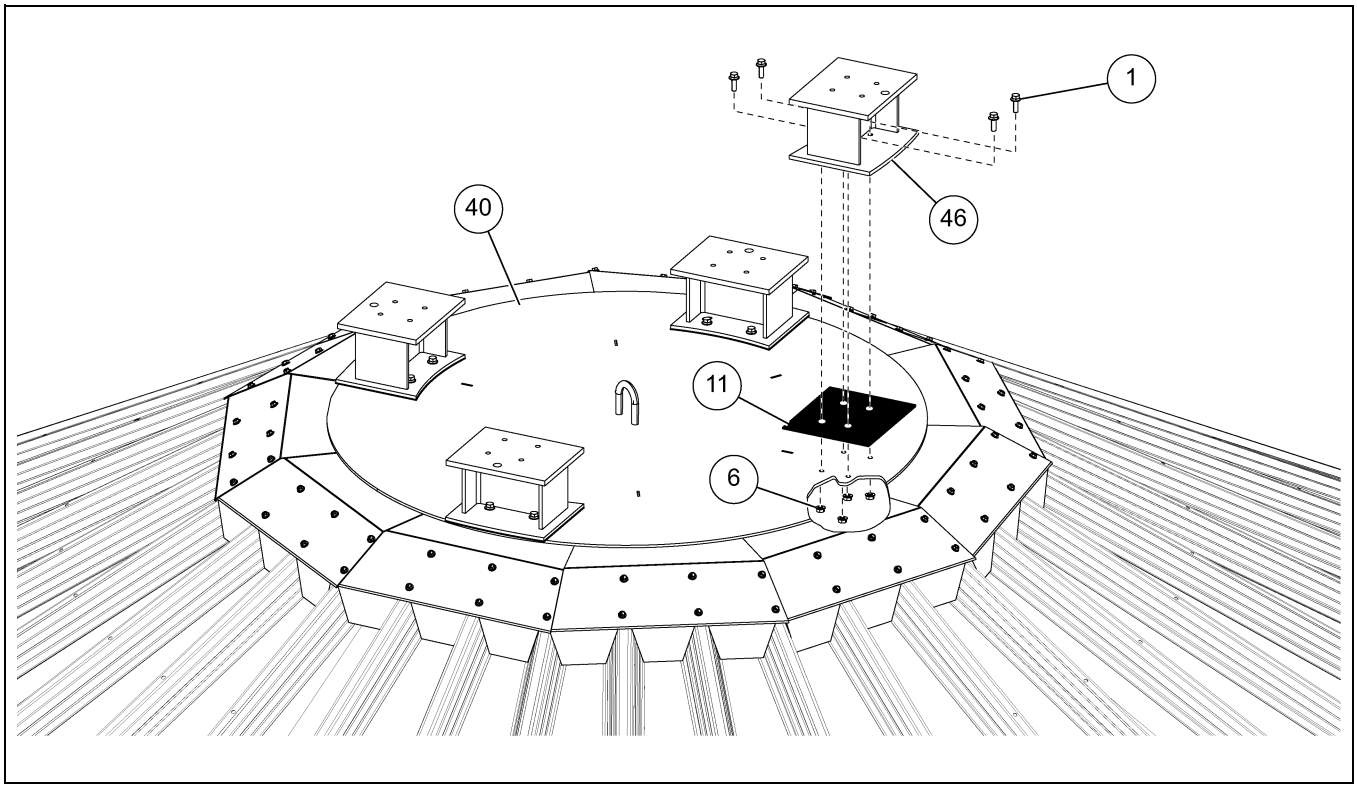


Figure 4AB *Installing the Conveyor Support Brackets*

Ref #	Part #	Description
1	S-7488	3/8" x 1-1/2" Flange Bolt with Sealing Washer
6	S-9426	3/8" Flange Nut
11	S-10387	Gasket

Ref #	Part #	Description
40	CTR-1510	Center Cap Plate
46	CTR-1221	Conveyor Support Bracket

4. Tighten all the hardware to the recommended torque specifications. See bolt torque specifications *on Page 13.*

NOTES

Limited Warranty - N.A. Grain Products

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 from the date of shipment (or, if shipped by vessel, 14 months from the date of arrival at the port of discharge). If, in GSI’s sole judgment, a product is found to have a defect in materials and/or workmanship, GSI will, at its own option and expense, repair or replace the product or refund the purchase price. This Limited Warranty is subject to extension and other terms as set forth below.

Warranty Enhancements:

The warranty period for the following products is enhanced as shown below and is in lieu of (and not in addition to) the above stated warranty period. (Warranty Period is from date of shipment.)

	Product	Warranty Period
Storage	Grain Bin Structural Design • Sidewall, roof, doors, platforms and walkarounds • Flooring (when installed using GSI specified floor support system for that floor) • Hopper tanks (BFT, GHT, NCHT, and FCHT)	5 Years
Conditioning	Dryer Structural Design - (Tower, Portable and TopDry) • Includes (frame, portable dryer screens, ladders, access doors and platforms)	5 Years
	All other Dryer parts including: • Electrical (controls, sensors, switches and internal wiring)	2 Years
	All Non-PTO Driven Centrifugal and Axial Fans	3 Years
	Bullseye Controllers	2 Years
Material Handling	Bucket Elevators Structural Design	5 Years
	Towers Structural Design	5 Years
	Catwalks Structural Design	5 Years
	Accessories (stairs, ladders and platforms) Structural Design	5 Years

Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH HEREIN; SPECIFICALLY, GSI DISCLAIMS ANY AND ALL OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) ANY 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.

The sole and exclusive remedy for any claimant is set forth in this Limited Warranty and shall not exceed the amount paid for the product purchased. This Warranty only covers the value of the warranted parts and equipment, and does not cover labor charges for removing or installing defective parts, shipping charges with respect to such parts, any applicable sales or other taxes, or any other charges or expenses not specified in this Warranty. GSI shall not be liable for any other direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. Expenses incurred by or on behalf of a claimant without prior written authorization from the GSI warranty department shall not be reimbursed. 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. Prior to installation, the end-user bears all responsibility to comply with federal, state and local codes which apply to the location and installation of the products.

This Limited Warranty extends solely to products sold by GSI and does not cover any parts, components or materials used in conjunction with the product, that are not sold by GSI. GSI assumes no responsibility for claims resulting from construction defects, unauthorized modifications, corrosion or other cosmetic issues caused by storage, application or environmental conditions. Modifications to products not specifically delineated in the manual accompanying the product at initial sale will void all warranties. 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.

Notice Procedure:

In order to make a valid warranty claim a written notice of the claim must be submitted, using the RMA form, within 60 days of discovery of a warrantable nonconformance. The RMA form is found on the OneGSI portal.

Service Parts:

GSI warrants, subject to all other conditions described in this Warranty, Service Parts which it manufactures for a period of 12 months from the date of purchase unless specified in Enhancements above.

(Limited Warranty - N.A. Grain Products_ revised 01 October 2020)

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.

1004 E. Illinois St.
Assumption, IL 62510-0020
Phone: 1-217-226-4421
Fax: 1-217-226-4420
www.gsiag.com

CN-363434