



JS500 36' Diameter 40°/45° NCHT Commercial Hopper Tanks

Installation Manual

PNEG-805-JS

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PNEG-805-JS

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.

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READ THIS MANUAL carefully to learn how to properly use and install equipment. Failure to do so could result in personal injury or equipment damage.

INSPECT the shipment immediately upon arrival. The customer is responsible for ensuring that all quantities are correct. The customer should report and note any damage or shortage on the bill of lading to justify their claim to the transport company.

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your equipment and should be easily accessible when needed.

This warranty provides you the assurance that the company will back its products when defects appear within the warranty period. In some circumstances, the company also provides field improvements, often without charge to the customer, even if the product is out of warranty. Should the equipment be abused, or modified to change its performance beyond the factory specifications, the warranty will become void and field improvements may be denied.

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.

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.



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



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



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



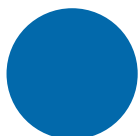
This symbol is used to address practices not related to personal injury.



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

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

Lifting Hazard

- Single person lift can cause injury.
- Use a mechanical lifting device to lift or move the equipment during installation.



ST-0021-2

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.



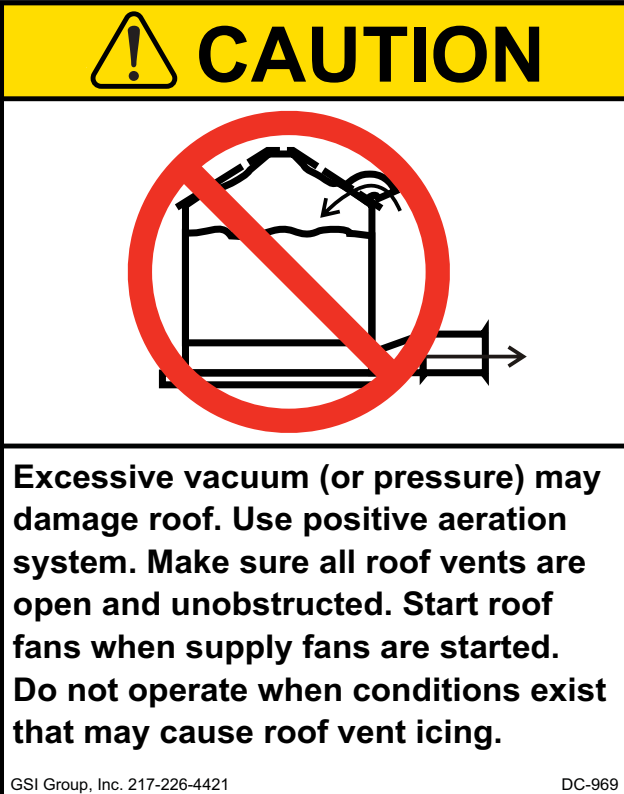
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The safety decals on your equipment are safety indicators which must be carefully read and understood by all personnel involved in the installation, operation, service and maintenance of the equipment.


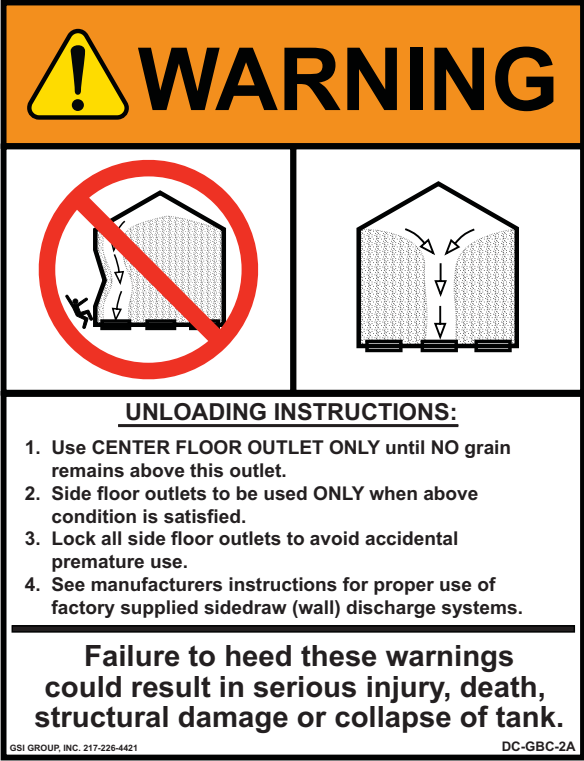
To replace a damaged or missing decal, contact us to receive a free replacement.

GSI Decals

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

Location	Decal #	Decals	Description
<p>Located next to aeration system.</p>	<p>DC-969</p>		<p>Caution Vacuum Pressure</p>

3. Decals

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

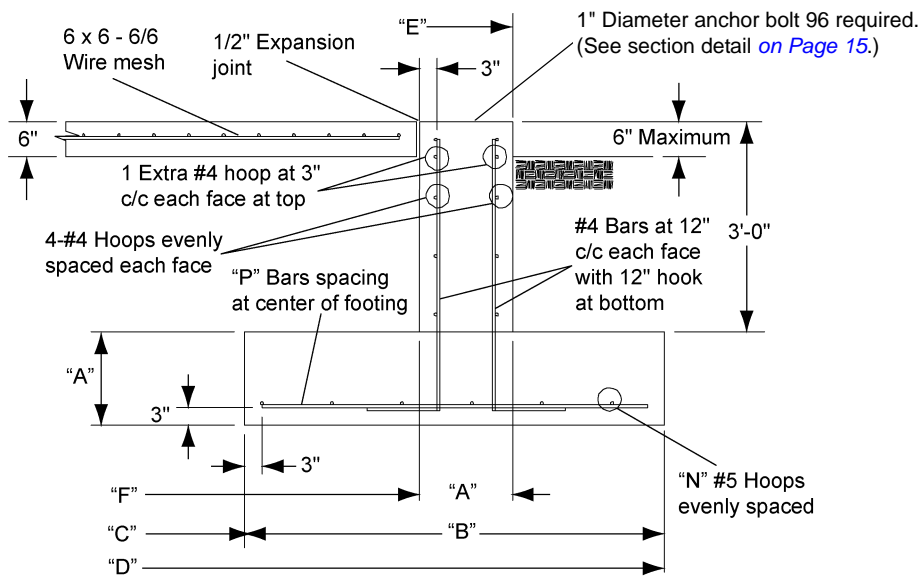


Sidewall and stiffener gauge sheets are not included in this manual. They may be obtained by calling GSI if they are not attached to the front of this manual.

4. Foundations

36' Diameter Commercial Hopper Tank Foundation up to 18 Rings

Description	# of Rings	Up to 10	11-14	15-18
Stem Wall Width	A	1'-4"	1'-4"	1'-8"
Footing Width	B	6'-0"	7'-6"	9'-2"
Inside Footing Radius	C	14'-11"	13'-11"	12'-11"
Outside Footing Radius	D	20'-11"	21'-5"	22'-1"
Outside Stem Wall Radius	E	18' - 8-5/8"	18' - 8-5/8"	18' - 10-5/8"
Inside Stem Wall Radius	F	17' - 4-5/8"	17' - 4-5/8"	17' - 2-5/8"
Footing Rebar	N	#5 at 12" c/c	#5 at 10" c/c	#5 at 9" c/c
Footing Rebar	P	#5 at 10" c/c	#6 at 10" c/c	#7 at 8-1/2" c/c
	#4 Rebar (Ft.)	2400	2400	2400
	#5 Rebar (Ft.)	1500	1000	1400
	#6 Rebar (Ft.)	0	1000	0
	#7 Rebar (Ft.)	0	0	1400
	6 x 6 - 6/6 Wire Mesh (Ft. ²)	960	960	960
	Concrete (Cu. Yds.)	75	80	110



Footing detail

(NOTE: Not to scale.)

NOTES:

1. The foundation design is based on a minimum allowable soil bearing capacity of 3000 PSF. Bearing capacity of the soils should be determined by geotechnical investigation and be of uniform bearing capacity.
2. The foundation site must be free of vegetation and debris and well drained.
3. The foundation must be founded below the frost line or placed on non-expansive frost free fill.
4. All material used for backfill inside the ring wall should be clean, well graded, crushed rock or a sand-gravel mixture. Backfill should be placed in 6" lifts, 95% compaction.
5. All reinforcement must meet the requirements of ASTM A615 grade 60 deformed bars.
6. Lap all circumferential bars 35 bar diameters and stagger all laps in plans 3'-0". Estimates for material do not include end laps.
7. Concrete must have a minimum compressive strength of 3000 PSI at 28 days, 6%-8% air entrainment, 4" slump.
8. Codes: ACI 318-95.
9. Interior top slab may be crowned 2" to provide water drainage away from foundation. Crowning the slab will reduce the clearance under the discharge.

Figure 4A

36' Diameter Commercial Hopper Tank Foundation up to 18 Rings (Continued)

Chord dimensions shown from center of base plate to center of base plate.

Anchor bolts must be set with a template, not by hand.

The minimum anchor rod shall be a 1" diameter F1554 grade 55 rod with 15" embedment with a SAE grade 5 or A325 nut. Ninety six (96) anchor rods are required per 36' hopper bin. (See Figure 4B.) Anchor rod requirements should be determined in conjunction with the foundation engineer.

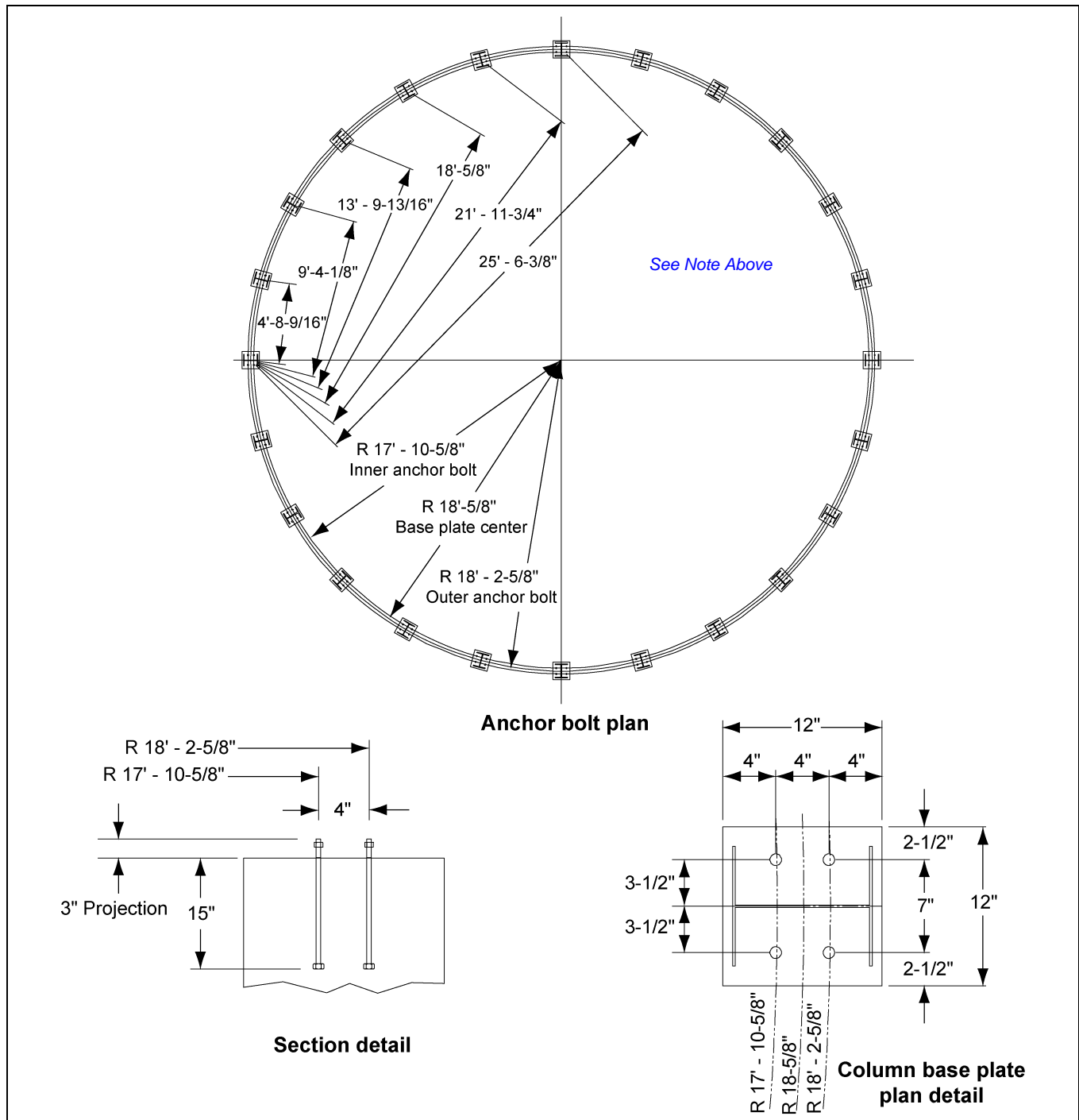
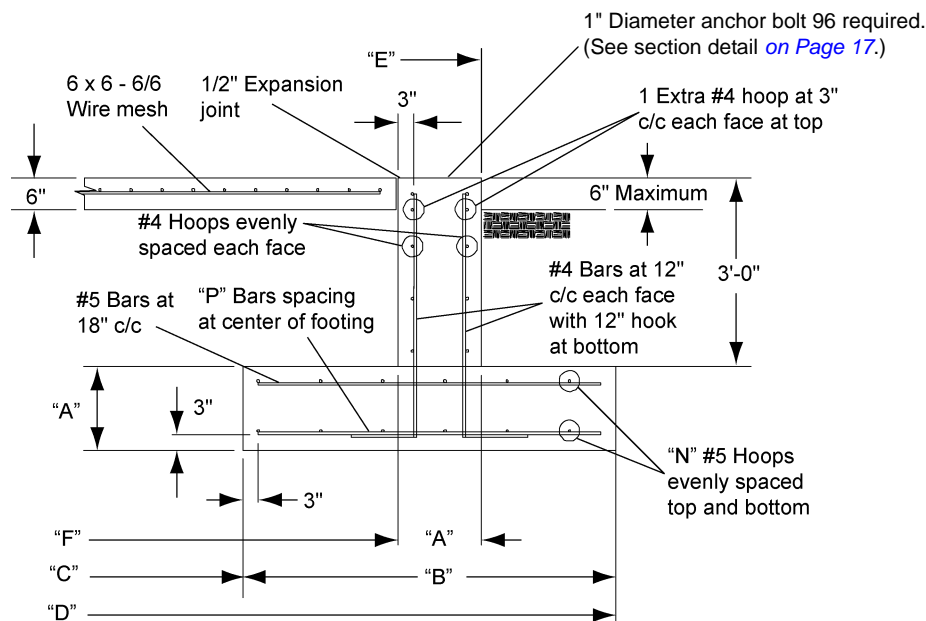


Figure 4B

4. Foundations

36' Diameter Commercial Hopper Tank Foundation 19-22 Rings

Description	# of Rings	19-20	21-22
Stem Wall Width	A	2'-0"	2'-0"
Footing Width	B	10'-2"	11'-2"
Inside Footing Radius	C	11'-7"	11'-7"
Outside Footing Radius	D	22'-5"	22'-9"
Outside Stem Wall Radius	E	19' - 0-5/8"	19' - 0-5/8"
Inside Stem Wall Radius	F	17' - 0-5/8"	17' - 0-5/8"
Footing Rebar	N	#5 at 12" c/c	#5 at 12" c/c
Footing Rebar	P	#5 at 6" c/c	#6 at 5" c/c
	#4 Rebar (Ft.)	2400	2400
	#5 Rebar (Ft.)	3000	3300
	#6 Rebar (Ft.)	2300	3000
	6 x 6 - 6/6 Wire Mesh (Ft. ²)	960	960
	Concrete (Cu. Yds.)	122	128



NOTES:

1. The foundation design is based on a minimum allowable soil bearing capacity of 3000 PSF. Bearing capacity of the soils should be determined by geotechnical investigation and be of uniform bearing capacity.
2. The foundation site must be free of vegetation and debris and well drained.
3. The foundation must be founded below the frost line or placed on non-expansive frost free fill.
4. All material used for backfill inside the ring wall should be clean, well graded, crushed rock or a sand-gravel mixture. Backfill should be placed in 6" lifts, 95% compaction.
5. All reinforcement must meet the requirements of ASTM A615 grade 60 deformed bars.
6. Lap all circumferential bars 35 bar diameters and stagger all laps in plans 3'-0". Estimates for material do not include end laps.
7. Concrete must have a minimum compressive strength of 3000 PSI at 28 days, 6%-8% air entrainment, 4" slump.
8. Codes: ACI 318-95.
9. Interior top slab may be crowned 2" to provide water drainage away from foundation. Crowning the slab will reduce the clearance under the discharge.

Figure 4C

36' Diameter Commercial Hopper Tank Foundation 19-22 Rings (Continued)

Chord dimensions shown from center of base plate to center of base plate.

Anchor bolts must be set with a template, not by hand.

The minimum anchor rod shall be a 1" diameter F1554 grade 55 rod with 15" embedment with a SAE grade 5 or A325 nut. Ninety six (96) anchor rods are required per 36' hopper bin. (See Figure 4D.) Anchor rod requirements should be determined in conjunction with the foundation engineer.

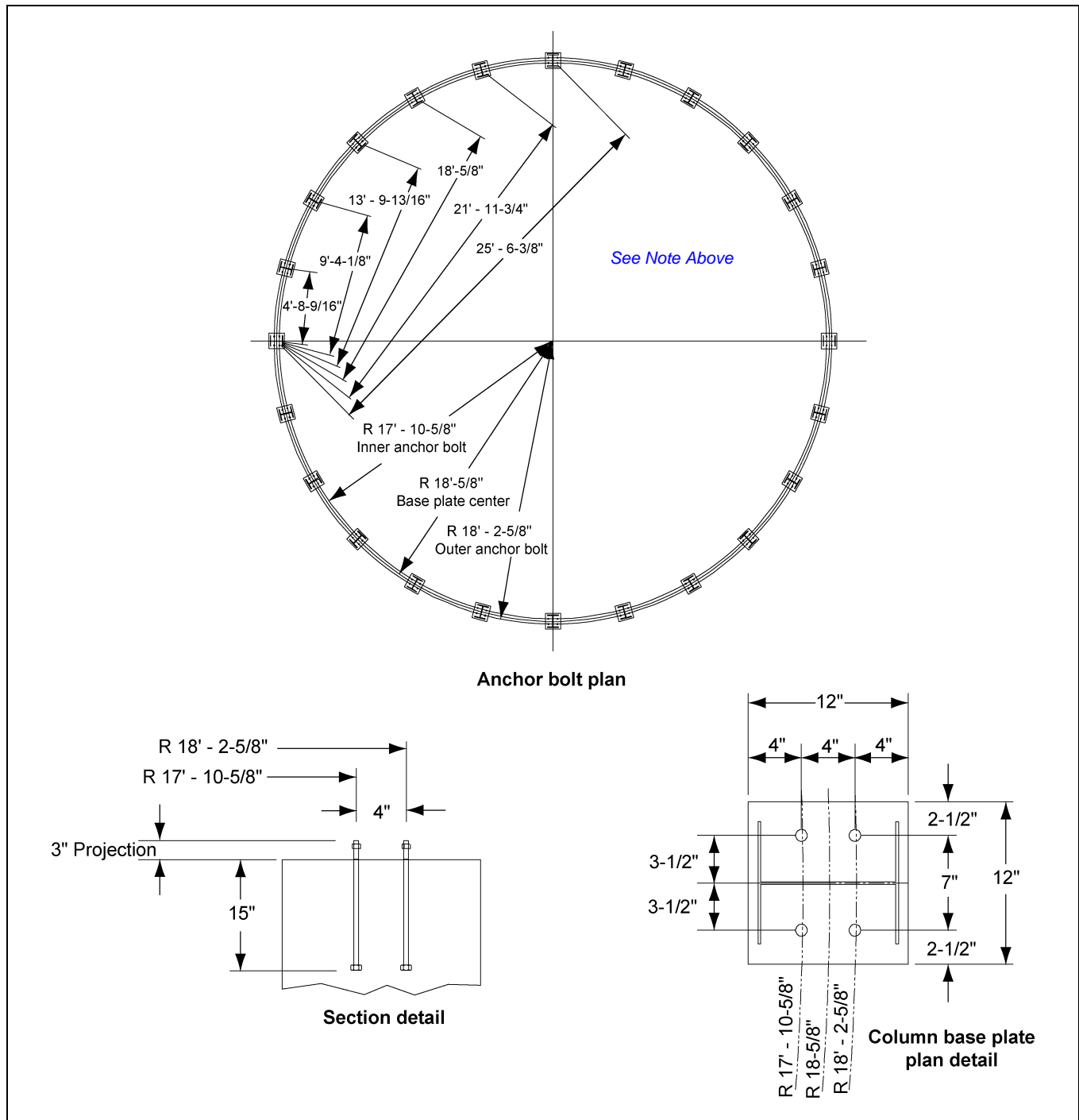


Figure 4D

Standard Commercial Hopper Tank Column Heights

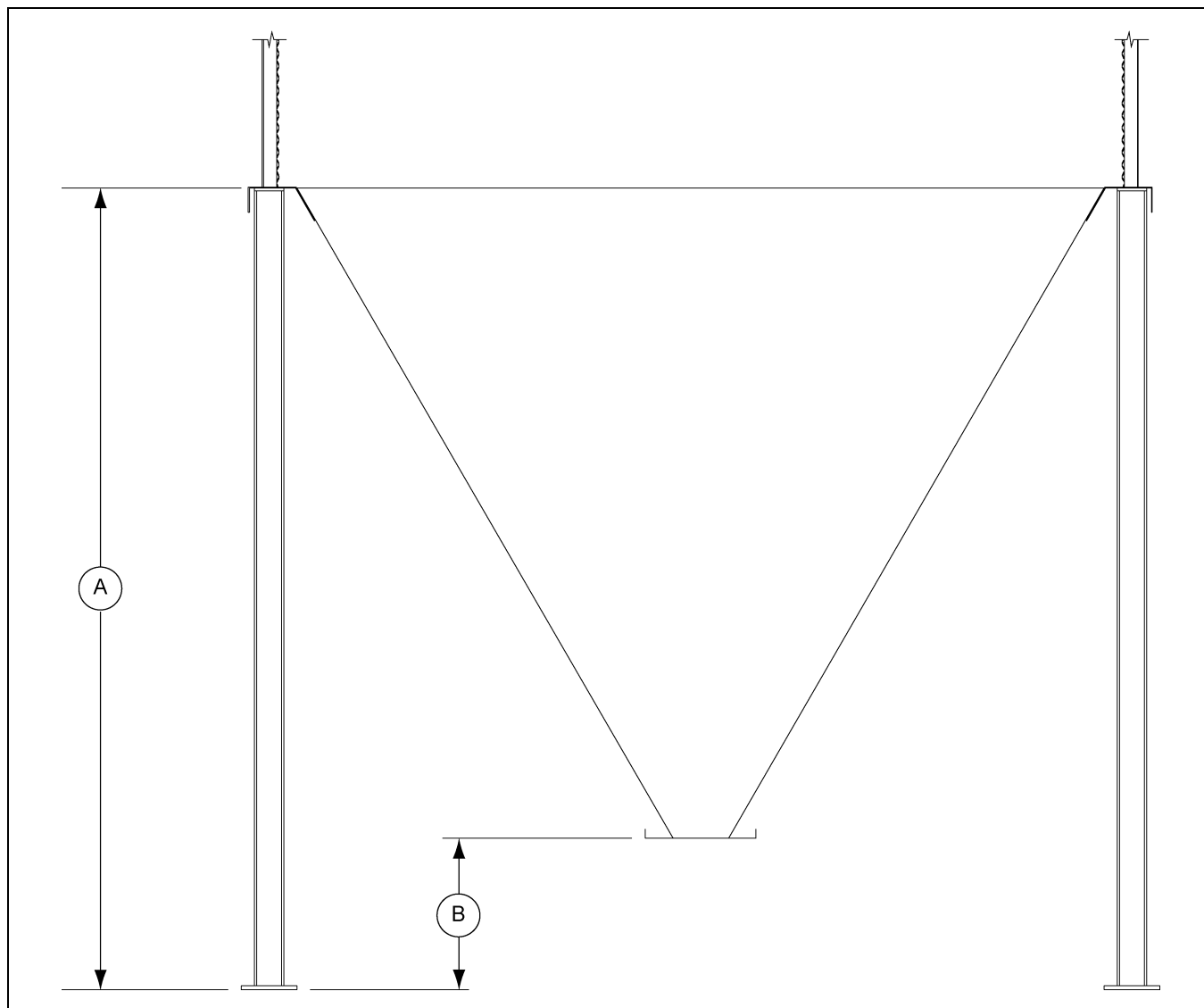


Figure 5A

Tank Diameter	Hopper Slope	"A" Dimension		"B" Dimension	
		Feet	Meters	Inches	Millimeters
36'	40	15' - 11-1/2"	4.86	32	813
36'	45	20' - 1-1/2"	6.13	32	813

Substructure Part List for 36' Commercial Hopper Tanks

Tank Size	36'-40°	36'-45°
Color Code	White	Light Blue
Column Weldment	CHT-1580 (24)	CHT-1566 (24)
Compression Angle Weldment	CHT-1532 (24)	CHT-1568 (24)
Compression Channel Weldment	CHT-1535 (24)	CHT-1535 (24)
Diagonal Column Brace	CHT-1538 (96)	CHT-1570 (144)
Horizontal Column Brace	CHT-1539 (48)	CHT-1539 (96)
Top Hopper Panel	CHT-1540 (24)	CHT-1571 (24)
Middle L.H. Hopper Panel	CHT-1541 (24)	CHT-1572 (24)
Middle R.H. Hopper Panel	CHT-1542 (24)	CHT-1573 (24)
Bottom Hopper Panel	CHT-1543 (24)	CHT-1574 (24)
Collar Weldment	CHT-1445 (1)	CHT-1577 (1)
Support Hardware	CHT-1427 New (1)	CHT-1578 (1)

Typical NCHT36 Column

NOTE: In the field no material attaches to tabs on the inside of the column. Tabs used for manufacturing purposes only. (See Figure 6A.)

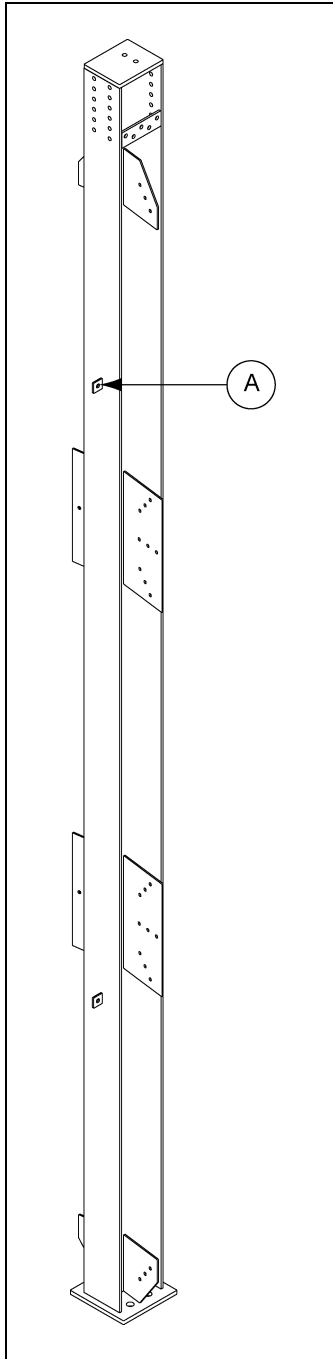


Figure 6A

Ref #	Description
A	For Internal Use Only

Hopper Section Assembly 36' Diameter Hopper Tanks

Use a transit and surveyors rod to locate high and low areas in the concrete, before placing the support columns on the anchor bolts. To assure level alignment, use the proper supplied shim (or) shims between the concrete and base plate. After leveling, place the support columns over the anchor bolts, on the shims and loosely fasten with nuts and washers (not supplied). (See Figure 7A.)

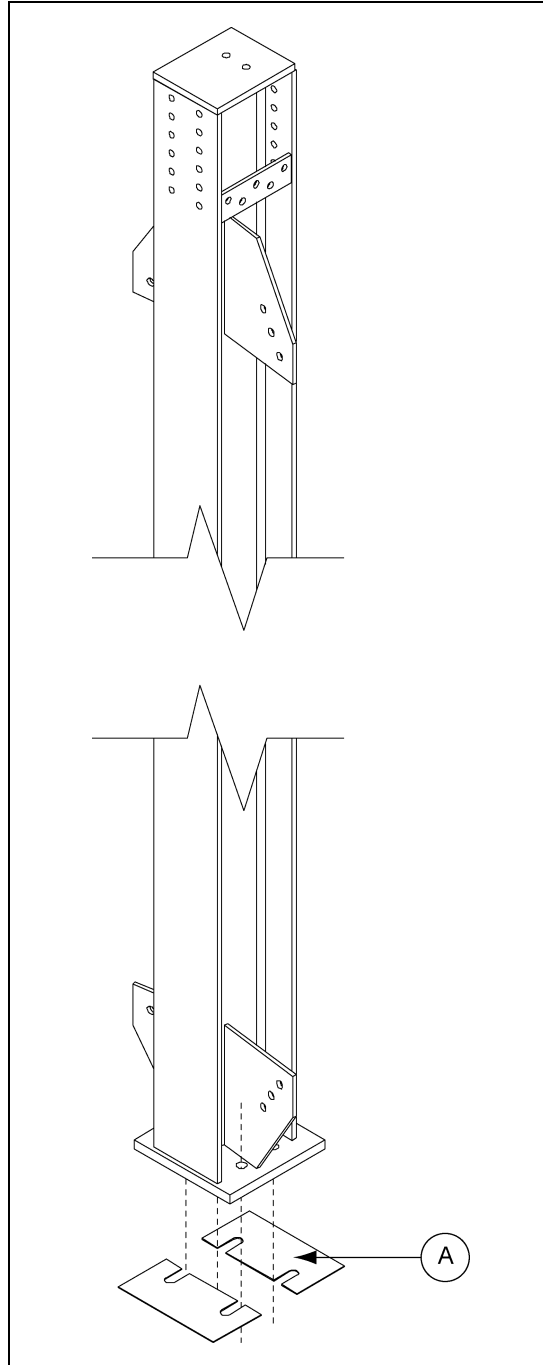


Figure 7A Column Shim Plate Detail (Use when necessary.)

Ref #	Part #	Description
A	CHT-1425	Shim Plate

7. Hopper Section Assembly

Bracing Assembly

Using 1/2"-13 x 1-1/2" hex head bolts for all brace connections with a washer on each side. Fasten the diagonal and horizontal braces to the support columns as shown in [Figure 7B](#). The horizontal brace consists of two (2) formed channels placed back to back. Connect each set of diagonal braces at their intersection. *Do not tighten bolts until after hopper panels are installed to allow alignment.*

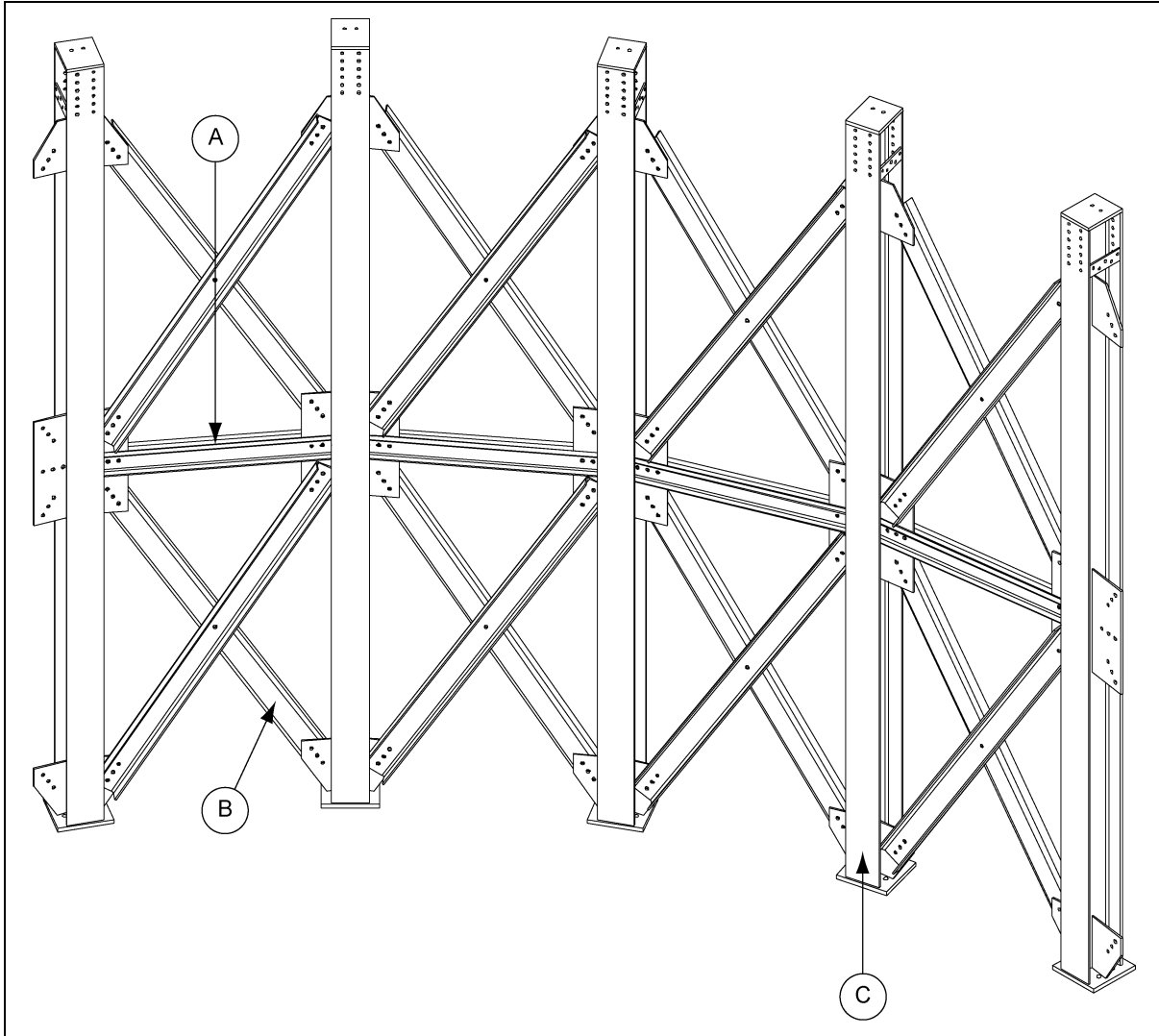


Figure 7B Bracing Erection

Ref #	Description
A	Horizontal Braces (Two (2) per brace location.)
B	Diagonal Braces (40° = Four (4) per Bay) (45° = Six (6) per Bay)
C	Column Weldment

NOTE: Utilize SCHAT-1963 spacer washer between the braces.

Install Compression Angle

Lift the compression angles on top of the columns so that the columns fit between the inside and outside vertical plates of the compression angle. A 5/8"-11 x 2-3/4" bolt may be placed in the top hole of the compression angle and the top plate of the column for alignment purposes. Using 5/8"-11 x 2" bolts, connect the compression angles to the columns with a splice plate on each side as shown in [Figure 7C](#). *Do not tighten bolts until after hopper panels are installed to allow alignment.*

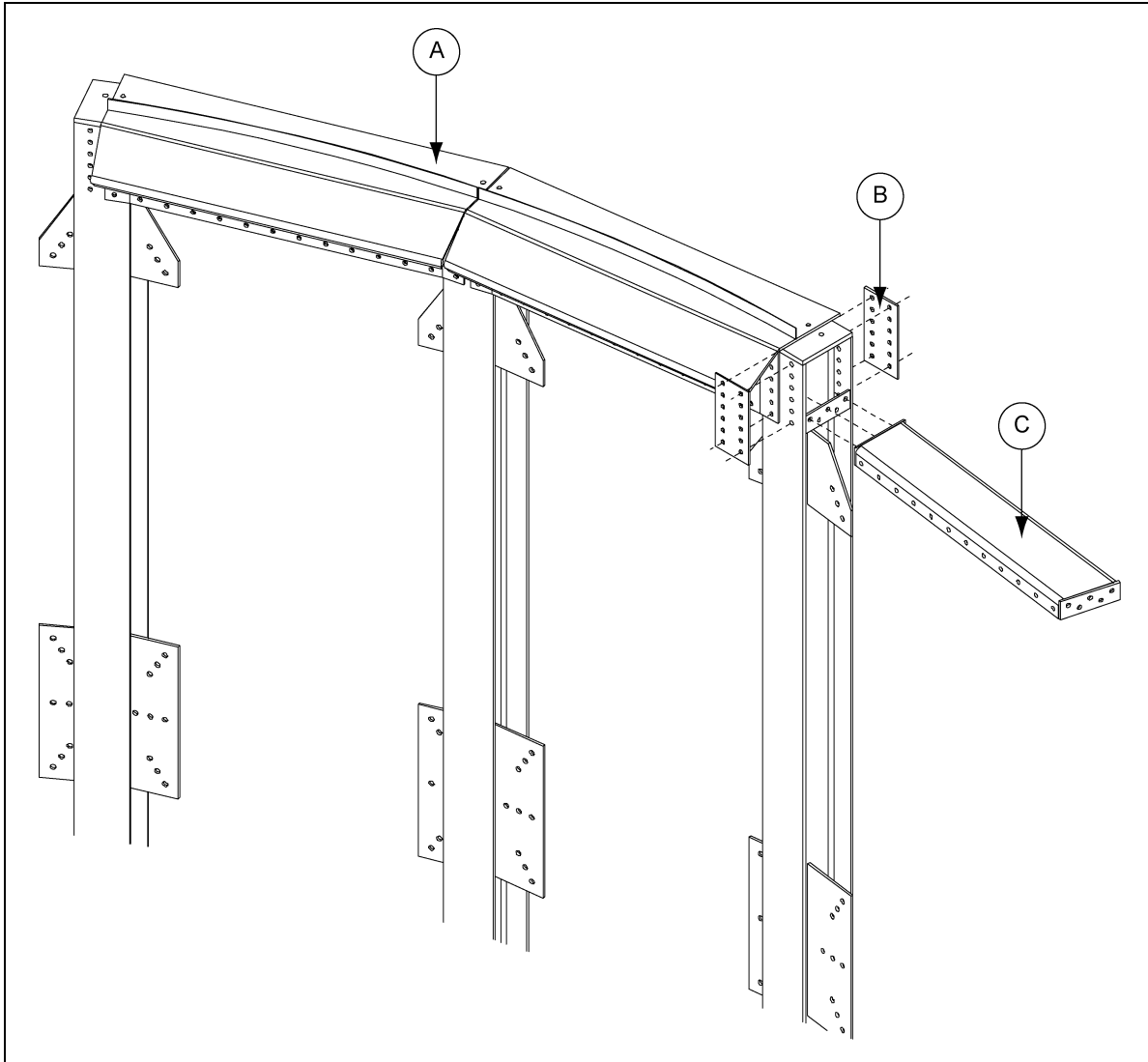


Figure 7C Compression Angle Erection

Ref #	Description
A	Compression Angle Segments
B	Splice Plate
C	Horizontal Compression Channel (See Figure 7D on Page 24.)

NOTE: Compression angle holes not shown for clarity. **Structural bracing not shown for clarity.**
36' Diameter hopper tanks have 24 columns.

7. Hopper Section Assembly

Install Compression Channel

After the compression angle weldments have been aligned, place the compression channels under the compression angle weldments and fasten with 5/8"-11 x 2" bolts to the column attachment plates. Fasten the inside and outside vertical compression angle segments to the channel, see [Figure 7D](#). Use the supplied compression channel shim (CHT-1536) if necessary. *Do not tighten bolts until hopper panels are installed to allow alignment.*

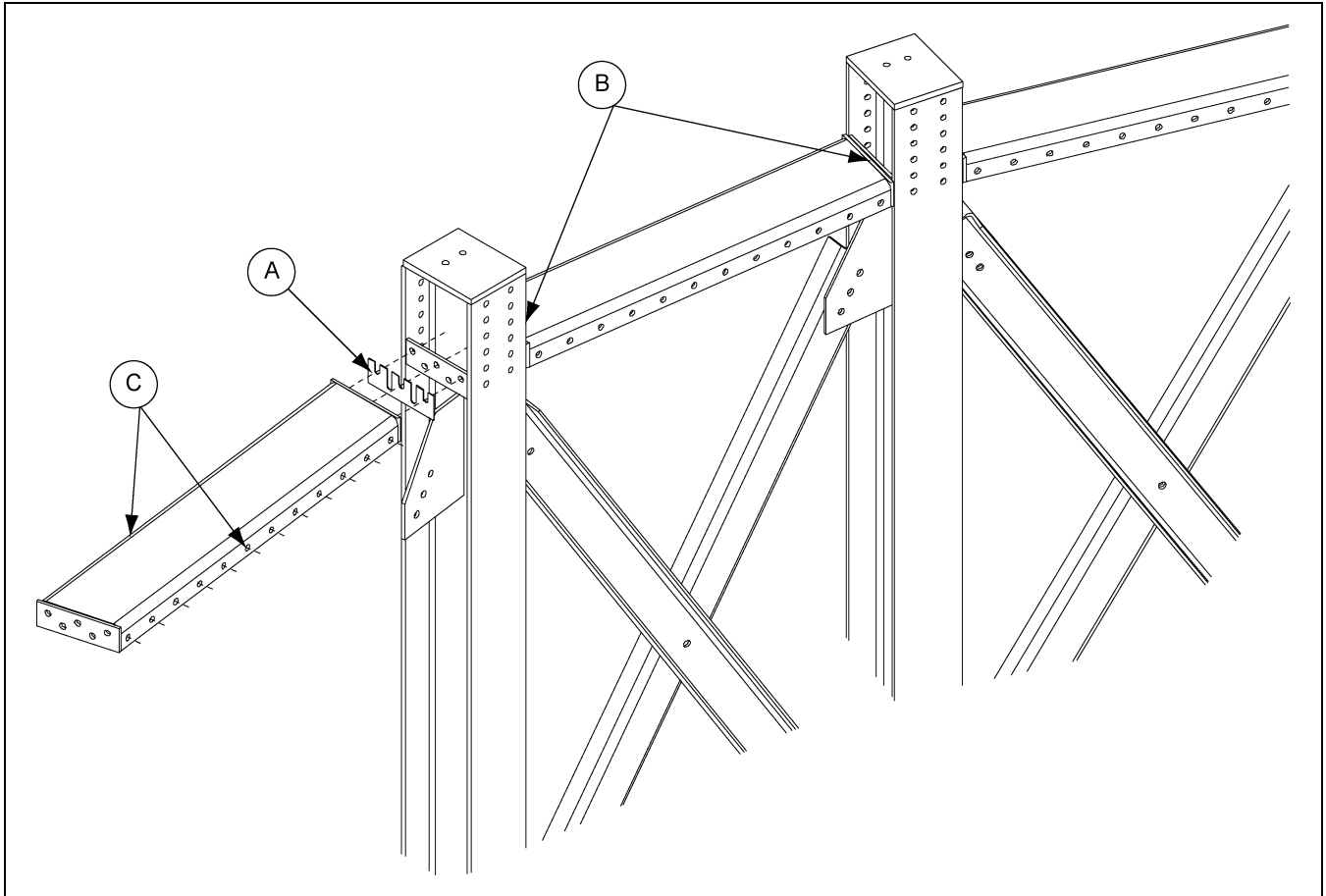


Figure 7D Compression Channel Erection

Ref #	Part #	Description
A	CHT-1536	Channel Shim
B		Fasten to column attachment plates
C		Fasten to compression angle members

NOTE: Compression angle weldments not shown for clarity.

Install Hopper Panels

The 36' hopper bottom has three (3) sections. Apply caulk to all hopper section seams as shown in [Figure 7H on Page 26](#).

Step 1: Attach all the top panels to the compression angles using bolts. See chart [below](#) for bolt specifications. Install the compression splice plates on the back side of the compression angle. (See [Figure 7E.](#)) All top panel overlap seams use 1/2" x 1" bolts. Lap all panels as shown in [Figure 7F](#).

Step 2: Assemble the left and right sides of the middle section to the top sections that were just installed. Use 1/2" x 1" bolts for all middle section seams. Use 1/2" x 1-1/2" bolts at the corners of the panels where three (3) or more panels overlap. Lap all panels as shown in [Figure 7F](#).

Step 3: Once the middle panels are installed the bottom hopper panels and discharge collar may be attached with 1/2" x 1" bolts at four (4) opposing points as shown in [Figure 7I on Page 26](#). Complete this assembly by laying the remaining panels - moving around in one direction and lapping all sheets the same way. *Do not tighten bolts until all hopper panels are attached to each other, the compression ring, splice plates and discharge collar.*

NOTE: All bolts used in hopper assembly should be installed with the bolt heads to the inside of the hopper.

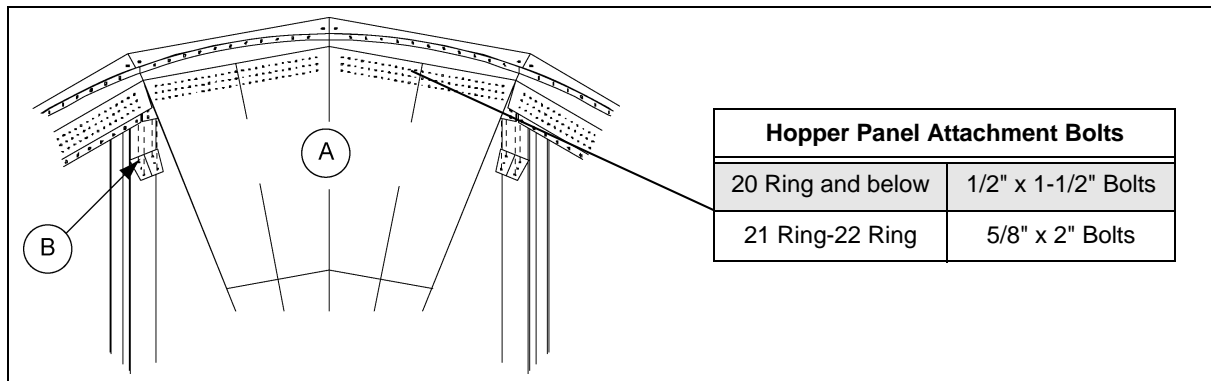


Figure 7E Top Section and Splice Assembly

Ref #	Description
A	Top Panels
B	Splice Plate using 1/2" x 1-1/2" Bolts

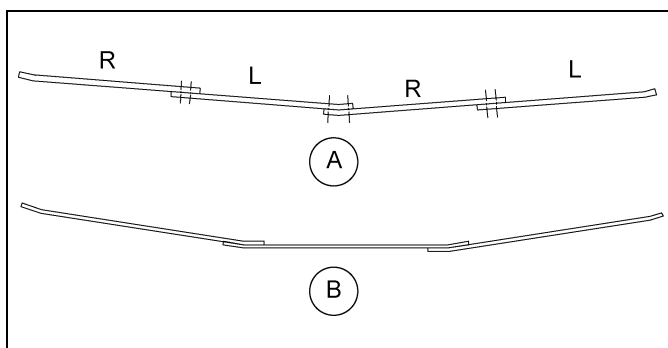


Figure 7F Lap Details

Ref #	Description
A	Middle Hopper Section Lap Detail
B	Top/Bottom Hopper Section Lap Detail

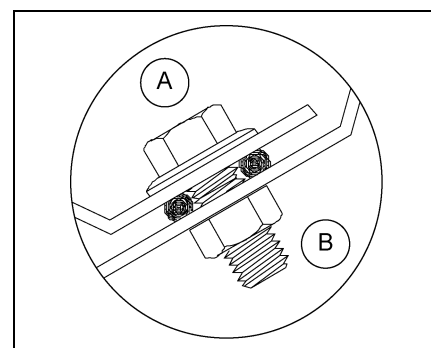


Figure 7G

Ref #	Description
A	Inside
B	Outside

7. Hopper Section Assembly

Install Hopper Panels (Continued)

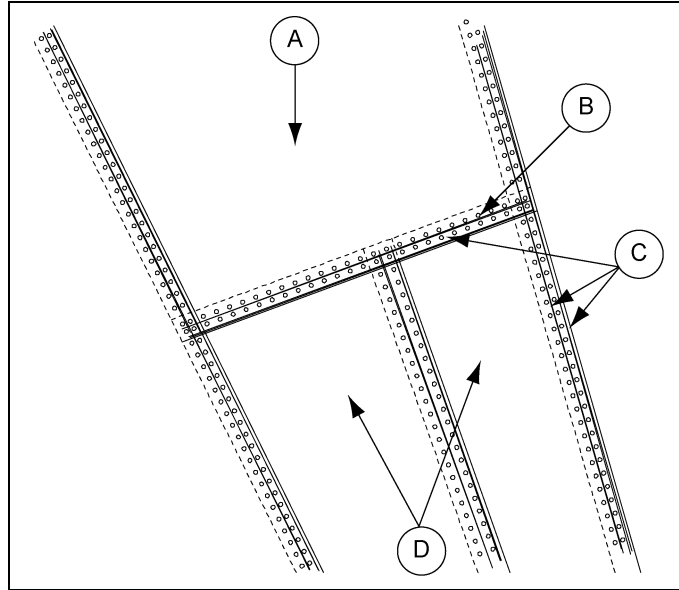


Figure 7H Caulking Detail

Ref #	Description
A	Top Hopper Panel
B	1/2" Flange Head Bolts with Nut on Underneath Side

Ref #	Description
C	Caulking
D	Middle Hopper Panels

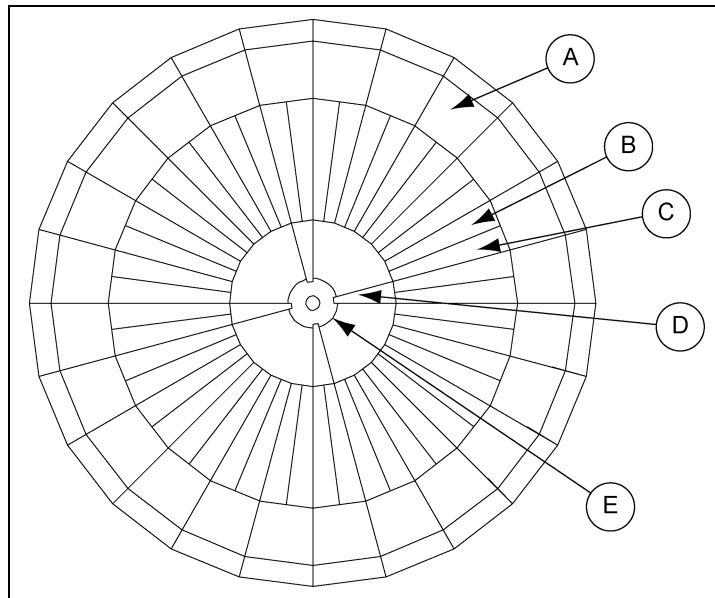


Figure 7I Hopper Panel and Discharge Collar Assembly

Ref #	Description
A	Top Panel
B	Left Middle Panel
C	Right Middle Panel

Ref #	Description
D	Bottom Panel
E	Center Collar

Install Hopper Panels (Continued)

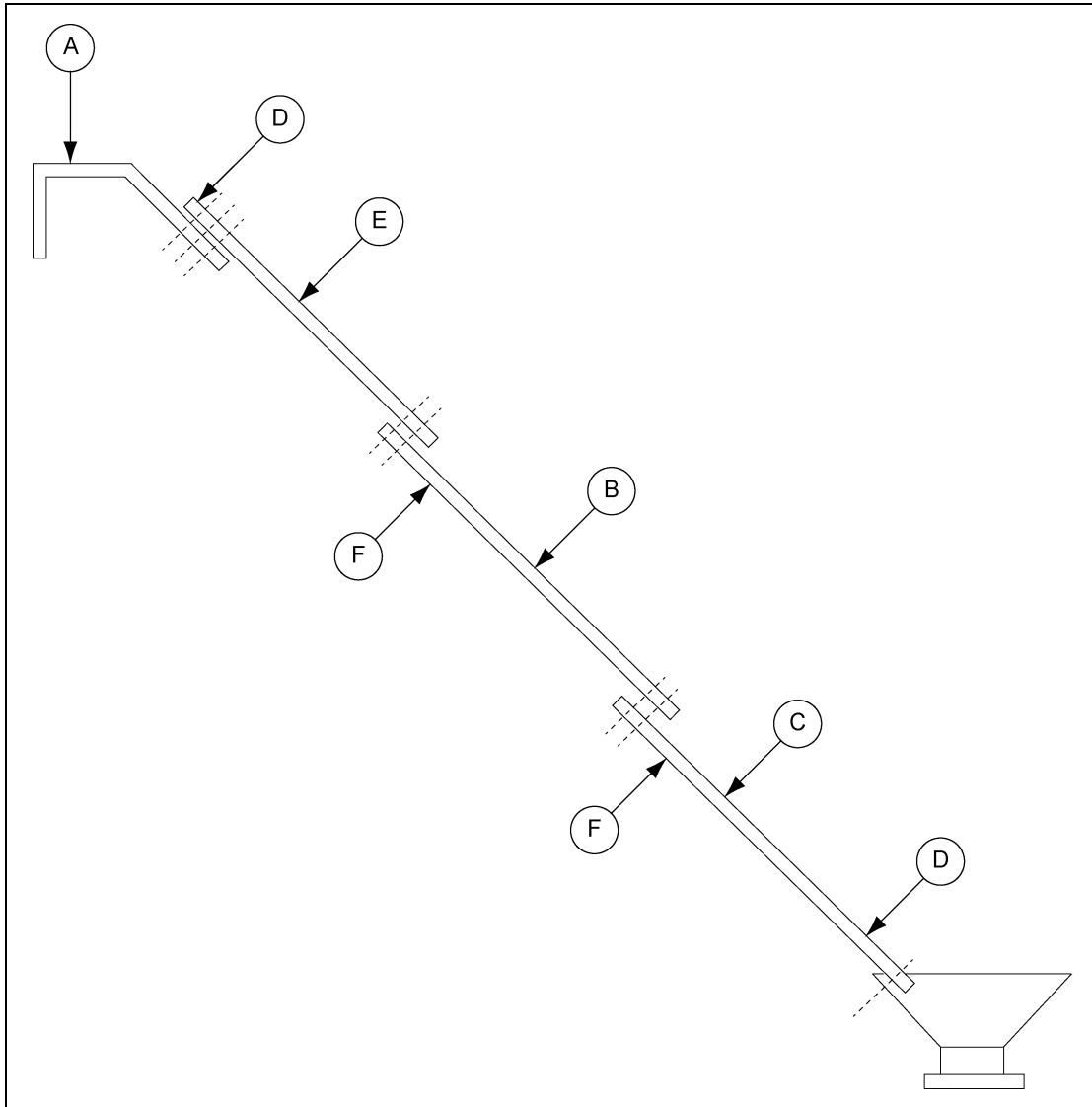


Figure 7J

Ref #	Description
A	Top Compression Ring
B	Galvanized Top Sheet (Two (2) per Orange)
C	Galvanized Bottom Sheet (Single)

Ref #	Description
D	On Top
E	Orange
F	Below

Tighten All Bolted Connections

Start at the bottom of the hopper and tighten all bolts, including anchor bolts, discharge collar, hopper panels, splice plates and compression angle segments.

Install rack and pinion roller gate as shown in [Figure 7K on Page 28](#), using 5/16" x 3/4" bolts.

When hopper structure has been completed, it should be level to within plus or minus 1/8" maximum deviation, as compared to all other support columns as measured at the top to the compression angle ring. The support columns must be plumb to within plus or minus 1/2" as measured from the top.

7. Hopper Section Assembly

Install Rack and Pinion Roller Gate

If a rack and pinion gate is purchased, install as shown in [Figure 7K](#), using 5/16" x 3/4" hardware.

NOTE: Top extension plate may have to be loosened prior to discharge collar connection.

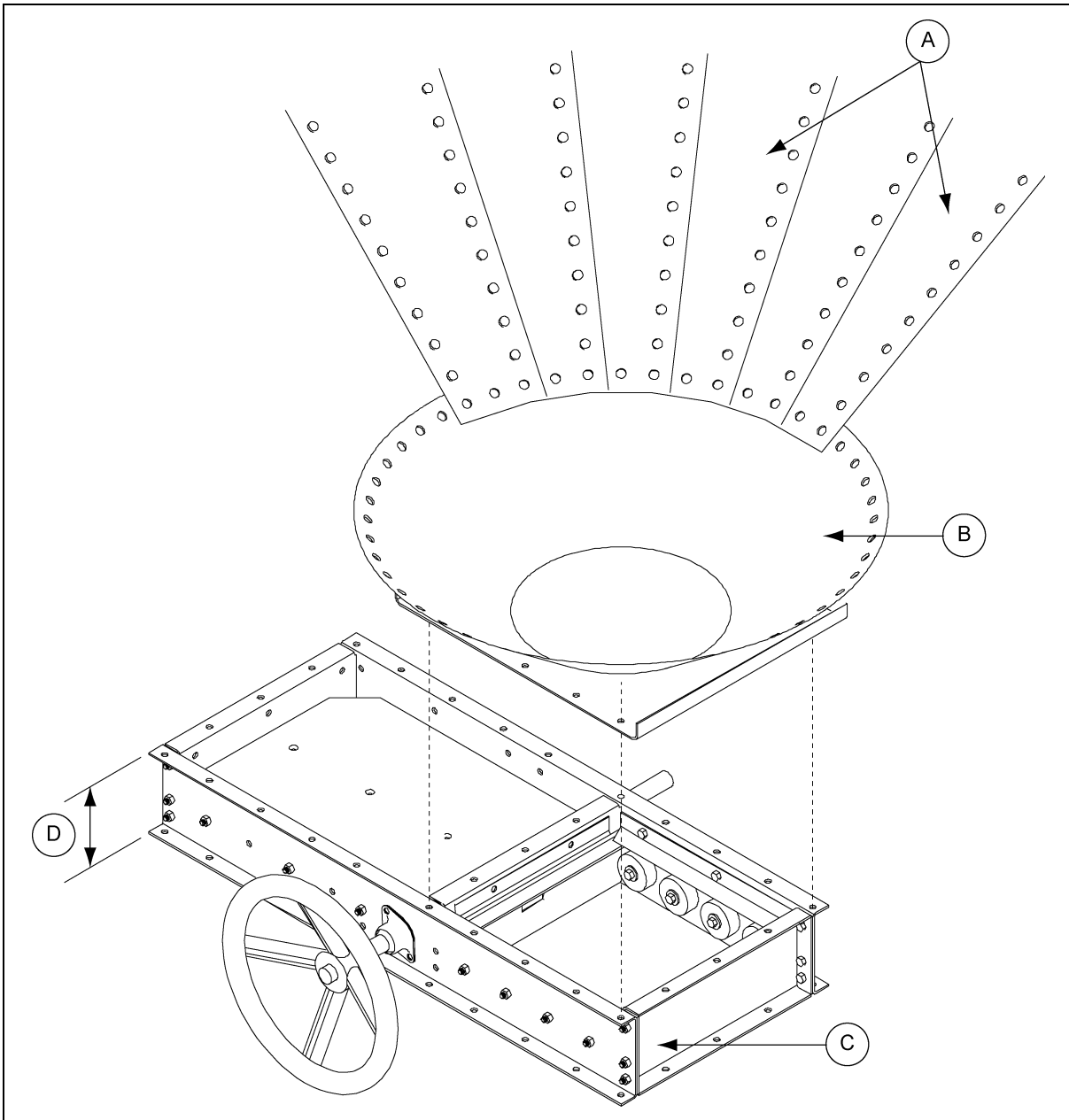


Figure 7K Hopper Discharge Collar to Roller Gate

Ref #	Description
A	Hopper Panels
B	Discharge Collar Weldment
C	Roller Gate Assembly
D	5-1/2" Height

Sidewall Erection Instructions

Before bolting the sidewall sheets together, check that you have the proper gauge steel for the first ring. The higher gauge numbers denote the thinner materials. (For example, 22 gauge material is thinner than 14 gauge.) 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. Check the various gauges of the bin with the color code chart and begin building accordingly. **REMEMBER** assemble the top ring first.

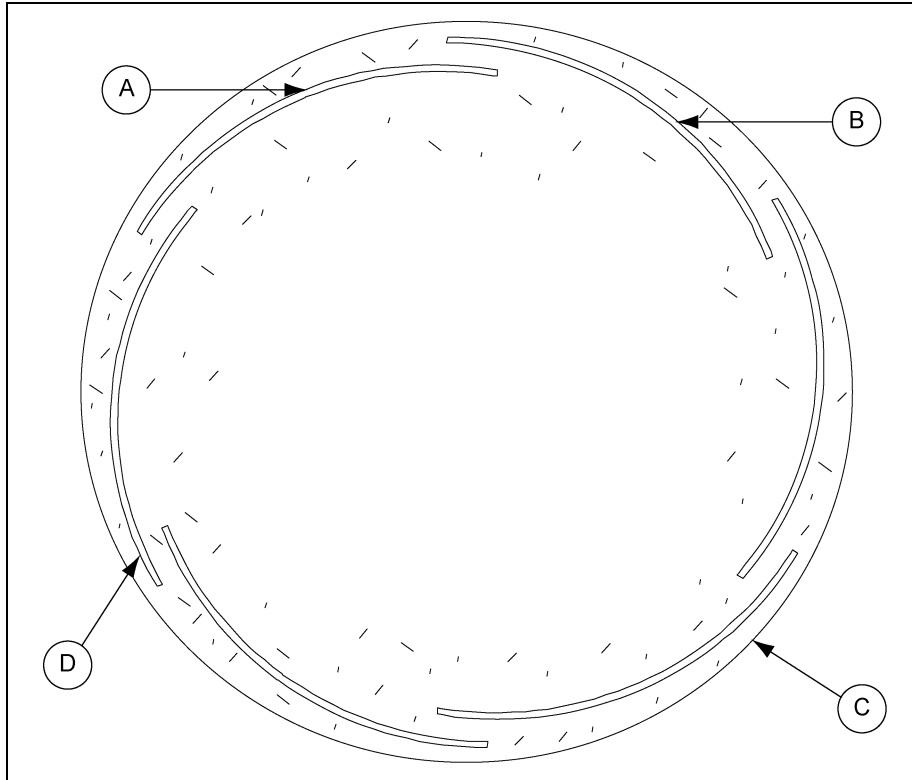


Figure 8A

Ref #	Description
A	Left Panel
B	Right Panel
C	Concrete Foundation
D	Sidewall Sheet

Once you have selected the proper gauge material, begin assembling all sidewall sheets in the following manner: Standing on inside of the bin, place the left panel to the inside with the right panel to the outside. (See [Figure 8A](#).)

NOTE: The rope caulking is installed before each sheet is assembled. Wipe sheet clean where caulking is to be applied. Refer to [Page 30](#) for caulking placement.

Using correct size bin bolts throughout, begin assembling sidewall sheets end to end (overlapping the same way throughout) until the ring is completed. All body sheet bolts are to be installed with the bolt head and its neoprene washer to the outside and the nut on the inside. Do not tighten bolts until all sheets are assembled and form a complete ring. Lifting of sidewall should be done with jacks and lifting brackets on the stiffener bolt holes.

Caulking Detail

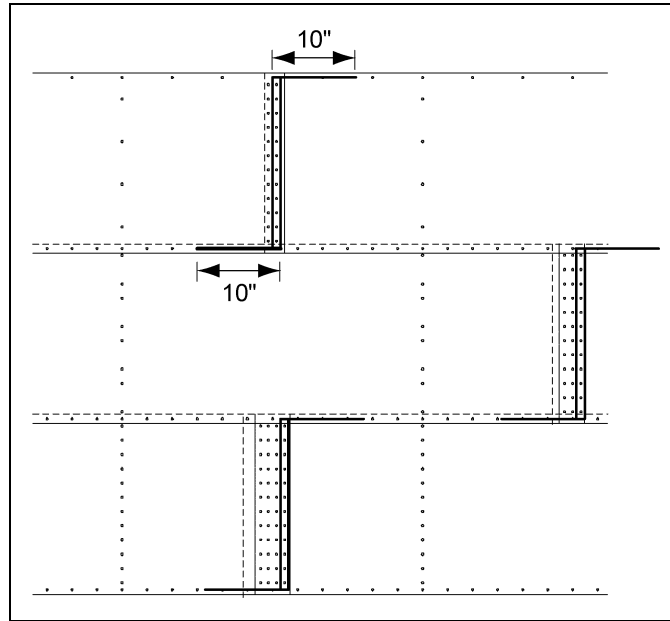


Figure 8B Standard, Triple and Quad Punched Sidewall Sheets as Viewed from Outside.

Apply one strip of caulking near the outside edge of the outer sheet and between the outer two (2) rows of bolts, refer to [Figure 8C](#). A strip of caulking 10" long, should be placed along the horizontal seams. Before bolting the next ring in place, apply one strip of caulking 10" long on the front of the underlapped sheet at each joint. Also, a 10" strip of caulking is to be placed along the lower horizontal edge of lapping sheet at every vertical seam. This will fill the space that occurs between the holes caused by the overlapped sheets. Additional 10" strips should be used to fill gaps that occur with heavier gauges.

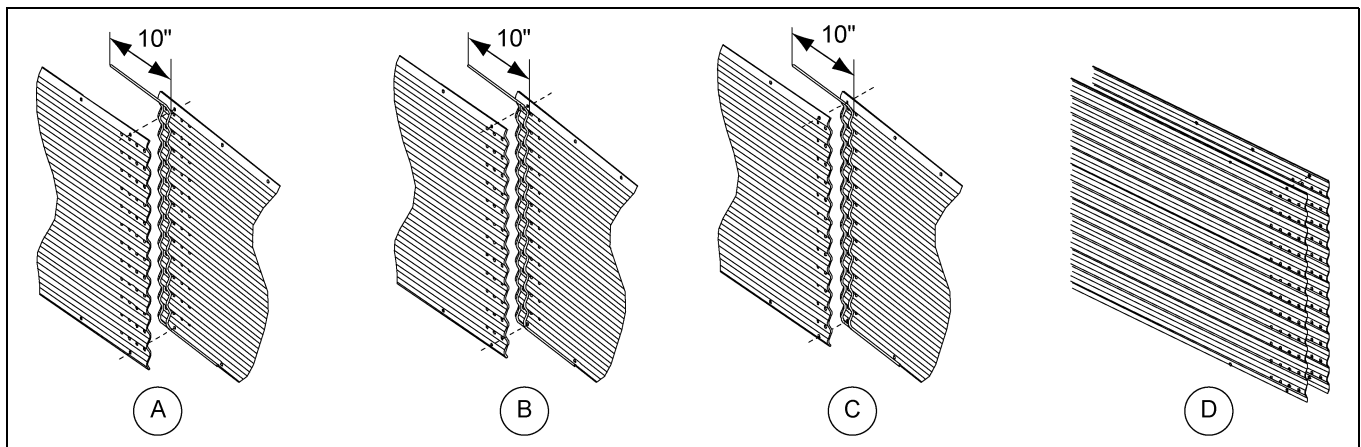


Figure 8C As Viewed from Inside of Bin (Externally stiffened reverse rolled sheets shown.)

Ref #	Description
A	Quad Punch Caulking Detail
B	Triple Punch Caulking Detail
C	Double Punch Caulking Detail
D	Laminated Sheet Detail (Caulking not shown.)

Decal Sheet Placement

NOTE: *The decal sheets are located in the second ring from the top, evenly spaced around the diameter of the bin.*

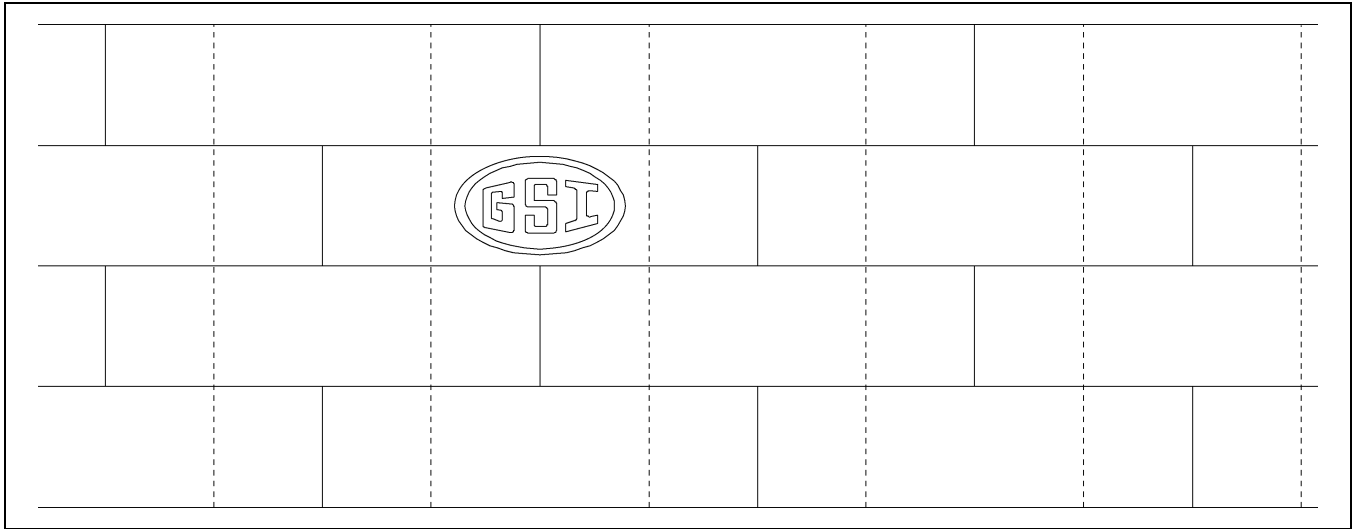


Figure 8D 2 Post (Two (2) rows of stiffeners used on each sidewall sheet.)

NOTE: *Dashed lines represent stiffener locations.*

Lifting Jack Usage

Give some thought before starting the bin on location of door and other accessories. Proper placement of lifting jacks in relationship to anchor bolts could make a difference on odd or even ring bins. Attachment of lifting brackets should be made on the stiffener row of bolts. The sidewall sheets are also staggered 1/2" from end to end.

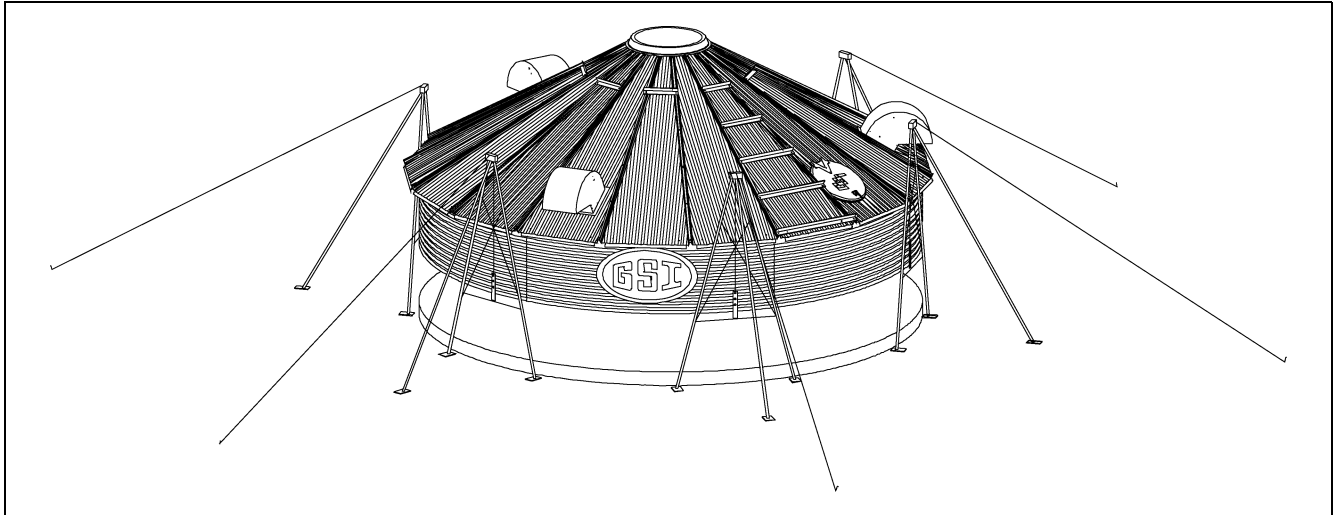


Figure 9A Anchor Jacks Securely

Anchor all jacks securely with metal stakes and cable. Now raise the bin just high enough to assemble the next ring. When lifting the bin, crank all jacks at an equal rate. This will prevent bowing previously assembled rings and make for easier hole alignment. To the inside of the first ring, bolt the next ring. Be sure to stagger the sheets and select the proper gauge material. To avoid excessive pulling of the holes in the sidewall, some stiffener lap and splice connections may go together easier if the sidewall is not tightened until the stiffeners have been put in place. Lower the bin on the foundation after assembling and tightening bolts on the new ring or rings. Now, re-bolt the lifting straps to the lowest ring in place thus far.

NOTES: Add inside and outside ladders to bin walls as you continue to raise the bin.

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 other stiffener (one per sheet). Be sure to use heavy duty jacks for commercial installations.

Color Code Chart 2.66" Commercial Stiffeners

NOTE: Some colors are different than those used for sidewall sheets.

* **NOTE:** Only Orange on 1 ring stiffener.

Stiffener Gauge	Color Code
15	Red/Orange*
14	Green/Orange*
13	Dark Blue
12	Black
11	Pink
10	Light Blue
9	Purple
8	Yellow
6	White
5	Fluorescent Green
5+12	Gold/Black
5+10	Gold/Light Blue
5+8	Gold/Yellow

Color Code Chart 2.66" Sidewall Gauges

NOTE: Some colors are different than those used for stiffener sheets.

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

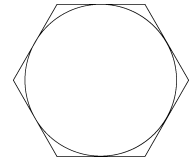
Identifying Bolt Grades



Under no condition shall any other bolts be substituted for those supplied by the manufacturer.

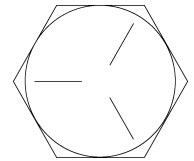
Grade 2 Bolts

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



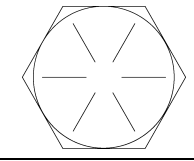
Grade 5 Bolts

2. 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.



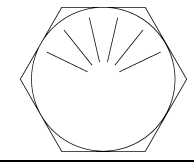
Grade 8 Bolts

3. Grade 8 bolts are designated by six (6) slash marks evenly spaced out around the head of the bolt.



Grade 8.2 Bolts

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



NOTE: Bolts should not be tightened in excess of the torque specifications.

Torque (ft. lbs.)		
Bolt Size	Minimum	Maximum
5/16"-18	15	20
3/8"-16	35	42
7/16"-14	65	72
1/2"-13	95	105

Hardware Identification Notes

Refer to 2.66" Commercial Tank Bolting Requirements for Complete Bolt Usage

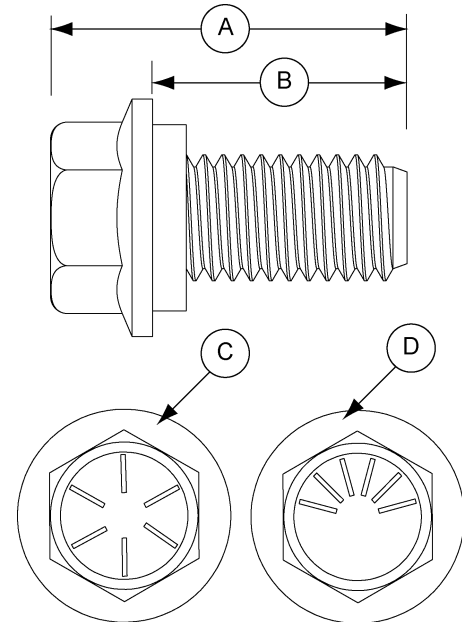
S-7482

An S-7482 is a 5/16" x 3/4" pre-assembled with a plastic sealing washer.

Bolt (S-7482) is used in the following locations:

1. Use in accessories.
2. Color of bucket lid is dark blue.

A	0.950" (2.41 cm)
B	0.750" (1.90 cm)
C	Grade 8
D	Grade 8.2



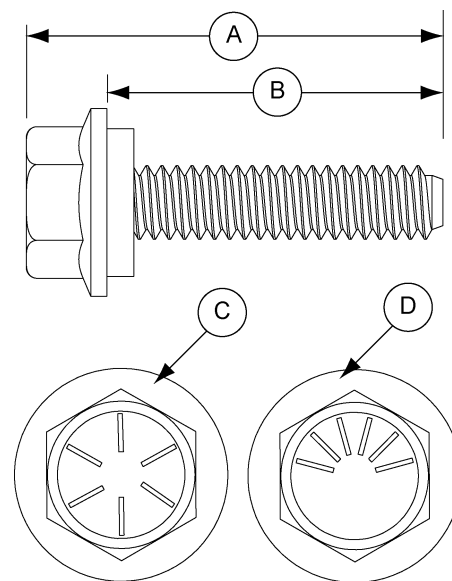
S-7483

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

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

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

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



11. Hardware

Refer to 2.66" Commercial Tank Bolting Requirements for Complete Bolt Usage (Continued)

S-7487

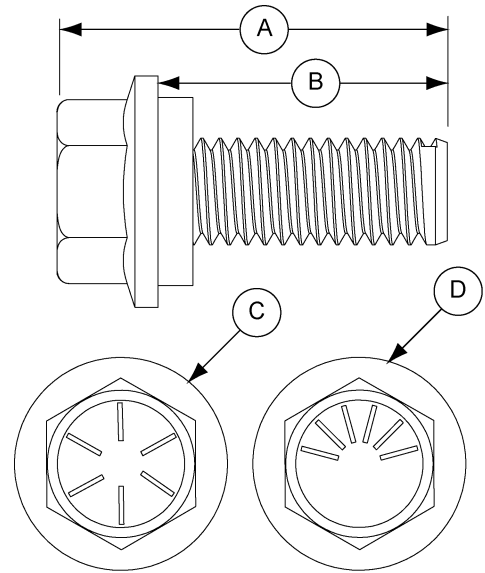
An S-7487 is a 3/8" x 1" JS bolt that is pre-assembled with a sealing washer.

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

1. Use in all sidewall connections for 20 gauge through 10 gauge sidewall to sidewall sheets.
2. Use for horizontal and vertical seam connections for 9 gauge through 8 gauge sidewall sheets.
3. Use in horizontal seam connections for 6 gauge and 5 gauge sidewall sheets.
4. Use when attaching base angle to sidewall sheet on flat bottom bins.
5. The color of the bucket lid is grey.

NOTE: Do not use to splice the stiffeners together on the flanges where they connect to each other or the splice plates.

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



S-7488

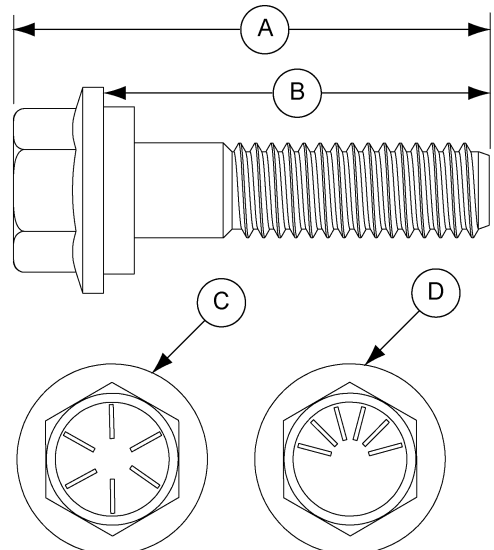
An S-7488 is a 3/8" x 1-1/2" JS bolt that is pre-assembled with a sealing washer.

Bolt (S-7488) is used in the following locations:

1. Use in all stiffener to sidewall and overlap connections where the sidewall is 9 gauge to 10 gauge laminated.
2. Use in vertical seams on sidewall that is 5 gauge to 6 gauge.
3. Use in horizontal seams on sidewall that are 11 gauge laminated to 8 gauge laminated.
4. The color of the bucket lid is orange.

NOTE: Do not use in flanges where the splice plate bolts to the stiffeners. Sealing washers should not be used for these connections.

A	1.850" (4.70 cm)	C	Grade 8
B	1.500" (3.81 cm)	D	Grade 8.2



Refer to 2.66" Commercial Tank Bolting Requirements for Complete Bolt Usage (Continued)

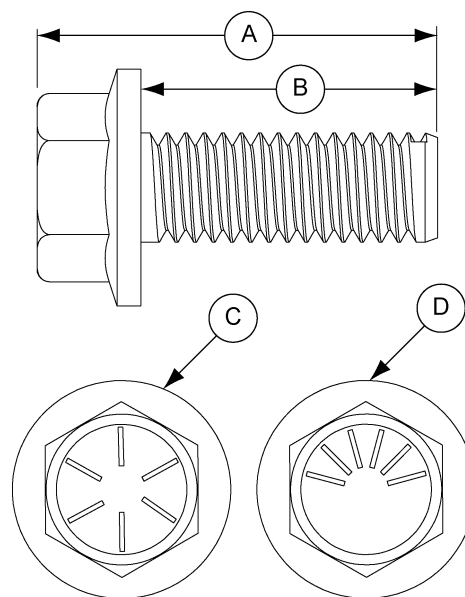
S-7485

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 to splice the stiffeners together on the flanges.
(A flange nut is used on the nut side of the connection.)
2. Use to splice the laminated stiffeners together. (A flange nut is used on the nut side of the connection.)
3. The color of the bucket lid is light green.

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



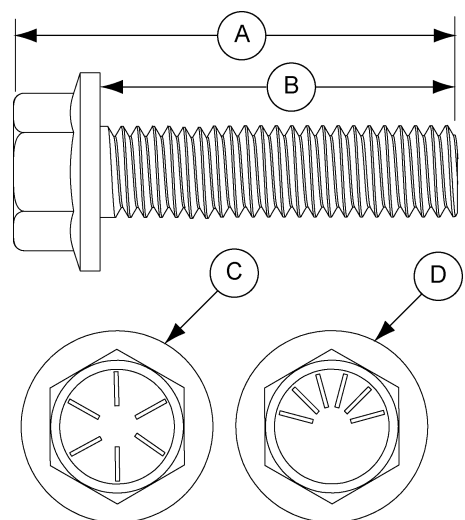
S-7486

An S-7486 is a 3/8" x 1-1/2" JS hex bolt with a flanged head without a sealing washer.

Bolt (S-7486) is used in the following locations:

1. Use in special seismic tanks.
2. The color of the bucket lid is dark brown.

A	1.850" (4.70 cm)
B	1.500" (3.81 cm)
C	Grade 8
D	Grade 8.2











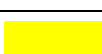

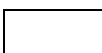


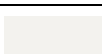




NOTE: The only washers shipped loose with the bins are the steel flat washers. The 5/16" steel flat washer (S-845) is used where the base angle attaches to the sheet and some are used at the main eave clips. The 3/8" steel flat washers (S-248) are used at the stiffener splices and some are used in the roof rafter splices.

11. Hardware

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.

JS Part #	YDP Part #	Color	Bucket Count	Lid Color	Description
S-7482	S-275	Dark Blue	1500		5/16" x 3/4" Bolt pre-assembled with sealing washer
NA	S-10260	Lime Green	1250		5/16" x 1" Bolt pre-assembled with sealing washer
S-7483	S-277	Black	1000		5/16" x 1-1/4" Bolt pre-assembled with sealing washer
S-7484	S-396	Red	5000		5/16" Hex nut
S-10268	S-3611	Gold	NA		5/16" Flange nut
S-7487	S-455	Grey	850		3/8" x 1" Bolt pre-assembled with sealing washer
S-7485	S-7927	Light Green	1000		3/8" x 1" Flanged bolt without sealing washer
S-7488	S-5060	Orange	650		3/8" x 1-1/2" Bolt pre-assembled with sealing washer
S-7486	S-7928	Dark Brown	700		3/8" x 1-1/2" Flange bolt without sealing washer
S-10165	S-9445	Light Blue	500		3/8" x 2" Bolt pre-assembled with sealing washer
S-7489	S-456	Yellow	4000		3/8" Hex nut
S-9426	S-9373	Dark Purple	2500		3/8" Hex flanged nut
NA	S-10250	NA	NA	In Box	7/16" x 1-1/4" Flanged bolt
S-10262	S-9464	White	500		7/16" x 1-1/2" Flange bolt pre-assembled with sealing washer
S-9389	S-10114	Light Purple	350		7/16" x 2" Bolt pre-assembled with sealing washer
S-10134	S-9444	Dark Green	300		7/16" x 2-1/2" Bolt pre-assembled with sealing washer
S-10261	NA	Natural (Clear)	200		7/16" x 3-1/4" Flange bolt pre-assembled with sealing washer
S-9281	S-7332	Fire Orange	1500		7/16" Hex nut
NA	S-8479	Light Brown	800		7/16" Special recessed nut
NA	S-10251	NA	NA	In Box	7/16" Un-serrated flange nut
NA	S-10252	NA	NA	In Box	1/2" x 1-3/4" Flange bolt
NA	S-10253	NA	NA	In Box	1/2" Un-serrated flange nut

2.66" Commercial Tank Bolting Requirements - 2 Stiffeners per Sidewall Sheet

Sidewall Seams and Stiffener to Sidewall Bolt Usage				
Sidewall Gauge	Horizontal Seam	Vertical Seam	Stiffener to Sidewall	Overlap Seam
20-19	5/16" x 3/4" [10]	5/16" x 3/4" [24]	3/8" x 1" [8]	5/16" x 3/4" [2]
18T	5/16" x 3/4" [22]	5/16" x 3/4" [36]	3/8" x 1" [16]	5/16" x 3/4" [2]
17T-16T	5/16" x 3/4" [22]	5/16" x 3/4" [36]	3/8" x 1" [24]	5/16" x 3/4" [2]
15Q-14Q	5/16" x 3/4" [22]	5/16" x 3/4" [48]	3/8" x 1" [24]	5/16" x 3/4" [2]
13Q-10Q	3/8" x 1" [22]	3/8" x 1" [48]	3/8" x 1" [24]	3/8" x 1" [2]

- T - Triple punched sheets (36 Holes in vertical seams.)
Q - Quad punched sheets (48 Holes in vertical seams.)
All bolts are standard bin bolts with neoprene washers. For horizontal and vertical seam bolts, the bolt head and neoprene washers are on the outside of the bin. Refer to stiffener instructions on stiffener to sidewall bolt usage on [Page 40](#).
- Hardware part numbers
5/16" x 3/4" (S-7482)
3/8" x 1" (S-7487)
- See [Pages 40-42](#) for special instructions on stiffener to sidewall bolt usage for stiffener splices and laminated stiffeners.
- Use 5/16" bolts and nuts when joining 14 gauge to 13 gauge on horizontal seams.

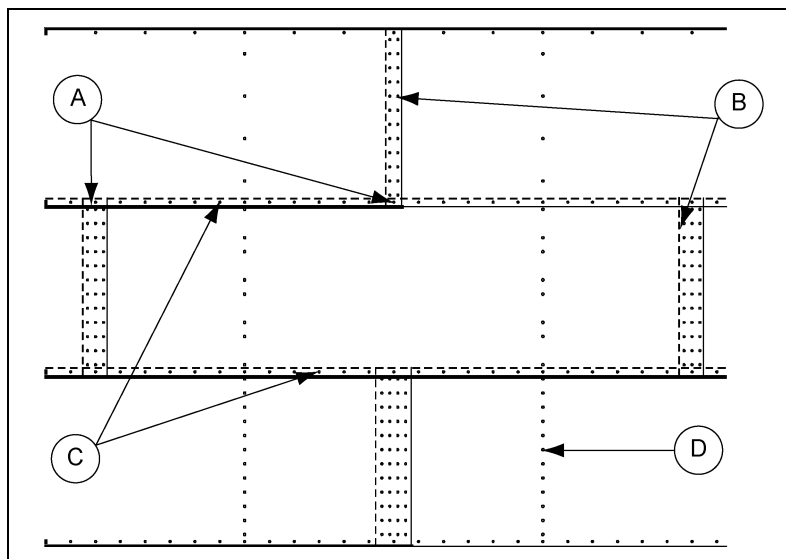


Figure 11A 18 Gauge Sidewall Sheet

Ref #	Description
A	Overlap Seam
B	Vertical Seam
C	Horizontal Seam
D	Stiffener to Sidewall Standard Stiffened Punched

12. Stiffeners

Universal Stiffener and Splice Hardware

Stiffeners	Splicing Systems
12 Gauge to 12 Gauge and Thinner	Offset/Lapped Stiffener No Separate Splices Plate
12 Gauge to 11 Gauge through 8 Gauge to 5 Gauge, 6 Gauge	Use SS-7053 Splice Color Code: Yellow
5 Gauge, 6 Gauge to 5 Gauge, 6 Gauge	Use SS-7053 Splice Color Code: Yellow
5 Gauge to Laminated Laminated to Laminated	Use SS-6966 or SS-7427 Splice 2 per Joint

Splice Hardware Usage (Not Including Sidewall to Splice Bolts)

Stiffeners	Splicing Systems	Hardware Part #	Description	Qty
14 Gauge and 15 Gauge	Offset Stiffener Joint	S-7485	3/8" x 1" Flange Bolts	8
		S-9426	3/8" Flange Nuts	8
12 Gauge and 13 Gauge	Offset Stiffener Joint	S-7485	3/8" x 1" Flange Bolts	10
		S-9426	3/8" Flange Nuts	10
10 Gauge and 11 Gauge	SS-7053 8 Gauge Splice Plate	S-7485	3/8" x 1" Flange Bolts	16
		S-9426	3/8" Flange Nuts	16
8 Gauge and 9 Gauge	SS-7053 8 Gauge Splice Plate	S-7485	3/8" x 1" Flange Bolts	20
		S-9426	3/8" Flange Nuts	20
5 Gauge and 6 Gauge	SS-7053 8 Gauge Splice Plate	S-7486	3/8" x 1-1/2" Flange Bolts	20
		S-9426	3/8" Flange Nuts	20
Laminated	SS-6966 or SS-7427	S-7486	3/8" x 1-1/2" Flange Bolts	30
		S-9426	3/8" Flange Nuts	30

Stiffener to Sidewall Hardware Usage

Stiffeners	Hardware Part #	Description
Stiffener to Sidewall	S-7487	3/8" x 1" Flange Bolts
	S-9426	3/8" Flange Nuts
SS-7053 Splice to Sidewall	S-7488	3/8" x 1-1/2" Flange Bolts
	S-9426	3/8" Flange Nuts
Laminated Stiffener to Sidewall	S-7488	3/8" x 1-1/2" Flange Bolts
	S-9426	3/8" Flange Nuts

Commercial Stiffeners for 2.66" Corrugation

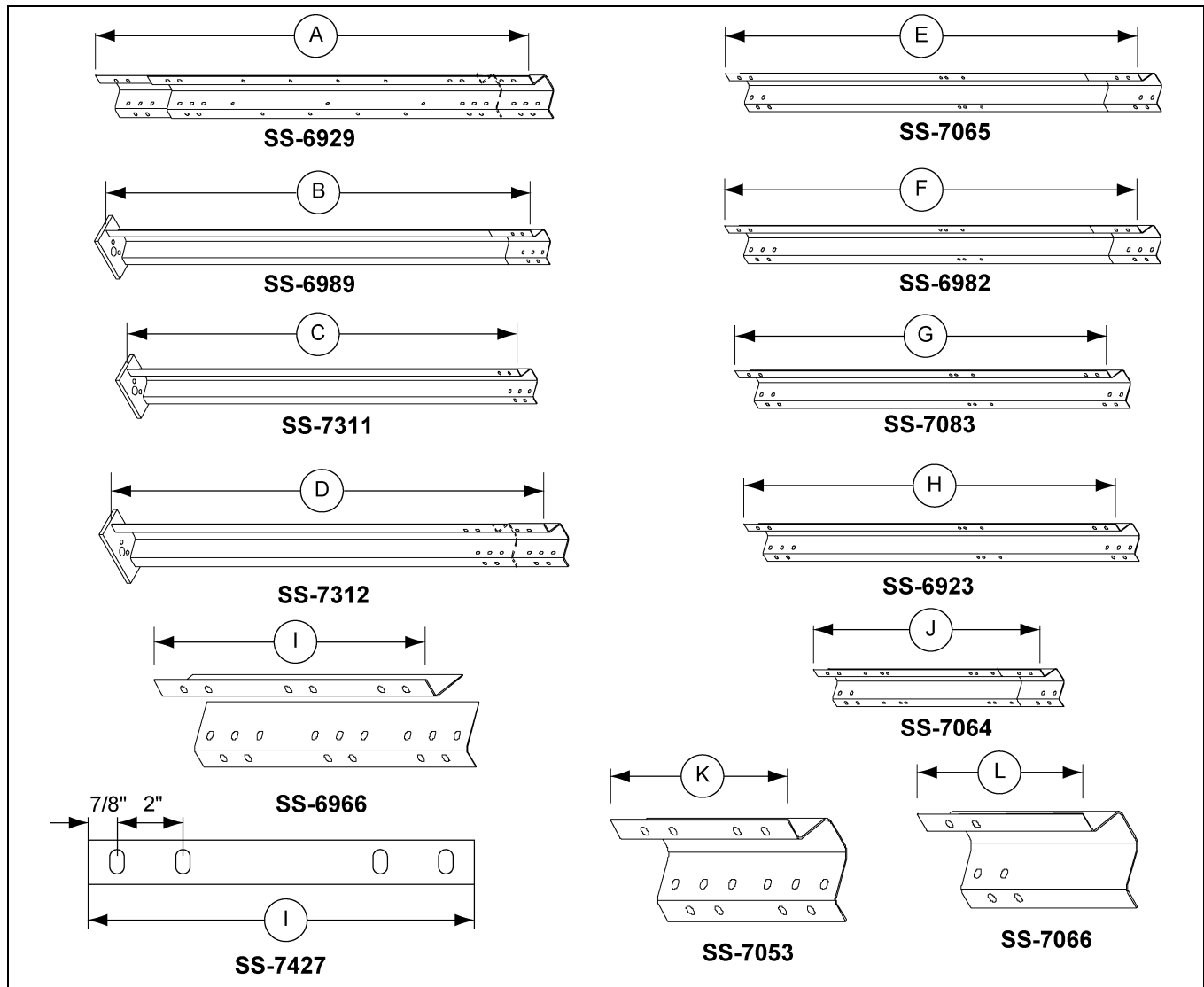


Figure 12A

Ref #	Part #	Description	Length
A	SS-6929	2 Ring Laminated Stiffener	71.906" (182.642 cm)
B	SS-6989	Offset Base Stiffener	87-1/8" (180.260 cm)
C	SS-7311	Base Stiffener	80.094" (203.438 cm)
D	SS-7312	Universal Stiffener Laminated Base Weldment	88.094" (223.758 cm)
E	SS-7065	14 Gauge and 15 Gauge 2 Ring Stiffener	70.969" (180.260 cm)
F	SS-6982	12 Gauge and 13 Gauge 2 Ring Stiffener	70.969" (180.260 cm)
G	SS-7083	10 Gauge and 11 Gauge 2 Ring Stiffener	63.938" (162.401 cm)
H	SS-6923	5 Gauge, 6 Gauge, 8 Gauge and 9 Gauge 2 Ring Stiffener	63.938" (162.401 cm)
I	SS-6966 or	Laminated Back Plate Splice	22" (55.88 cm)
I	SS-7427	Laminated Back Plate Splice	11-3/4" (29.85 cm)
J	SS-7064	Offset 1 Ring Stiffener	38.969" (98.981 cm)
K	SS-7053	8 Gauge Splice	14" (35.56 cm)
L	SS-7066	1 Ring Top	12.469" (31.671 cm)

12. Stiffeners

2.66" Corrugation Commercial Stiffener Splice Details

When installing bottom stiffeners, you may find that in some cases the stiffener with base plate attached will not rest on support structure. Shim plates have been furnished and should be used to fill opening between base plate and compression element.

IMPORTANT: *If shim plates are not used where required, the downward pressure of the stiffeners will not be transferred directly to the foundation and bin failure could result.*

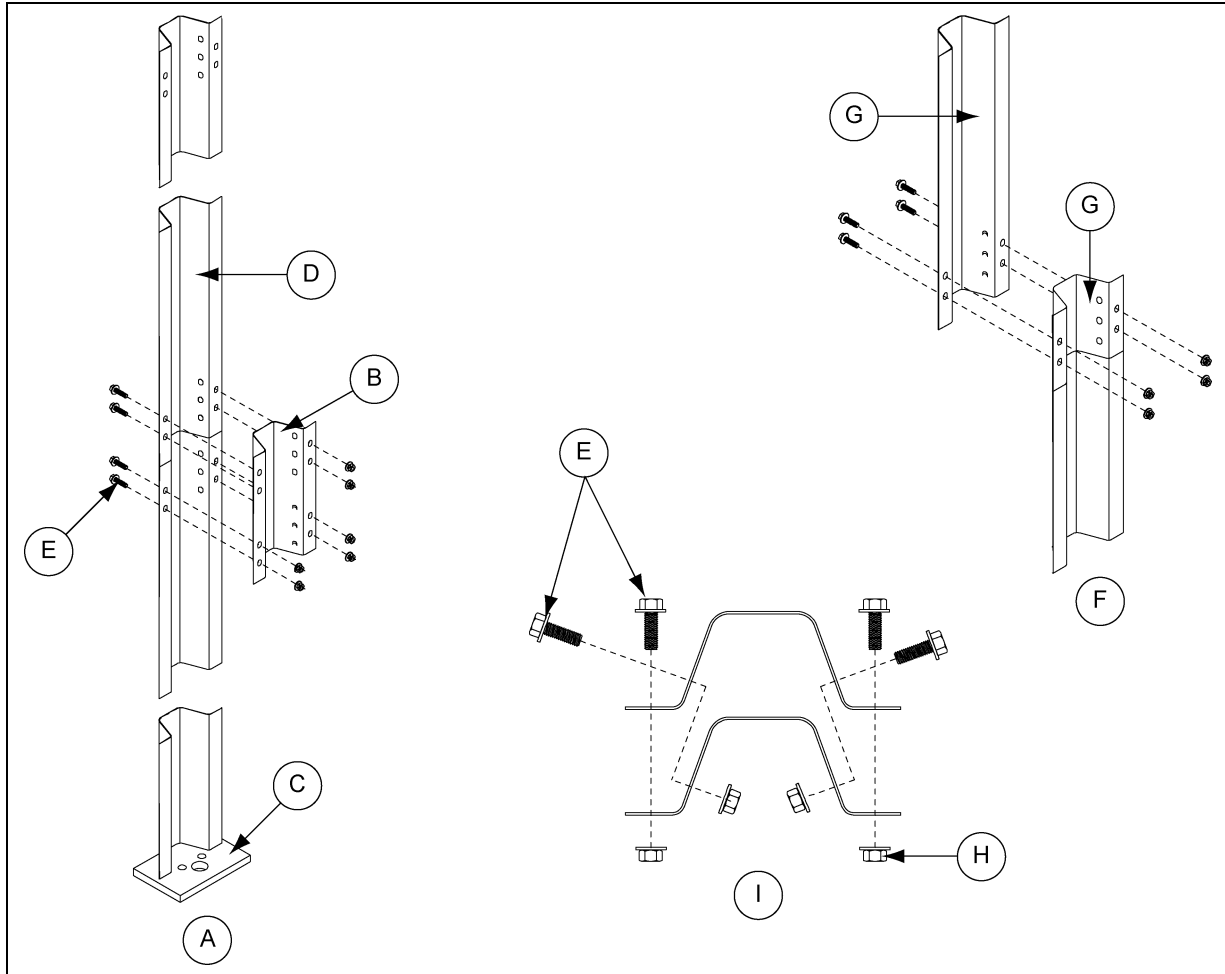


Figure 12B

Ref #	Description
A	Splice Plate Joint Detail (Non-Offset Joint)
B	Splice Plate 8 Gauge (Fluorescent Green) (SS-7053)
C	Base Stiffener (SS-6976)
D	2 Ring Standard Stiffener
E	3/8" Diameter Hex Flanged Head Bolt (No Sealing Washer)
F	Offset Joint Connection Detail
G	Standard Offset Stiffener
H	3/8" Flange Nut
I	Splice Plate Joint (Top View)

See Page 30 and Pages 40-42 for further details.

2.66" Corrugation Commercial Stiffener Splice Details (Continued)

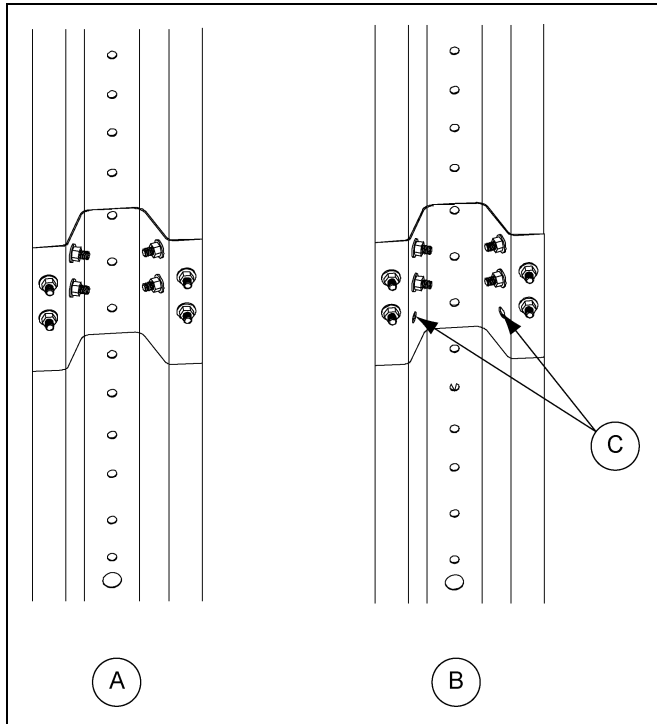


Figure 12C

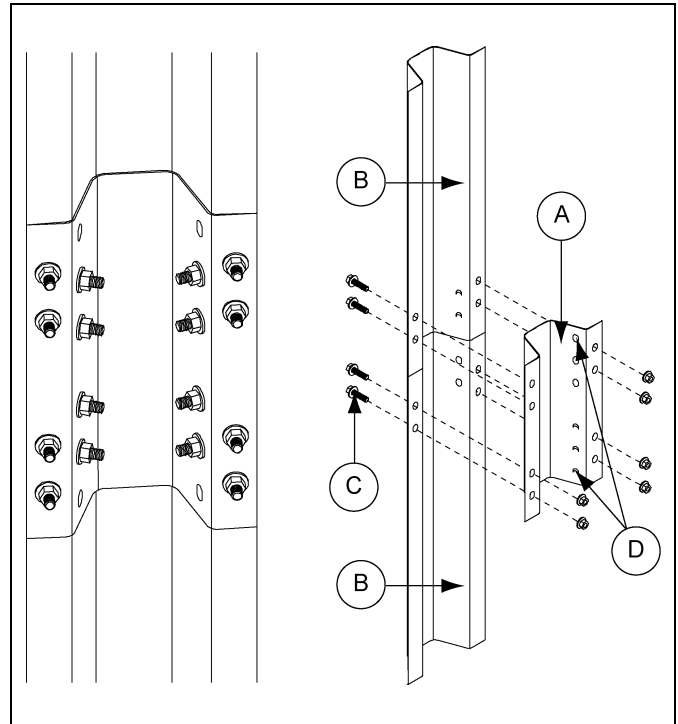


Figure 12D 10 Gauge and 11 Gauge Stiffener Bearing Splice

Ref #	Description
A	14 Gauge and 15 Gauge to 14 Gauge and 15 Gauge Offset Connection Detail
B	14 Gauge and 15 Gauge to 13 Gauge and 12 Gauge Offset Connection Detail
C	Bolt hole not used in 14 gauge and 15 gauge. Do not drill.

Ref #	Description
A	Splice Plate 8 Gauge (SS-7053)
B	10 Gauge or 11 Gauge Standard Stiffener
C	3/8" Diameter Hex Flanged Head Bolt (No Sealing Washer)
D	Bolt holes in splice plate not used. Do not drill.

2.66" Corrugation Commercial Stiffener Splice Details (Continued)

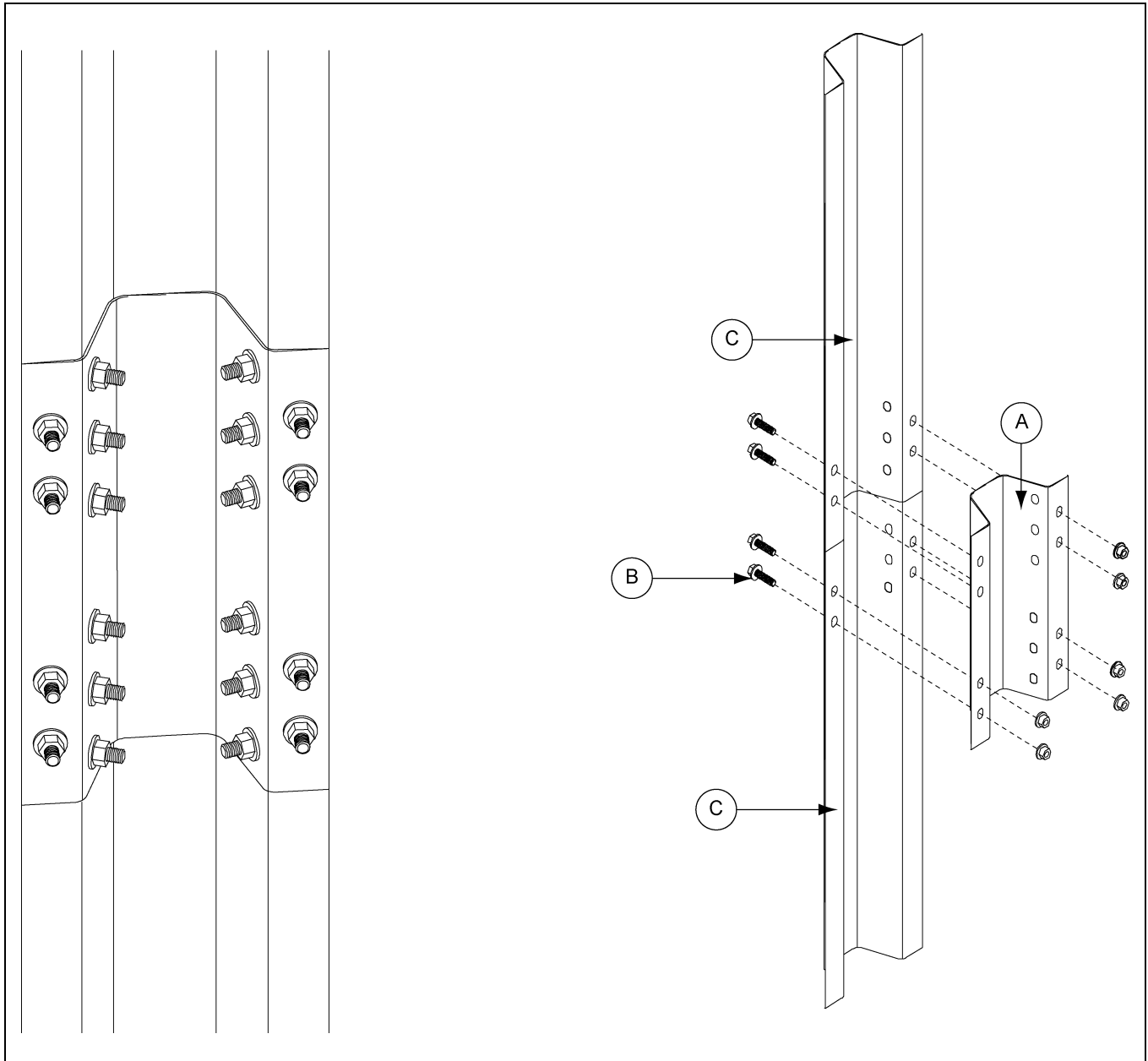


Figure 12E 5 Gauge, 6 Gauge, 8 Gauge and 9 Gauge Stiffener Bearing Splice

Ref #	Description
A	Splice Plate 8 Gauge (SS-7053)
B	3/8" Diameter Hex Flanged Head Bolt (No Sealing Washer)
C	5 Gauge, 6 Gauge, 8 Gauge and 9 Gauge Standard Stiffener

NOTE: Install bolts in all bolt hole locations on stiffener splices.

2.66" Corrugation Commercial Stiffener Splice Details (Continued)

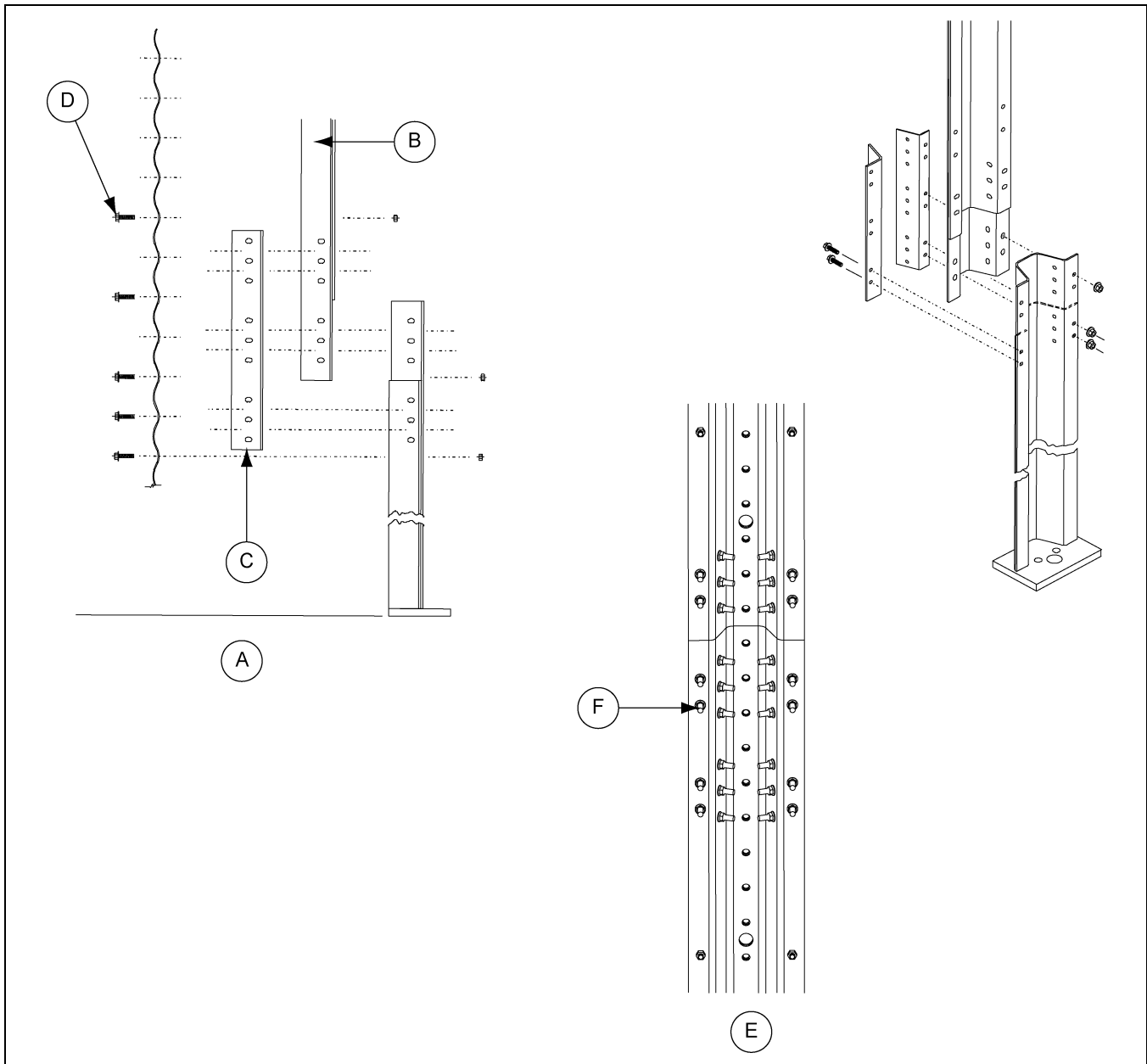


Figure 12F Laminated Stiffener Splice 2.66" Corrugation

Ref #	Description
A	Stiffener Detail for SS-6929
B	Laminated Stiffener Assembly (SS-6929)
C	Back Plate Splice (Two (2) per Connection) (SS-6966)
D	Use 3/8" x 1-1/2" Bin Bolt
E	Bolting Detail for Laminated to Laminated Stiffener Connection
F	3/8" x 1-1/2" Flange Bolts and 3/8" Flange Nuts (30)

NOTE: Install bolts in all bolt hole locations on stiffener splices.

2.66" Corrugation Commercial Stiffener Splice Details (Continued)

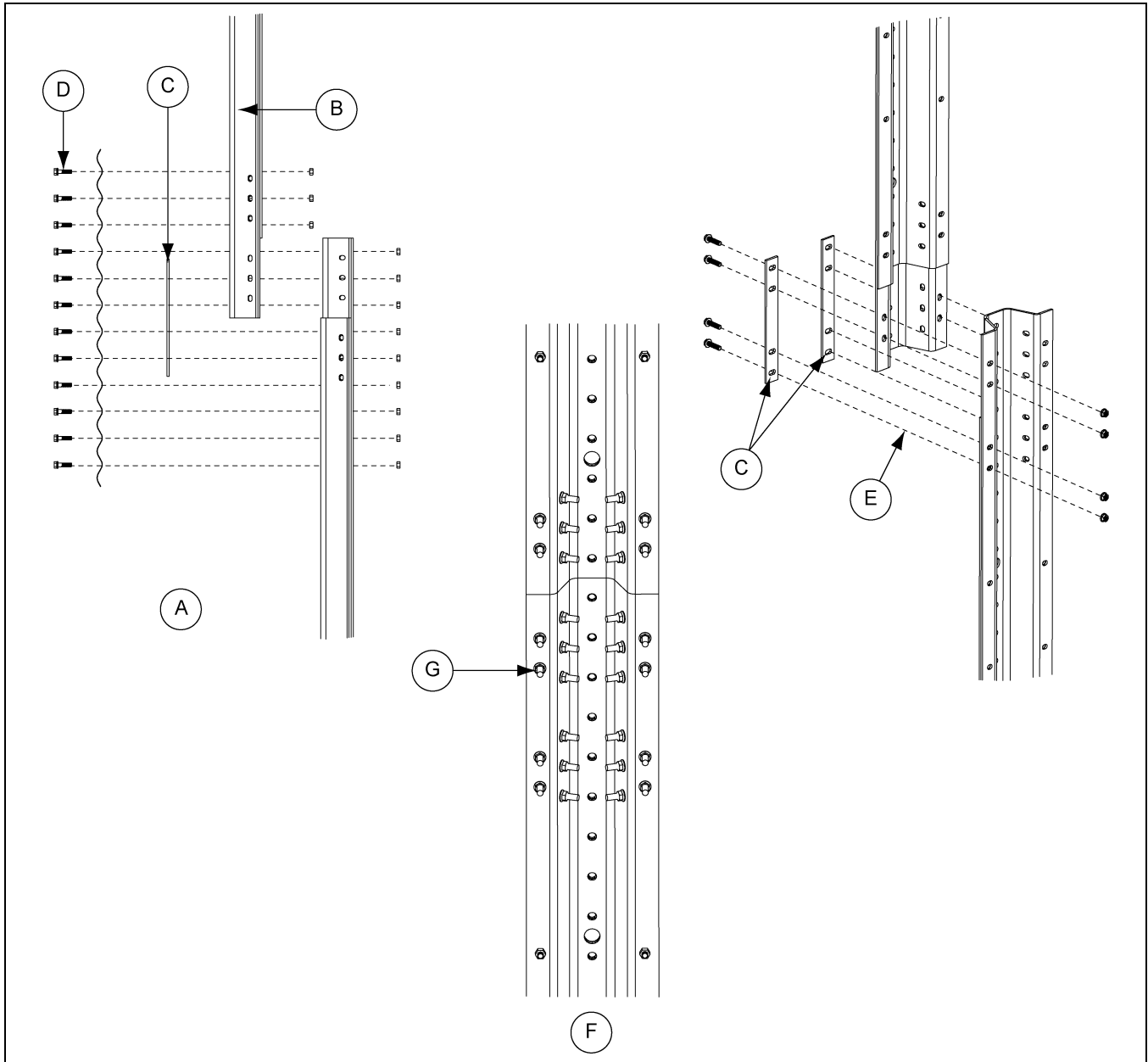


Figure 12G

Ref #	Description
A	Special Laminated Stiffener Splice Detail (SS-7427 Substituted for SS-6966)
B	Laminated Stiffener Assembly (SS-6929)
C	Laminated Stiffener Splice (SS-7427)
D	Use 3/8" x 1-1/2" Bin Bolt and 3/8" Hex Nut
E	Use 3/8" x 1-1/2" Flange Bolt and 3/8" Flange Nut
F	Bolting Detail for Laminated to Laminated Stiffener Connection
G	3/8" x 1-1/2" Flange Bolts and 3/8" Flange Nuts (30)

NOTE: Install bolts in all bolt hole locations on stiffener splices.

2.66" Corrugation Commercial Stiffener Splice Details (Continued)

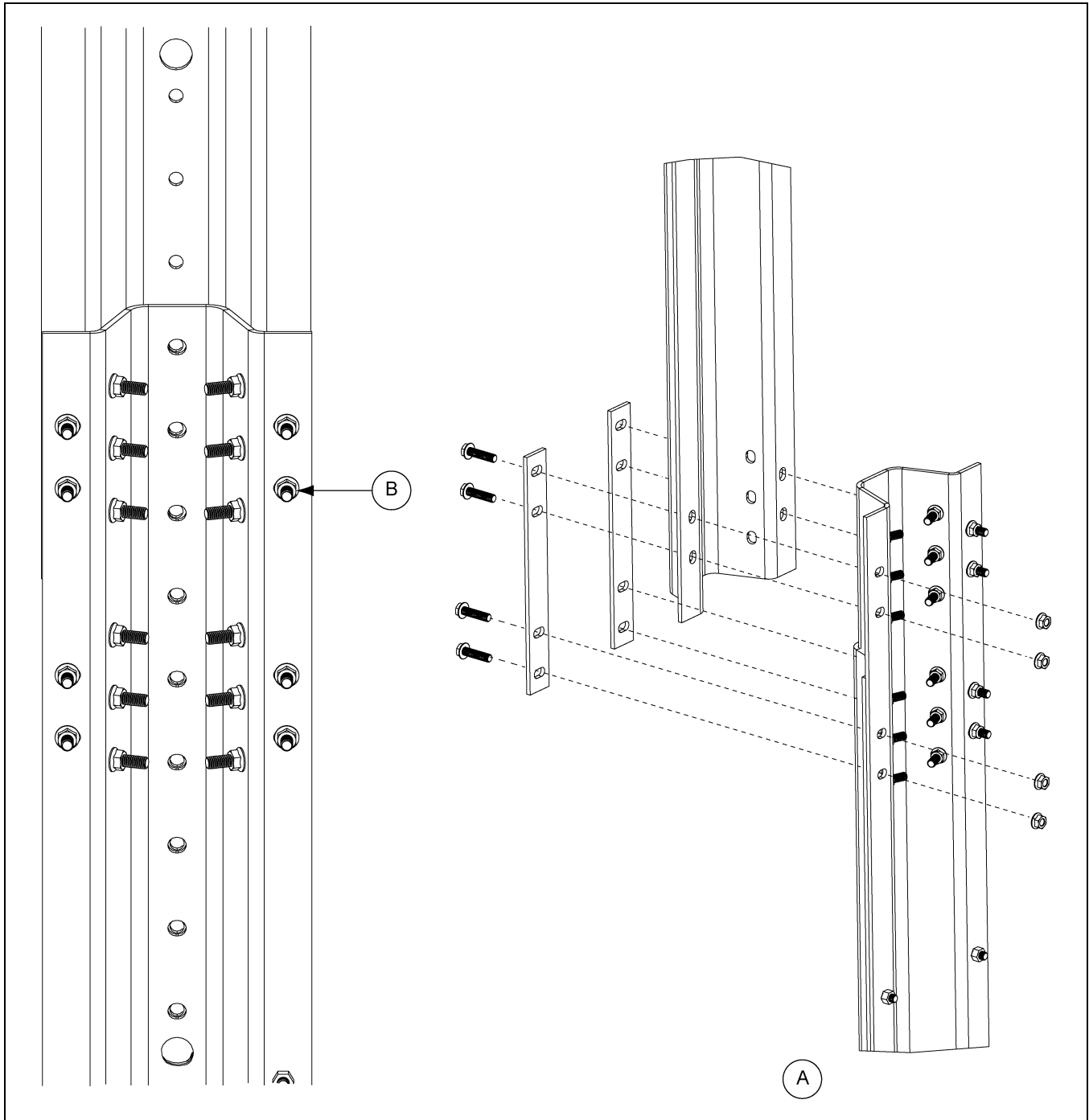


Figure 12H Laminated to Universal Stiffener Splice 2.66" Corrugation

Ref #	Description
A	Bolting Detail for Laminated to Universal Stiffener Connection
B	3/8" x 1-1/2" Flange Bolts and 3/8" Flange Nuts (20)

NOTE: Install bolts in all bolt hole locations on stiffener splices.

Non-Laminated Stiffener to Sidewall Detail

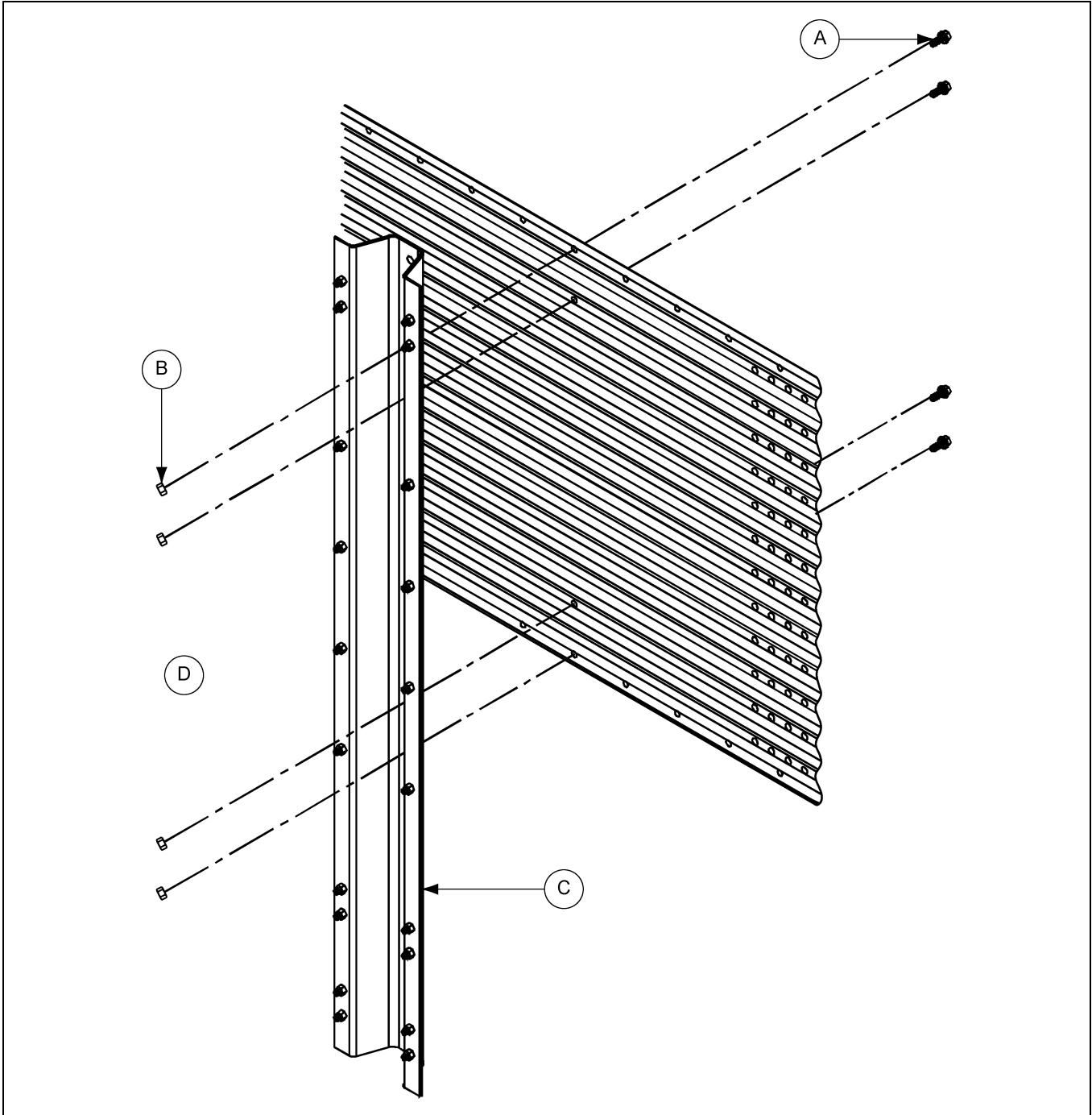


Figure 12I Non-Laminated Stiffener to Sidewall Detail

Ref #	Description
A	3/8" Bin Bolt with a Steel Backed Neoprene Washer
B	3/8" Flange Nut (S-9426)
C	Non-Laminated Stiffener
D	Outside of Bin

Laminated Stiffener to Sidewall Detail

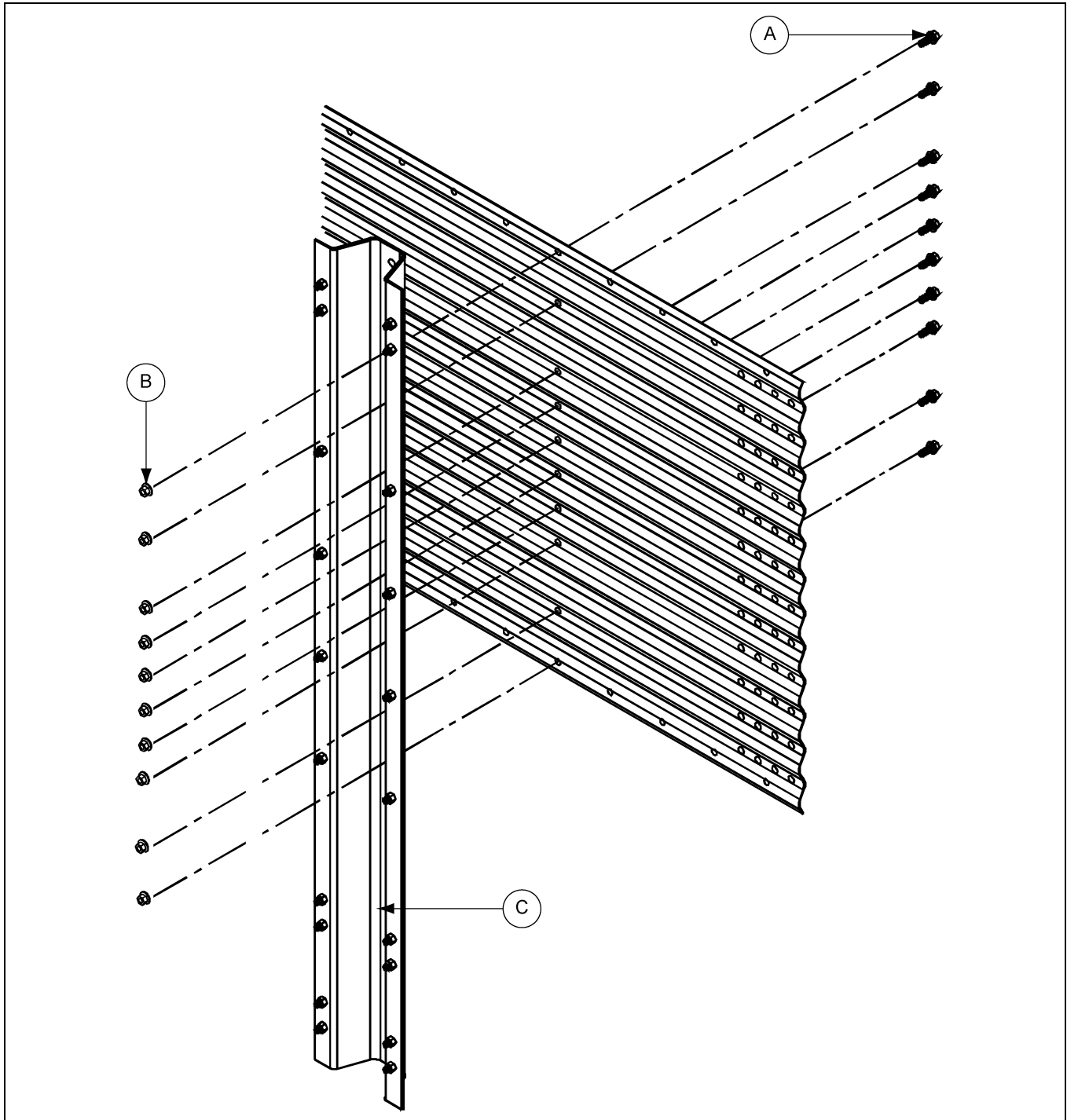


Figure 12J Laminated Stiffener to Sidewall Detail

Ref #	Description
A	3/8" Bin Bolt with a Steel Backed Neoprene Washer
B	3/8" Flange Nut
C	Laminated Stiffener

12. Stiffeners

Universal Stiffener Starting Location - 2.66" Reverse Corrugation Outside Stiffener Only

For sidewall to stiffener connections, use 3/8" x 1" bin bolt except horizontal seam. 19 Gauge and 20 gauge sidewall sheet will bolt four (4) locations per sheet. 18 Gauge and thicker sidewalls will bolt every 2.66".

NOTE: Splice plate and laminated stiffener to sidewall connection, use 3/8" x 1-1/2" bin bolts.

Offset joints and 8 gauge splice plated joints, use 3/8" x 1" hex flanged head bolts. All other stiffener joints, use 3/8" x 1-1/2" hex flanged head bolts. Washers used on the nut side of all stiffener joint connections. (See Figure 12K.)

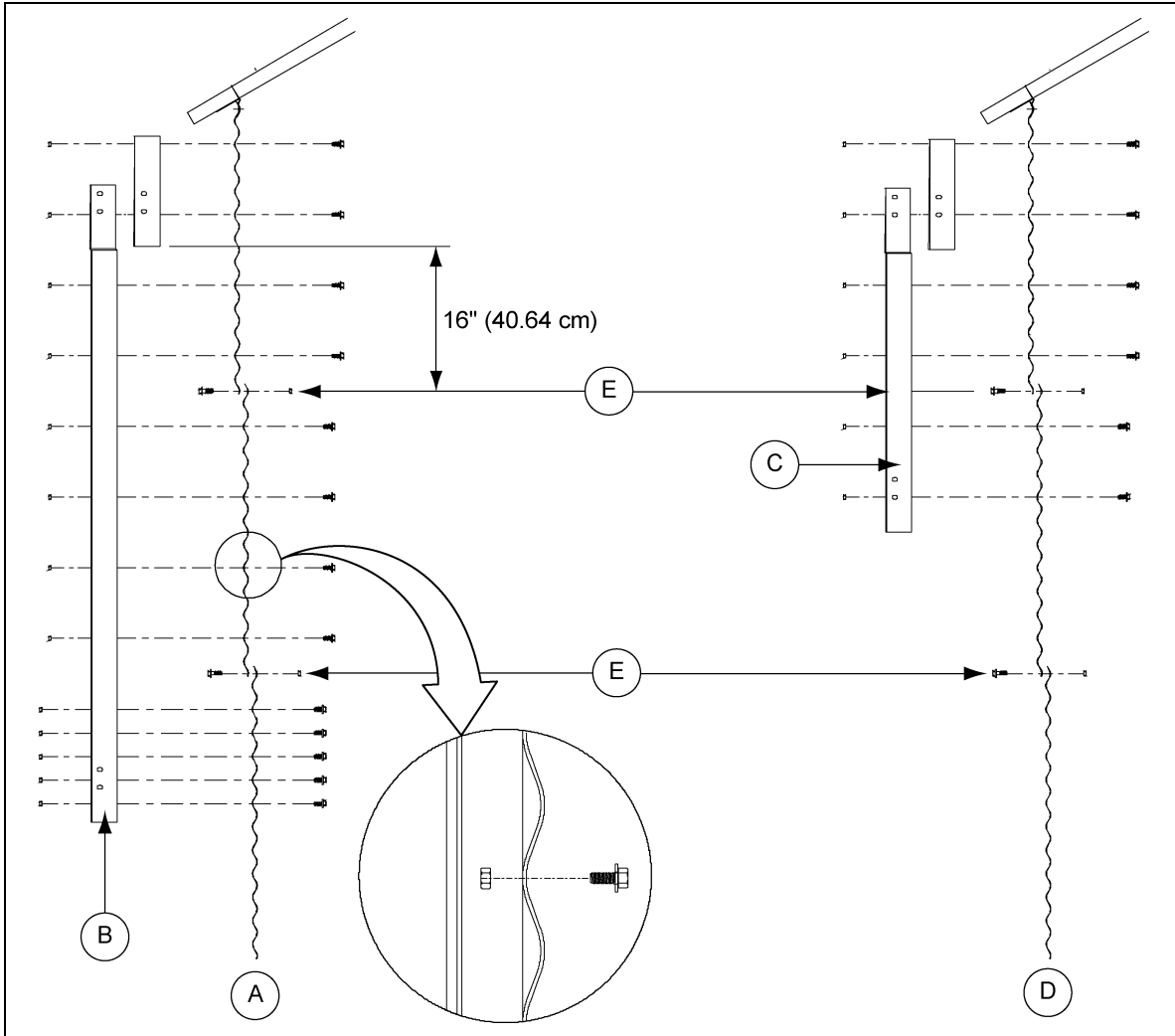


Figure 12K

Ref #	Description
A	Odd Ring Bins
B	2 Ring Offset Stiffener (SS-7065 or SS-6982)
C	1 Ring Offset Stiffener (SS-7064)
D	Even Ring Bins
E	Horizontal Seam

Stiffener to Sidewall Pattern for 18 Gauge Pattern

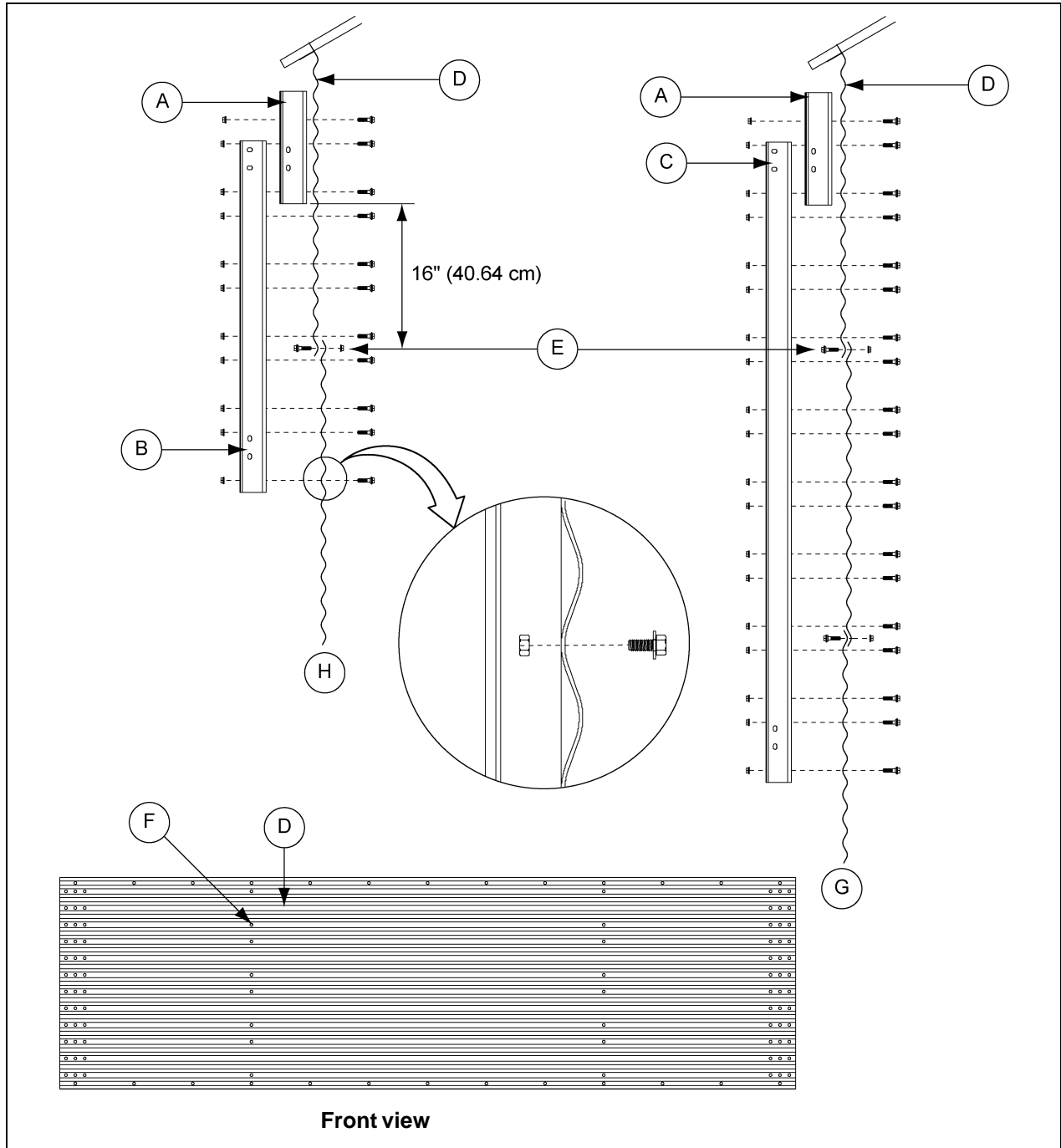


Figure 12L

Ref #	Description
A	Stiffener Splice (SS-7066)
B	1 Ring Offset Stiffener (SS-7064)
C	2 Ring Offset Stiffener (SS-7065)
D	18 Gauge Sidewall (SS-7228)

Ref #	Description
E	Horizontal Seam
F	Vertical Seam
G	Odd Ring Bins
H	Even Ring Bins

13. Wind Ring

Wind Ring Requirements

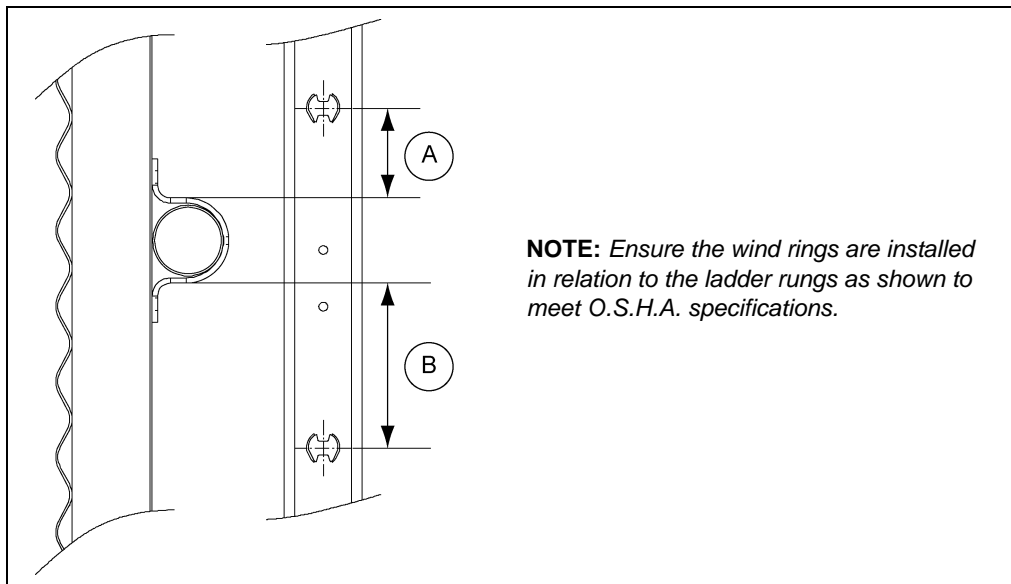


Figure 13A Dimensions for O.S.H.A. Complaint Ladder Rung Placement

Ref #	Description	Ref #	Description
A	1-1/2" (3.81 cm)	B	4-1/2" (11.43 cm)

Installing Wind Rings

Installation of wind rings is similar for a 2 and a 3 post bin design, although hardware quantities may vary.

What You Should Know

Before installing, determine the bin size, sidewall gauge thickness and height. Use the hardware chart to match the correct bolt length with the correct sidewall gauge thickness when installing the wind ring section to the stiffeners. (Refer to hardware requirements chapter [on Page 34](#).) To determine the location of the wind rings or if additional wind rings will be needed for sidedraw systems, see wind ring requirements for sidedraw systems.

1. Place a wind ring section (B) into the stiffener (A) and install the two (2) C-clamps (F), securing with flange bolts (E) and flange nuts (G). Do not tighten until all wind ring sections are installed.
2. Repeat this procedure, inserting each wind ring section (B), over the previously installed wind ring section, securing the wind ring sections together with flange bolts (C) and hex nuts (D).
3. Before installing the last wind ring section (B), slide a wind ring coupling collar (H) over the wind ring section (B).
4. Install the last wind ring section (B) and cut the wind ring section to the proper length.

NOTE: The cut needs to be made in a location that allows minimal space between the pipes.

5. Slide the wind ring coupling collar (H), aligning the three (3) pre-drilled holes and install flange bolts (C) and hex nuts (D). Field drill the remaining three (3) holes (I) using the wind ring coupling collar (H) as a guide or template. ([See Figure 13B on Page 53](#).)
6. Install the remaining flange bolts (C) and hex nuts (D) and tighten all hardware to the recommended torque specifications. See bolt torque specifications [on Page 34](#).

Installing Wind Rings (Continued)

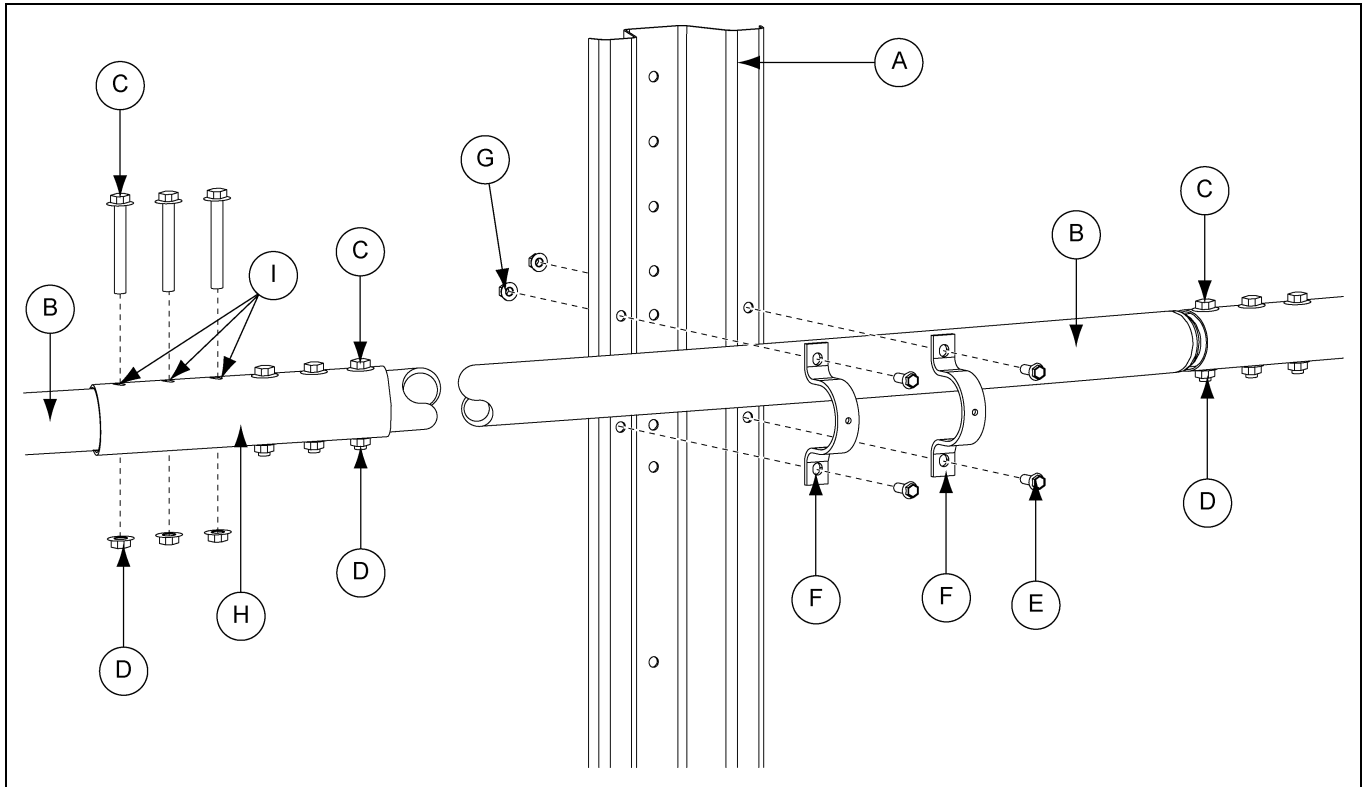


Figure 13B Exploded View of Wind Ring Installed at Upper Portion of Stiffener

Ref #	Part #	Description
A	Varies	Stiffener
B	CTS-1004-XX (or) CTS-1002-XX	Wind Ring Section
C	S-10261	Flange Bolt 7/16"-14 x 3-1/4" JS Grade 8.2 with Sealing Washer
D	S-9281	Hex Nut 7/16"-14 JS Grade 5
E	S-7485	Flange Bolt 3/8"-16 x 1" JS Grade 8 or Grade 8.2
F	SS-7248	C-Clamp
G	S-9426	Flange Nut 3/8"-16 JS
H	CTS-1006	Wind Ring Coupling Collar
I		Field Drilled Hole Location

NOTE: (-XX) denotes the bin diameter.

14. Base Stiffener

Stiffener Shim Plate Detail (Use when Necessary)

The shim plates should be used where necessary to ensure the base plates are firmly supported by the columns. Use the shim plates to fill any gaps between the base plate and the compression weldment. (See Figure 14A.) Attach the base stiffener to the stiffener column and compression weldment with 5/8" x 2-3/4" bolts (two (2) per stiffener). Place a washer on the top side of the stiffener base plate.

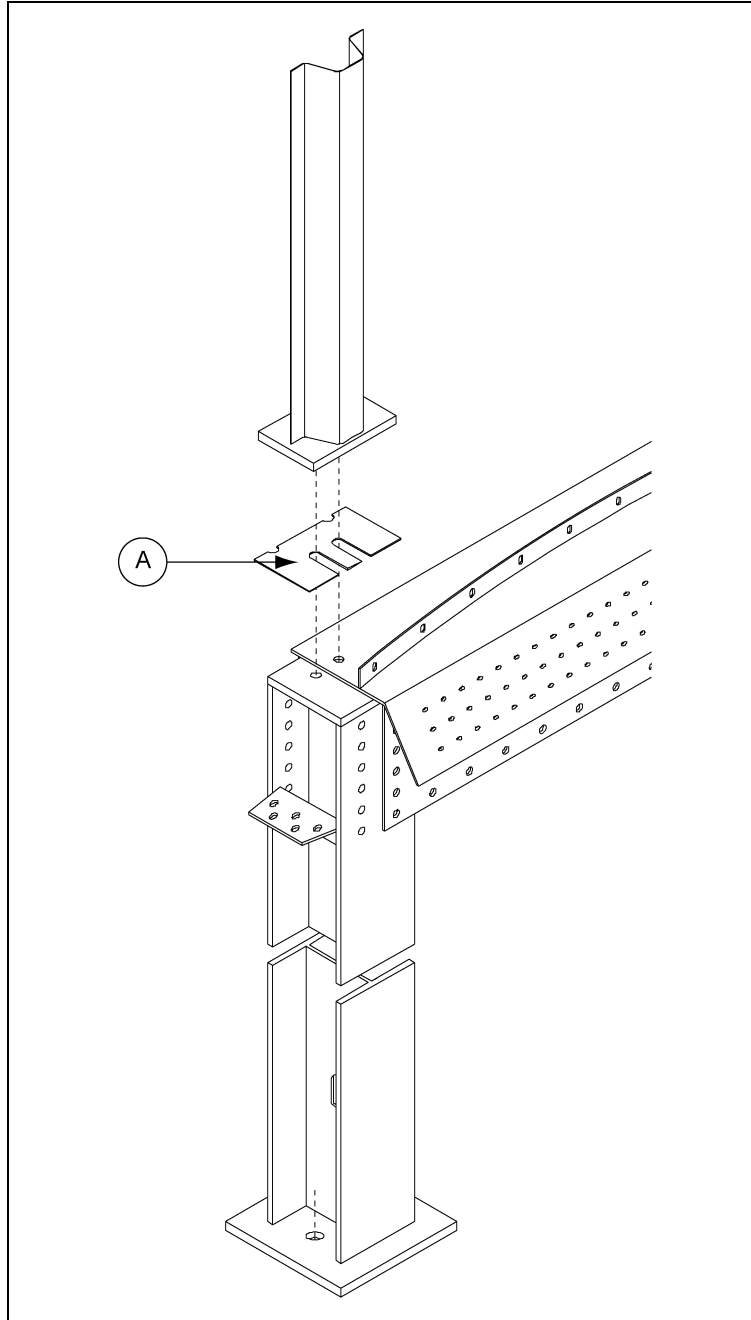


Figure 14A

Ref #	Part #	Description
A	CHT-1160	Shim Plate

Access Door Weldment Assembly Hardware Package (PLS-41985)

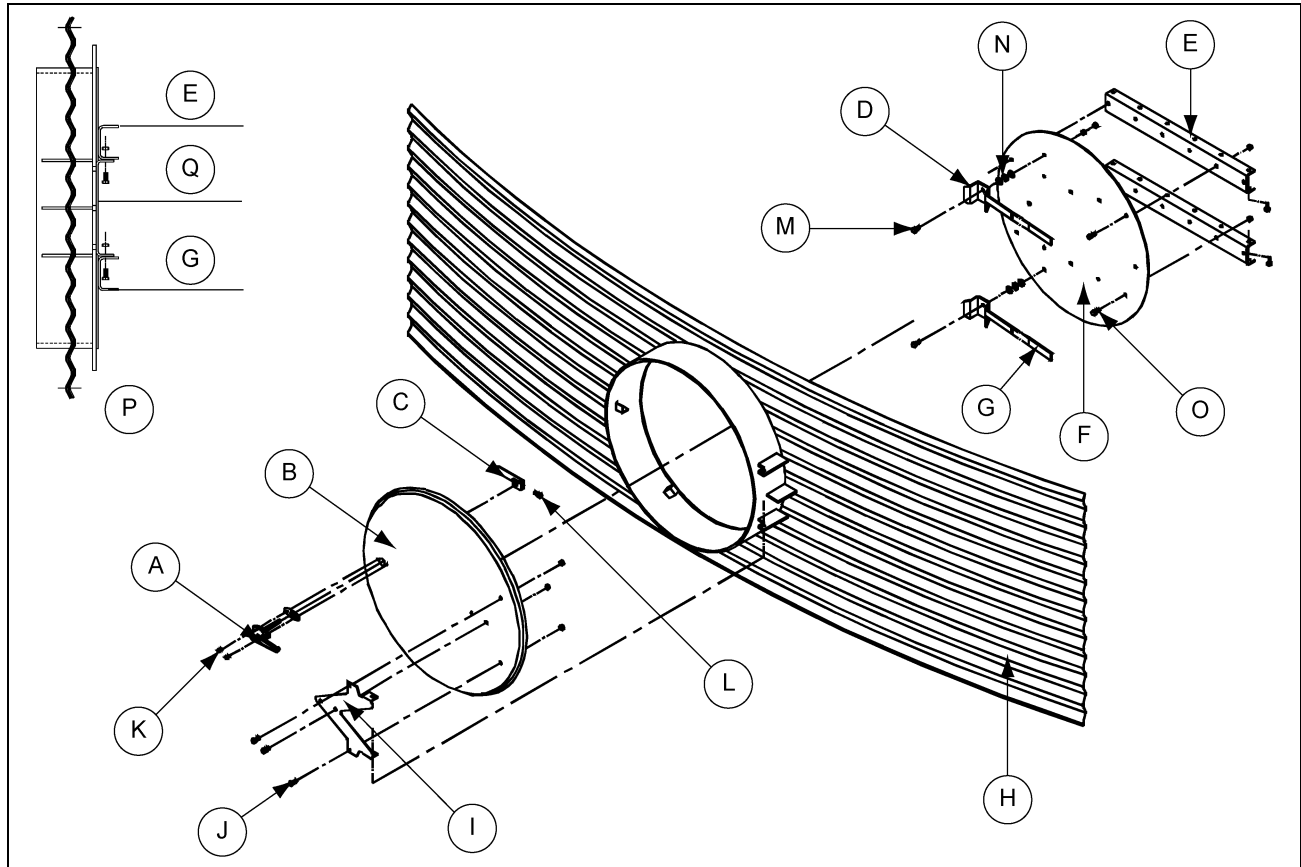


Figure 15A

Ref #	Part #	Description
A	ACD-4513	Access Door Handle
B	ACD-4531	Door Cover
C	ACD-4514	Latch Bar
D	ACD-4515	Access Inner Door Handle (2)
E	ACD-4549	Bottom Ring Inner Door Hinge (2)
F	ACD-4548	Inner Door
G	S-3867	Sleeve, Plastic RD Door Handle (2)
H	SS-7211 and SS-7214	Access Door Weldment
I	ACD-4505	Access Door Hinge
J		5/16" x 3/4" Bolt
K		#10 Screw
L		5/16" x 3/4" Bolt and Nut
M		3/8" x 1-1/2" Full Threads
N		** 3/8" Washers (Use as Needed)
O		3/8" x 1" Bolt
P		Assembled Side Detail
Q	ACD-4509	Access Inner Door Hinge Bracket

** The quantity of 3/8" washers needed may vary depending on the sidewall gauges.

16. Aeration

Aeration Package (Optional)

The 36' aeration package is installed through the sidewall of the bottom ring of the hopper tank. An extra sheet of sidewall is provided to reinforce the aeration opening. A platform for supporting the fan units on the side of the tank is not provided.

- Step 1:** Install the two (2) extra sidewall sheets 180° opposite of each other in the location where the aeration tubes are to be located.
- Step 2:** Using 18" reinforcement sleeve (SCHAT-2458) as a template, mark hole in sidewall for cutting. Locate hole 2" above compression angle. Do not locate hole on vertical sidewall seam.
- Step 3:** Using a torch or saw, cut the hole in sidewall sheets for tube.
- Step 4:** Install reinforcement sleeve in sidewall hole and weld in place.
- Step 5:** Insert elbow joint through sleeve and weld or screw in place as shown.
- Step 6:** Connect tube coupler to the tube with the clamp provided.
- Step 7:** Place tube with tube coupler in elbow and install angle hold-downs. Six (6) angles with corrugated pieces welded on them are supplied for each tube (three (3) per side). Bolt or weld each angle to the hopper sheet and screw or weld the corrugated material to the perforated tube (#14 x 1" self-drilling). Weld or screw elbow joint to tube.
- Step 8:** Bolt or weld on angle ring for attachment of fan.
- Step 9:** Touch up any welded areas with a rust inhibitive type paint.

Aeration Package (Optional) (Continued)

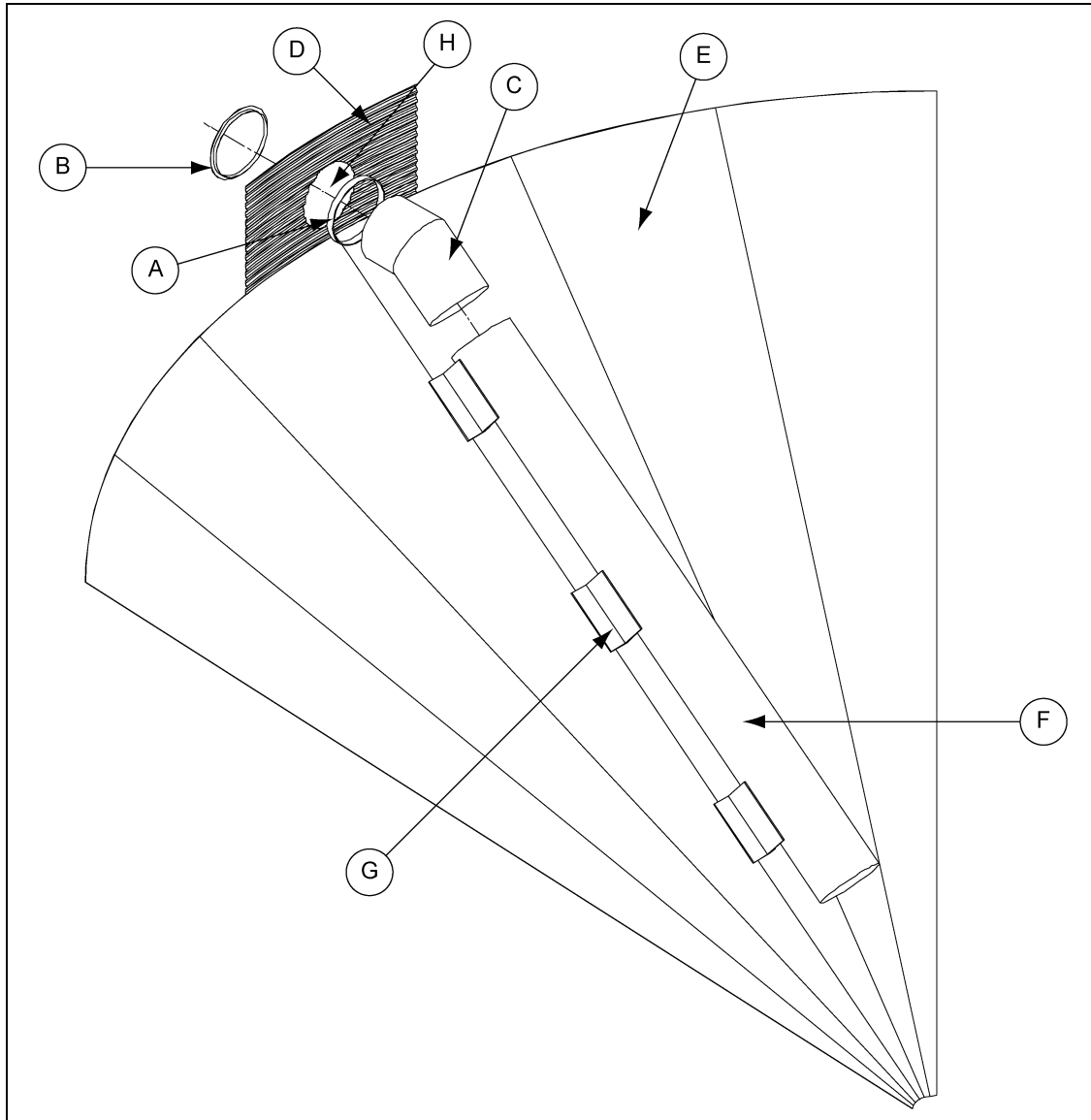


Figure 16A Typical Installation

Ref #	Description
A	Reinforcement ring weld to sidewall inside and outside (SCHI-2458)
B	18" Angle Ring (Bolt or weld to elbow tube after installation.) (F-895)
C	Elbow Tube
D	Two (2) Layers of Sidewall
E	Bin Hopper
F	Corrugated perforated tube (18" diameter standard) with corrugated coupler.
G	Hold-Down (Typical)
H	Mark location (see side profile on Page 58) and field cut a 18-1/8". Diameter hole between stiffeners to allow installation of the elbow. Do not locate hole on vertical sidewall seam.

Aeration Package (Optional) (Continued)

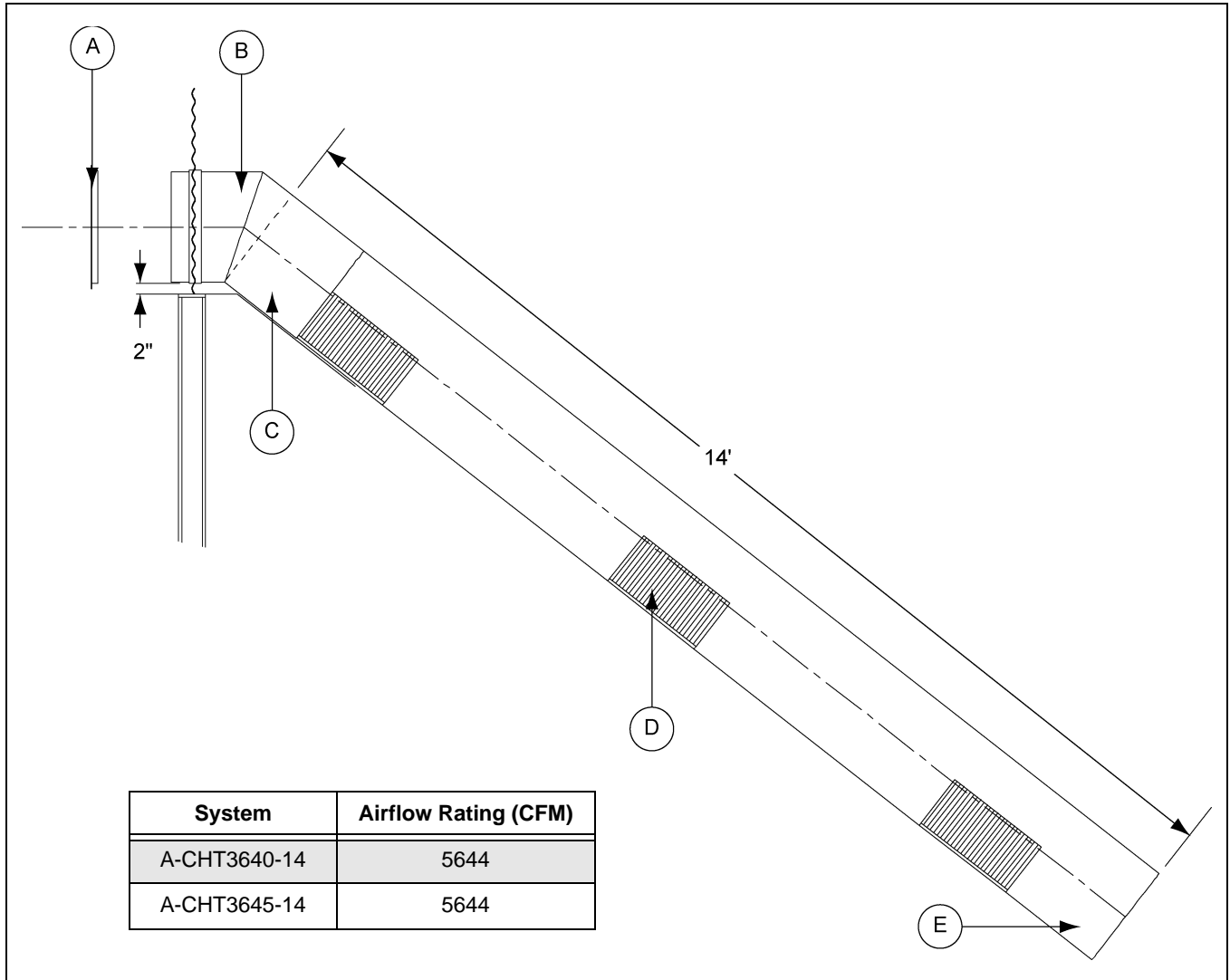


Figure 16B Side Profile

Ref #	Description
A	18" Angle Ring (Bolt or weld to elbow tube.) (F-895)
B	Elbow Tube
C	Corrugated Coupler
D	Hold-Down
E	Perforated End Cap/Heavy Duty X-Brace

Aeration Package (Optional) (Continued)

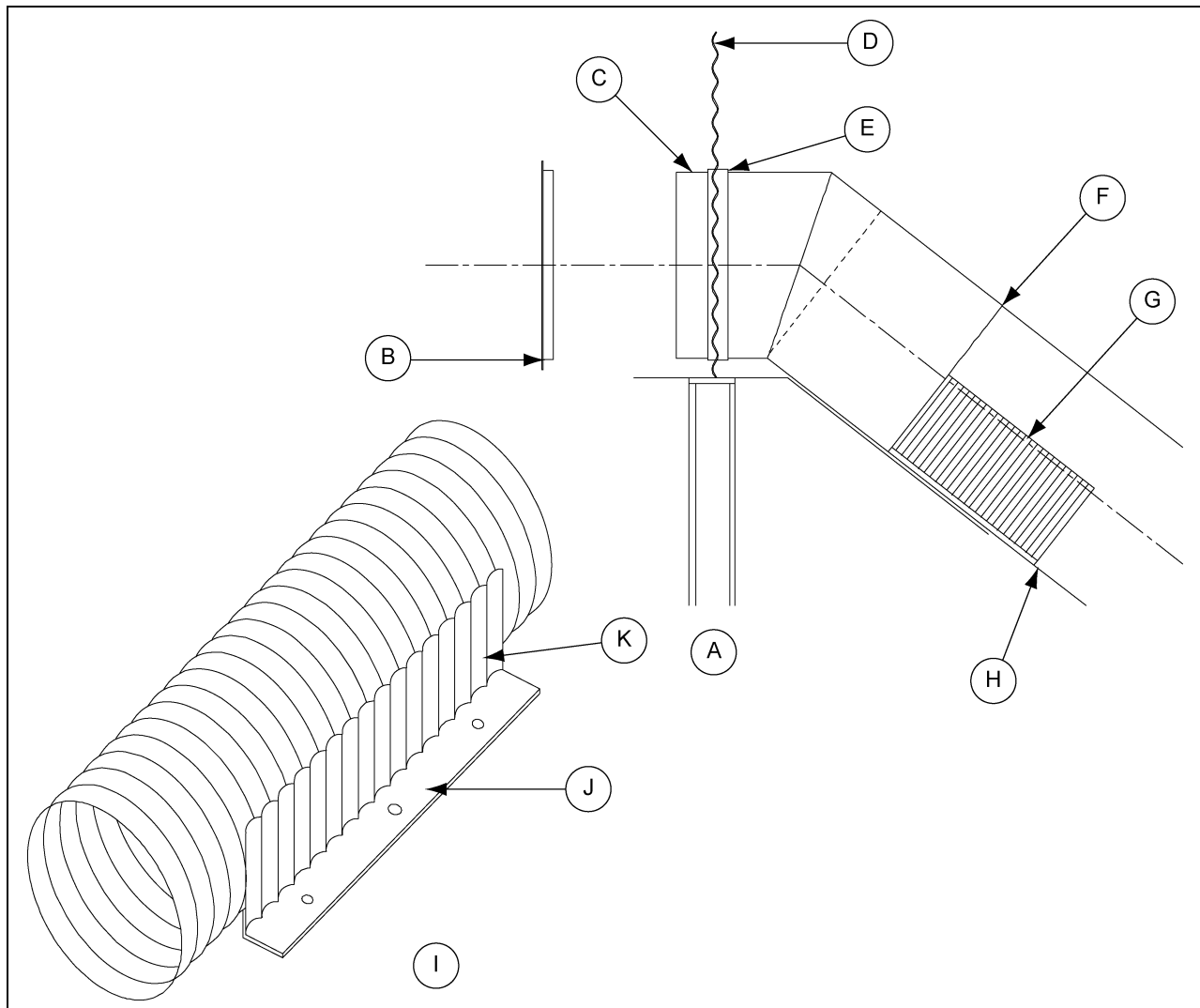
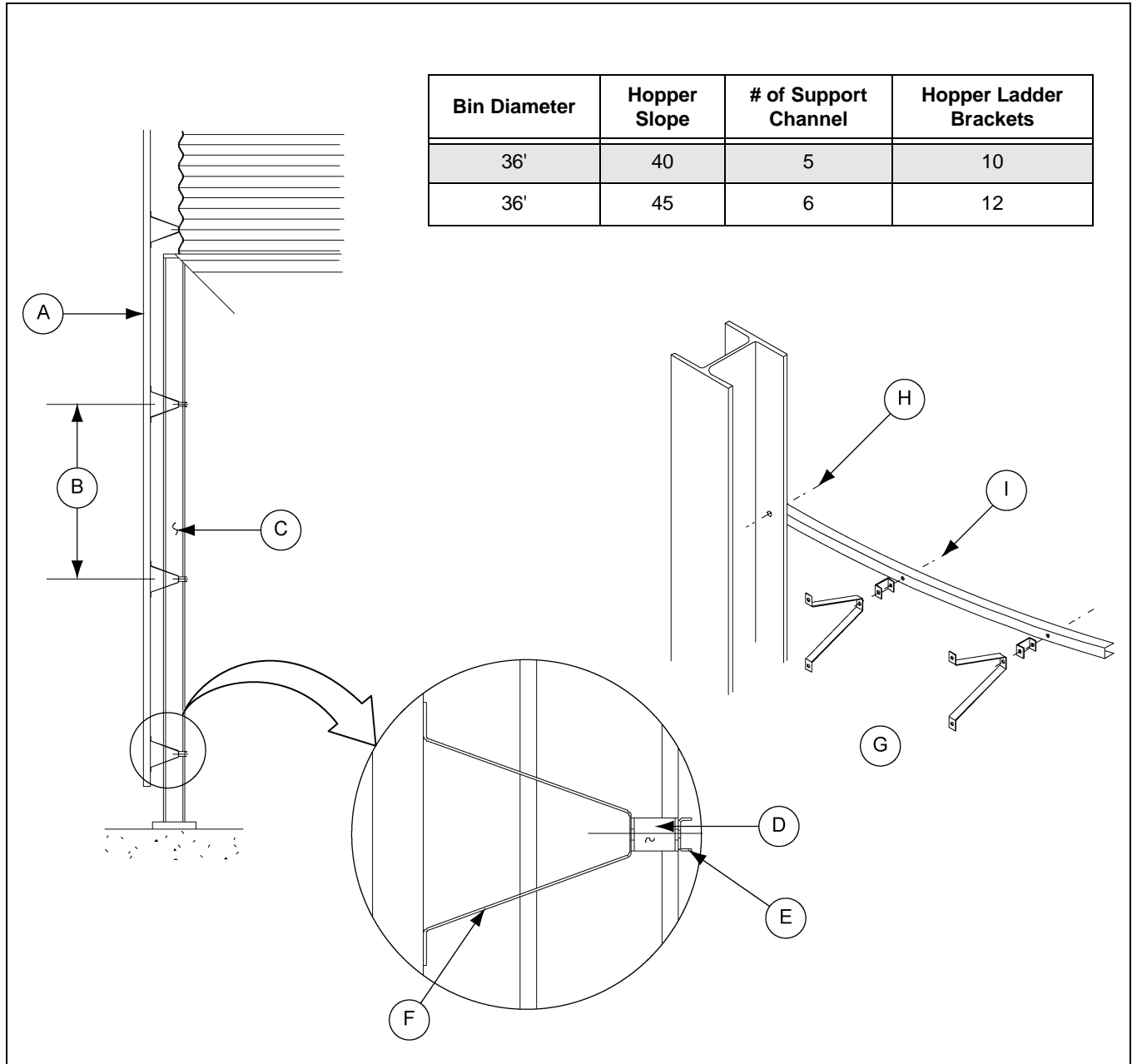


Figure 16C

Ref #	Description
A	Weld Detail
B	18" Angle Ring (F-895) (Bolt or weld to elbow tube after tube installation.)
C	Weld Reinforcement Sleeve to Sidewall
D	Two (2) Layers of Sidewall
E	Weld Reinforcement Sleeve to Sidewall, Weld or Screw Elbow to Sleeve
F	Screw or Weld Elbow to Aeration Tube Coupler
G	Screw or Weld to Aeration Tube
H	Bolt or Weld to Hopper Sheet
I	Corrugated Angle Hold-Down Attachment Detail
J	Weld to Hopper or Bolt with 1/2" Bolts (Field drill and replace all seam bolts.)
K	Screw or Weld to Tube

Hopper Ladder Supports



Bin Diameter	Hopper Slope	# of Support Channel	Hopper Ladder Brackets
36'	40	5	10
36'	45	6	12

Figure 17A

Ref #	Description
A	Ladder
B	44" Typical
C	Support Column
D	Ladder Bracket
E	Support Channel

Ref #	Description
F	Ladder Standoff
G	Ladder Support Detail
H	Field Drill Hole 5/16" x 1-1/4" Hardware
I	5/16" x 3/4" Hardware

Hoist Instructions

Recommendations for hoisting completed tank onto hopper bottom structure.

(All parts mentioned in this section are **not** furnished.) A crane is normally used to lift the tank and place it on top of the substructure. Technique of hoisting of the complete tank on the hopper structure is in large part based on personal experience, equipment and manpower. The following recommendations are intended as a guideline only.

1. Before lifting the tank the following should be checked:
 - a. The columns and substructure should be checked for levelness and verified plumb and leveled if necessary.
 - b. Final ladder and safety cage and door locations should be determined and clearance at these locations verified.
 - c. Proper provisions should be made for safe working platforms around the top of the substructure.
2. Lifting technique are largely influenced by personal experience and equipment capacity however general recommendations as follows:
 - a. Twelve (12) lifting brackets should be attached at the stiffeners. At least one bracket on every other stiffener should be used. These would typically be attached in the third ring from the bottom of the tank. Brackets should attach to a minimum of four (4) bolts through the stiffener. Attach cables to the lift brackets and to the crane hook, which has been lowered through the center ring opening. Cables should be sized to handle the entire weight of the bin. Make all lift cables of equal length before the bin is lifted. *(See Figure 18A and Figure 18B.)*
 - b. To prevent distortion of the assembled tank a “spider” or horizontal bracing is recommended. A suggested method of this is illustrated in the following details. This may be done by using a center “hub” and pipe. The center hub would typically be made of 6" schedule 40 pipe with four (4) 3" x 3" x 3/8" angles welded to it and the pipe bolting to the hub. The second smaller pipe would bolt to the lifting brackets attached to the stiffeners. *(See Figure 18C on Page 62.)* Four (4) horizontal braces are recommended.
 - c. Use of temporary bracing across the peak collar may be needed to guide the cable. This should be made easily removable.

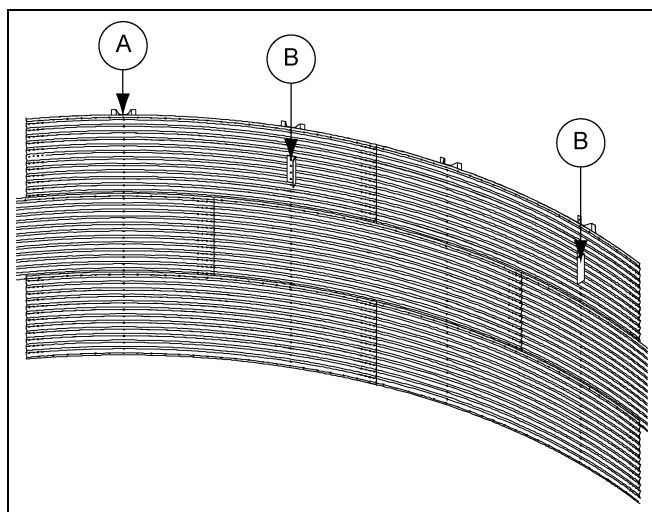


Figure 18A

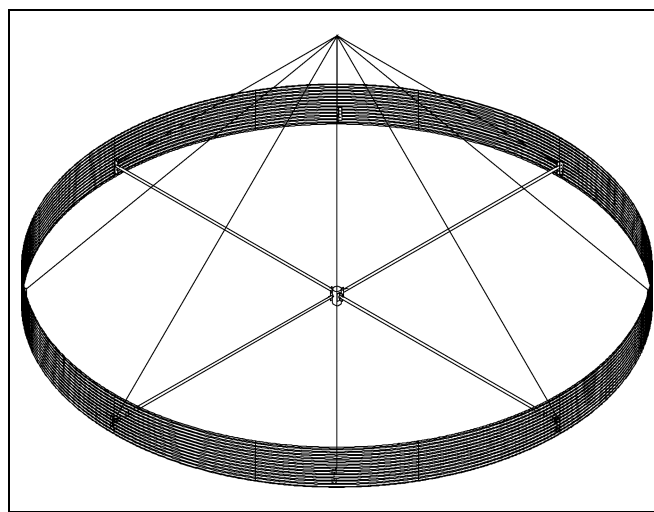


Figure 18B

Ref #	Description
A	Stiffener
B	Lift Bracket Every Other Stiffener

Hoist Instructions (Continued)

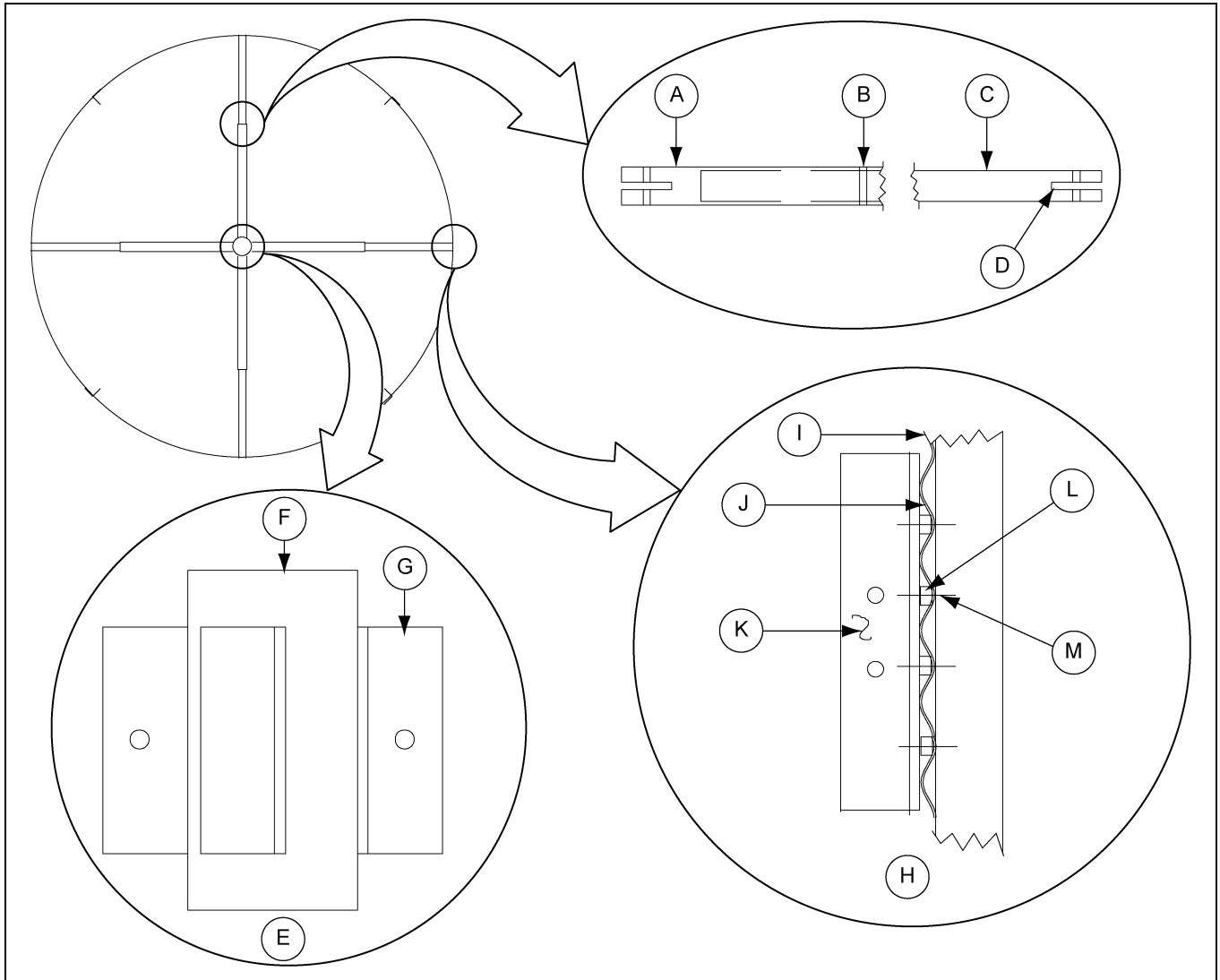


Figure 18C

Ref #	Description
A	2-1/2" Pipe
B	Bolt Hole
C	2" Pipe
D	3-1/2" x 1-1/2" Slots (2)
E	Hub Assembly
F	6" Schedule 40 Pipe
G	3" x 3" x 3/8" Angle Iron Welded to Hub (Four (4) Places)

Ref #	Description
H	Sidewall Support Angle
I	Sidewall Sheet
J	Sidewall Stiffener
K	Lifting Bracket 3" x 3" x 3/8" Angle
L	Extra Nut or Sidewall Spacer
M	3/8" Grade 8 Bolts (4)

- It will generally simplify the setting process to bend the sealing lip inward slightly to allow sidewall sheet clearance. Once tank is in place, bolt the sealing strip to the bottom of the sheet. Shim between the bottom of the stiffener and the compression angle ring for level alignment if necessary.
- After tank is secured remove the spider or horizontal bracing and all hoisting attachments and cables.**

Hoist Instructions (Continued)

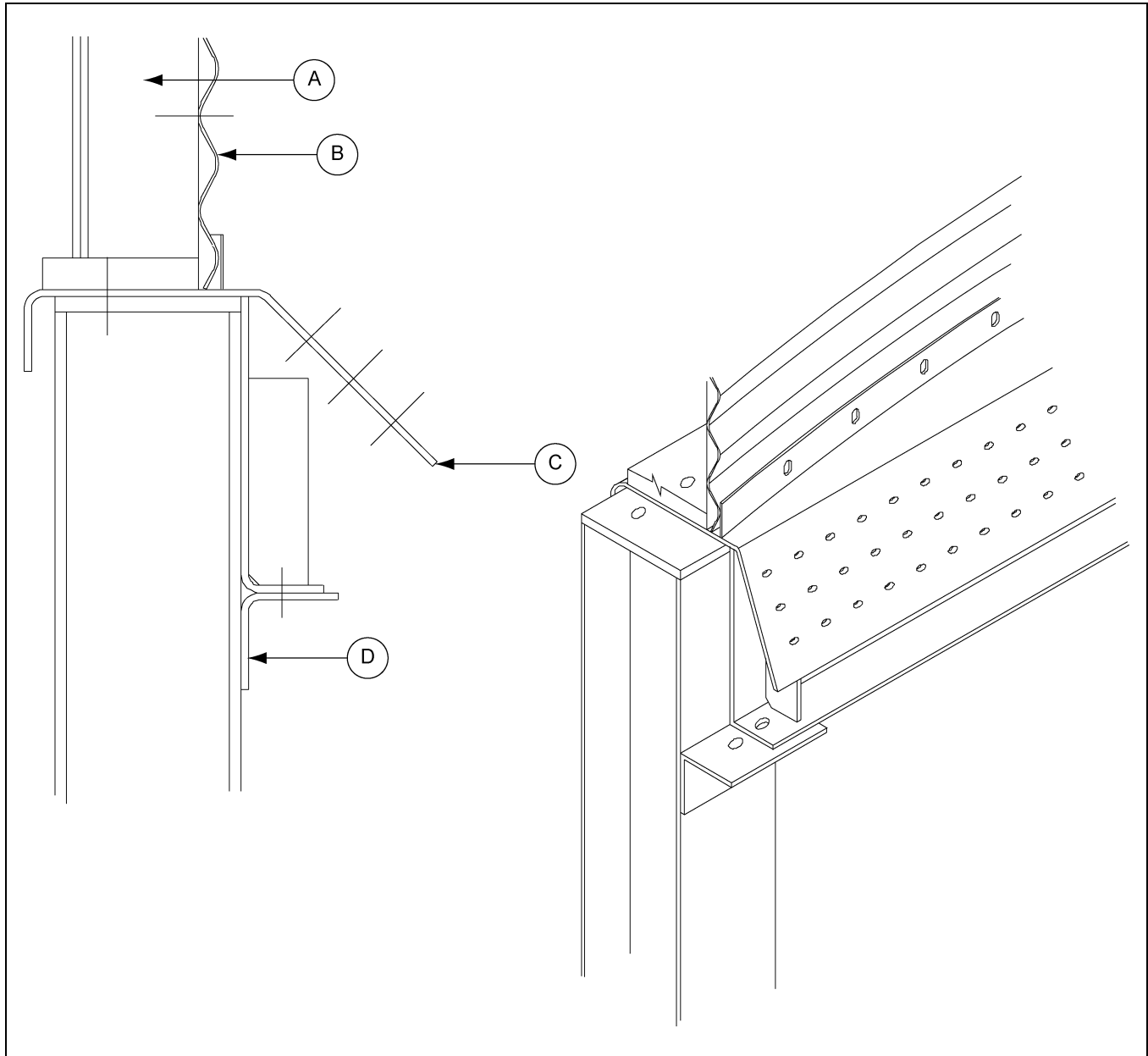


Figure 18D Tank on Support Columns

Ref #	Description
A	Sidewall Base Stiffener
B	Sidewall
C	Compression Angle Ring
D	Support Column Weldment

After lifting the tank clean all dirt and debris from the base of the tank.

19. Flashing

Flashing Installation

1. Attach flashing to the bin wall using the pre-punched holes at 9-1/3" above the horizontal seam.
2. Attach left side of the first piece of flashing to the sidewall using the connection as shown in [Figure 19A](#). Working clockwise, overlap the flashing at the right hand hole of each piece of flashing. **NOTE:** *If bolts are installed at flashing seam location they will need to be removed.*
3. At vertical seams attach flashing that is to span the vertical seams using both left and right holes. Drill flashing holes from the outside of the bin through the sidewall sheet holes. Remove drilled flashing and assemble vertical seam bolts and nuts. ([See Figure 19C on Page 65.](#)) Replace drilled flashing and attach according to [Figure 19B](#). Continue around the bin clockwise.

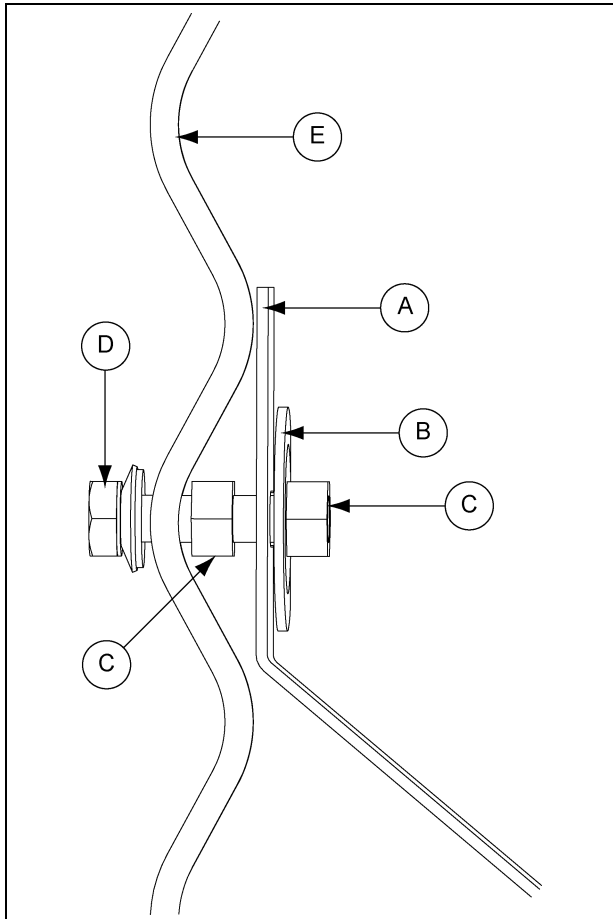


Figure 19A Flashing Hardware

Hardware Configuration for Flashing Installation

Ref #	Part #	Description
A	CHT-2104	Flashing
B	S-7569	5/16" Fender Washer
C	S-10268	5/16" Nut
D	S-7483	5/16" x 1-1/4" Bin Bolt
E		Sidewall Sheet

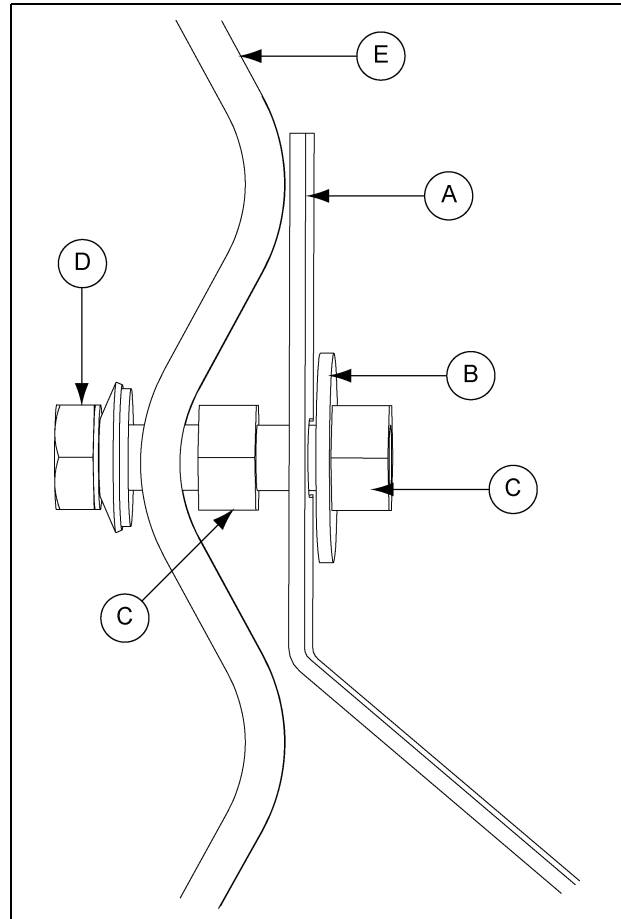


Figure 19B Vertical Seam Flashing Hardware

Hardware Configuration for Flashing Installation at Vertical Seams

Ref #	Part #	Description
A	CHT-2104	Flashing
B	S-248	3/8" Washer
C	S-10268	5/16" Nut
D	S-7483	5/16" x 1-1/4" Bin Bolt
E		Sidewall Sheet

NOTE: *Only difference between normal hardware configuration and vertical seam hardware configuration is washer.*

Flashing Installation (Continued)

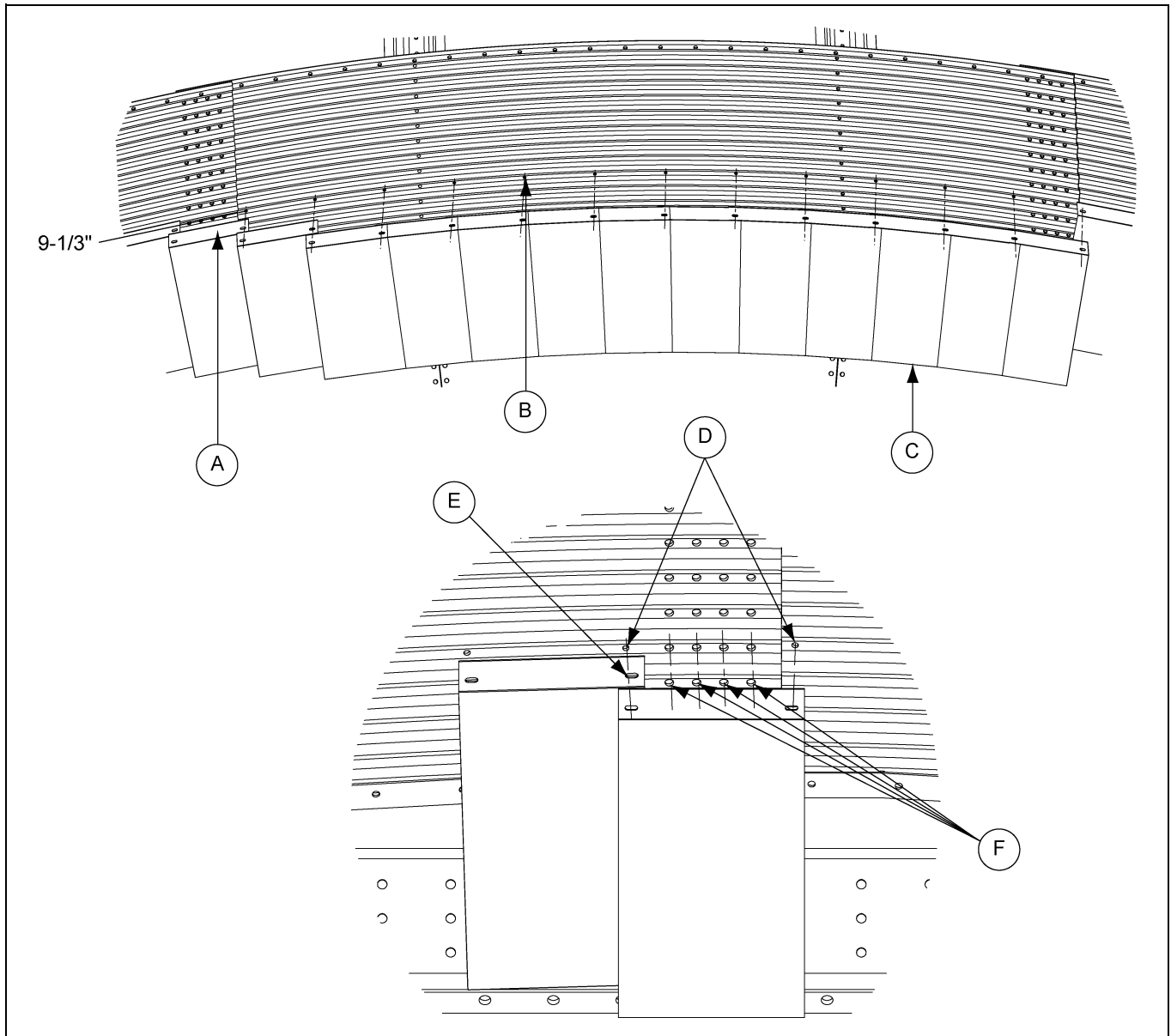


Figure 19C

Ref #	Description
A	Overlap flashing at right hand hole work clockwise when installing flashing.
B	Pre-Punched Holes
C	Flashing (CHT-2104)
D	Attach flashing here to drill holes.
E	Attach flashing to span vertical seam at both left and right hand holes. Drill flashing holes from outside of bin through vertical seam holes.
F	Drill holes through flashing.

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	* 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%
	All Fiberglass Housings	Lifetime	
	All Fiberglass Propellers	Lifetime	
AP and Cumberland	Flex-Flo/Pan Feeding System Motors	2 Years	** Warranty prorated from list price: 0 to 3 years - no cost to end-user 3 to 5 years - end-user pays 50%
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	† Motors, burner components and moving parts not included. Portable dryer screens included. Tower dryer screens not included.
Grain Systems Farm Fans Zimmerman	Portable and Tower Dryers	2 Years	
	Portable and Tower Dryer Frames and Internal Infrastructure †	5 Years	

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 (12th) month from the date of purchase and continuing until the sixtieth (60th) 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.

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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