12', 15', 18' and 21' Bulk Feed Tank Series and Grain Hopper Tank Series

Assembly Manual

PNEG-1461

Version: 4.3

Date: 12-12-16

PNEG-1461

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.

Proper Storage of Grain Bin/Silo Materials Prior to Construction

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.

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

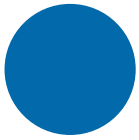
WARNING This symbol indicates a potentially hazardous situation which, if not avoided, **can result in serious injury or death.**

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

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

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

Store Bin Sheets Properly

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

ST-0058-1

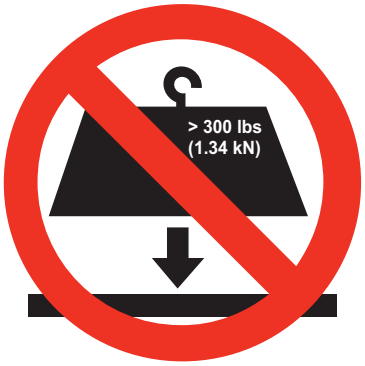
Stay Clear of Hoisted Equipment

- 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

Ladder Load Limit

- The ladder load limit is 300 LBS (1.34 kN). Do not exceed this weight.
- Excessive load will damage the ladder and severe injury or death will result.
- Ladders, stairways and platforms are for use by competent and trained personnel only. Do not allow children or other unauthorized persons to have access to the equipment.
- Access to the equipment must be restricted by the use of security fencing and lockable gates.
- Lower sections of ladders must be fitted with a lockable safety gate to prevent unauthorized access.
- Lock out and tag out power supplies to all equipment.
- Do not attach lifting equipment to ladders.
- Do not work at heights during high winds, rain, snow, or ice storms.



ST-0059-2

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

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*

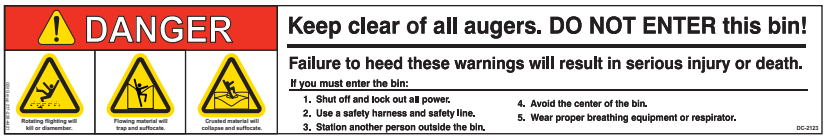
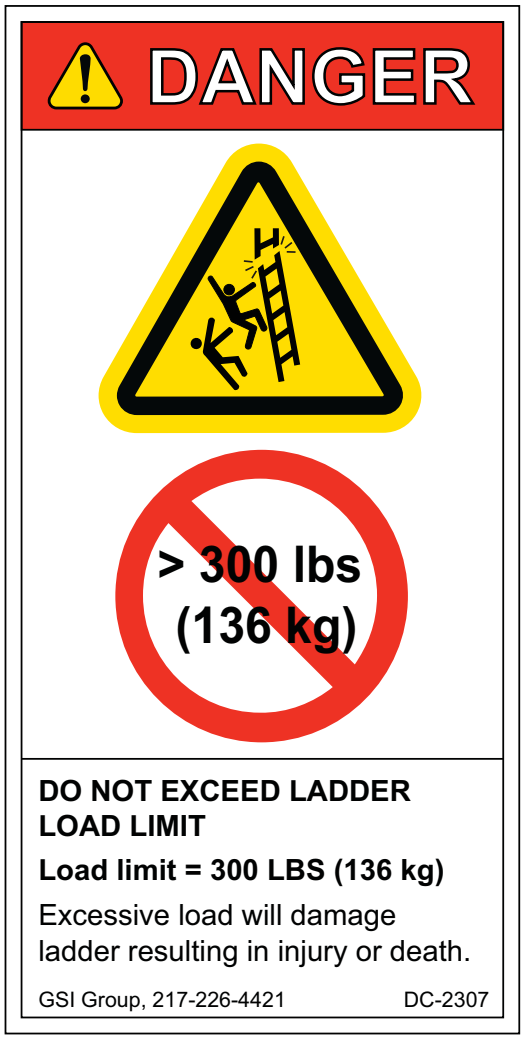
ST-0007

3. Safety Decals

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

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

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

Location	Decal No.	Decals	Description
Located on inside of bin collar.	**DC-2123**		**Danger, Keep Clear of Augers**
Located on bin ladders.	**DC-2307**		**Danger, Do not exceed load limit.**

Bulk Feed Tank Assembly Manual General Instructions

First, read the assembly manual completely before starting to assemble the Bulk Feed Tank. Check the shipment with the packing list to be sure there are no shortages.

1. Decal protective mask must be removed when assembling tank. Use soapy water to soak the decal protective mask for 5 minutes to ease removal.
2. Vertical seams **must be staggered** on all sidewall rings.
3. When legs extend up 2 rings, the leg holes must be in **alignment** in the bottom 2 rings.
4. All hopper seams and the hopper collar use truss head bolts. The heads of the bolts must be on the **inside** of the tank.
5. Hex head bin bolts are used on all sidewall and roof seams with the bolt heads on the **outside** of the bin.
6. Hex head bolts are to be used on all leg to sidewall connections with the bolt heads on the inside of the tank.
7. All bolts are to be tightened from the **nut side only. Do not allow bolt heads to spin.**
8. Drift punches can be used to align holes.
9. All vertical sidewall sheet seams must be overlapped in the same direction.
10. A hole spacing of 3-1/8" is used at the top of all top sidewall sheets and at the bottom of all bottom sidewall sheets.

Selecting the Proper Site

The selected site should be level, firm and free from underlying debris. The tank can be installed satisfactorily on slopes, but as the slope increases, additional labor and materials are required for the foundation. The concrete foundation surfaces must be level. If some fill is required, it should be watered and tamped thoroughly to prevent uneven settling from the weight of the tank. Good water drainage should be provided to prevent water collecting under or around the tank. The site must allow convenient access for loading and unloading and plus provide additional space for future units. Also, consider the positioning of handling equipment, availability of electricity, etc.

Tools

Tools recommended for assembly of Bulk Feed Tanks.

1. Assorted sizes of combination wrenches
2. Hammer
3. 3-12" Long drift punches
4. 1 Large flathead screwdriver
5. 1 Pair of slip joint pliers
6. Two (2) adjustable wrenches
7. Ratchet and sockets
8. Impact wrenches and sockets (if available)

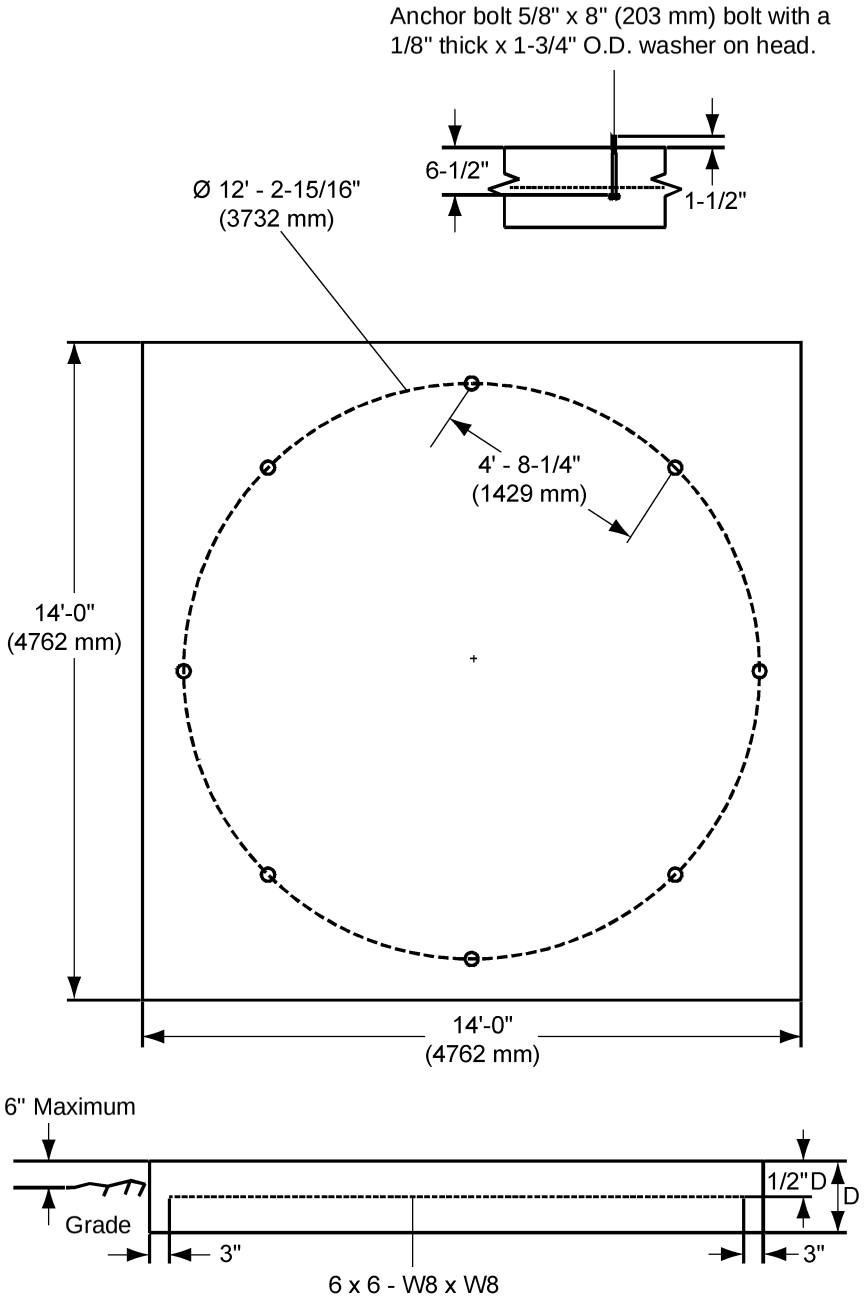


Figure 5A *12' 2-8 Rings BFT/GHT Square Pad*

All instructions shall be construed as recommendations only. The actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

	# of Rings	Slab Thickness (D)	Concrete Volume	Wire Mesh Area	# of Column Legs
	2-5	15"	9.1 Cu. Yards	196 Sq. Ft.	8
	6	16"	9.7 Cu. Yards	196 Sq. Ft.	8
	7	16"	9.7 Cu. Yards	196 Sq. Ft.	8
*	8	17"	10.3 Cu. Yards	196 Sq. Ft.	8

	# of Rings	Slab Thickness (D)	Concrete Volume	Wire Mesh Area	# of Column Legs
	2-5	381 mm	6.93 Cu. Meters	18.21 Sq. Meters	8
	6	406 mm	7.40 Cu. Meters	18.21 Sq. Meters	8
	7	406 mm	7.40 Cu. Meters	18.21 Sq. Meters	8
*	8	432 mm	7.86 Cu. Meters	18.21 Sq. Meters	8

GENERAL NOTES:

1. *Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.*
2. *Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.*
3. *The foundation site must be well drained and free of vegetation and debris.*
4. *The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.*
5. *Material estimates do not include allowance for shrinkage and waste.*
6. *These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.*

* Applies to 45° hopper tank only.

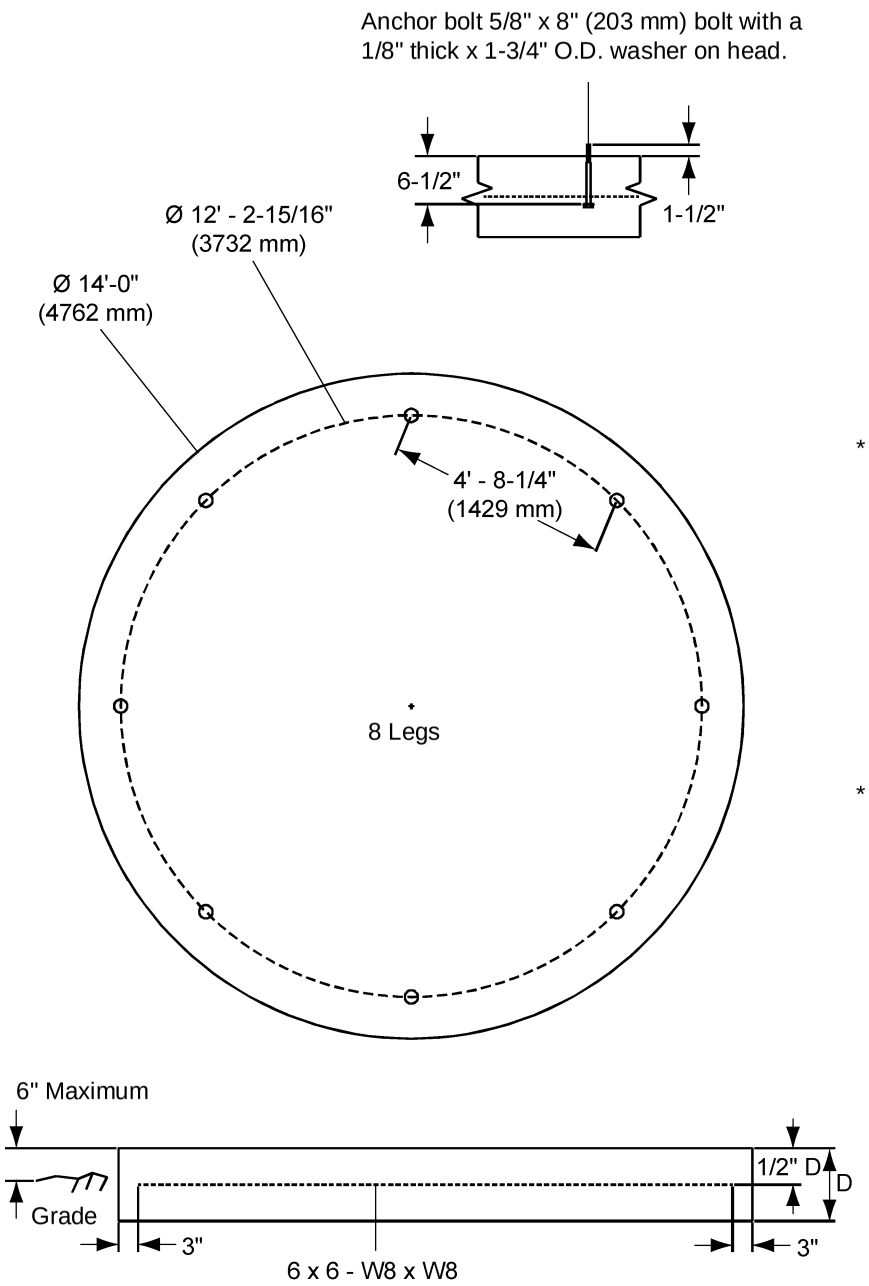


Figure 5B *12' 2-8 Rings BFT/GHT Round Pad*

All instructions shall be construed as recommendations only. The actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

# of Rings	Slab Thickness (D)	Concrete Volume	Wire Mesh Area	# of Column Legs
2-5	15"	7.1 Cu. Yards	155 Sq. Ft.	8
6	16"	7.6 Cu. Yards	155 Sq. Ft.	8
7	16"	7.6 Cu. Yards	155 Sq. Ft.	8
* 8	17"	8.1 Cu. Yards	155 Sq. Ft.	8

# of Rings	Slab Thickness (D)	Concrete Volume	Wire Mesh Area	# of Column Legs
2-5	381 mm	5.45 Cu. Meters	14.40 Sq. Meters	8
6	406 mm	5.81 Cu. Meters	14.40 Sq. Meters	8
7	406 mm	5.81 Cu. Meters	14.40 Sq. Meters	8
* 8	432 mm	6.18 Cu. Meters	14.40 Sq. Meters	8

GENERAL NOTES:

1. *Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.*
2. *Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.*
3. *The foundation site must be well drained and free of vegetation and debris.*
4. *The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.*
5. *Material estimates do not include allowance for shrinkage and waste.*
6. *These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.*

* Applies to 45° hopper tank only.

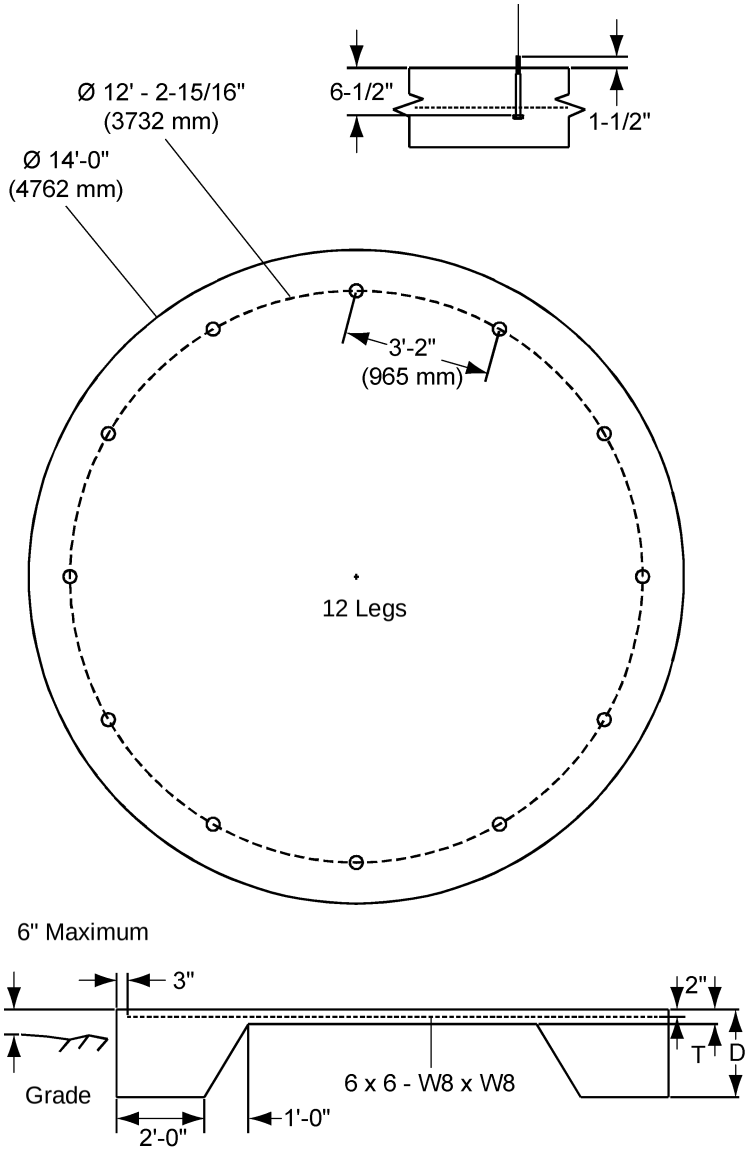


Figure 5C *12' 8-10 Rings BFT/GHT Round Pad*

All instructions shall be construed as recommendations only. The actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

	# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
*	8	15"	4"	5.0 Cu. Yards	175 Sq. Ft.	12
**	9	18"	4"	5.8 Cu. Yards	175 Sq. Ft.	12
	10	20"	4"	6.4 Cu. Yards	175 Sq. Ft.	12

	# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
*	8	381 mm	102 mm	3.82 Cu. Meters	16.26 Sq. Meters	12
**	9	457 mm	102 mm	4.43 Cu. Meters	16.26 Sq. Meters	12
	10	508 mm	102 mm	4.89 Cu. Meters	16.26 Sq. Meters	12

GENERAL NOTES:

1. *Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.*
2. *Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.*
3. *The foundation site must be well drained and free of vegetation and debris.*
4. *The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.*
5. *Material estimates do not include allowance for shrinkage and waste.*
6. *These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.*

* Applies to 60° hopper tank only.
** Applies to 45° and 60° hopper tanks.

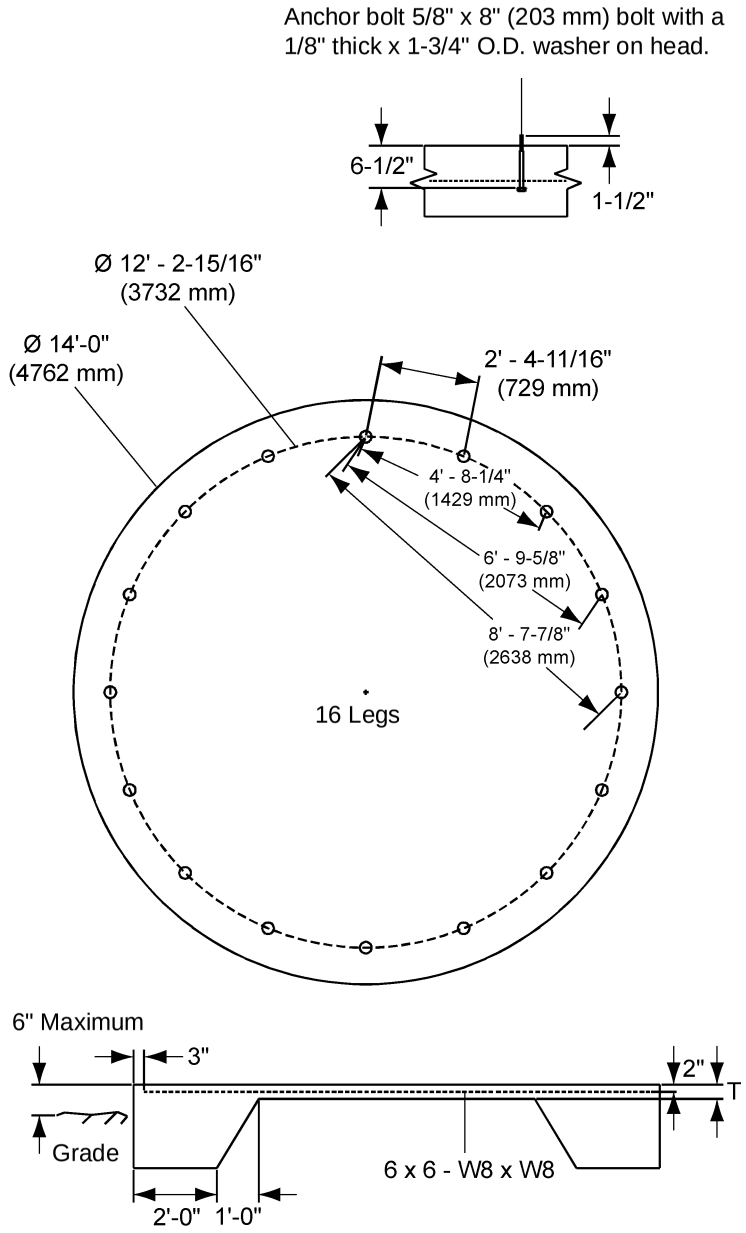


Figure 5D *12' 11 Rings BFT/GHT 16 Leg Round Pad*

All instructions shall be construed as recommendations only. The actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
11	24"	4"	7.5 Cu. Yards	175 Sq. Ft.	16

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
11	610 mm	102 mm	5.73 Cu. Meters	16.26 Sq. Meters	16

GENERAL NOTES:

1. Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.
2. Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.
3. The foundation site must be well drained and free of vegetation and debris.
4. The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.
5. Material estimates do not include allowance for shrinkage and waste.
6. These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.

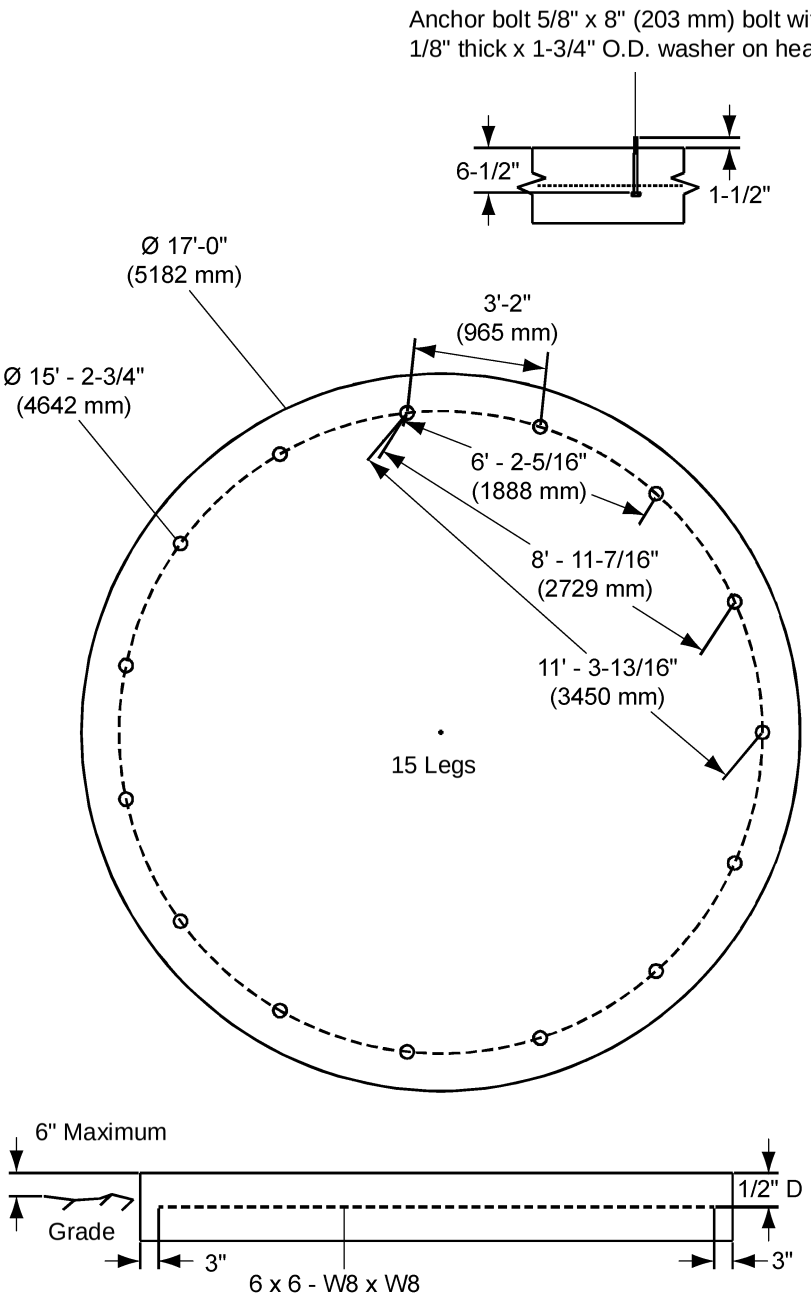


Figure 5E *15' 1-6 Rings BFT/GHT Round Pad*

All instructions shall be construed as recommendations only. The actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

# of Rings	Slab Thickness (D)	Concrete Volume	Wire Mesh Area	# of Column Legs
1-4	14"	11.0 Cu. Yards	255 Sq. Ft.	15
5	15"	11.8 Cu. Yards	255 Sq. Ft.	15
6	16"	12.6 Cu. Yards	255 Sq. Ft.	15

# of Rings	Slab Thickness (D)	Concrete Volume	Wire Mesh Area	# of Column Legs
1-4	356 mm	8.41 Cu. Meters	23.69 Sq. Meters	15
5	381 mm	9.01 Cu. Meters	23.69 Sq. Meters	15
6	406 mm	9.63 Cu. Meters	23.69 Sq. Meters	15

GENERAL NOTES:

1. *Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.*
2. *Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.*
3. *The foundation site must be well drained and free of vegetation and debris.*
4. *The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.*
5. *Material estimates do not include allowance for shrinkage and waste.*
6. *These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.*

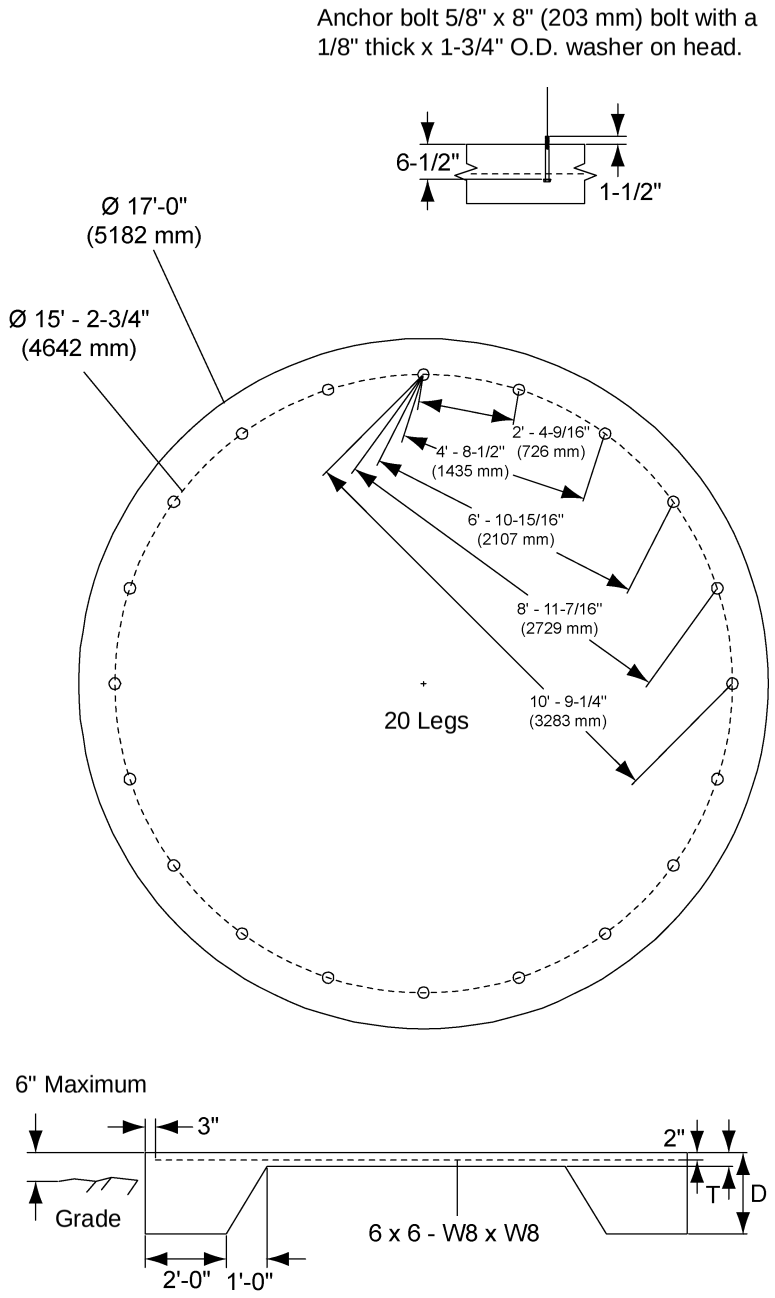


Figure 5F *15' 7-8 Rings BFT/GHT 60° Round Pad*

All instructions shall be construed as recommendations only. The actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
7	14"	4"	6.3 Cu. Yards	225 Sq. Ft.	20
8	15"	4"	6.6 Cu. Yards	225 Sq. Ft.	20

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
7	356 mm	102 mm	4.82 Cu. Meters	20.9 Sq. Meters	20
8	381 mm	102 mm	5.05 Cu. Meters	20.9 Sq. Meters	20

GENERAL NOTES:

1. *Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.*
2. *Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.*
3. *The foundation site must be well drained and free of vegetation and debris.*
4. *The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.*
5. *Material estimates do not include allowance for shrinkage and waste.*
6. *These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.*

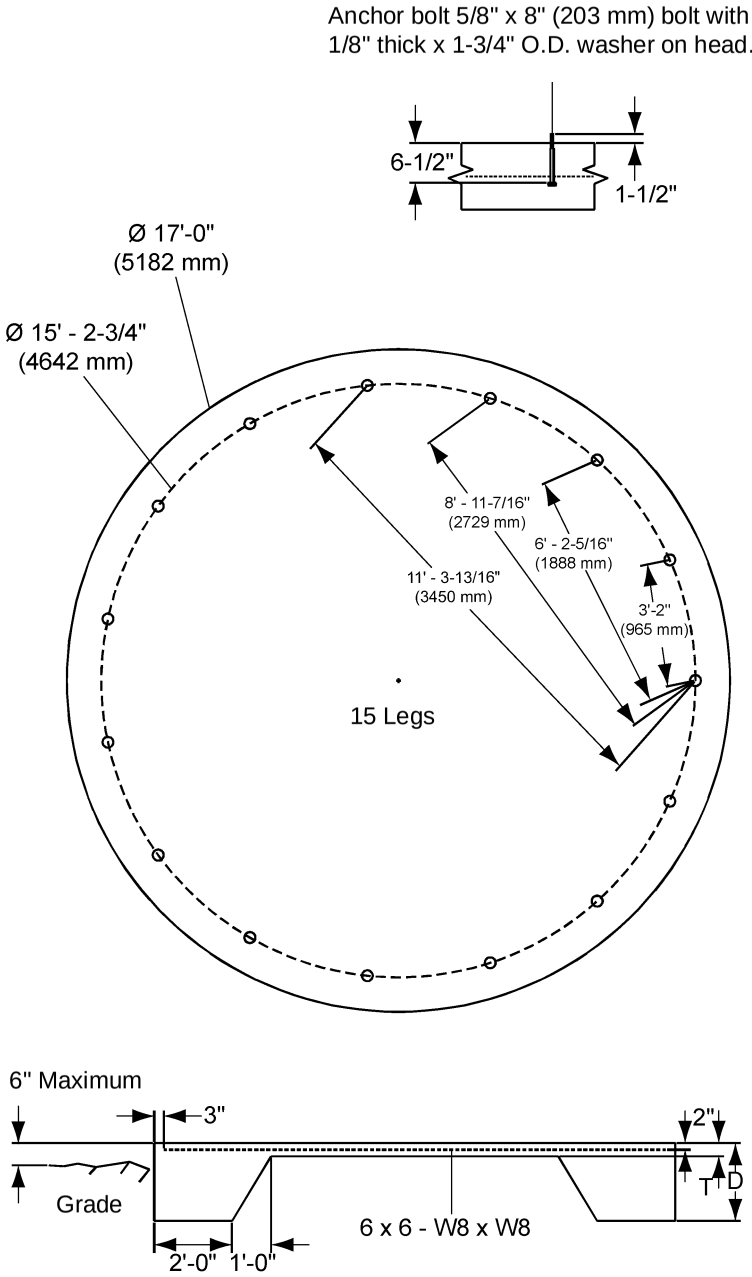


Figure 5G *15' 7-8 Rings BFT/GHT 45° Hopper Tank*

All instructions shall be construed as recommendations only. The actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
7	17"	4"	7.4 Cu. Yards	225 Sq. Ft.	15
8	18"	4"	7.7 Cu. Yards	225 Sq. Ft.	15

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
7	432 mm	102 mm	5.66 Cu. Meters	20.90 Sq. Meters	15
8	457 mm	102 mm	5.89 Cu. Meters	20.90 Sq. Meters	15

GENERAL NOTES:

1. *Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.*
2. *Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.*
3. *The foundation site must be well drained and free of vegetation and debris.*
4. *The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.*
5. *Material estimates do not include allowance for shrinkage and waste.*
6. *These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.*

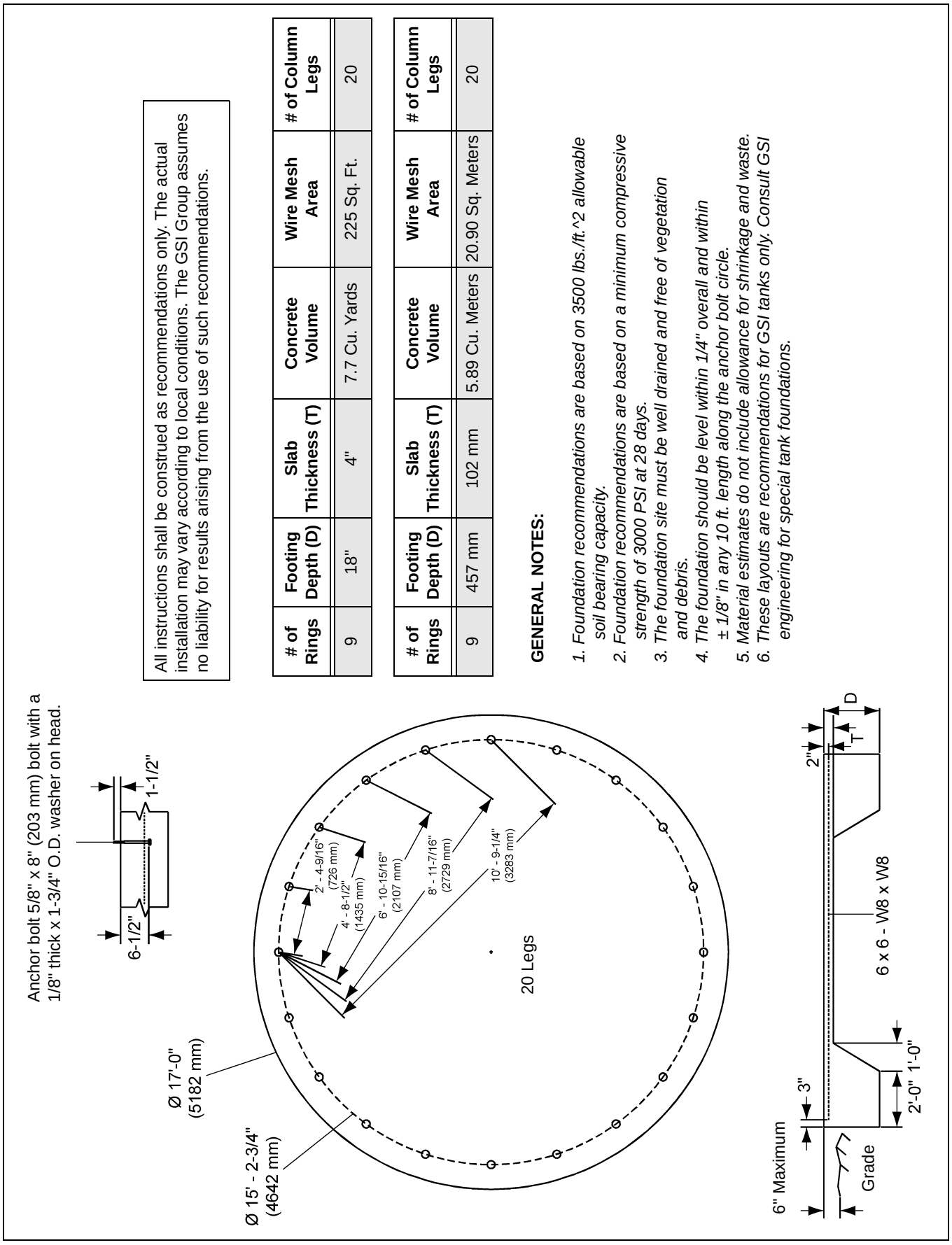


Figure 5H *15' 9 Rings BFT/GHT 20 Leg 45° Tank*

All instructions shall be construed as recommendations only. The actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
2-4	12"	4"	8.5 Cu. Yards	350 Sq. Ft.	18
5-6	15"	4"	10 Cu. Yards	350 Sq. Ft.	18
7	16"	4"	10.9 Cu. Yards	350 Sq. Ft.	18
8	18"	4"	11.5 Cu. Yards	350 Sq. Ft.	18

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
2-4	305 mm	102 mm	6.5 Cu. Meters	32.52 Sq. Meters	18
5-6	381 mm	102 mm	7.66 Cu. Meters	32.52 Sq. Meters	18
7	406 mm	102 mm	8.33 Cu. Meters	32.52 Sq. Meters	18
8	457 mm	102 mm	8.79 Cu. Meters	32.52 Sq. Meters	18

GENERAL NOTES:

1. *Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.*
2. *Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.*
3. *The foundation site must be well drained and free of vegetation and debris.*
4. *The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.*
5. *Material estimates do not include allowance for shrinkage and waste.*
6. *These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.*

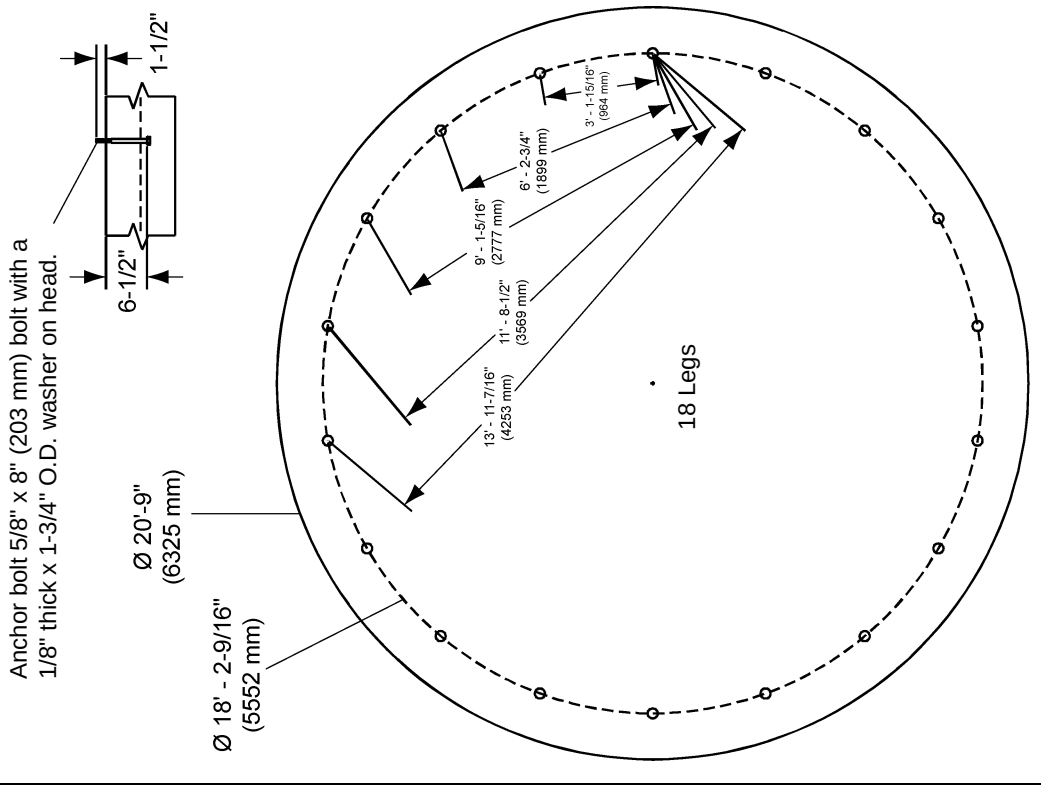


Figure 5I *18' 2-8 Rings BFT/GHT Hopper Tank*

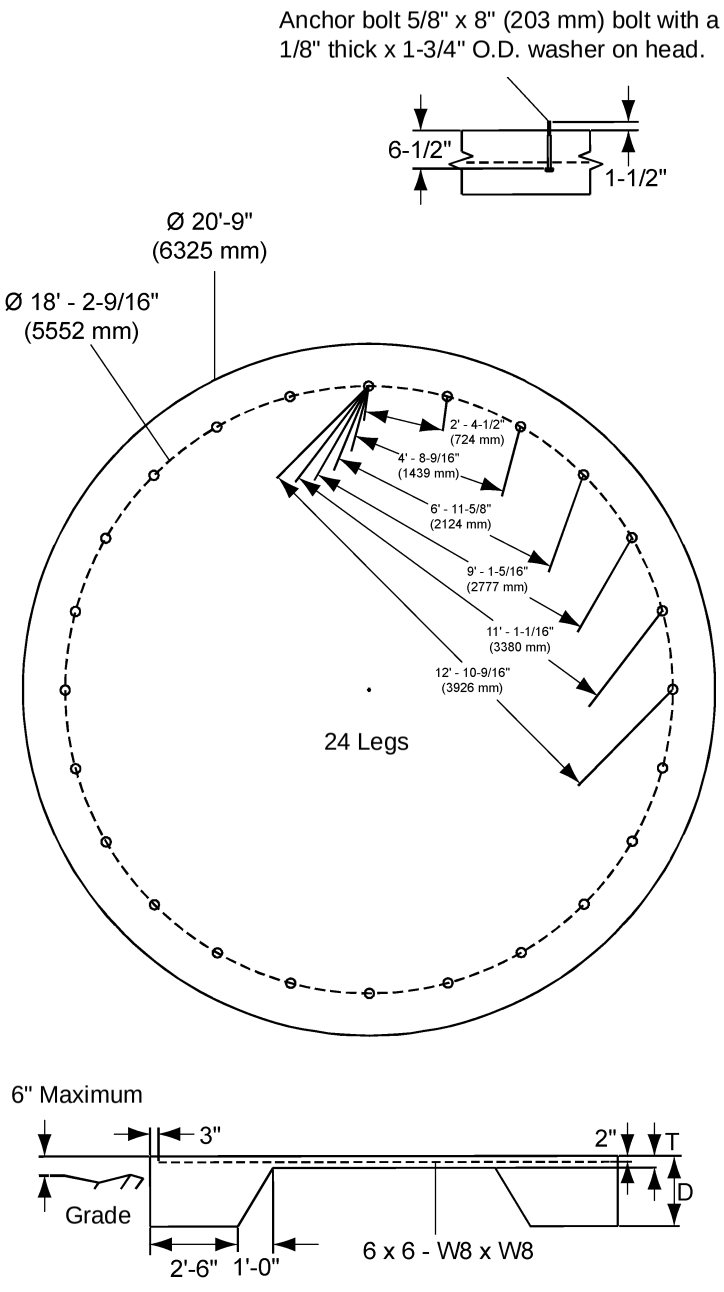


Figure 5J *18' 9 Rings BFT/GHT 24 Leg Hopper Tank*

All instructions shall be construed as recommendations only. the actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
9	18"	4"	11.5 Cu. Yards	350 Sq. Ft.	24

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
9	457 mm	102 mm	8.79 Cu. Meters	32.52 Sq. Meters	24

GENERAL NOTES:

1. *Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.*
2. *Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.*
3. *The foundation site must be well drained and free of vegetation and debris.*
4. *The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.*
5. *Material estimates do not include allowance for shrinkage and waste.*
6. *These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.*

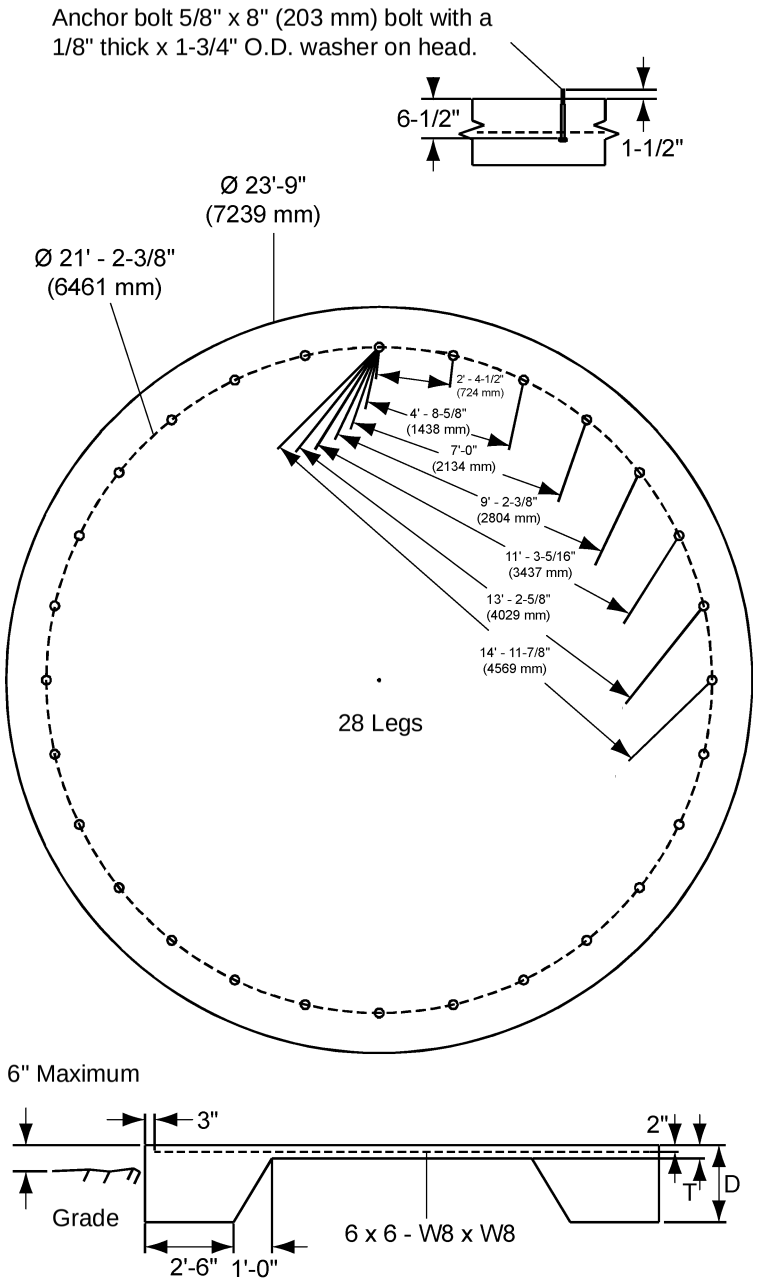


Figure 5K *21' 2-8 Rings BFT/GHT 24 Hopper Tank*

All instructions shall be construed as recommendations only. The actual installation may vary according to local conditions. The GSI Group assumes no liability for results arising from the use of such recommendations.

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
2-6	13"	4"	11 Cu. Yards	450 Sq. Ft.	28
7	15"	4"	12.1 Cu. Yards	450 Sq. Ft.	28
8	16"	4"	12.7 Cu. Yards	450 Sq. Ft.	28

# of Rings	Footing Depth (D)	Slab Thickness (T)	Concrete Volume	Wire Mesh Area	# of Column Legs
2-6	330 mm	102 mm	8.41 Cu. Meters	41.81 Sq. Meters	28
7	381 mm	102 mm	9.25 Cu. Meters	41.81 Sq. Meters	28
8	406 mm	102 mm	9.71 Cu. Meters	41.81 Sq. Meters	28

GENERAL NOTES:

1. *Foundation recommendations are based on 3500 lbs./ft.^2 allowable soil bearing capacity.*
2. *Foundation recommendations are based on a minimum compressive strength of 3000 PSI at 28 days.*
3. *The foundation site must be well drained and free of vegetation and debris.*
4. *The foundation should be level within 1/4" overall and within ± 1/8" in any 10 ft. length along the anchor bolt circle.*
5. *Material estimates do not include allowance for shrinkage and waste.*
6. *These layouts are recommendations for GSI tanks only. Consult GSI engineering for special tank foundations.*

Bulk Feed Tank Assembly

Body Sheet Chart

Model	Gauge
BFT 12'-1 Ring	18
BFT 12'-2 Ring	13-20
BFT 12'-3 Ring	13-20-20
BFT 12'-4 Ring	13-18-20-20
BFT 12'-5 Ring	12-16-18-20-20
BFT 12'-6 Ring	12-15-16-18-20-20
BFT 12'-7 Ring	12-13-15-16-18-20-20
BFT 15'-2 Ring	14-16
BFT 15'-3 Ring	14-16-20
BFT 15'-4 Ring	14-16-18-20
BFT 15'-5 Ring	12-14-16-18-20
BFT 15'-6 Ring	12-14-16-16-18-20
BFT 15'-7 Ring	12-14-14-16-16-18-20
BFT 15'-8 Ring	12-14-14-14-16-16-18-20
BFT 18'-2 Ring	10-16
BFT 18'-3 Ring	10-16-20
BFT 18'-4 Ring	10-16-18-20
BFT 18'-5 Ring	10-16-18-20-20
BFT 18'-6 Ring	10-14-16-18-20-20
BFT 18'-7 Ring	10-14-16-18-18-20-20
BFT 18'-8 Ring	10-14-14-16-18-18-20-20
BFT 21'-2 Ring	10-16
BFT 21'-3 Ring	10-16-20
BFT 21'-4 Ring	10-16-20-20
BFT 21'-5 Ring	10-16-17-20-20
BFT 21'-6 Ring	10-16-17-17-20-20

NOTE: ** Represents 45° Bulk Tanks. All other tanks come with 60° or 45° hoppers.*

How to use charts on this page

The chart titled “Body Sheet Chart” is for the reference when building the tank. This chart tells you how many rings the specific tank must have. To read the chart find the tank size you wish to build. For example, an 12' diameter tank with 4 rings will look like BFT 12'-4 rings. The side labeled “Gauge” will tell you which body sheets to use. The sheets are color coded, simply match the gauge number with the color. (Use “Sheet Gauge Color Code Chart” *on Page 26*.)

Sheet Gauge Color Code Chart

Code #	Color Code
20	Red
18	Orange
17	Pink/Light Blue
16	Blue
15	Brown/Red
14	Green
13	Yellow/Blue
12	Black
11	Pink
10	Light Blue

IMPORTANT: *Number of rings shown for each tank size are maximums. (12' 60° Tanks have a 6 ring maximum. 15' 45° and 18' 45° tanks have an 8 ring maximum.)*

NOTE: *Body sheets are color coded on edges for gauge identification.*

12' Sidewall Sheet Orientation

IMPORTANT: *Please note sheet orientation when assembling the bin sidewall. The upper right corner will have a hole or identifying sticker. This corner should be on the inside of the tank when assembled. (See Figure 6A.)*

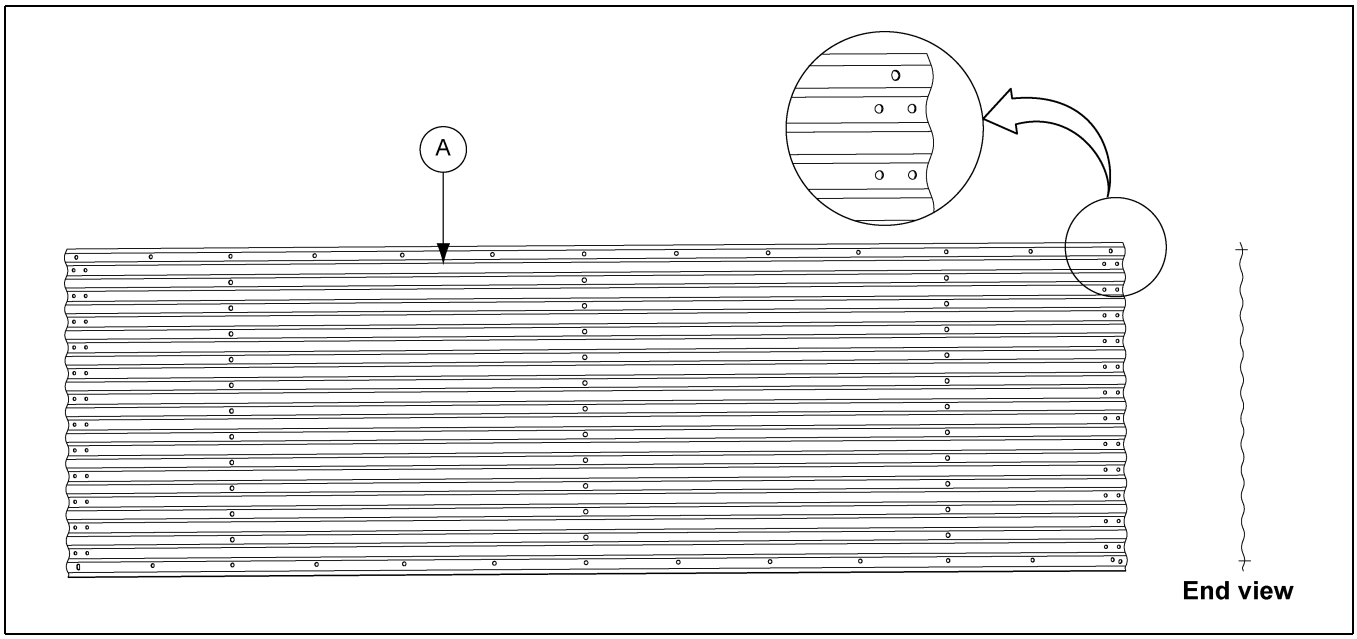


Figure 6A *Viewed from Inside (Sheet orientation effects how sheets overlap.)*

Ref #	Part #	Description
A	SS-738714	Sidewall Sheet

Sidewall Erection

12'-21' Bulk Feed Tank

12'-21' Diameters Bulk Feed Tanks are designed to be built vertically utilizing bin jacks or a crane of adequate capacity. Before bolting the sidewall sheets together, check that you have the proper gauge steel for the first ring. The higher gauge number denote the thinner materials. For example, 20 gauge material is thinner than 14 gauge. In erecting all Bulk Feed Tanks the thinnest material always goes on top, therefore the first sidewall ring you assemble will be the top ring of the tank. Check the various gauges of the tank with the color code chart and begin building accordingly. Remember assemble the top ring first. Note ring overlap detail *in Figure 6B*.

NOTE: *See Page 26 for proper gauges and color code chart.*

IMPORTANT: *The number of rings shown for each tank size are **maximums**. (15' 60° Tanks have a 6 ring maximum, 21' 45° tanks have a 7 ring maximum. 12' 60° Tanks have a 7 ring maximum. 15' 45° Tanks have an 8 ring maximum. The 12' 45° and 18' 45° tanks have an 9 ring maximum.)*

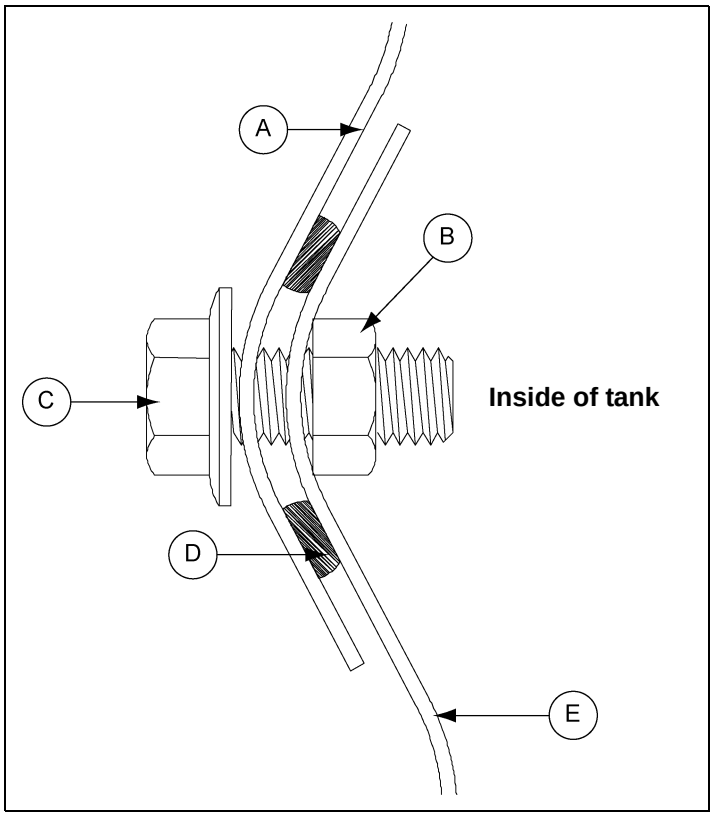


Figure 6B *Ring Overlap Detail*

Ref #	Description
A	Upper Ring
B	5/16" Nut (S-7484)
C	5/16" x 1" Bin Bolt (S-10260)
D	Caulking (Two (2) Strips)
E	Lower Ring

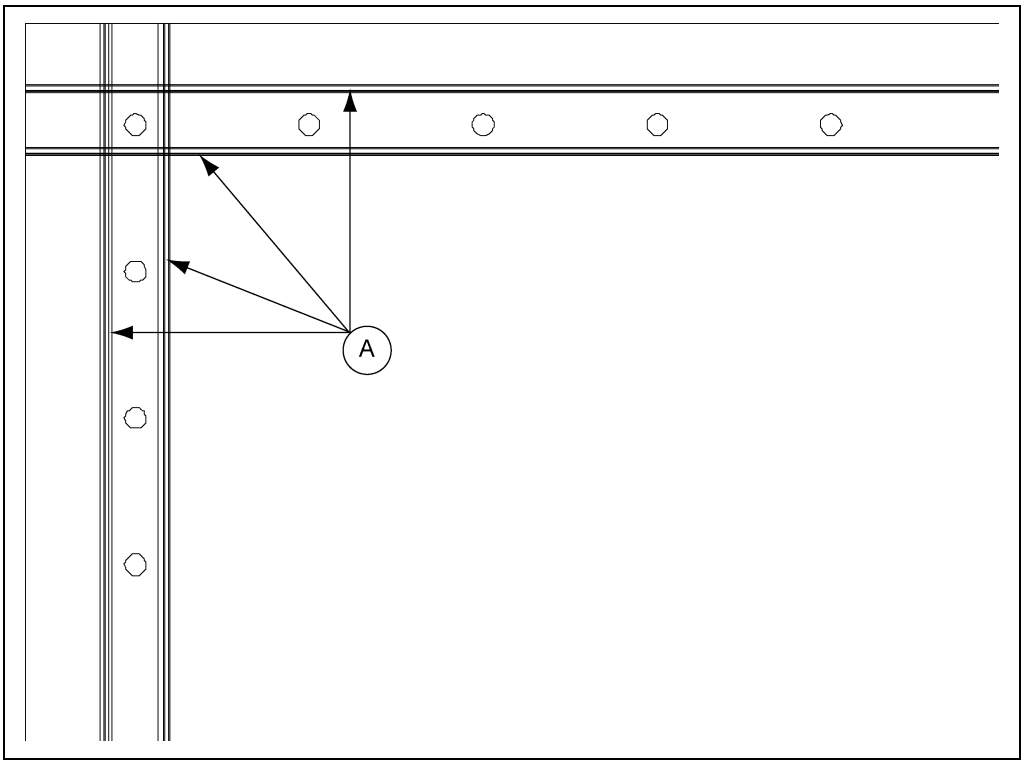


Figure 6C *Caulking Detail (For 12' tanks only.)*

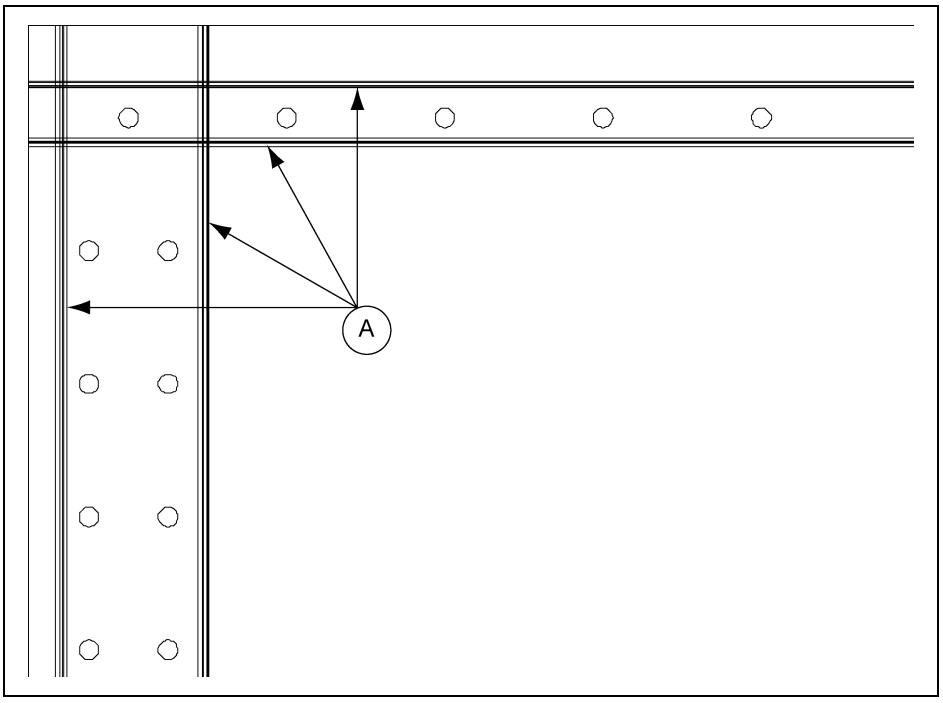


Figure 6D *Caulking Detail (For 15', 18' and 21' tanks.)*

Ref #	Description
A	Caulking

Figure 6E

Figure 6F

IMPORTANT: *BEGIN BOLTING IN THE CENTER OF SHEETS when connecting sidewall rings to one another. When bolting sidewall rings to one another, always begin bolting in the center of the sheet and work toward the outside edges (horizontal seams). This allows the sidewall to draw up evenly.*

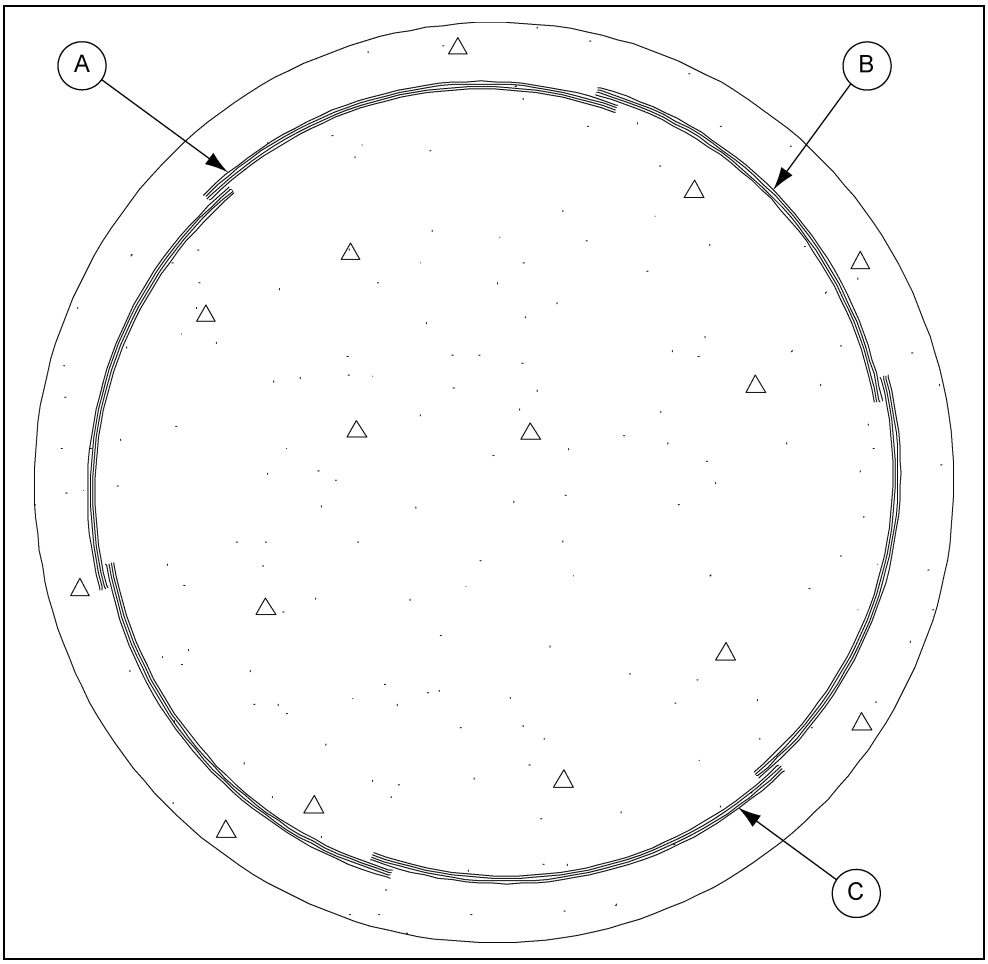


Figure 6G

Ref #	Description
A	Left Panel
B	Right Panel
C	Sidewall Sheet

Once you have selected the proper gauge material, begin assembling all sidewall sheets in the following manner. Standing on the inside of the tank, place the left panel to the inside with the right panel to the outside.

NOTE: *The rope caulking is applied before each sheet is assembled. Wipe sheets clean where caulking will be applied. Apply caulking on each side of the holes of the vertical seams and on each side of the horizontal row of holes.*

Using correct size bin bolt throughout, begin assembling sidewall sheet 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 to the inside. Do not tighten bolts until all sheets are assembled and form a complete ring. Remember to attach lifting straps at the bottom of the vertical seams while bolting the sheets together. These straps, coupled to the jacks, will enable you to later elevate the tank. Now tighten the bolts, in sequence, starting from the center and working to the edge in both directions. This permits the sidewall sheets to draw-up evenly. Complete one ring and stop. You are now ready to assemble the roof.

12'-18' BFT Sealed Roof Panel Installation

Roof to Sidewall

NOTE: *The roof and sidewall ladders are centered between seams.* When placing the roof panel, the one edge is bent down. This edge is to be placed on the outside of other roof panel to form a tight seal. *(See Figure 7A.)* Be sure to apply two (2) strips of caulking on all seams.

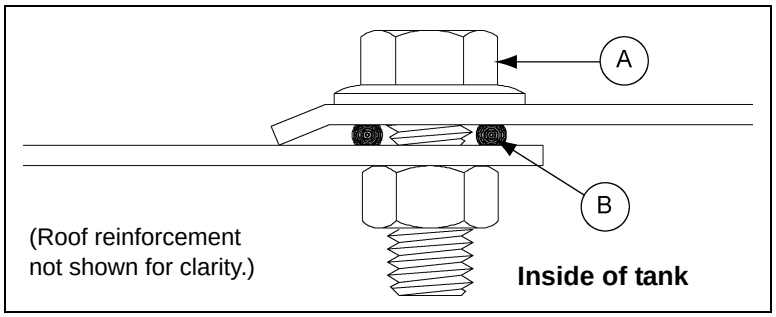


Figure 7A *Roof Sheet Overlap Detail*

Ref #	Description
A	5/16" x 1" Bin Bolt (S-10260)
B	Caulking (Two (2) Strips)

Roof Assembly

Assemble roof panels in a counterclockwise manner. On bins that will be equipped with pnuematic fill system (refer to *Page 100*), the two (2) roof panels with fill hole and exhaust hole must be located opposite each other on Bulk Feed Tank.

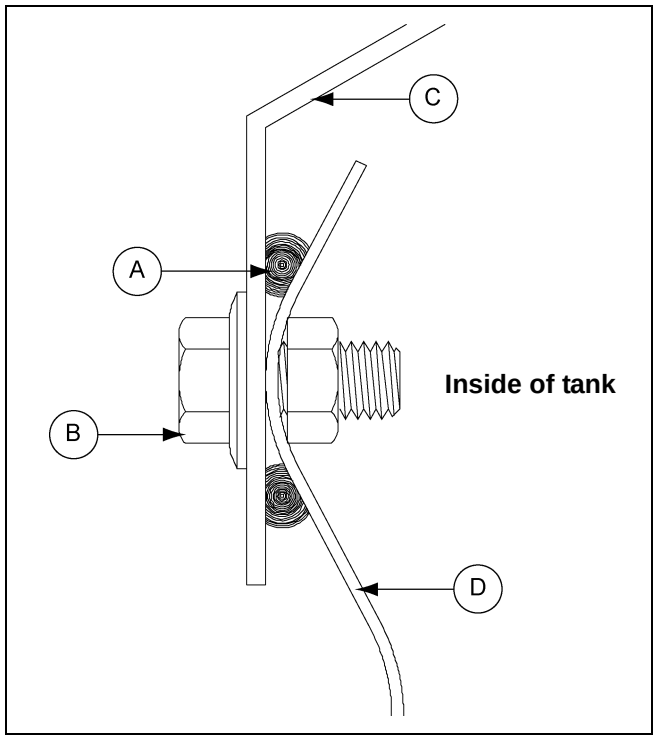


Figure 7B *Eave Detail*

Ref #	Description
A	Caulking (Two (2) Strips)
B	5/16" x 1" Bin Bolt (S-10260)
C	Roof Sheet
D	Sidewall Sheet

Peak Ring Collar to Roof Panels

Apply two (2) strips of caulking between peak ring and roof panels, *See Figure 7D*. Note that the peak ring goes on the outside of the roof panels.

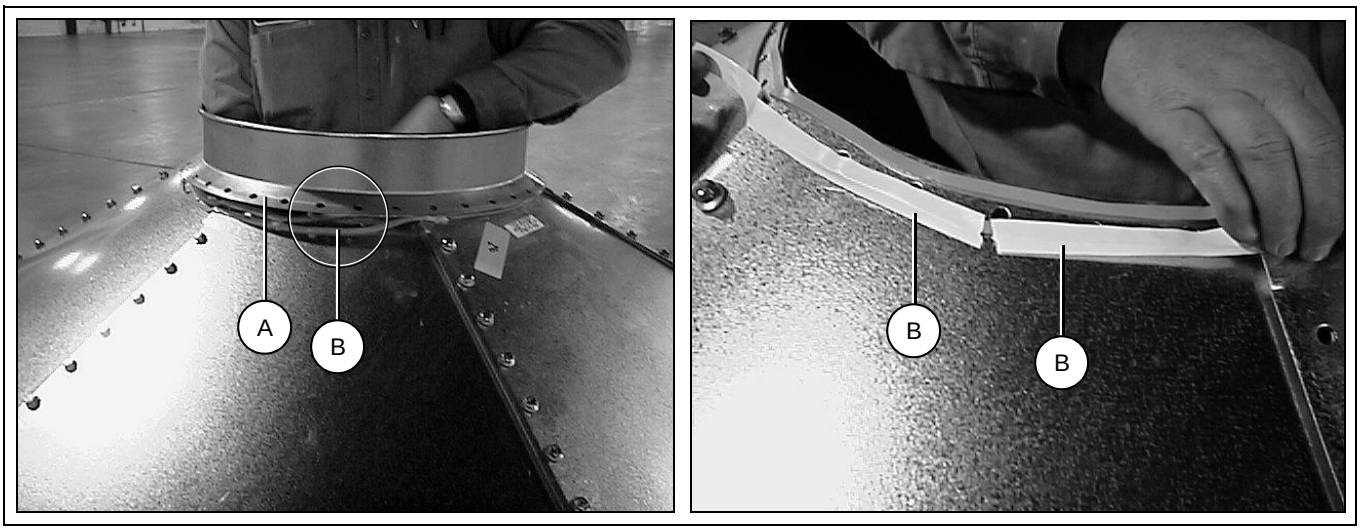


Figure 7C

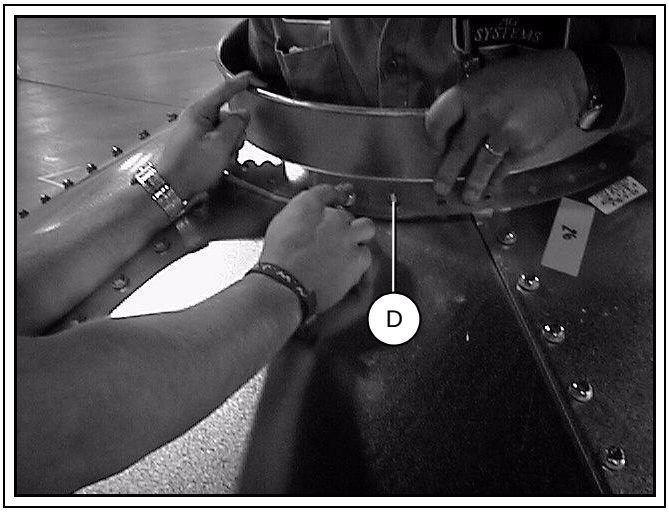


Figure 7D

Ref #	Description
A	Peak Ring Collar
B	Caulking (Two (2) Strips)
C	Roof Sheet
D	5/16" x 1" Bin Bolt (S-10260)

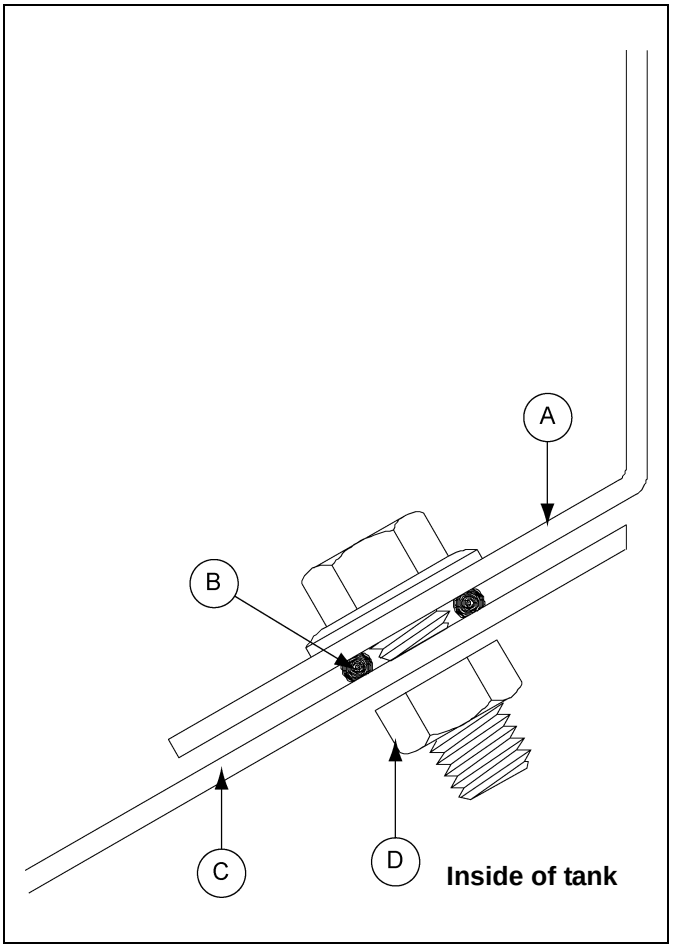


Figure 7E *Peak Ring Collar Detail*

12' Roof Reinforcement Angle

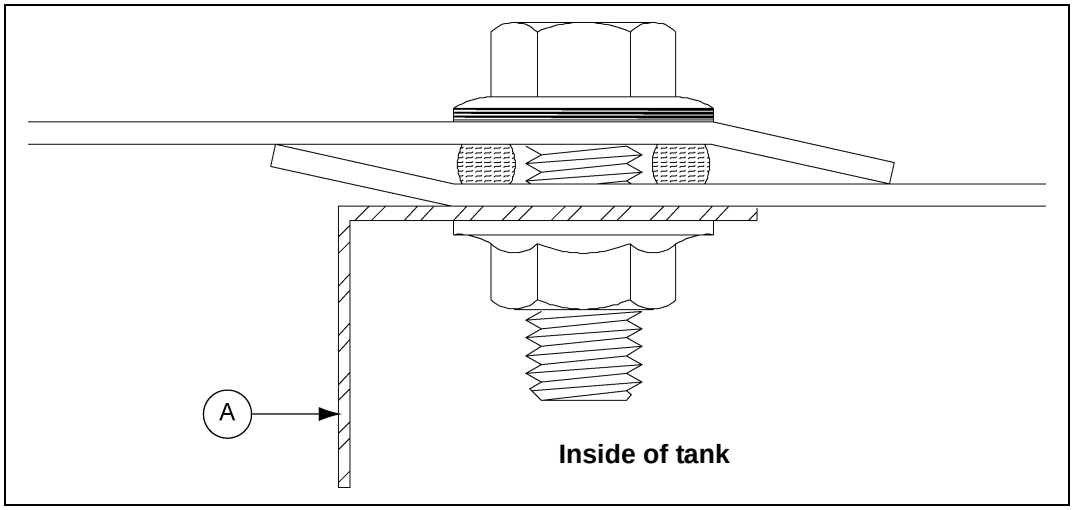


Figure 7F

Ref #	Description
A	12' Roof Inforcement Angle (Twelve (12) pieces required.)

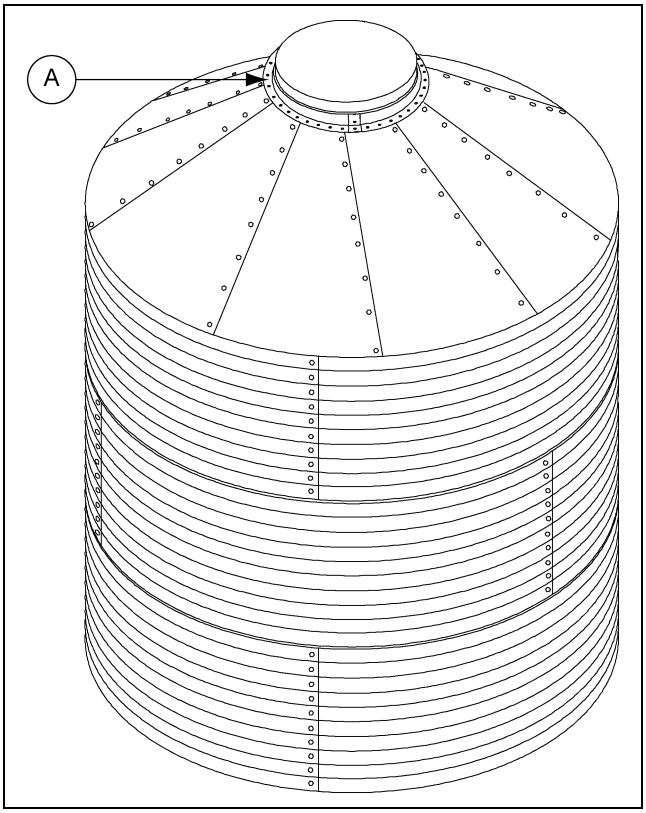


Figure 7G

Ref #	Description
A	Peak ring collar mounted to outside of roof panels.

15' and 18' Roof Assembly Instructions

After completing first ring assembly, you are ready to begin roof construction. First, build a roof center support to hold the peak ring in place at the proper height. A simple structure consisting of a sturdy cross arm attached to a pole and supported by a platform or scaffolding will do. Stand the center support directly in the center of the tank. The bottom of the peak ring should be 89-5/16" (2269 mm) above the foundation on the 18' tank and 78-15/16" (2005 mm) above it on the 15' tank. These dimensions are approximate ones used in BFT construction. Adjusting the center support height will ease roof erection. Refer to the accompanying drawings for details. Install six (6) roof reinforcement angles spaced equally around the tank. Reinforcement angle edges are parallel with sidewall sheet and peak ring, see views “A-A” *on Page 35* and “D-D” *on Page 36*.

The reinforcement angles utilize every other hole in the peak ring. At the sidewall, there are twelve (12) spaces between each reinforcement angle on the 18' tank and ten (10) spaces between each on the 15' tank. Next, “skin” the roof by installing the roof panels on the just completed reinforcement structure. Reinforcement angles will share all roof panels holes, including hole where panel and peak ring attach. Ensure that all roof seams are caulked and lapped correctly as shown in the accompanying detail drawings.

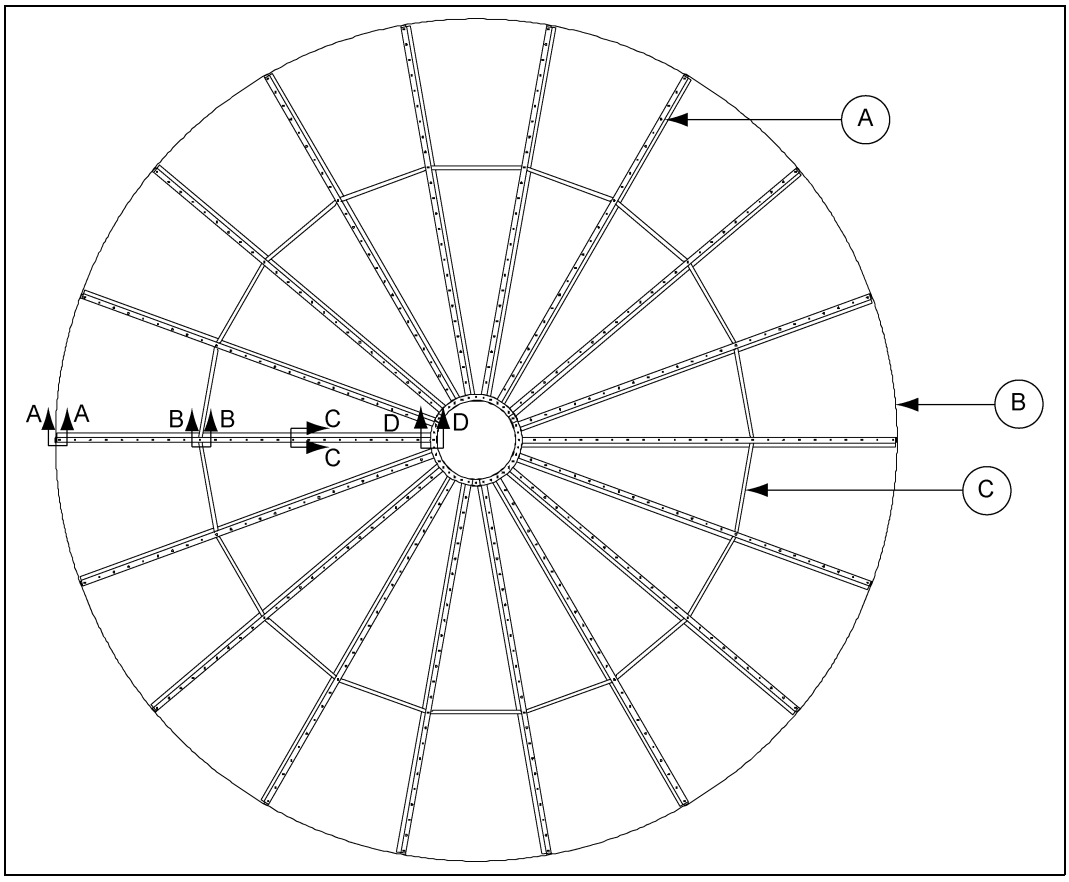


Figure 7H

Ref #	Description
A	Roof Reinforcement Angle
B	Sidewall Sheet
C	Roof Compression Straps

15' and 18' Roof Assembly Instructions (Continued)

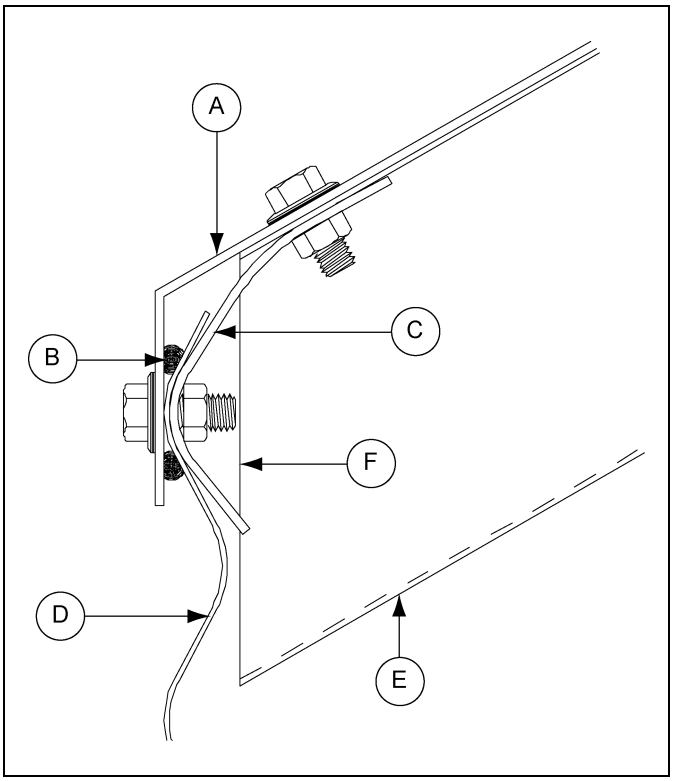


Figure 7I *View "A"-"A"*

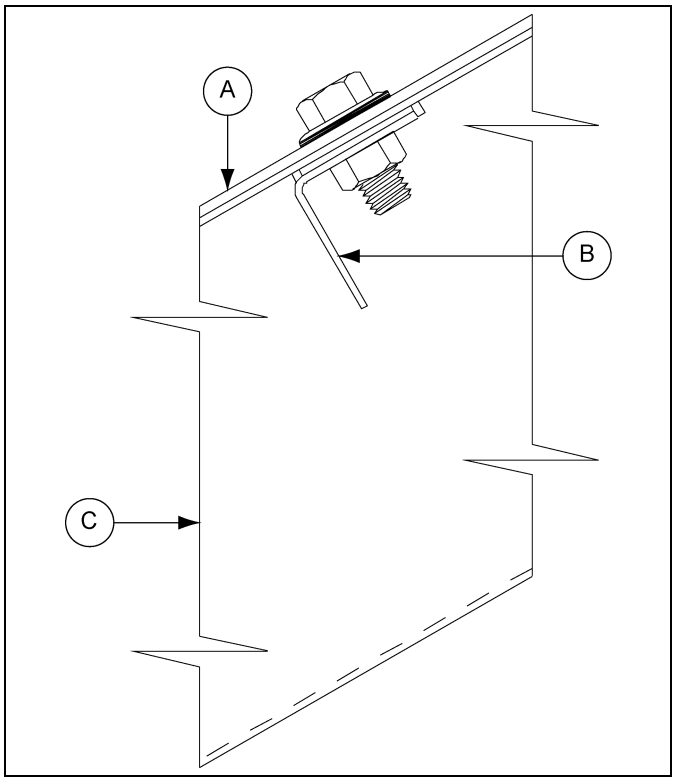


Figure 7J *View "B"-"B"*

Ref #	Description
A	Roof Panel
B	Caulking (Two (2) Strips)
C	Intermediate Eave Clip
D	Sidewall Sheet
E	Reinforcement Angle
F	**NOTE:** *Reinforcement angle edge is parallel to sidewall sheet. (Angle can be installed correctly only one way.)*

Ref #	Description
A	Roof Panel
B	Compression Strap
C	Reinforcement Angle

15' and 18' Roof Assembly Instructions (Continued)

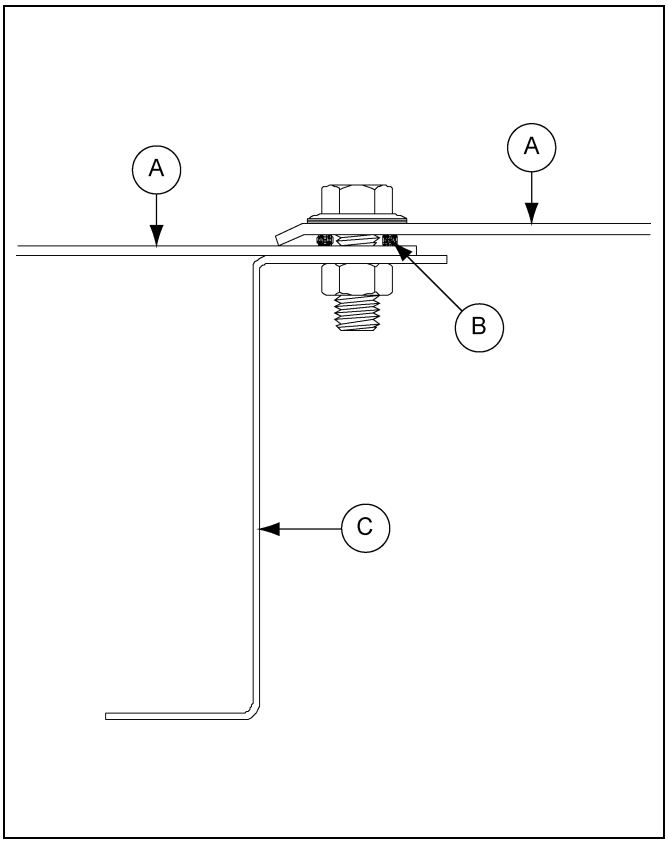


Figure 7K *View "C"-"C"*

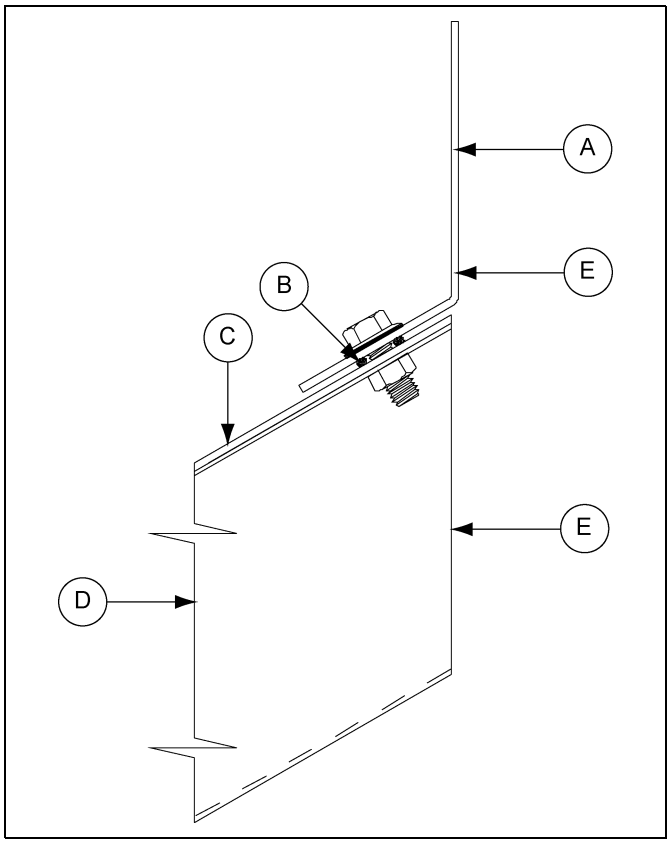


Figure 7L *View "D"-"D"*

Ref #	Description
A	Roof Panels
B	Caulking (Two (2) Strips)
C	Reinforcement Angle

Ref #	Description
A	Peak Ring
B	Caulking (Two (2) Strips)
C	Roof Panel
D	Reinforcement Angle
E	**NOTE:** *Reinforcement angle edge is parallel to peak ring.*

Raising the Roof

NOTE: ***See 30° roof manual (PNEG-1092) in roof hardware box for instructions on 12', 15', 18' and 21' grain bin roof.***

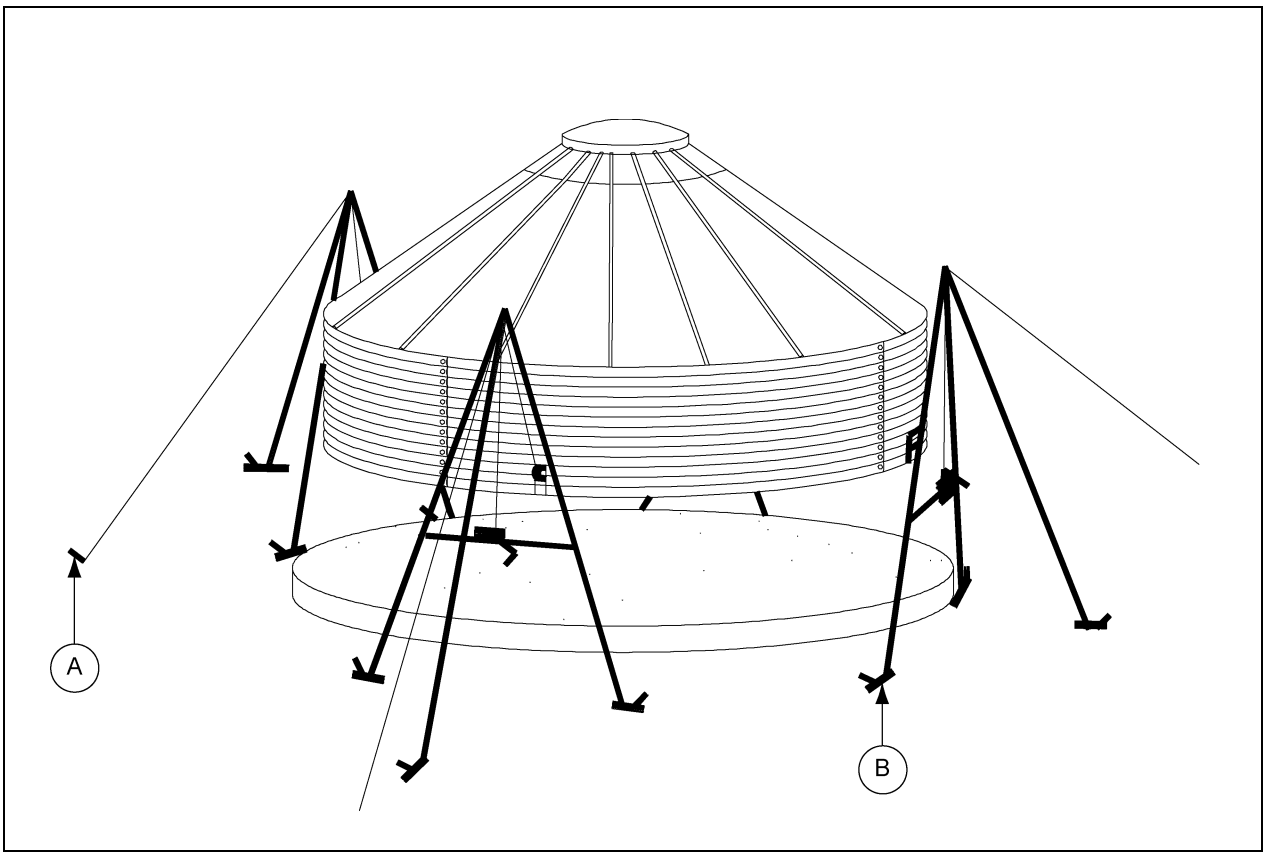


Figure 7M

Ref #	Description
A	Anchor Cable
B	Anchor Jacks Securely

Anchor Tank Before Second Ring Assembly

Anchor all jacks securely with metal stakes and cables (use one jack per sidewall sheet). Now raise the tank just enough to assemble the next ring. When lifting the tank 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. Lower the tank on the foundation after assembling and tightening bolts on each new ring. Now re-bolt lifting straps to the lowest ring in place thus far.

NOTE: *Add outside ladders and other accessories to tank walls as you continue to raise the tank.*

After body sheets are assembled and bolts are tightened, raise the tank and attach the legs. Do not put a bolt in the bottom sidewall hole yet, because the hopper must be attached here. When the legs are in place and tightened, release the jack enough to rest the tank on the legs.

Figure 7N

A crane of adequate capacity attached to a spider assembly with cables connecting at each vertical sidewall seam just above the legs can also be used to lift the tank. Make sure the tank is being lifted smoothly and evenly. Raise it enough to assemble the next ring and/or to attach the legs. Reference a qualified rigger.

WARNING

Watch for power lines. The crane and anything associated with building the bin (due to height) can get in the way of power lines.

12' 60° and 15' 60° Leg Attachment (for 12' 60° and 15' 60° Tanks Only)

Apply caulking between the hopper panel and the sidewall sheet. *(See Figure 7O.)*

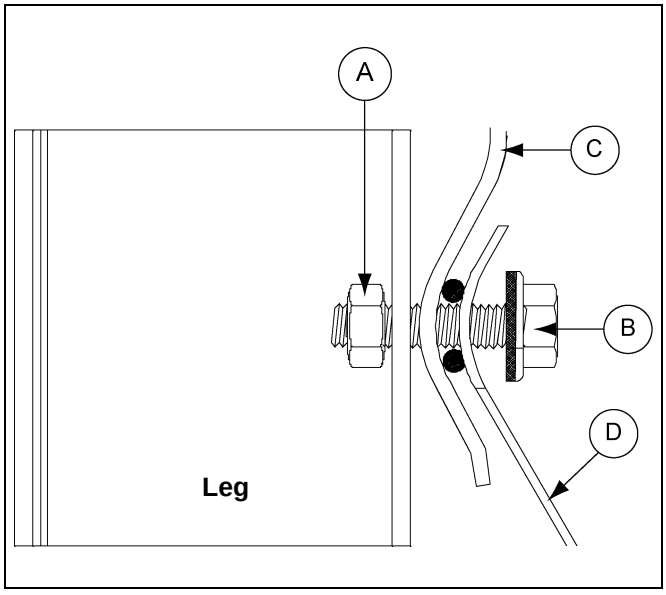


Figure 7O

Ref #	Part #	Description
A	S-7484	Hex Nut 5/16"-18 JS Grade 5
B	S-10260	5/16" x 1" Bin Bolt
C		Sidewall Sheet
D		Hopper Panel

Optional BFT Ladder Assembly

The components needed to complete the eave ladder assembly are listed in the chart *below* and are numbered in the order of assembly. Review the installation instructions for each component before beginning. Failure to do so may complicate the installation and cause unnecessary field drilling. *(See Figure 8A.)*

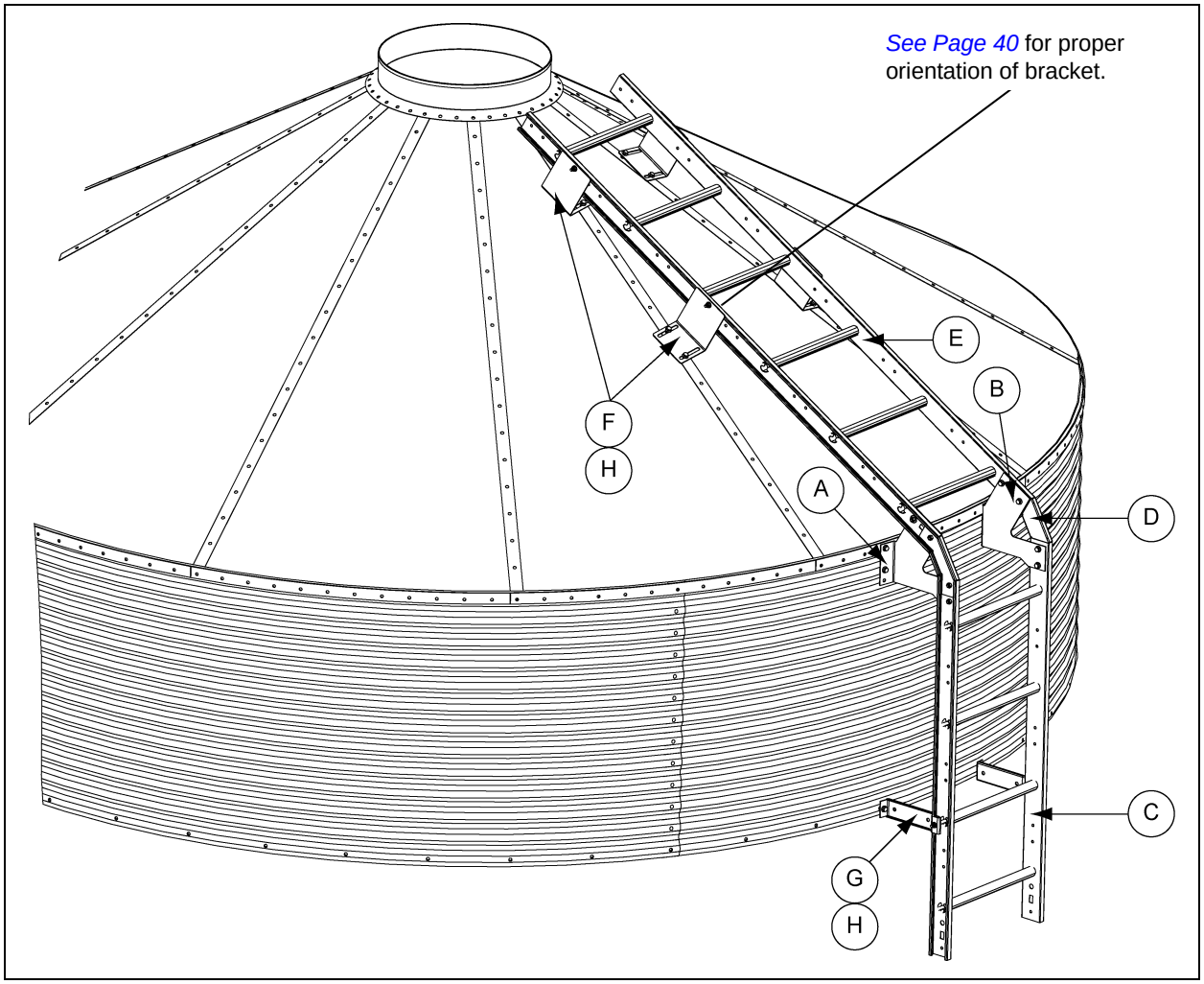


Figure 8A

Ref #	Description	Qty
A	L.H. Starter Bracket	1
B	R.H. Starter Bracket	1
C	Top 4' Ladder Section	1
D	Connector Bracket	2
E	Roof Ladder Section	1
F	Roof Ladder Support Bracket	4
G	Standoff Bracket	2
H	Wedge	6

Starter Bracket Installation

The starter brackets must be centered in the roof sheet to ensure proper installation of the roof ladder support brackets. Before the starter brackets can be installed, two (2) 3/8" holes must be drilled. The holes must be 2.66" below and directly in line with the top row of pre-punched horizontal holes 18-3/4" apart. Refer to *Figure 8B* for additional clarification of hole locations. Use 5/16" and 3/4" bin bolts for connections.

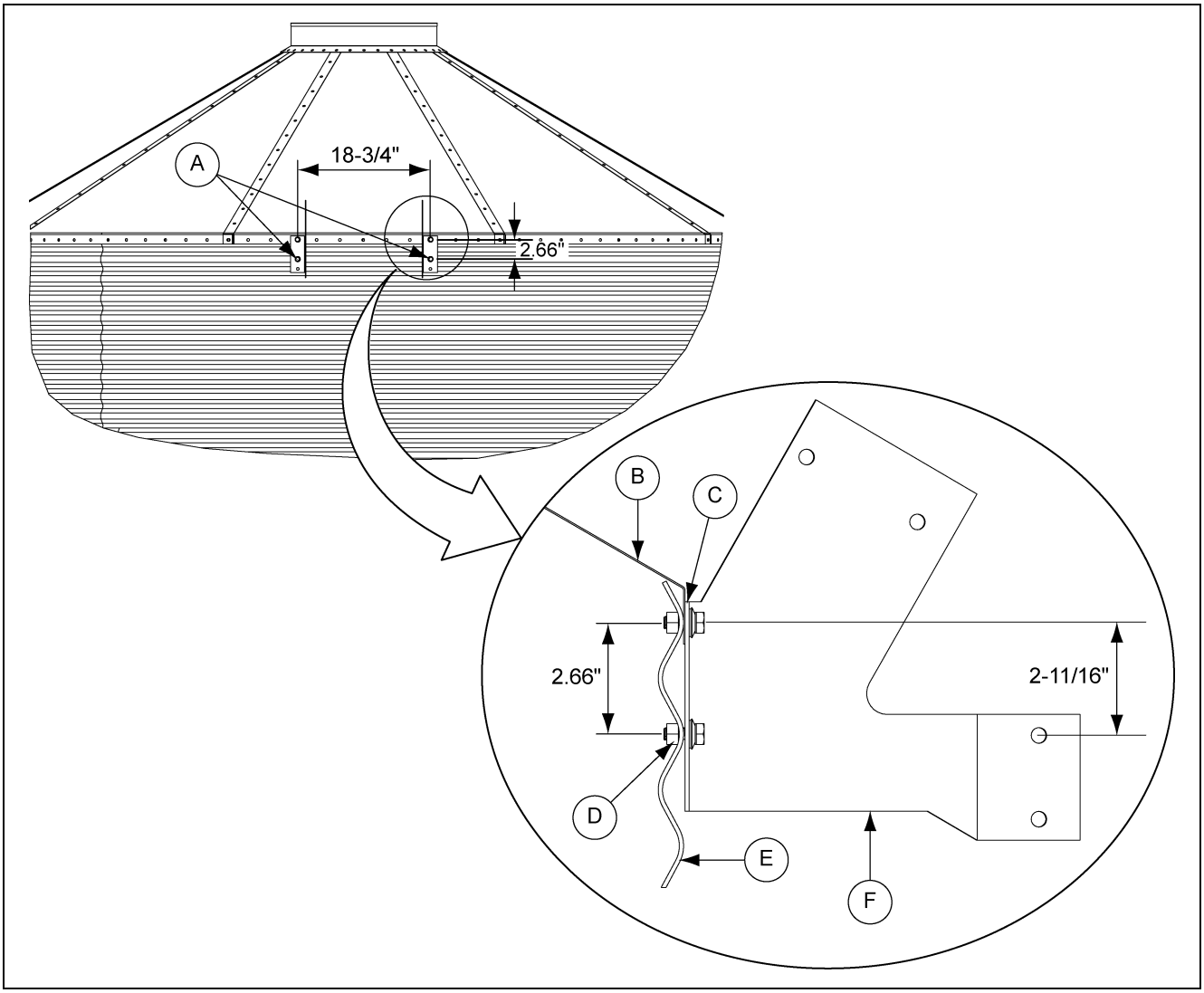


Figure 8B

Ref #	Description
A	Two (2) 3/8" Field Drilled Holes
B	Roof Panel
C	Top Horizontal Seam
D	3/8" Field Drilled Holes
E	Sidewall Sheet
F	L.H. 30° Roof (LDR-5405) and R.H. 30° Roof (LDR-5406)
	L.H. 40° Roof (LDR-5407) and R.H. 40° Roof (LDR-5408)

Sidewall and Roof Ladder Installation

Check the sidewall ladder to make sure the ladder rung dimples face upward. Attach the ladder to the sidewall with the starter brackets to the inside of the ladder and the connector brackets to the outside as shown in *Figure 8C*. Once the sidewall ladder is installed, attach the roof ladder to the other end of the connector brackets. All bolts should be installed with the head of the bolt to the inside of the ladder. Use 5/16" x 1" bin bolts for all connections.

NOTE: *The roof ladder must be one continuous ladder section. The roof ladder cannot be assembled from two (2) or more smaller ladder sections spliced together. See chart below for required roof ladder lengths vs bin diameter and roof angle.*

WARNING ***Failure to follow instructions may cause damage or failure of the equipment.***

Bin Diameter	Roof Ladder Length	
	30° Roof	40° Roof
12'	6'	7'
15'	8'	9'
18'	9'	N/A

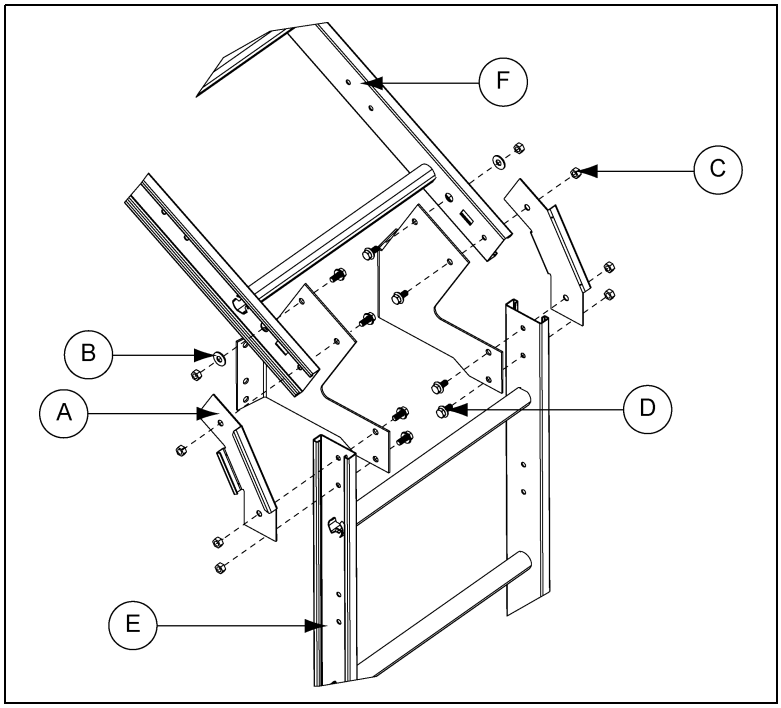


Figure 8C

Ref #	Part #	Description
A	LDR-4318	30° Connector Bracket
	LDR-4367	40° Connector Bracket
B	S-845	5/16" Flat Washer
C	S-7484	Hex Nut 5/16"-18 JS Grade 5

Ref #	Part #	Description
D	S-10260	5/16" x 1" Bin Bolt
E		Sidewall Ladder
F		Roof Ladder

Roof Ladder Support Bracket Installation

The roof ladder requires support brackets at the top of the ladder. These upper ladder support brackets either bend in towards the center of the ladder or bend out away from the ladder depending on the diameter and roof angle of the tank being assembled. *See Figure 8D below and Figure 8I on Page 46* that show brackets for the 12'-30° and 12'-40° roofs. *See Figure 8E on Page 43 and Figure 8J on Page 46* that show brackets for 15'-30° and 15'-40° roofs. *See Figure 8F on Page 44 and Figure 8K on Page 46* that show brackets for 18'-30° roofs. Assemble the wedge and support brackets to the ladder rail as shown in *Figure 8G and Figure 8H on Page 45*. Then, slide the support bracket assemblies along the ladder rails as shown in *Figure 8D below, Figure 8E on Page 43 and Figure 8F on Page 44* until the slots match up with the pre-punched holes in the roof panel and attach using the existing bolts.

NOTE: *The roof ladder supports must be assembled so that the maximum distances are not exceeded. See Figure 8L on Page 47 and the "maximum distances chart" to determine maximum allowable spacing of support brackets.*

WARNING

Failure to follow instructions may cause damage or failure of the equipment.

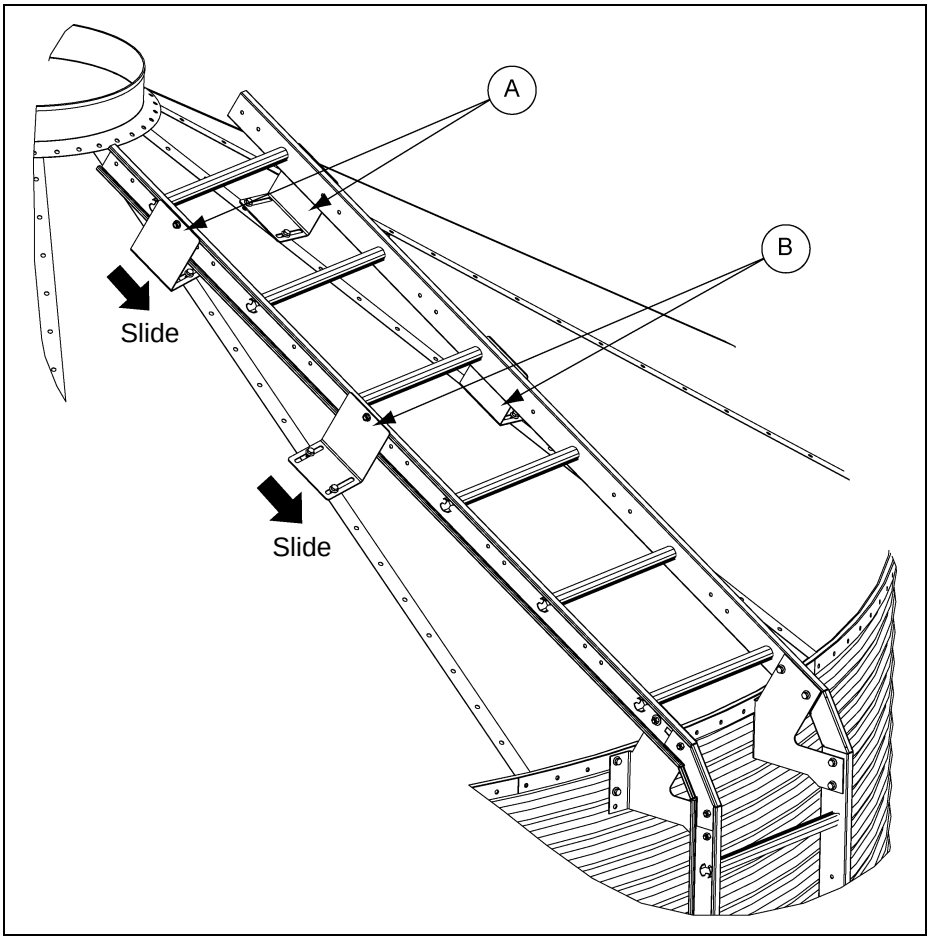


Figure 8D *12' Tank*

Ref #	Part #	Description
A	LDR-5403	30° Support Bracket
	LDR-5404	40° Support Bracket

Ref #	Part #	Description
B	LDR-4386	30° Support Bracket
	LDR-4387	40° Support Bracket

Roof Ladder Support Bracket Installation (Continued)

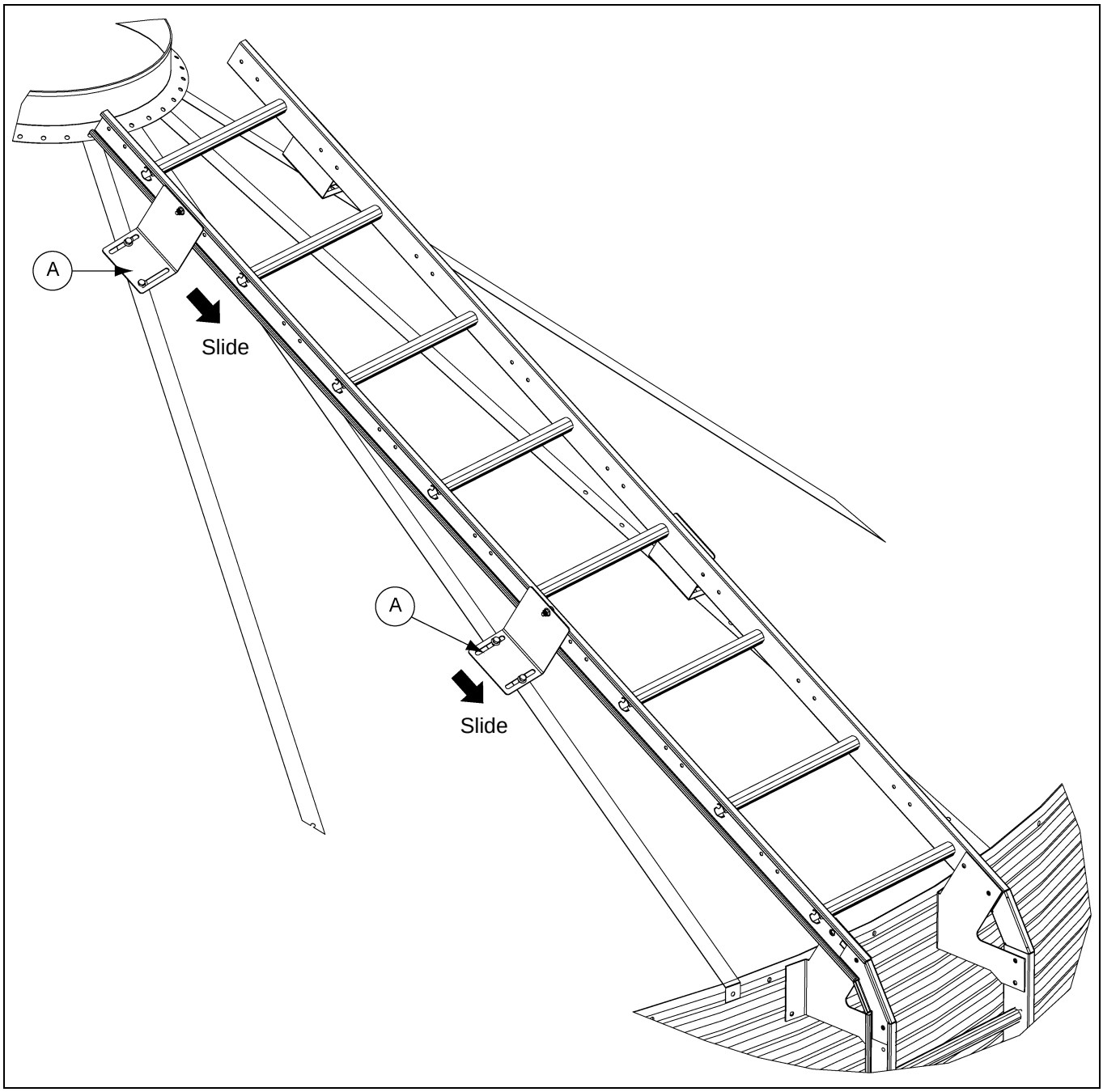


Figure 8E *15' Tank*

Ref #	Part #	Description
A	LDR-4386	30° Support Bracket (Two (2) on Each Side)
	LDR-4387	40° Support Bracket (Two (2) on Each Side)

Roof Ladder Support Bracket Installation (Continued)

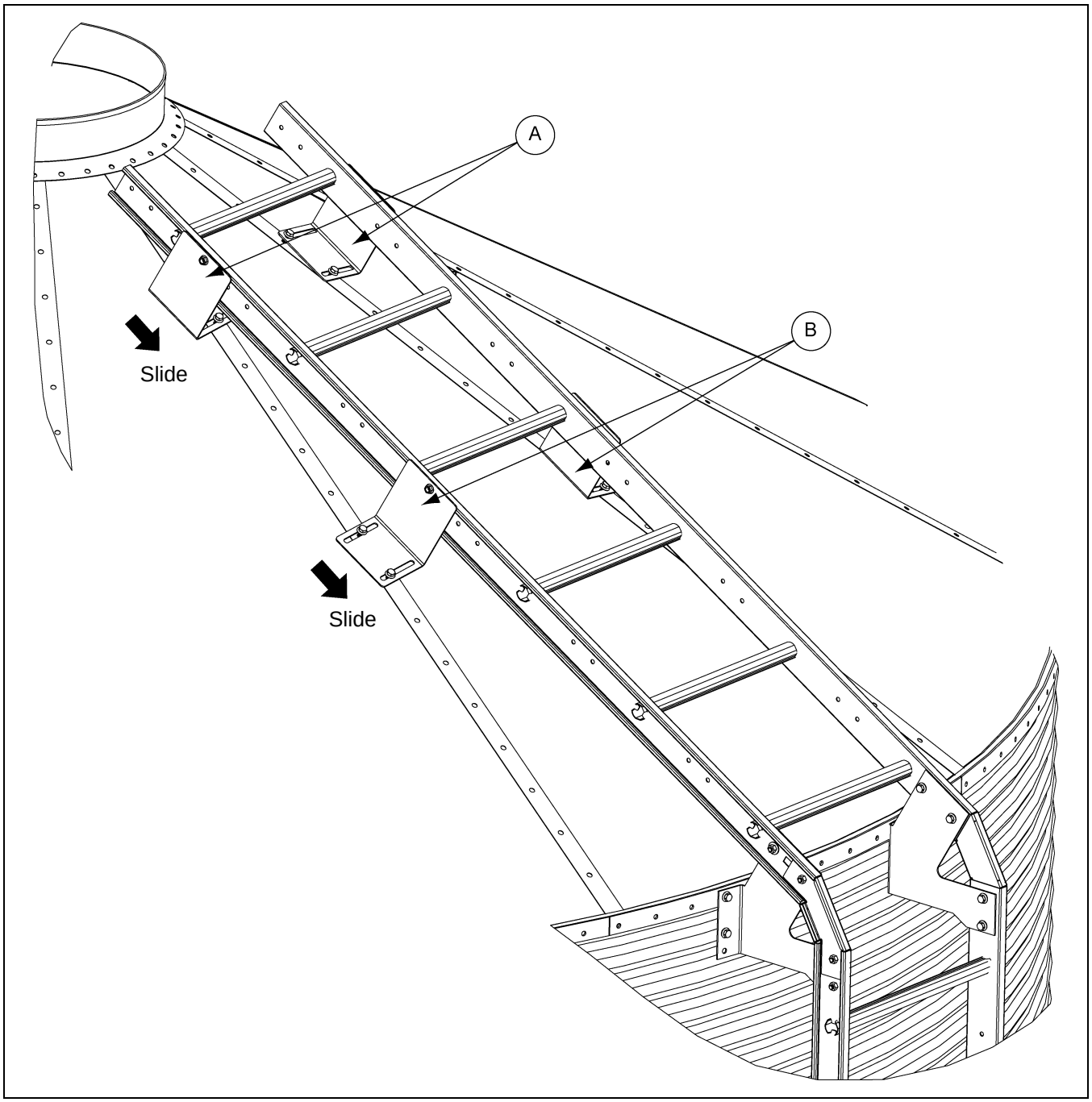


Figure 8F *18' Tank*

Ref #	Part #	Description
A	LDR-5426	30° Support Bracket
B	LDR-5425	30° Support Bracket

Roof Ladder Support Bracket Installation (Continued)

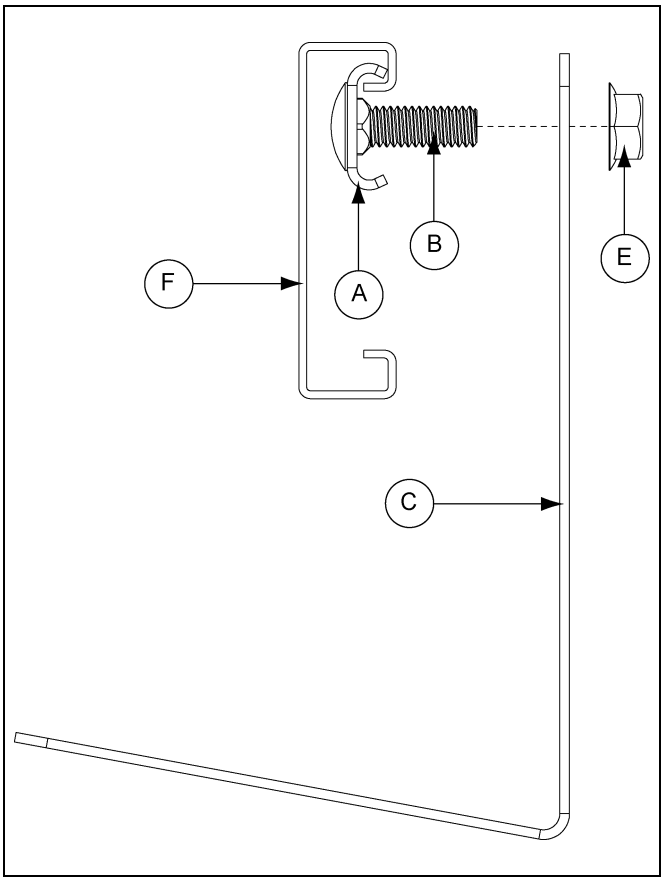


Figure 8G

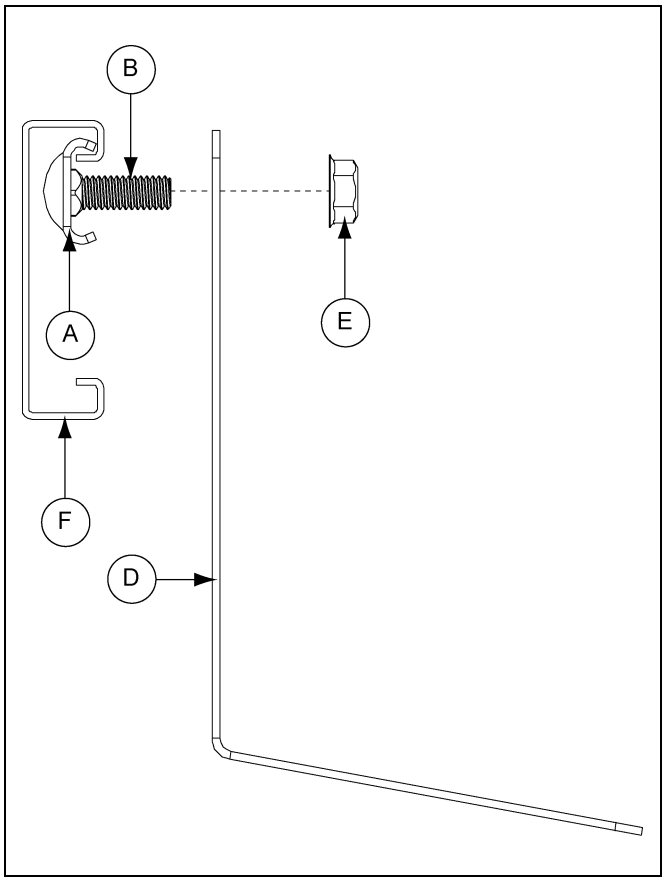
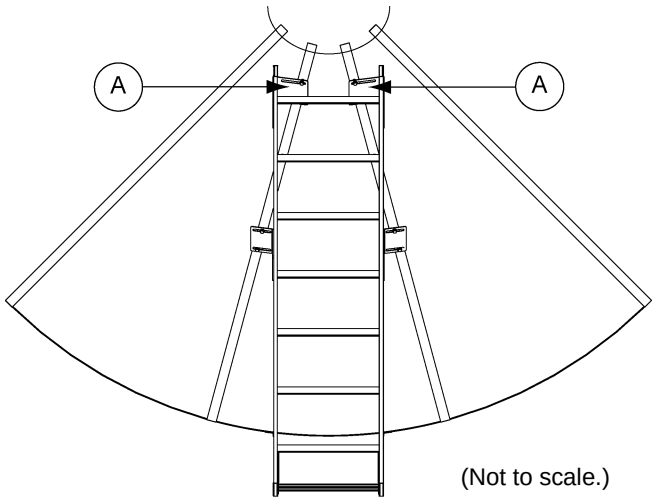


Figure 8H

Ref #	Part #	Description
A	LDR-4198	Wedge
B	S-3550	5/16" x 1" Carriage Bolt
C	LDR-5403	30° Support Bracket
	LDR-5404	40° Support Bracket
D	LDR-4386	30° Support Bracket
	LDR-4387	40° Support Bracket
E	S-10268	Flange Nut 5/16"-18 JS Grade 5
F		Ladder

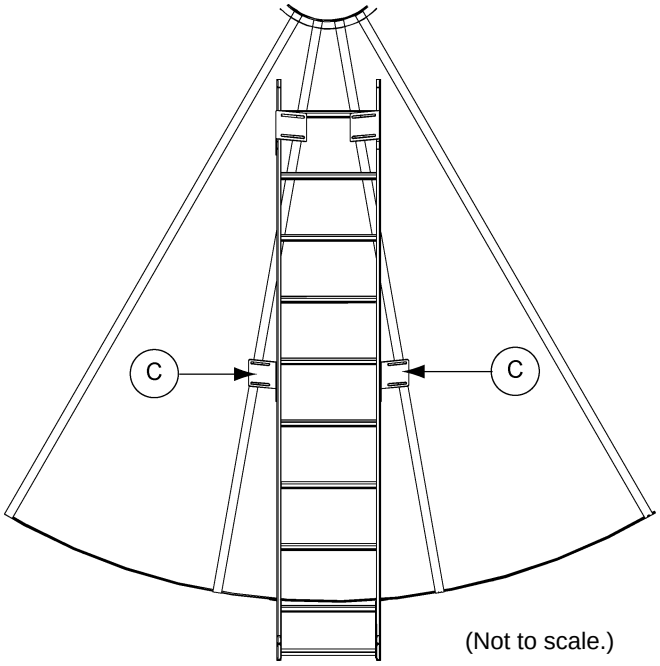
Roof Ladder Support Bracket Installation (Continued)



Top view for these tanks:

All 12' diameter 30° sealed roofs.
All 12' diameter 40° sealed roofs.

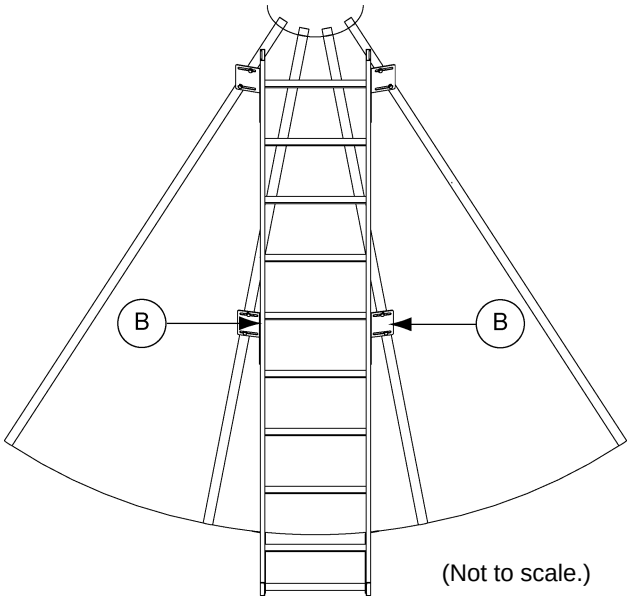
Figure 8I *12' Tank*



Top view for these tanks:

All 18' diameter 30° sealed roofs.

Figure 8K *18' Tank*



Top view for these tanks:

All 15' diameter 30° sealed roofs.
All 15' diameter 40° sealed roofs.

Figure 8J *15' Tank*

Ref #	Part #	Description
A	LDR-5403	30° Support Bracket
	LDR-5404	40° Support bracket
B	LDR-4386	30° Support Bracket
	LDR-4387	40° Support bracket
C	LDR-5425	30° Support Bracket
	LDR-5426	30° Support Bracket

Roof Ladder Support Bracket Installation (Continued)

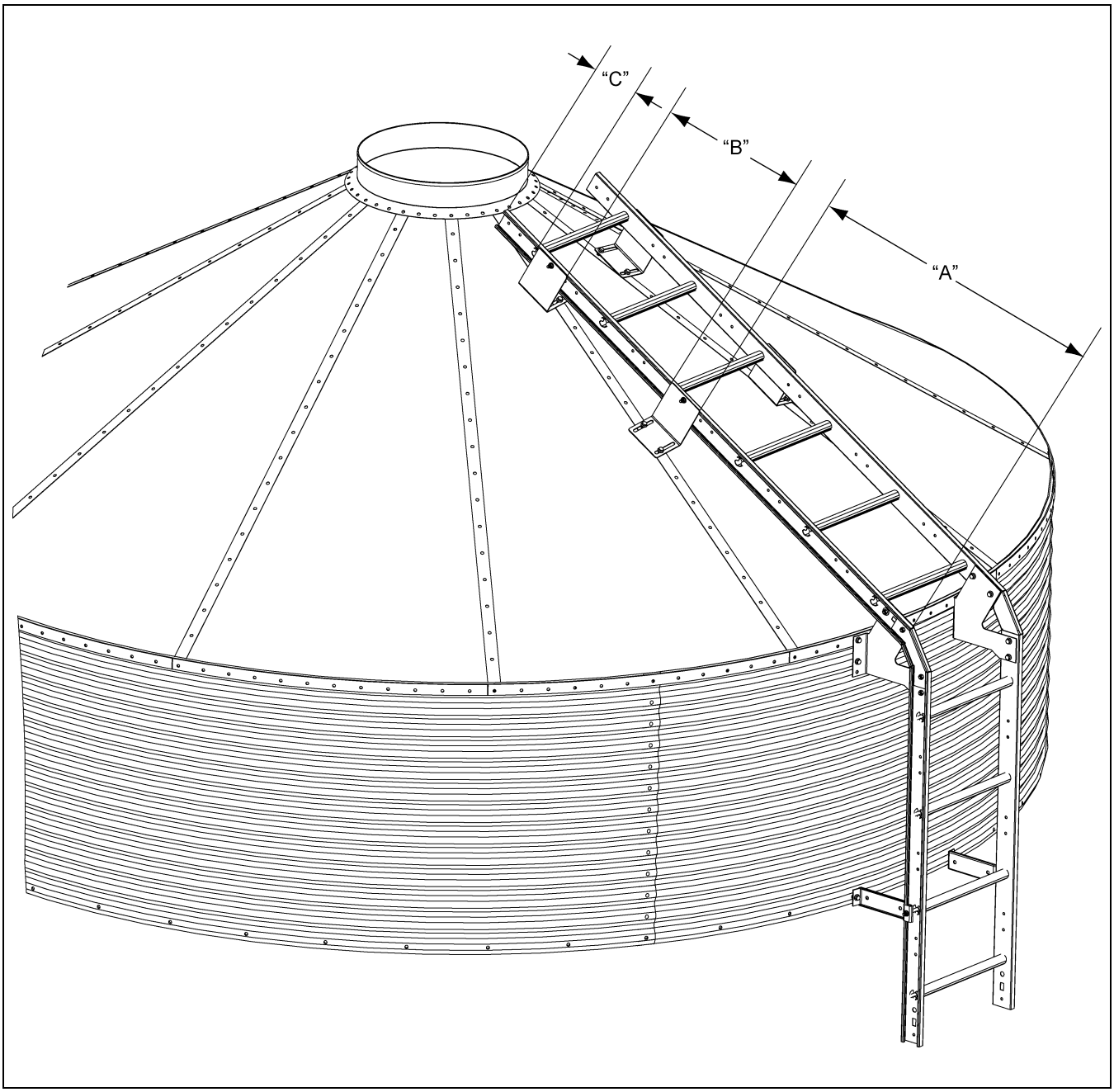


Figure 8L *Maximum Allowable Distance*

Maximum Distances Chart	“A”	“B”	“C”
Maximum allowable distance between ladder support bracket and the edge of the ladder at the eave.	50 Inches		
Maximum allowable distance between roof ladder support brackets.		46.5 Inches	
Maximum allowable distance between ladder support bracket and edge of ladder at peak.			10 Inches

Ladder Standoff Installation

With the sidewall ladder in place, standoff brackets must be installed on the ladder and attached to the sidewall at each horizontal seam (every 32"). Start by assembling the standoff bracket and wedge to the ladder rail as shown in *Figure 8M*. Then, slide the standoff assembly along the ladder rail until the standoff is in line with the pre-punched hole in the horizontal seam and attach to the sidewall using 5/16" x 1" bin bolts.

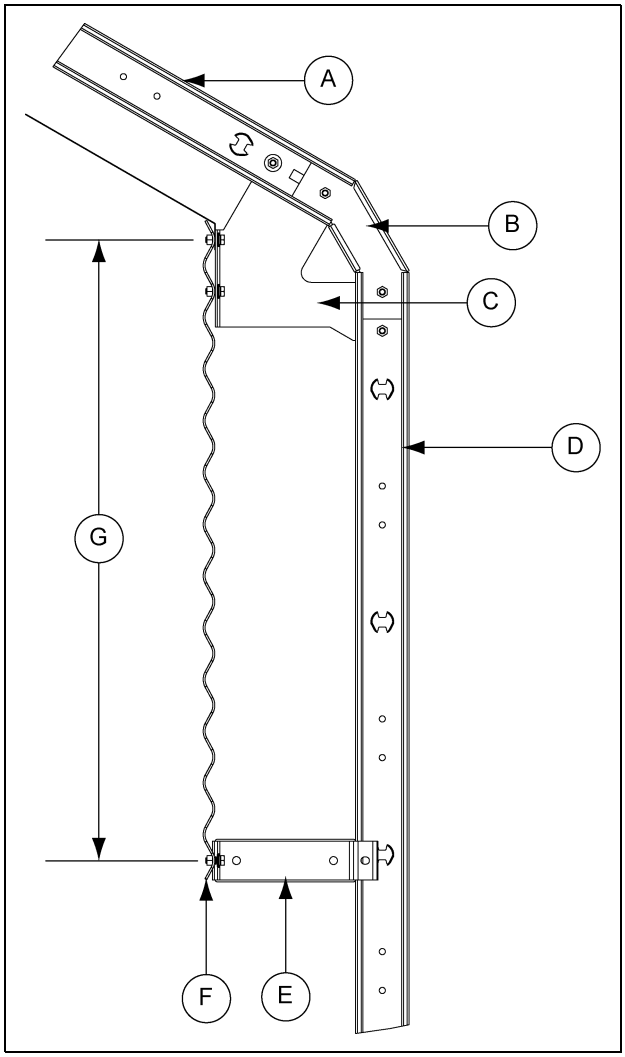


Figure 8M

Ref #	Description
A	Roof Ladder
B	Connector Bracket
C	Starter Bracket
D	Sidewall Ladder
E	Standoff Bracket (Two (2) Per Seam) (LDR-4314)
F	Horizontal Seam
G	32" Typical

Ladder Section Assembly

Two (2) splice plates are required to attach each additional ladder section. The head of the bolt should be to the inside of the ladder with the splice plate on the outside as shown in *Figure 8N*. Use 5/16" x 1" bolts for all connections.

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

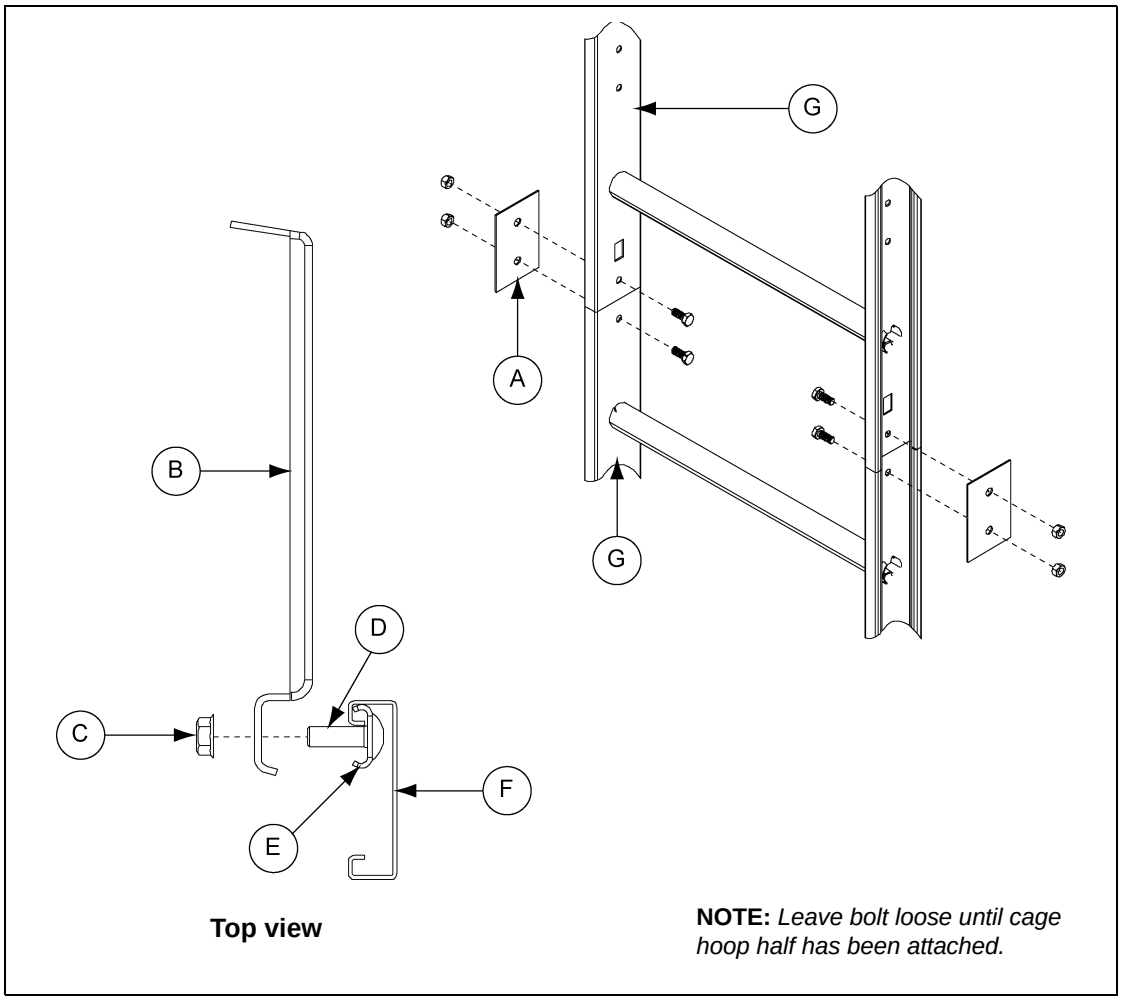
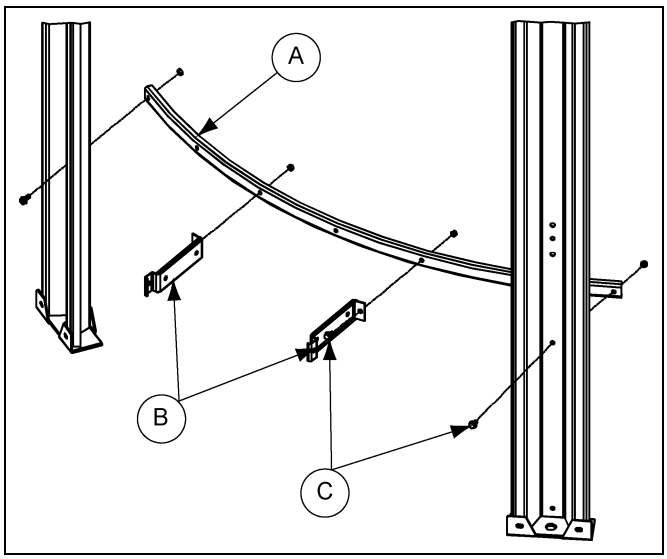


Figure 8N

Ref #	Part #	Description
A	LDR-4317	Splice Plate (Two (2) per Connection)
B	LDR-4314	Standoff Bracket
C	S-10268	Flange Nut 5/16"-18 JS Grade 5
D	S-3550	5/16" x 1" Carriage Bolt
E	LDR-4198	Wedge
F		Ladder
G		Ladder Sections

Ladder Support Detail

The ladder must be secured to the leg assembly with standoff brackets using support channels as shown in *Figure 8O*.



Ref #	Description
A	Support Channel
B	Ladder Standoff Bracket (LDR-4314)
C	5/16" x 1" Hardware

Figure 8O

Ladder Decal Application

Apply the ladder load limit decal (DC-2307) at eye level on the inside of the ladder rail. Make sure the ladder surface is clean and dry before application. *(See Figure 8P.)*

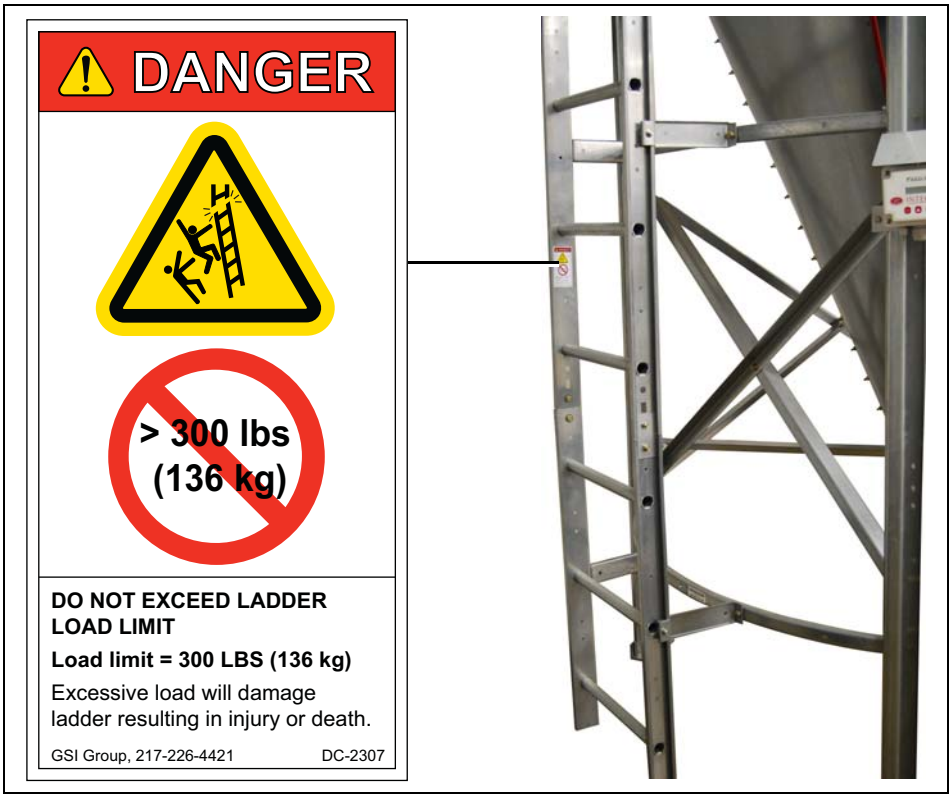


Figure 8P

Handrail Installation for Ladder System without Safety Cage

Handrail Gusset and Handrail Installation

For ladder systems without safety cages, handrails are required. Begin installation by sliding a handrail bar assembly through the top rung of the sidewall ladder and another handrail bar assembly through the second rung of the roof ladder as shown in *Figure 9A*. All four (4) pieces of LDR-5421, LDR-5414 (2) and LDR-5422 must be assembled as shown in *Figure 9B on Page 52 and Figure 9C on Page 53* and installed through the ladder rungs. The handrail bar assembly pieces will be bolted together when the handrail gussets and handrails are installed. Position the left hand bottom handrail gusset so that outer most hole lines up with the outer most hole of the handrail bar assembly. Clamp in place using the wedges, 5/16" x 1" carriage bolt and 5/16" flange nuts as shown in *Figure 9D on Page 54*. Bolt the handrail gusset to the handrail bar assembly as shown. Position the left hand top handrail gusset so that the outer most hole lines up with the outer most hole of the handrail bar assembly. Clamp in place using the wedges and hardware as shown in *Figure 9E on Page 55*. It will be necessary to loosen the wedge hardware slightly to allow proper installation of the handrail tubes. Repeat handrail gusset and wedge installation for the opposite side of the ladder. Install the handrail tubes using the 5/16" hardware as shown in *Figure 9F on Page 56* loosening the wedge hardware when necessary to obtain the proper fit of the handrail tubes. Tighten all hardware to complete the assembly. *See Figure 9G on Page 57 and Figure 9H on Page 58* for detail.

WARNING

Failure to follow instructions may cause damage or failure of the equipment.

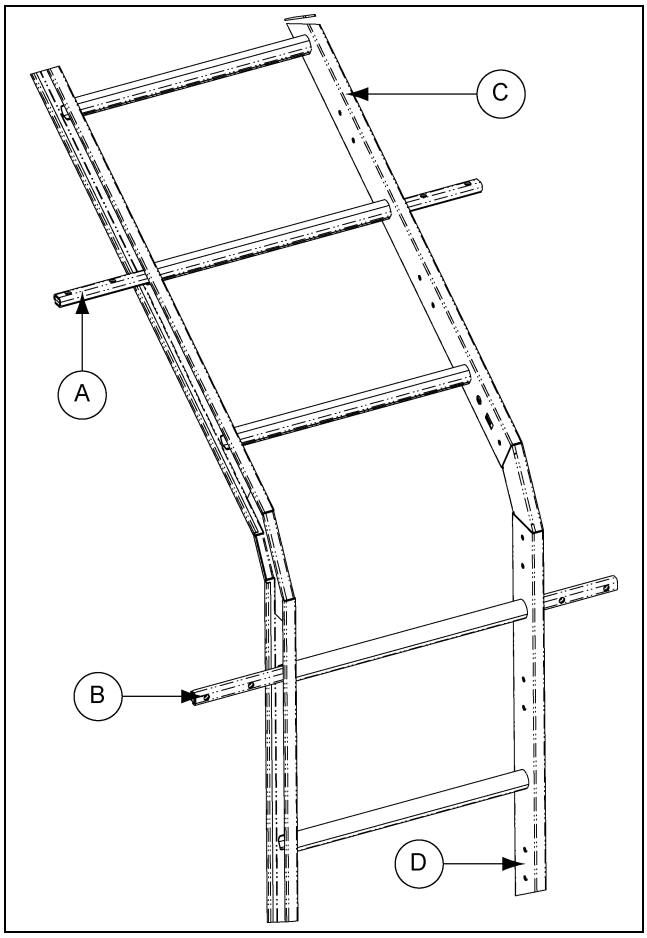


Figure 9A

Ref #	Part #	Description	Qty
A	LDR-5421	Handrail Bar Assembly *(See Figure 9B on Page 52.)*	1
	LDR-5414		2
	LDR-5422		1
B	LDR-5421	Handrail Bar Assembly *(See Figure 9C on Page 53.)*	1
	LDR-5414		2
	LDR-5422		1
C		Roof Ladder	
D		Sidewall Ladder	

Handrail Installation for Ladder System without Safety Cage (Continued)

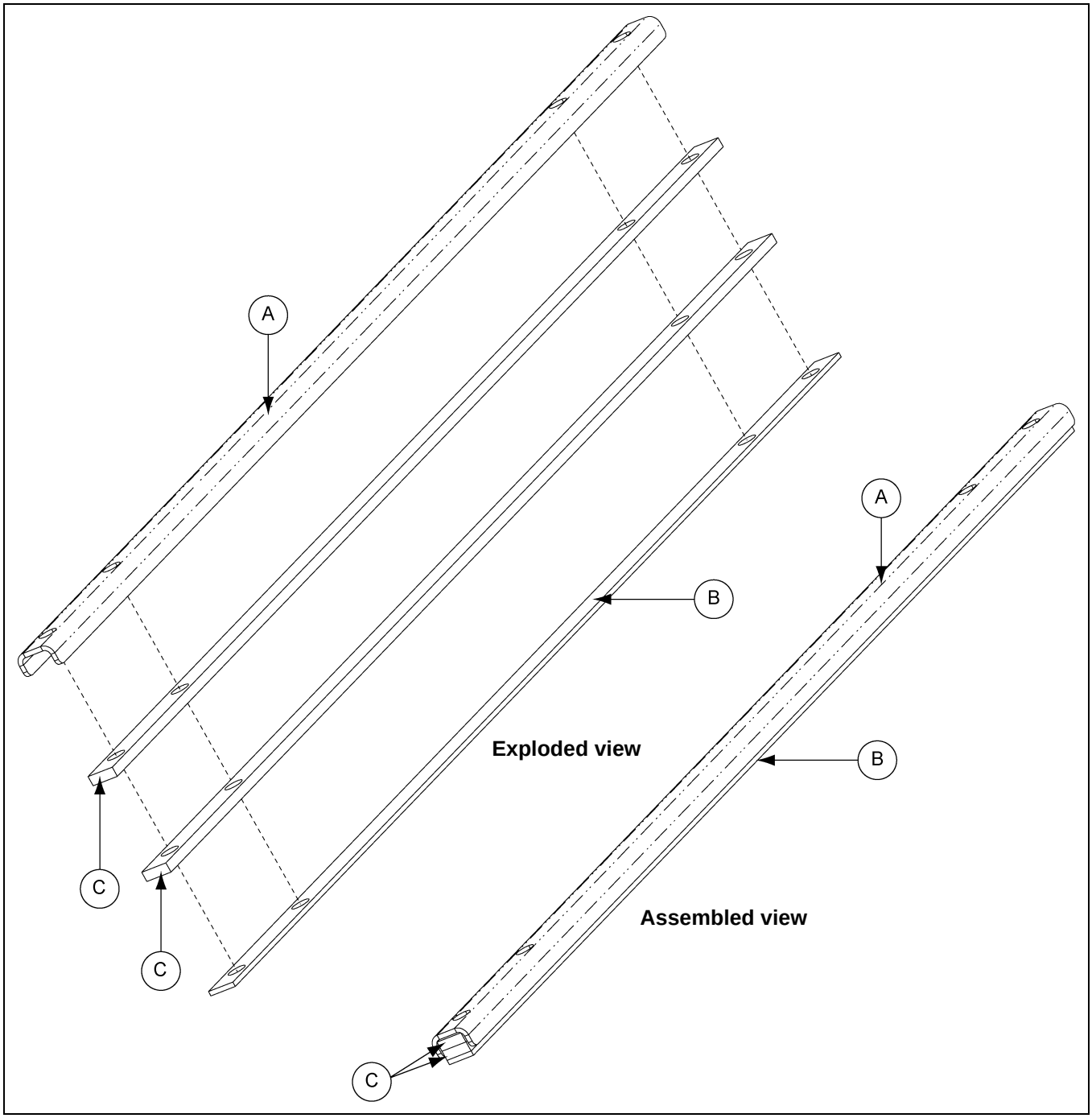


Figure 9B

Ref #	Part #	Description
A	LDR-5421	BFT Handrail Support Channel
B	LDR-5422	BFT Handrail Support Channel Reinforcement 12 Gauge
C	LDR-5414	BFT Handrail Support Channel Reinforcement

Handrail Installation for Ladder System without Safety Cage (Continued)

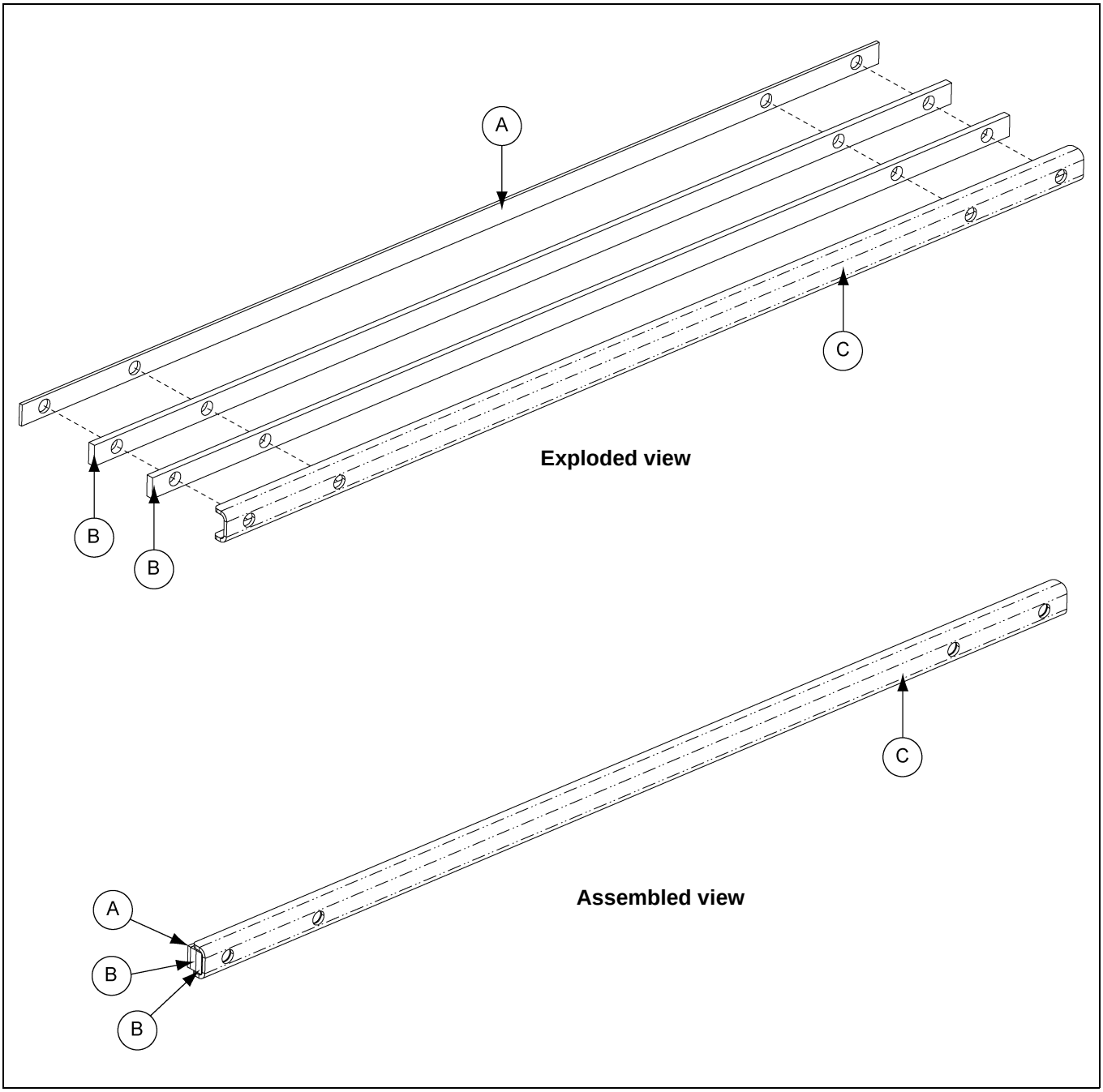


Figure 9C

Ref #	Part #	Description
A	LDR-5422	BFT Handrail Support Channel Reinforcement 12 Gauge
B	LDR-5414	BFT Handrail Support Channel Reinforcement
C	LDR-5421	BFT Handrail Support Channel

Handrail Installation for Ladder System without Safety Cage (Continued)

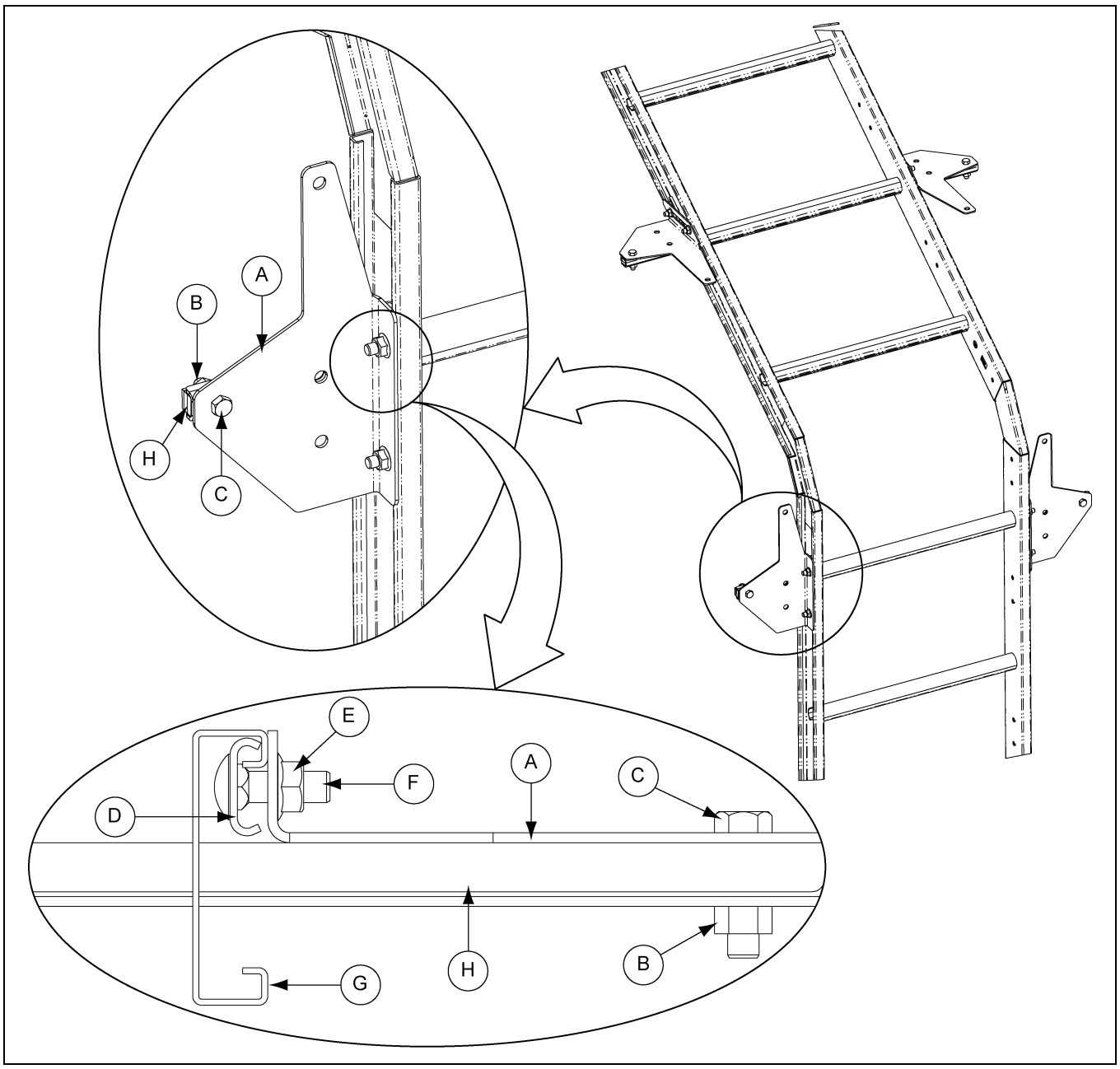


Figure 9D

Ref #	Part #	Description
A	LDR-5417	Bottom Handrail Gusset L.H.
	LDR-5418	Bottom Handrail Gusset R.H.
B	S-7484	Hex Nut 5/16"-18 JS Grade 5
C	S-4276	5/16" x 1-1/4" Hex Head Bolt
D	LDR-4198	Ladder Standoff Wedge

Ref #	Part #	Description
E	S-10268	Flange Nut 5/16"-18 JS Grade 5
F	S-3550	5/16" x 1" Carriage Bolt
G		Ladder
H		Handrail Bar Assembly

Handrail Installation for Ladder System without Safety Cage (Continued)

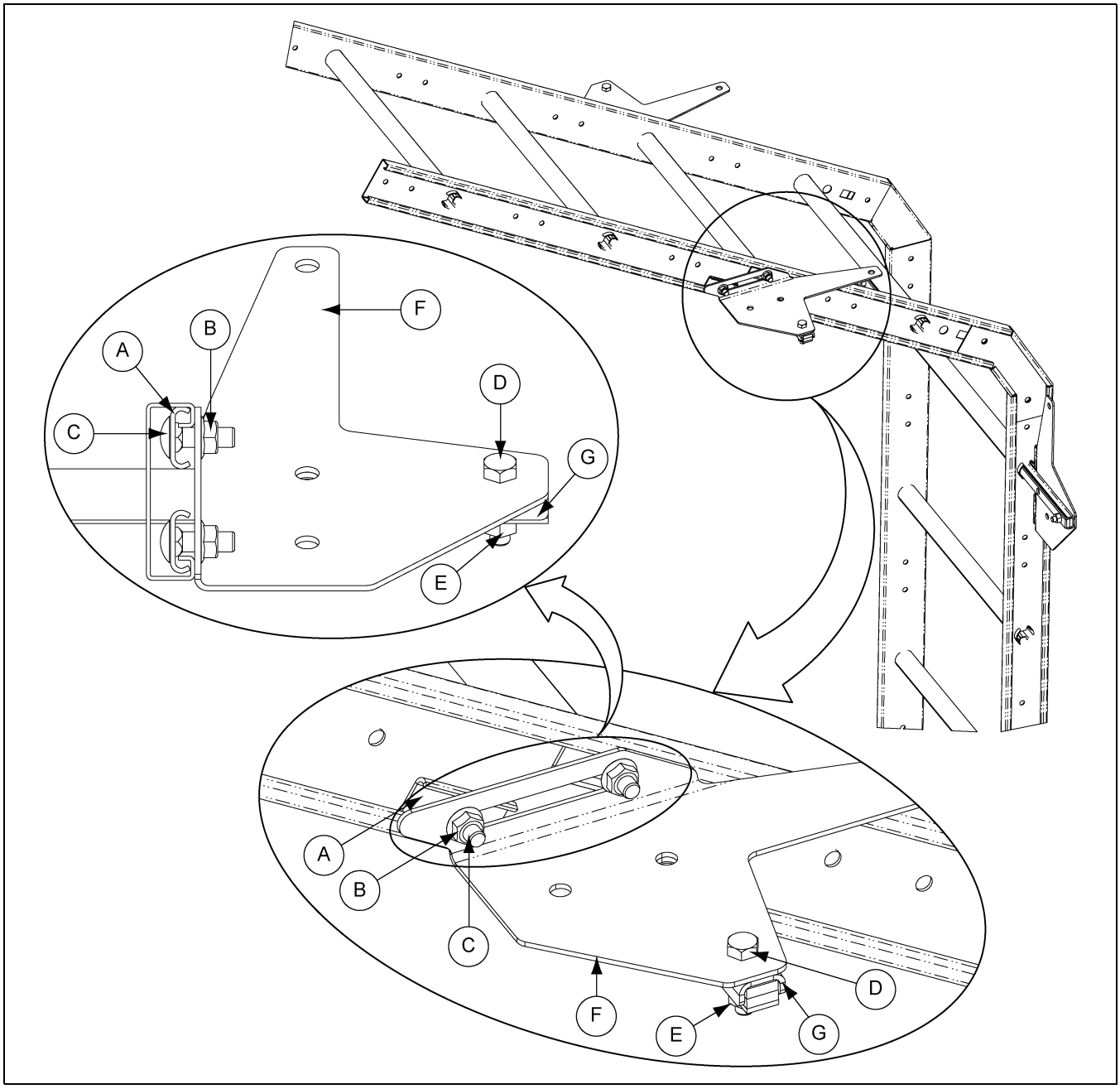


Figure 9E

Ref #	Part #	Description
A	LDR-4198	Wedge (Two (2) per Side)
B	S-10268	5/16" Flange Nut (Two (2) per Side)
C	S-3550	5/16" x 1" Carriage Bolt (Two (2) per Side)
D	S-4276	5/16" x 1-1/4" Hex Head Bolt (One per Side)

Ref #	Part #	Description
E	S-7484	5/16" Nut (One Per Side)
F	LDR-5415	Top Handrail Gusset L.H.
	LDR-5416	Top Handrail Gusset R.H.
G		Handrail Bar Assembly

Handrail Installation for Ladder System without Safety Cage (Continued)

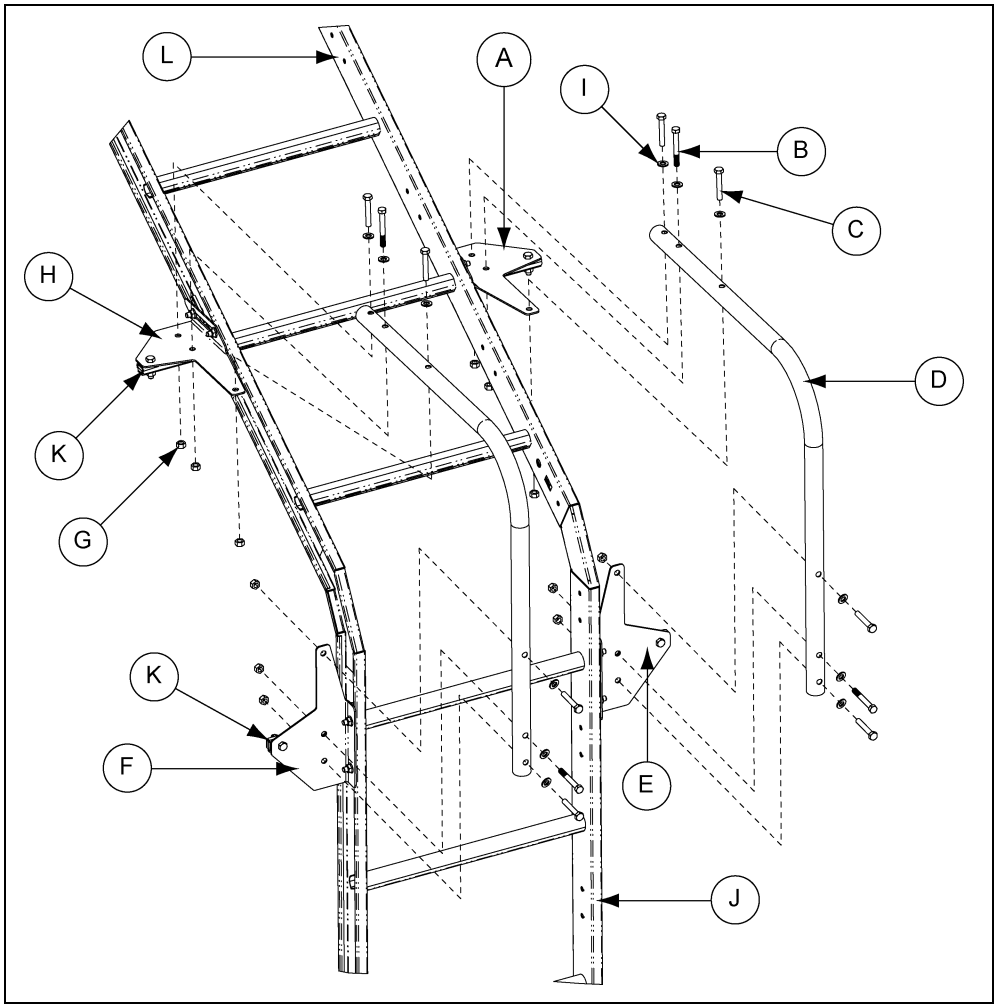


Figure 9F

Ref #	Part #	Description
A	LDR-5416	Top Handrail Gusset R.H.
B	S-7076	5/16" x 2-1/2" Hex Head Bolt (4)
C	S-7877	5/16" x 2" Hex Head Bolt (8)
D	LDR-5423	30° Handrail
	LDR-5424	40° Handrail
E	LDR-5418	Bottom Handrail Gusset R.H.
F	LDR-5417	Bottom Handrail Gusset L.H.
G	S-7484	Hex Nut 5/16"-18 JS Grade 5 (12)
H	LDR-5415	Top Handrail Gusset L.H.
I	S-1937	Flat Washer 5/16" ZN SAE Grade 2 (12)
J		Sidewall Ladder
K		Handrail Bar Assembly
L		Roof Ladder

Handrail Installation for Ladder System without Safety Cage (Continued)

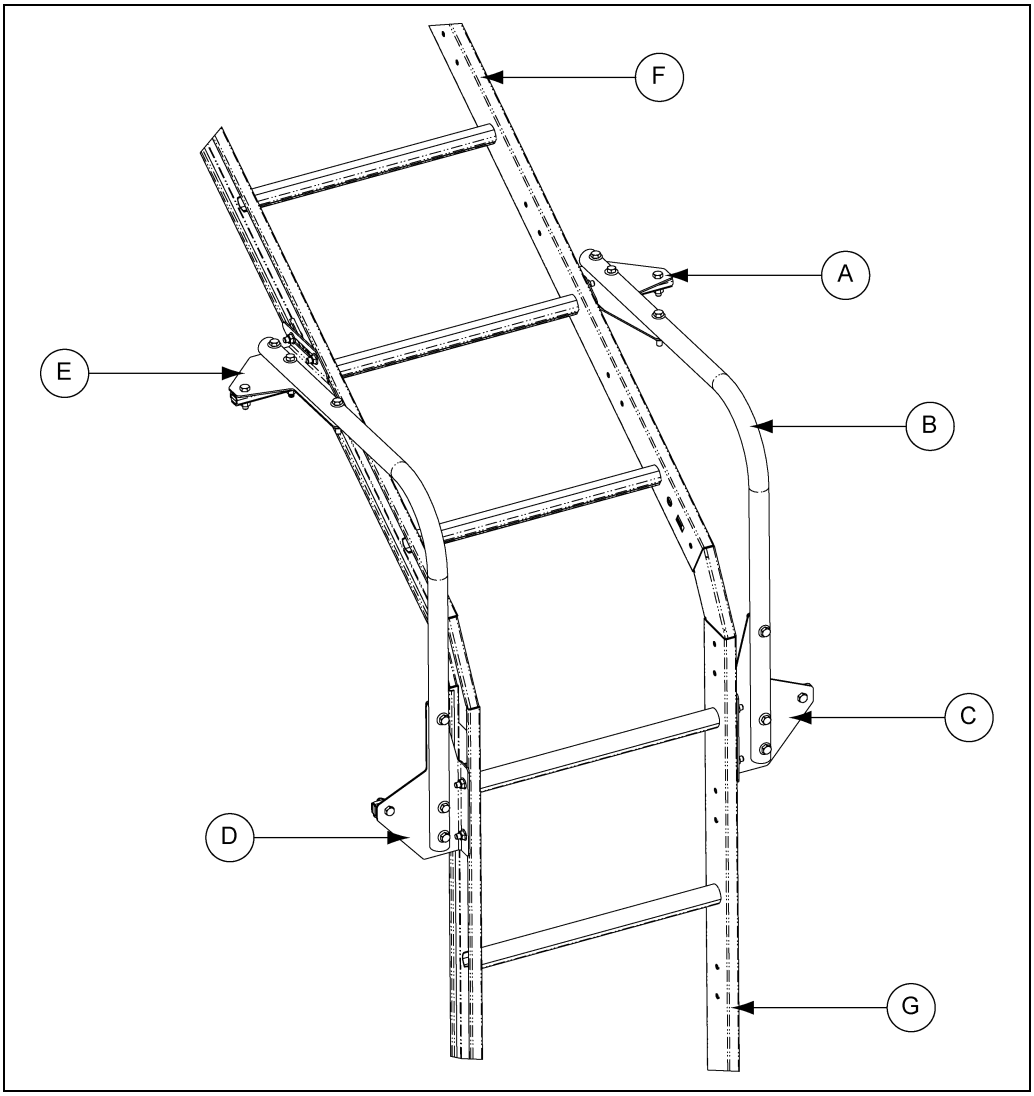


Figure 9G *Handrails Fully Assembled*

Ref #	Part #	Description
A	LDR-5416	Top Handrail Gusset R.H.
B	LDR-5423	30° Handrail
	LDR-5424	40° Handrail
C	LDR-5418	Bottom Handrail Gusset R.H.
D	LDR-5417	Bottom Handrail Gusset L.H.
E	LDR-5415	Top Handrail Gusset L.H.
F		Roof Ladder
G		Sidewall Ladder

Handrail Installation for Ladder System without Safety Cage (Continued)

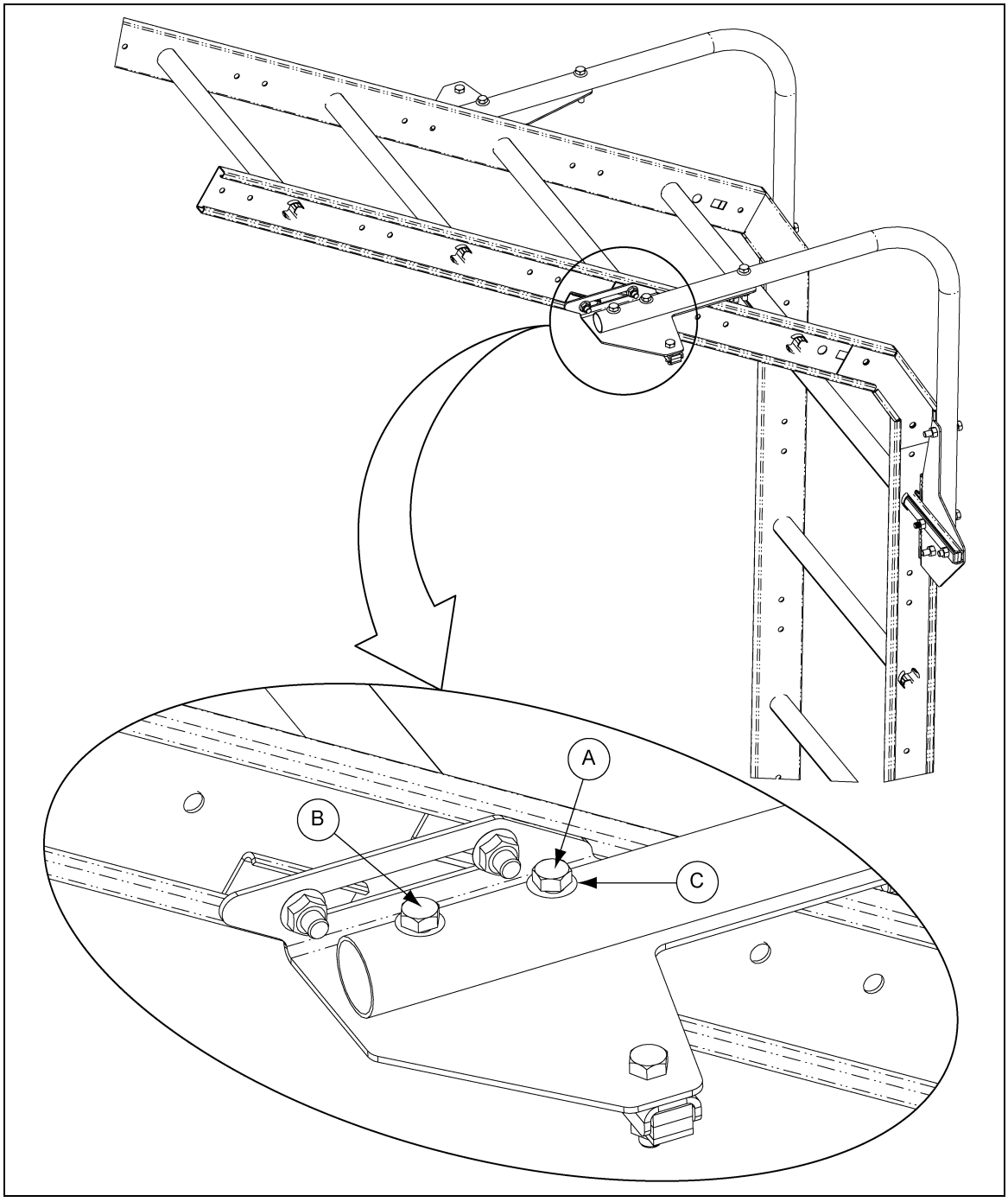


Figure 9H

Ref #	Part #	Description
A	S-7076	5/16" x 2-1/2" Hex Head Bolt
B	S-7877	5/16" x 2" Hex Head Bolt
C	S-1937	Flat Washer 5/16" ZN SAE Grade 2

Ladder System with Safety Cage

Extension Rail Installation

Before the safety cage can be installed, the ladder extension rails must be attached. Start by bolting the spacer brackets through the top and bottom set of holes in the top ladder section. Then, attach the extension rail to the spacer brackets as shown in *Figure 10A*. When installed correctly, the bottom of the extension rail should be flush with the bottom of the top ladder section. Use 5/16" x 1" bin bolts for all connections.

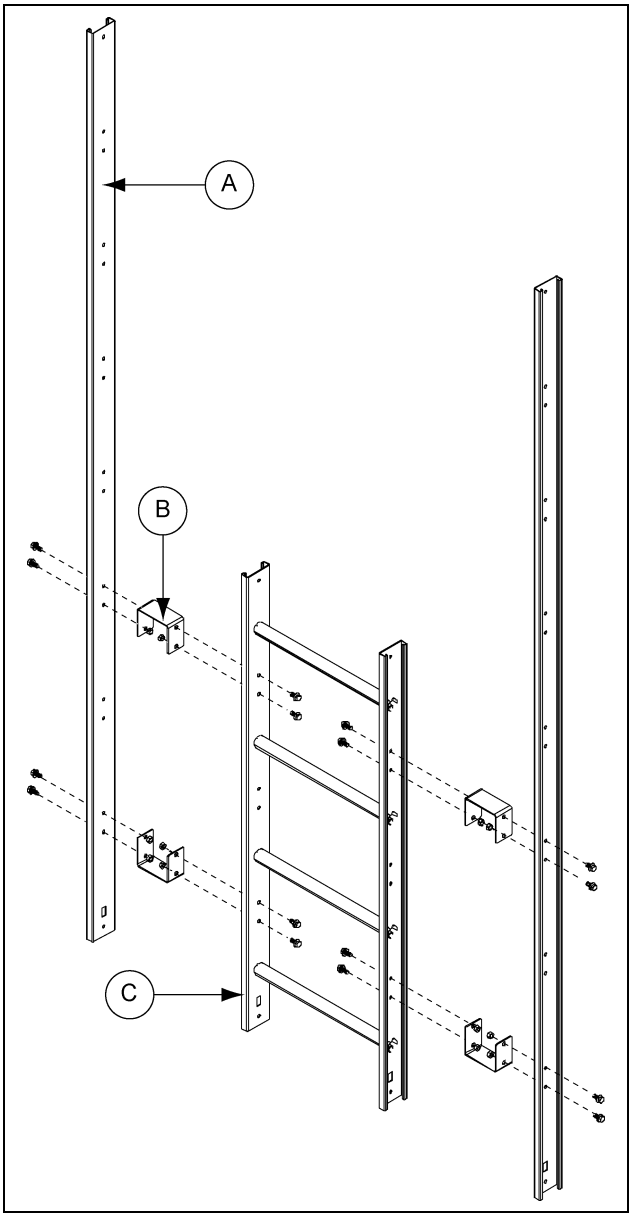


Figure 10A

Ref #	Description
A	8' RFB Extension Rail
B	Spacer Bracket (LDR-4403)
C	Top Ladder Section

Eave Adjustable Braces

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

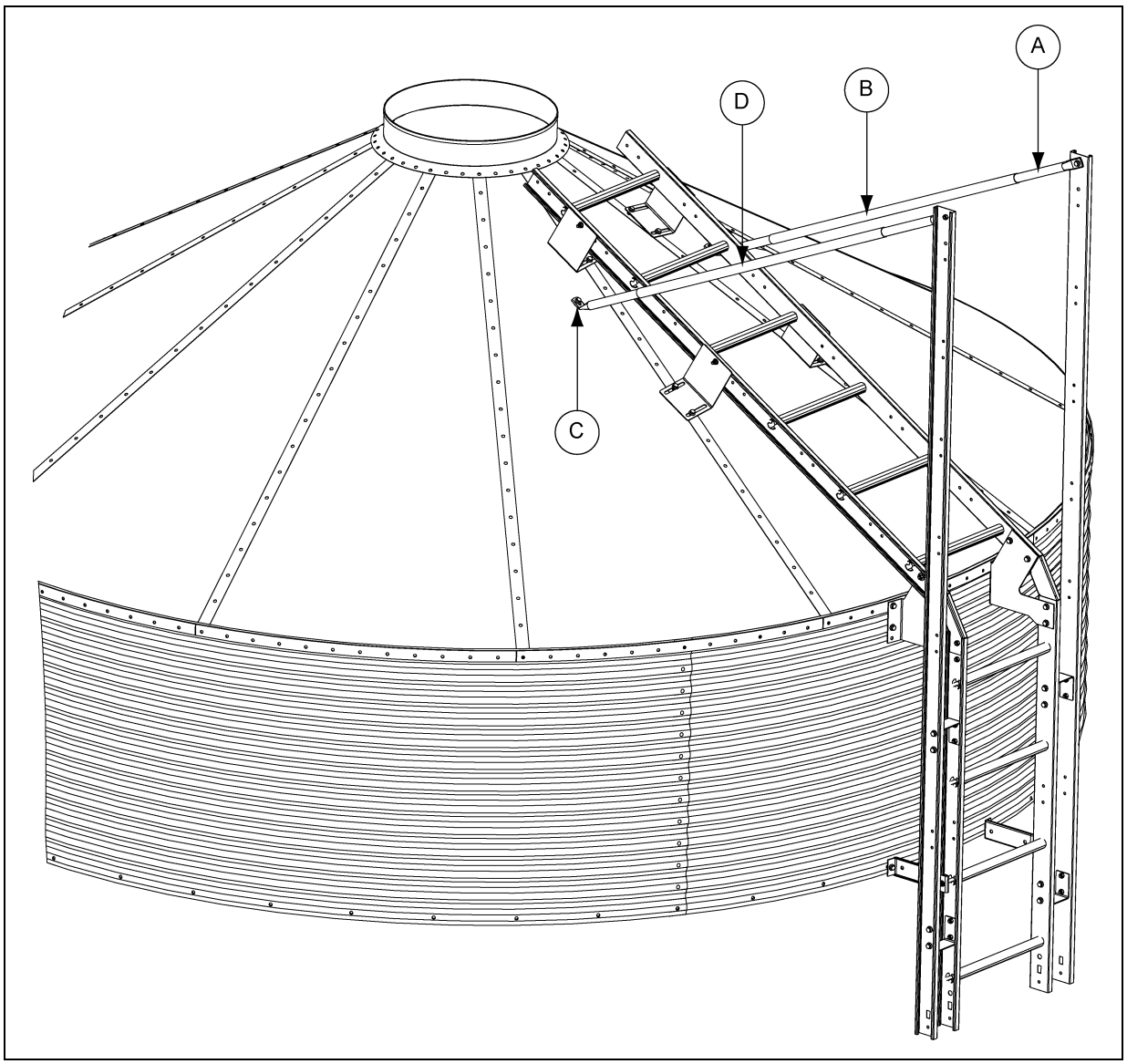


Figure 10B

Ref #	Description
A	End Tube (LS-6616)
B	Field drill 5/16" holes four (4) per brace
C	3/8" Field drilled hole one per brace
D	Center Tube (LS-6615)

Safety Cage Hoop Assembly

To complete the safety cage hoop installation, some pre-assembly is required. Attach four (4) safety cage brackets to the extension rails and two (2) safety cage brackets to the second 4' ladder section as shown in *Figure 10C*. See cage hoop bracket detail *on Page 62* for proper installation. Next, bolt each set of safety cage hoop halves together using 5/16" x 1" bolts with the head of the bolt to the inside of the safety cage. You may now bolt these assemblies to the safety cage brackets. Tighten bolts as you go.

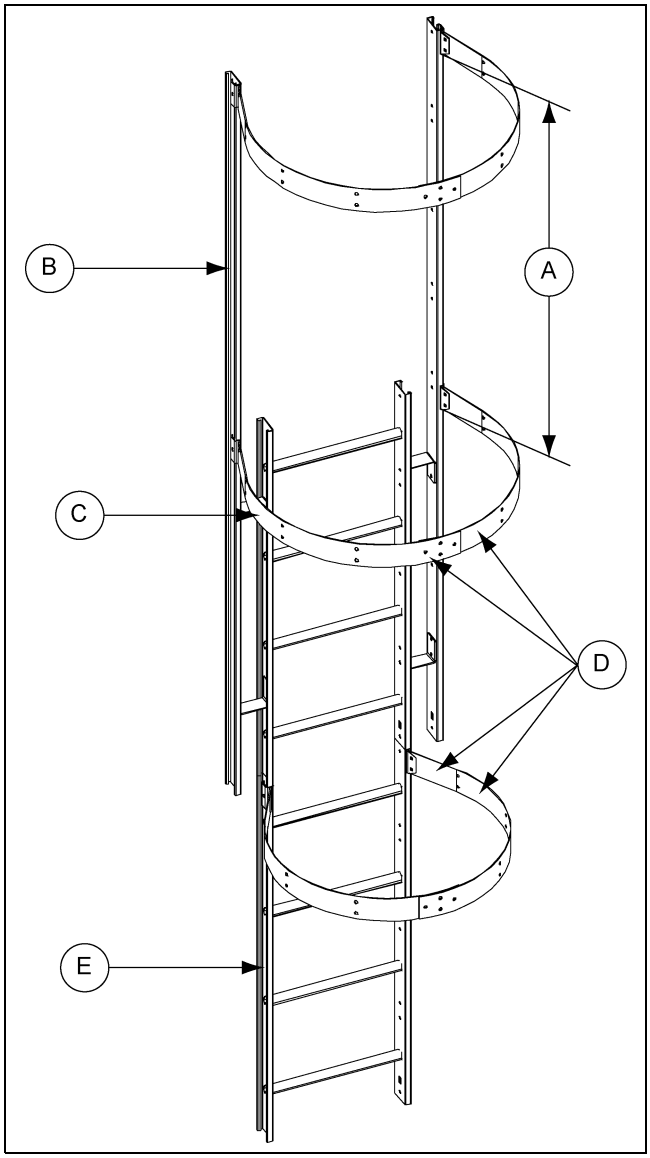


Figure 10C

Ref #	Description
A	48" Typical Bottom to Bottom
B	Extension Rail
C	Cage Hoop Bracket
D	Safety Cage Hoop Halves (LDR-4201)
E	Ladder Section

Cage Hoop Bracket Detail

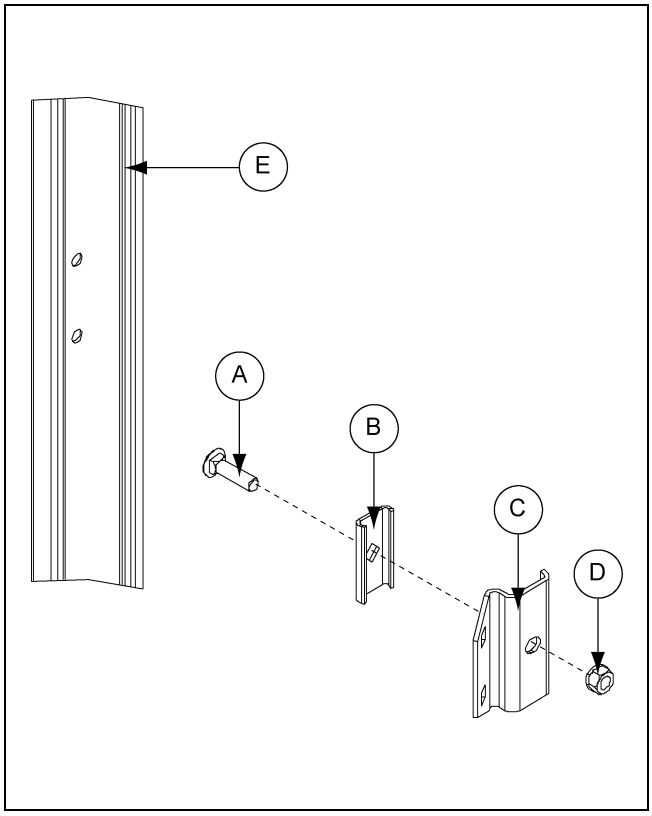
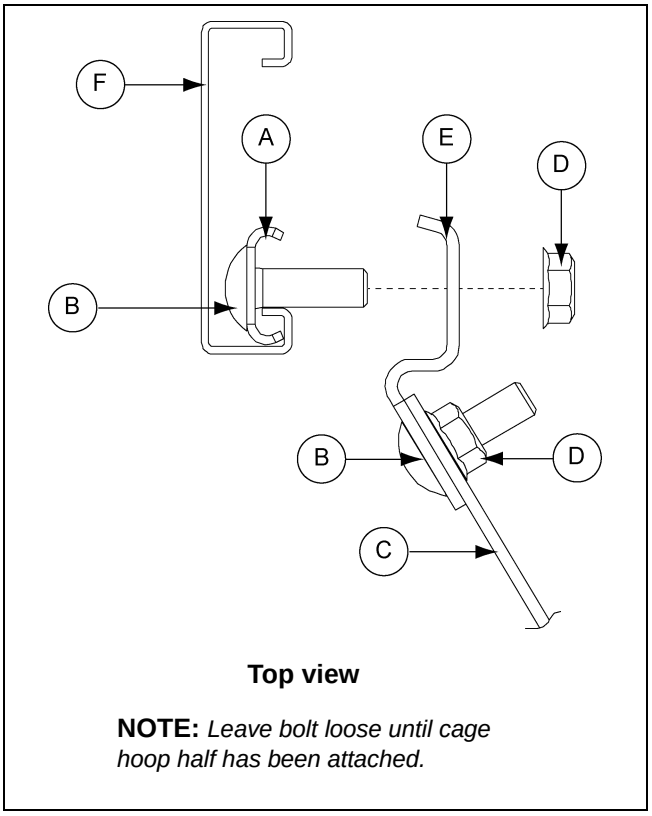


Figure 10D



Top view

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

Figure 10E

Ref #	Part #	Description
A	S-3550	5/16" x 1" Carriage Bolt
B	LDR-4198	Wedge
C	LDR-4199	Cage Hoop Bracket
D	S-10268	Flange Nut 5/16"-18 JS Grade 5
E		Extension Rail/Ladder

Ref #	Part #	Description
A	LDR-4198	Wedge
B	S-3550	5/16" x 1" Carriage Bolts
C	LDR-4201	Safety Cage Hoop Half
D	S-10268	Flange Nut 5/16"-18 JS Grade 5
E	LDR-4199	Cage Hoop Bracket
F		Extension Rail/Ladder

Safety Cage Installation

Vertical Supports

After all three (3) hoop assemblies are in place, attach the 48" vertical supports from hoop assembly to hoop assembly as shown in *Figure 10F*. This requires fourteen (14) supports, seven (7) between each set of hoops. The second set of vertical supports must be bent at the flat area to allow for the tapering of the bottom hoop assembly. Use 5/16" x 1" bolts with the head of the bolt to the inside of the safety cage.

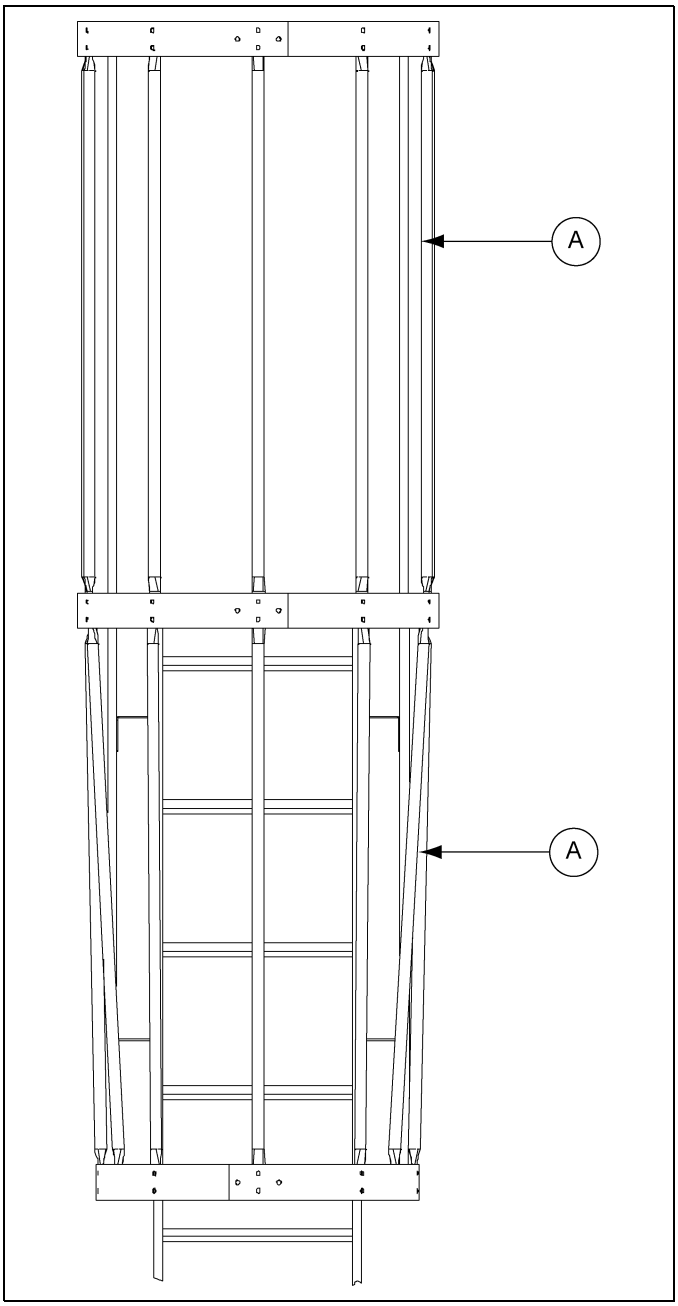


Figure 10F

Ref #	Part #	Description
A	LS-6713	Safety Cage 48" Vertical Supports

48" Safety Cage

Attach the vertical support pieces to the existing hoop halves above using 5/16" x 1" bolts and nuts with the head of the bolt to the inside of the safety cage. Fasten two (2) hoop halves together and bolt to other end of vertical supports. Attach cage hoop bracket to ladder. See cage hoop bracket detail *on Page 62*. Once cage hoop brackets are installed, attach cage hoop halves and tighten bolts. Repeat installation for each safety cage required.

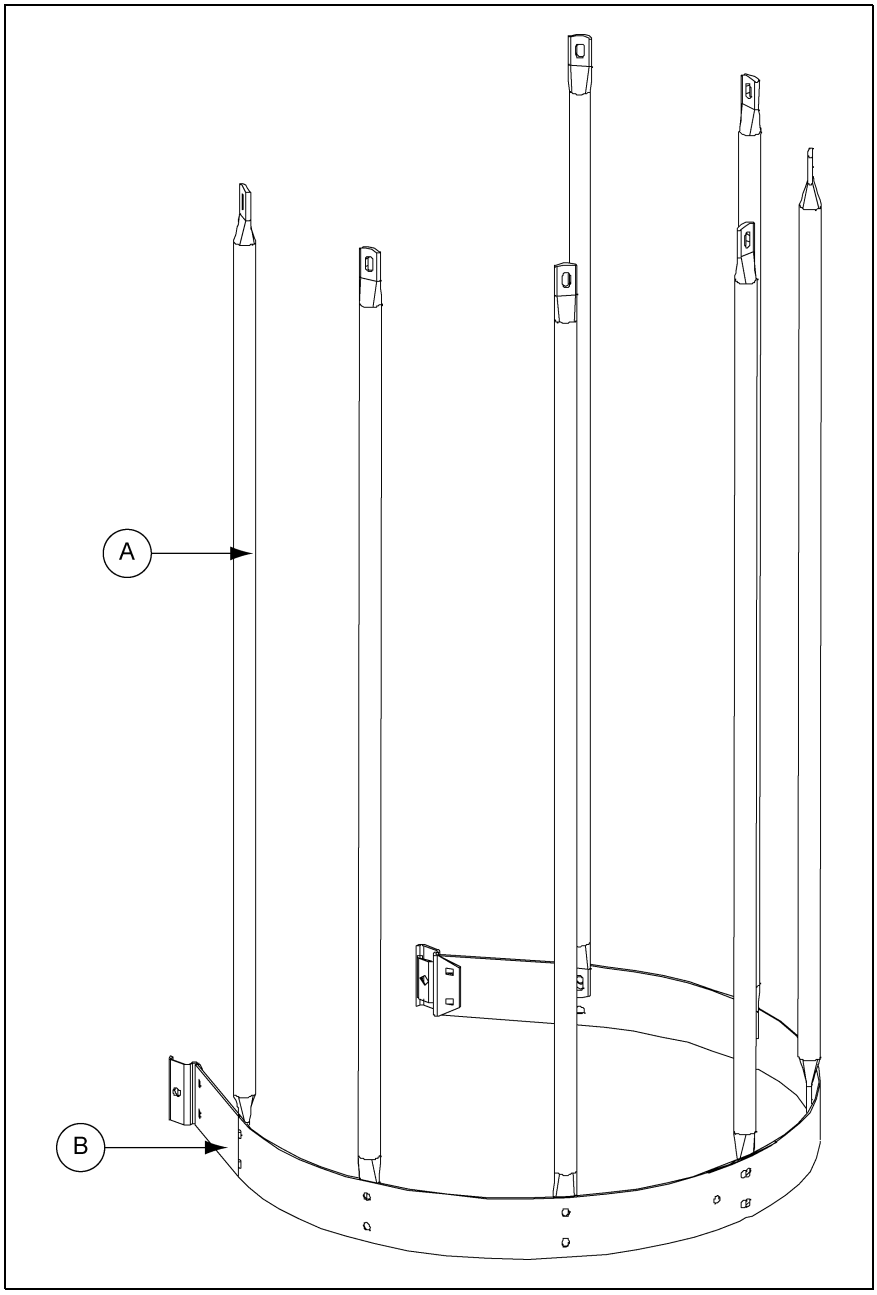


Figure 10G

Ref #	Part #	Description
A	LS-6713	Safety Cage 48" Vertical Support
B	LDR-4201	Safety Cage Hoop Half

24"-48" Safety Cage Bell Section

Attach the vertical supports to the hoop half assembly from the final safety cage installation using 5/16" x 1" bolts and nuts with the head of the bolt to the inside of the safety cage. Assemble the special bell hoop halves and attach to the other end of the vertical supports. The vertical supports must be bent at the flat area to allow for the angle of the bell section. Attach the safety cage brackets to the ladder as shown *in Figure 11A on Page 66*. Once the safety cage brackets are installed, attach the bell safety cage hoop half assembly to the safety cage brackets. Tighten bolts as you go.

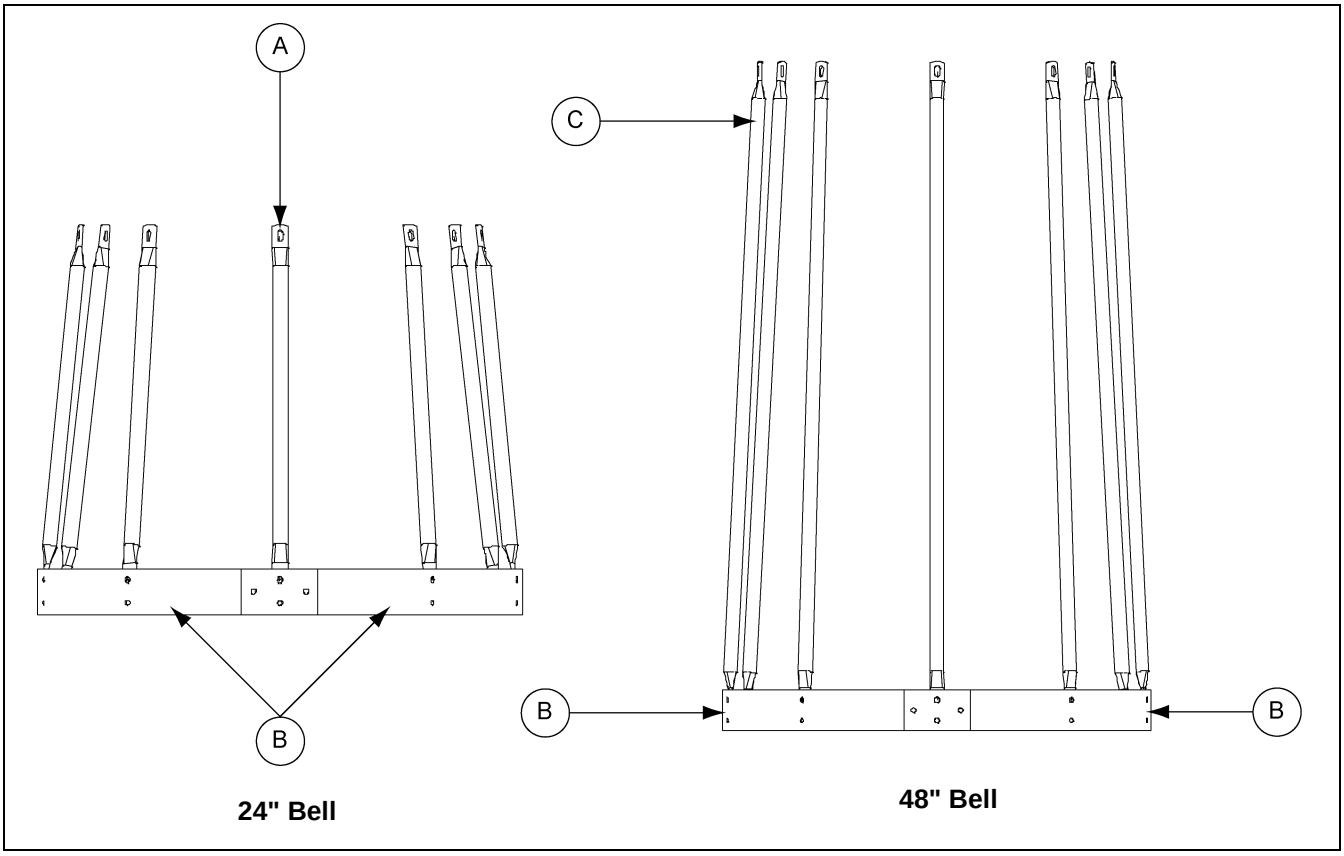


Figure 10H

Ref #	Part #	Description
A	LS-6714	24" Vertical Support
B	LS-4202	Safety Cage Bell Hoop Half
C	LS-6713	48" Vertical Support

Roof Cap and Ground Control Instructions

Additional Tools and Materials Needed:

- Clamp
- Assorted Wrench Set
- Ratchet and Socket Set

NOTE: *Roof cap ground control comes standard on 12'-60° Bulk Feed Tanks. Roof cap ground control is optional on all 45° Bulk Feed Tanks. (See Figure 11A.)*

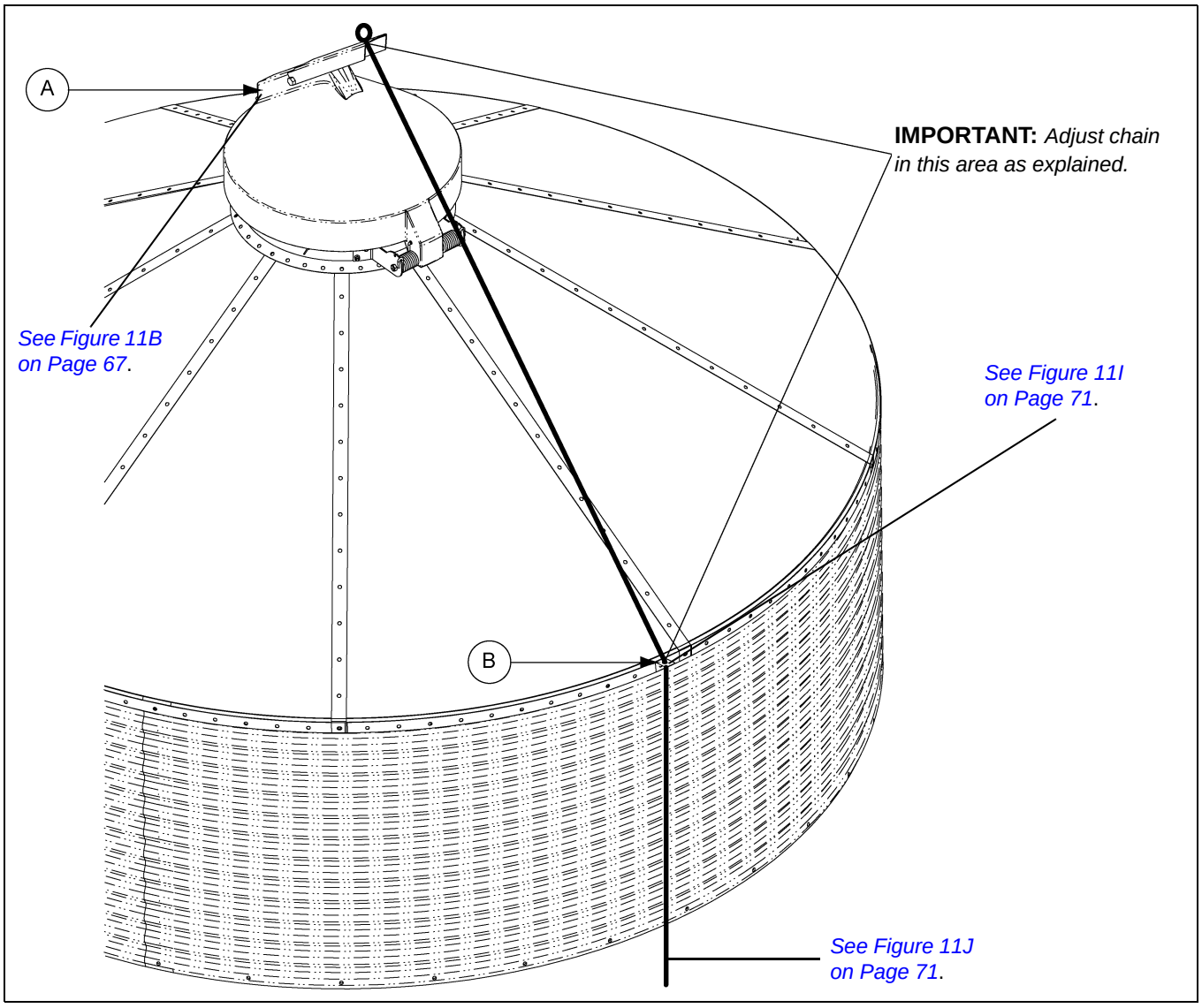
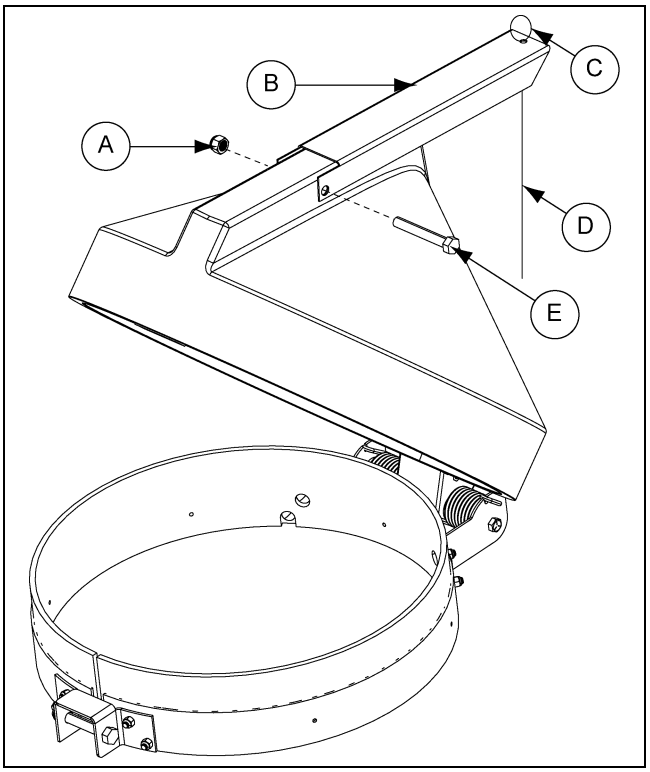


Figure 11A

Ref #	Description
A	Lever Arm
B	Roof Eave Bracket

1. **With the lid closed**, align the hole in the lever arm with the hole in the bin lid. Insert 1/2" bolt through the hole and fasten with the nylock nut using 3/4" wrench and ratchet. **NOTE:** *DO NOT over tighten. This is a pivot bolt and the lever arm must be able to pivot freely.*



Ref #	Description
A	Nut
B	Lever Arm
C	Key Ring
D	Chain
E	Bolt
F	Mounting Brackets
G	Clamp
H	Bracket should extend over flange.

Figure 11B *Install Lever Arm and Chain*

2. Place the lid assembly over the existing peak ring collar and rotate lid assembly such that the lever arm and spring hinge line up with the roof eave bracket, *See Figure 11A on Page 66*. Use a clamp to pull the mounting brackets together. Slide the 3/8" carriage bolt supplied through the mounting bracket and loosely fasten with nut, *See Figure 11C*. Remove clamp and tighten the bolt with 9/16" ratchet, ensuring that the vertical flange tightens past the left edge of the top, horizontal flange, *See Figure 11E on Page 68*.

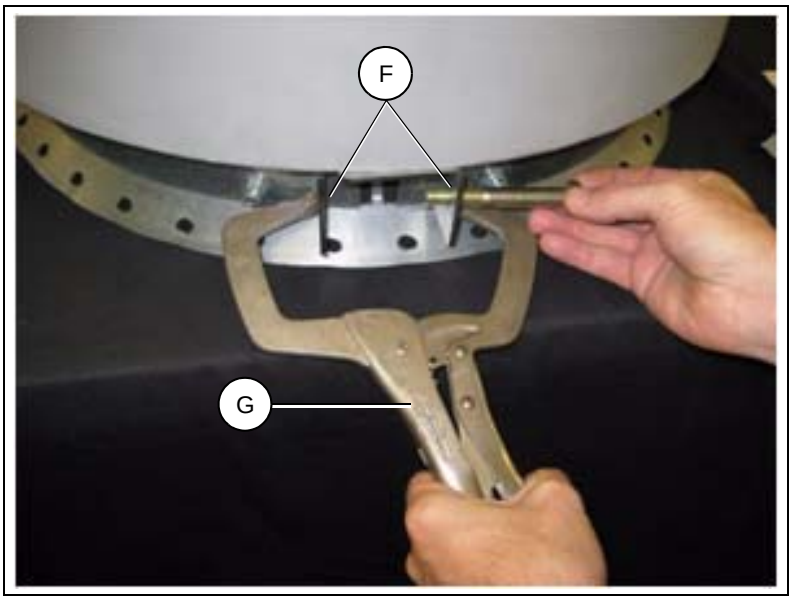


Figure 11C *Mount Lid to Peak Ring*

Figure 11D

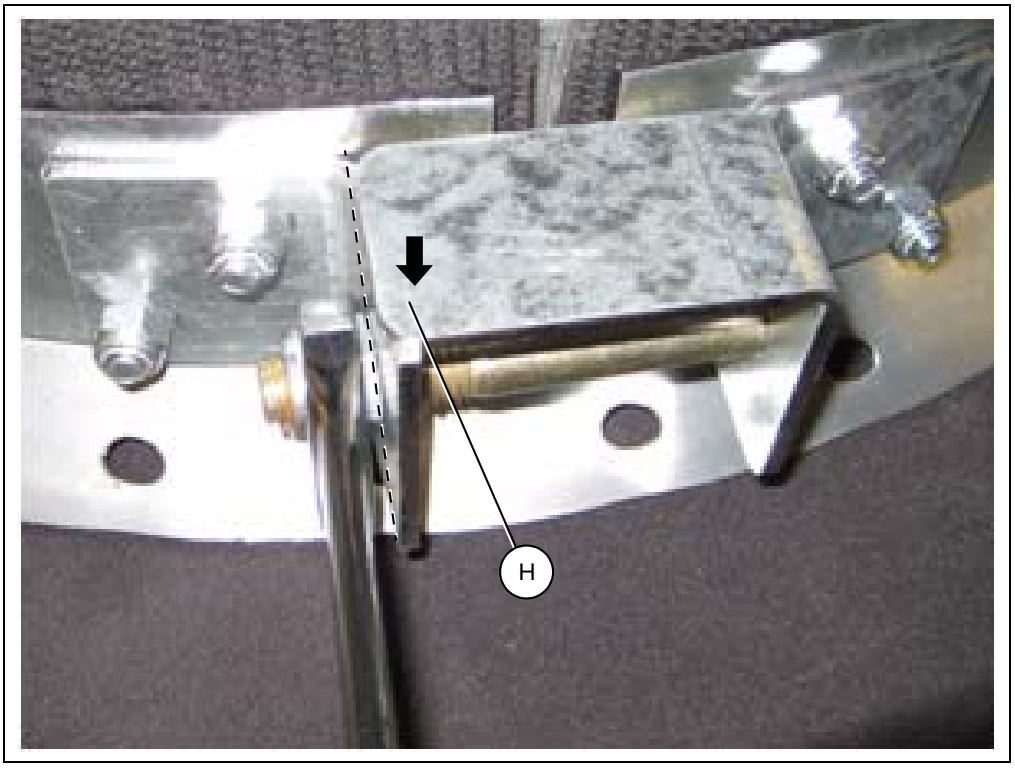


Figure 11E *Tighten Bolts Until Flush with Bracket*

NOTE: *The steel roof cap is used on GHT series bins.*

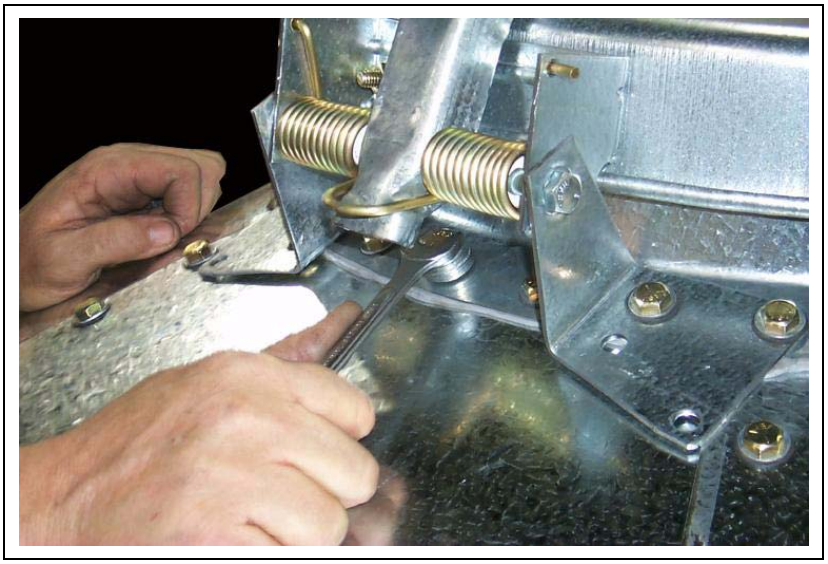


Figure 11F

IMPORTANT: *Make sure the loop of the main cap spring (BLK-12808) is held securely in the pre-loaded position by the head of the 5/16" bolt beneath. (See Figure 11F.)*

Figure 11G

IMPORTANT: *If necessary, place one or more 5/16" flat washers under the bolt head to ensure that the bolt catches the loop. (See Figure 11G.)*

WARNING

The control arm is spring loaded. It must be released while on the ground and before attaching it to the peak ring. Failure to do so will result in serious injury.

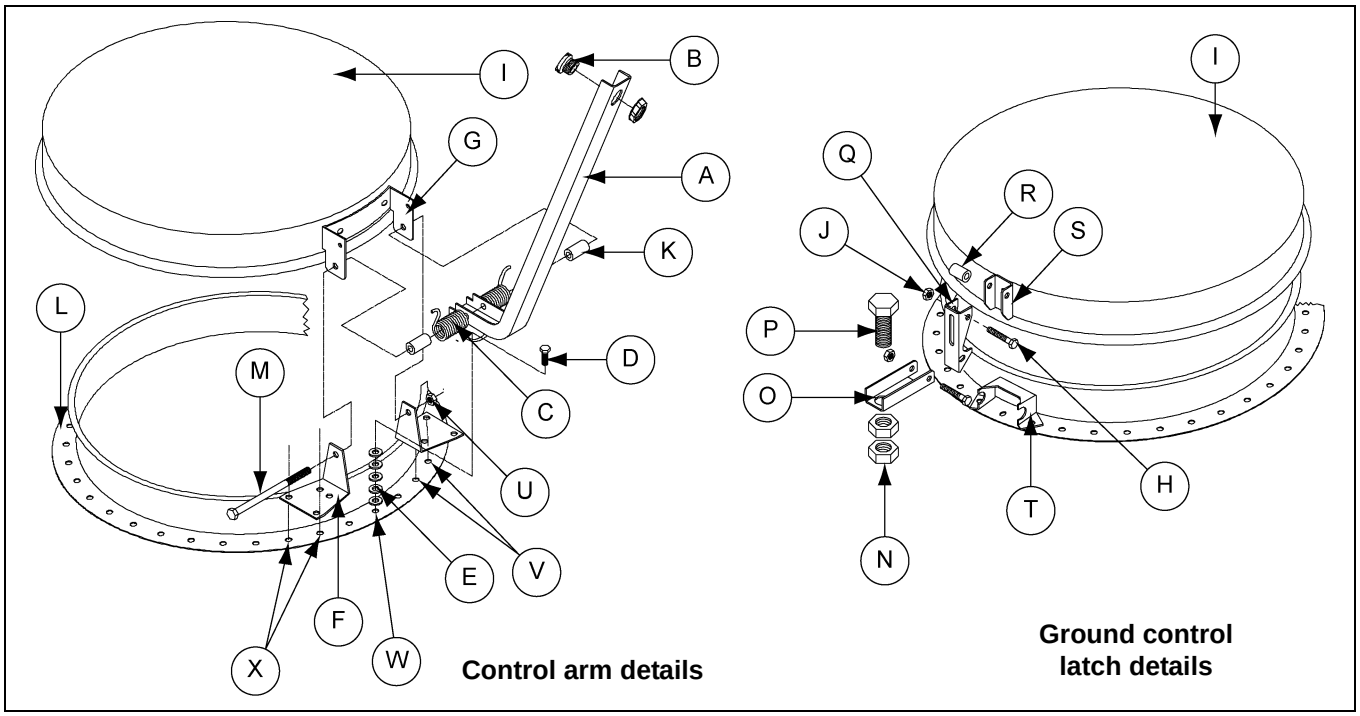


Figure 11H

Control Arm and Ground Control Parts List

Ref #	Part #	Description
A	BLK-11735	Control Arm
B	BLK-11876	Nylon Grommet with Nut
C	BLK-12808	Spring, Flush BFT Cap Heavy
D	S-10260	Flange Bolt 5/16"-18 x 1" JS with Sealing Washer
E	S-845	Flat Washer 5/16" USS SAE YDP Grade 2
F	BLK-11842	Lower Cap Hinge
G	BLK-11734	Upper Cap Hinge
H	S-7329	5/16"-18 x 2" Hex Head Bolt
I	BLK-10015D	BFT Roof Cap for Ground Control
J	S-5220	5/16"-18 Hex Lock Nut (Grade 2)
K	BLK-12809	Spring, 1-3/8" O.D. PVC Center 0.438" Center Bore
L	BLK-11730	1 Piece Bulk Tank Peak Ring
M	S-7171	3/8"-16 x 6-1/2" Hex Head Bolt (Grade 5)
N	S-3214	7/8"-9 Hex Nut (Grade 2)
O	BLK-11845	Latch Counterweight
P	S-7281	7/8"-9 x 1-1/2" Hex Head Bolt
Q	BLK-11844	Peak Cap Latch
R	BLK-11795	15/16" x 3/4" Diameter Plastic Spacer
S	BLK-11843	Pivot Bracket
T	BLK-11846	Cap Hold-Down Bracket
U	S-4663	3/8"-16 Hex Head Lock Nut
V		Right Hinge Attachment Holes
W		Spring Stop Attachment Holes
X		Left Hinge Attachment Holes

NOTE: *Use the above chart for control arm and ground control details.*

3. Thread the existing chain through the hole on the end of the lever arm and fasten it to the provided key ring. *(See Figure 11B on Page 67.)* Ensure that the ground control chain is freely looped through the roof eave bracket and chain holder. After removing the slack in the chain while the lid is fully closed and in latched position, re-position the key ring 2" below the roof eave bracket. *(See Figure 11I.)* Re-adjust the existing handle and key ring so the handle is positioned for easy access from ground. *(See Figure 11J.)* Check to make sure that the key rings allow the cap to fully close, but will not allow the chain enough slack on top of the cap to become wrapped around the lever arm in a high wind condition.

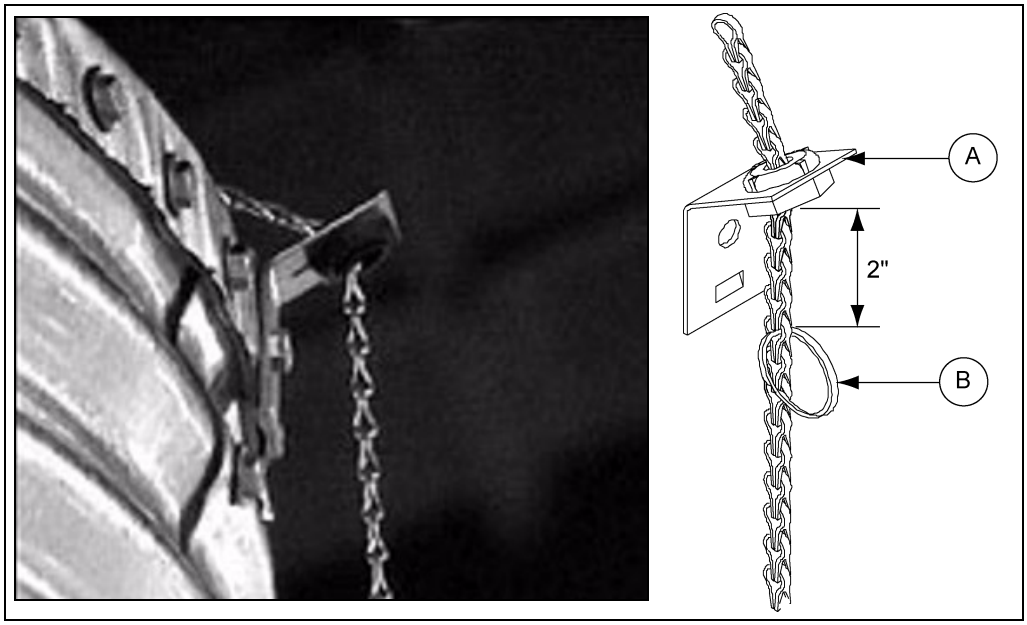


Figure 11I

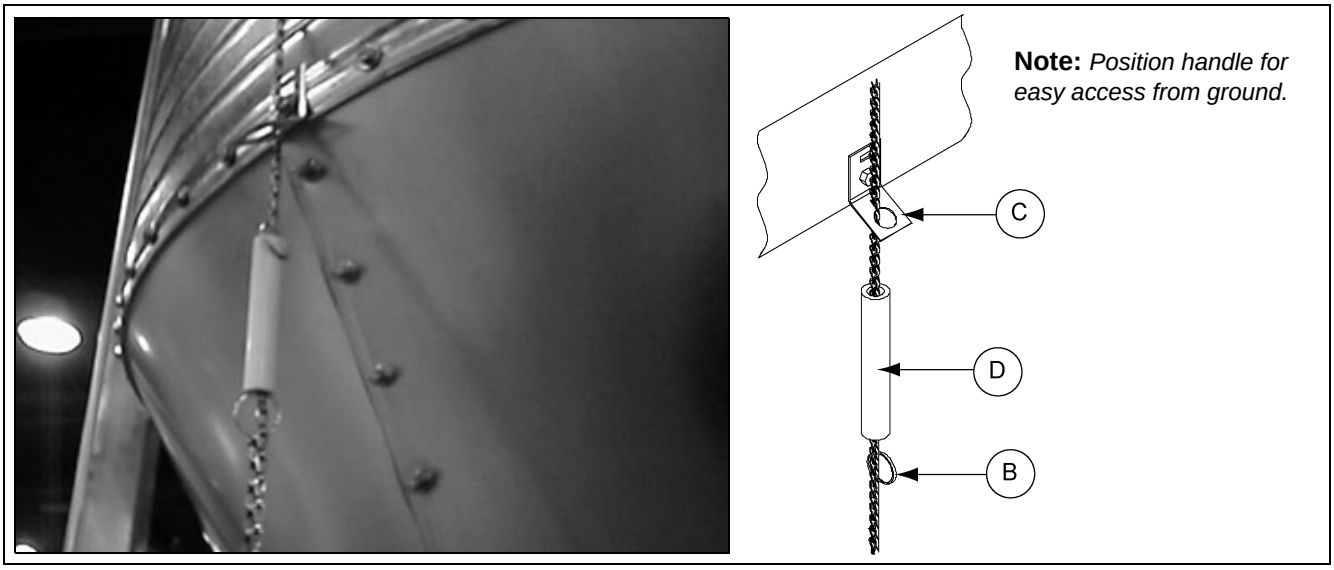


Figure 11J

Ref #	Description
A	Roof Eave Bracket (BLK-11950)
B	Key Ring

Ref #	Description
C	Chain Holder (BLK-11949)
D	Handle

4. Install the decal DC-2123 to the inside of peak ring on the hinge side of the lid as shown in *Figure 11K*. Decal should be clearly visible when lid is open.

Figure 11K

Roof Cap

Bulb Seal Kit (Optional)

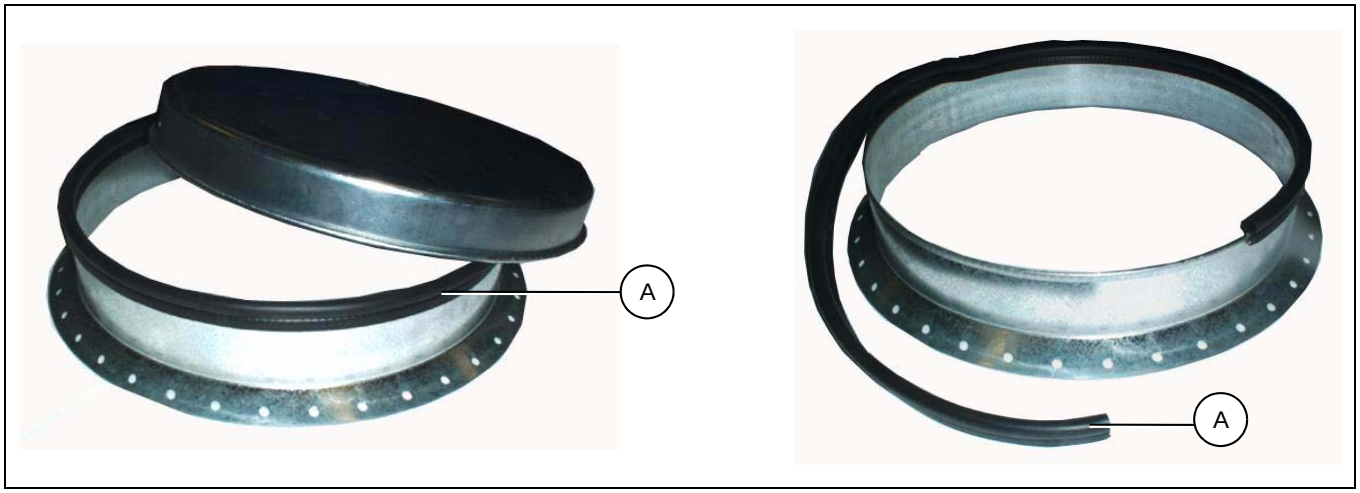


Figure 11L

Cap Hold-Down Package

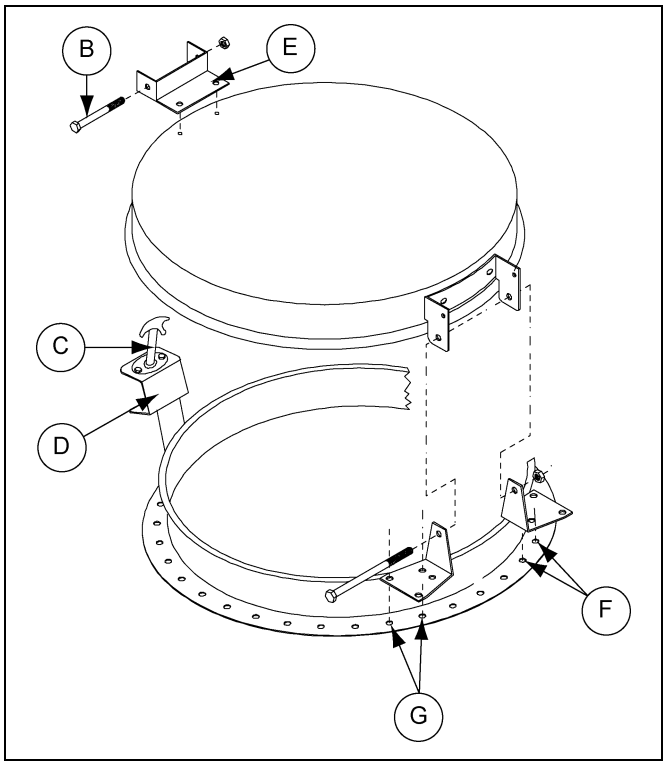


Figure 11M

Ref #	Part #	Description
A	BLK-10472	Bulb Seal
B	S-7120	5/16" x 3-1/2" Bolt
C	CRP-4654	Cap Hold-Down
D	CRP-4639	Cap Hold-Down Bracket
E	BLK-10022	Cap Latch
F		Right Hinge Attachment Holes
G		Left Hinge Attachment Holes

Bulb seal is pressed into place around the lip of the peak ring.

NOTE: *Bulb seal kit is included with all pneumatic fill kits. When ordered as a separate option, specify part# BLK-10472*.

Cap hold-down package comes standard on all 45° hopper bulk tanks. Optional on all 60° hopper bulk tanks.

BFT Collar Assembly (BLK-13062)

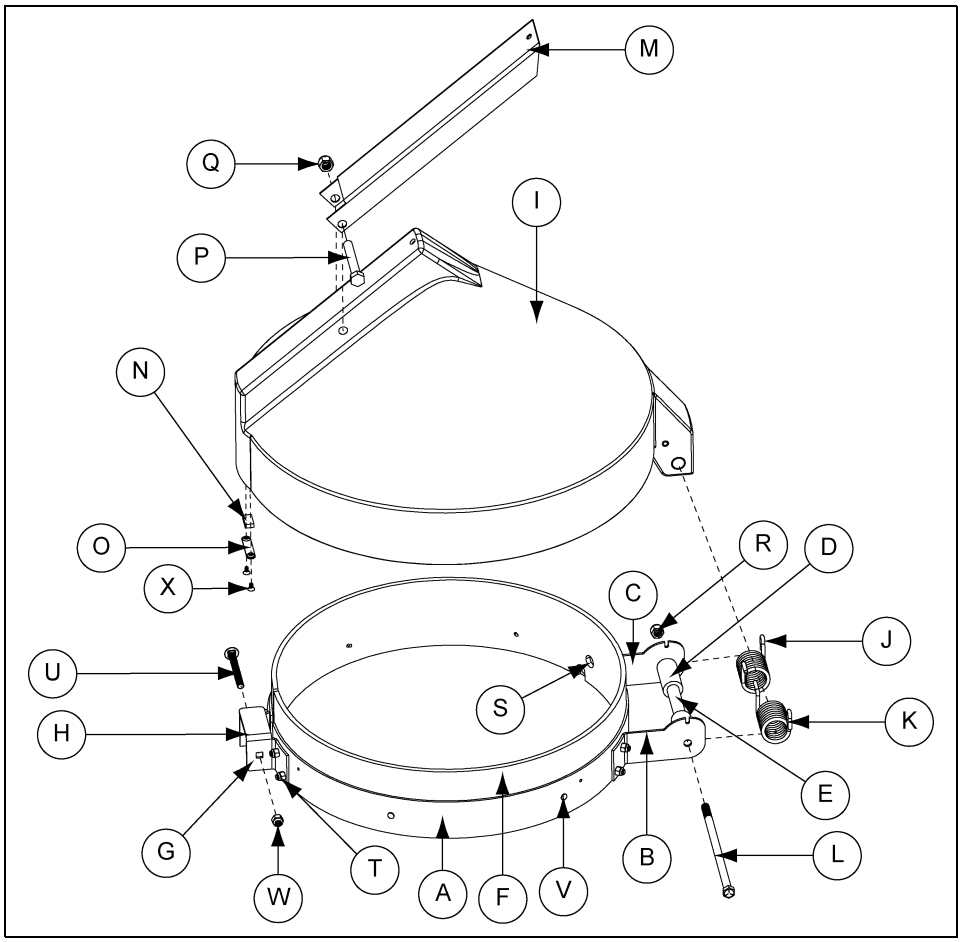


Figure 11N

BFT Collar Assembly (BLK-13062) Parts List

Ref #	Part #	Description	Qty
A	BLK-13059	BFT, Lid Clamp Band	1
B	BLK-13061	BFT, Lid Clamp Band Bracket - Right	1
C	BLK-13065	BFT, Lid Clamp Band Bracket - Left	1
D	BLK-13038	Support, Spring BFT	2
E	BLK-13064	BFT, Lid Pivot Tube	1
F	BLK-13053	Bumper, Reinforced Rubber Belting	1
G	BLK-13066	BFT, Lid Clamp Band Bracket - Right	1
H	BLK-13067	BFT, Lid Clamp Band Bracket - Left	1
I	BLK-13070	BFT, Lid	1
J	BLK-13027	Spring, L.H. Rear	1
K	BLK-13028	Spring, R.H. Rear	1
L	S-10121	Bolt, HHCS 7/16"-14 x 9" ZN Grade 5	1

Ref #	Part #	Description	Qty
M	BLK-13048	Leverage Arm - BFT Lid	1
N	BLK-13068	BFT, Lid Magnet	1
O	BLK-13058	Retainer, Magnet, BFT Lid	1
P	S-8314	Bolt, HHCS 1/2"-13 x 3-1/2" YDP Grade 8	1
Q	S-8260	Nylock Nut 1/2"-13 ZN Grade 5	1
R	S-8234	Nylock Nut 7/16"-14 ZN Grade 2	1
S	S-7645	Carriage Bolt 5/16"-18 x 3/4" ZN Grade 5	8
T	S-7382	Nylock Nut 5/16"-18 ZN Grade 5	8
U	S-9085	Carriage Bolt 3/8"-16 x 3-1/2" ZN Grade 5	1
V	S-7236	Rivet, POE 3/16" Diameter x 0.565" Long ARSM	7
W	S-7383	Nylock Nut 3/8"-16 ZN Grade 5	1
X	S-10138	Bolt, FHSCS #10-32 x 3/8" ZN	2

Installing the 15' Diameter 60° Hopper Bin Assembly

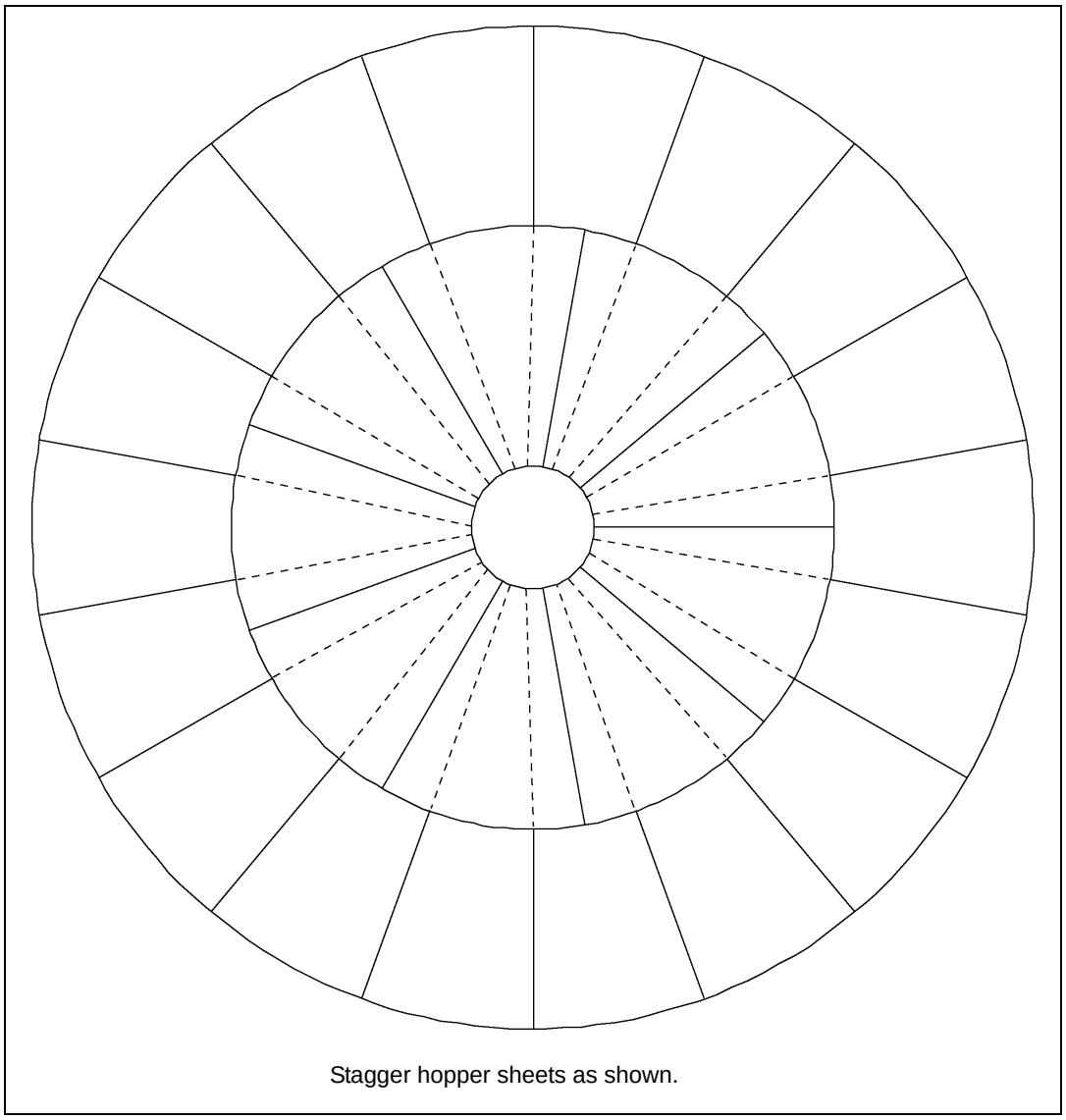


Figure 12A *15' 60° Two-Piece Hopper Layout*

Installing the Upper Hopper Panel to the Sidewall (15' Only)

1. Locate the first upper hopper panel (A) halfway between two (2) hopper legs (B).
2. Apply strip caulk (C) above and below the bolt holes in the horizontal seam.
3. Install the upper hopper panel (A) to the inside of the sidewall panel (D) using bolts (E) and nuts (F).

   NOTE: *Make sure the bolts are installed with the heads located on the* ***outside*** *of the bin.*
4. Repeat for all upper hopper panel to sidewall connections. *(See Figure 12B.)*

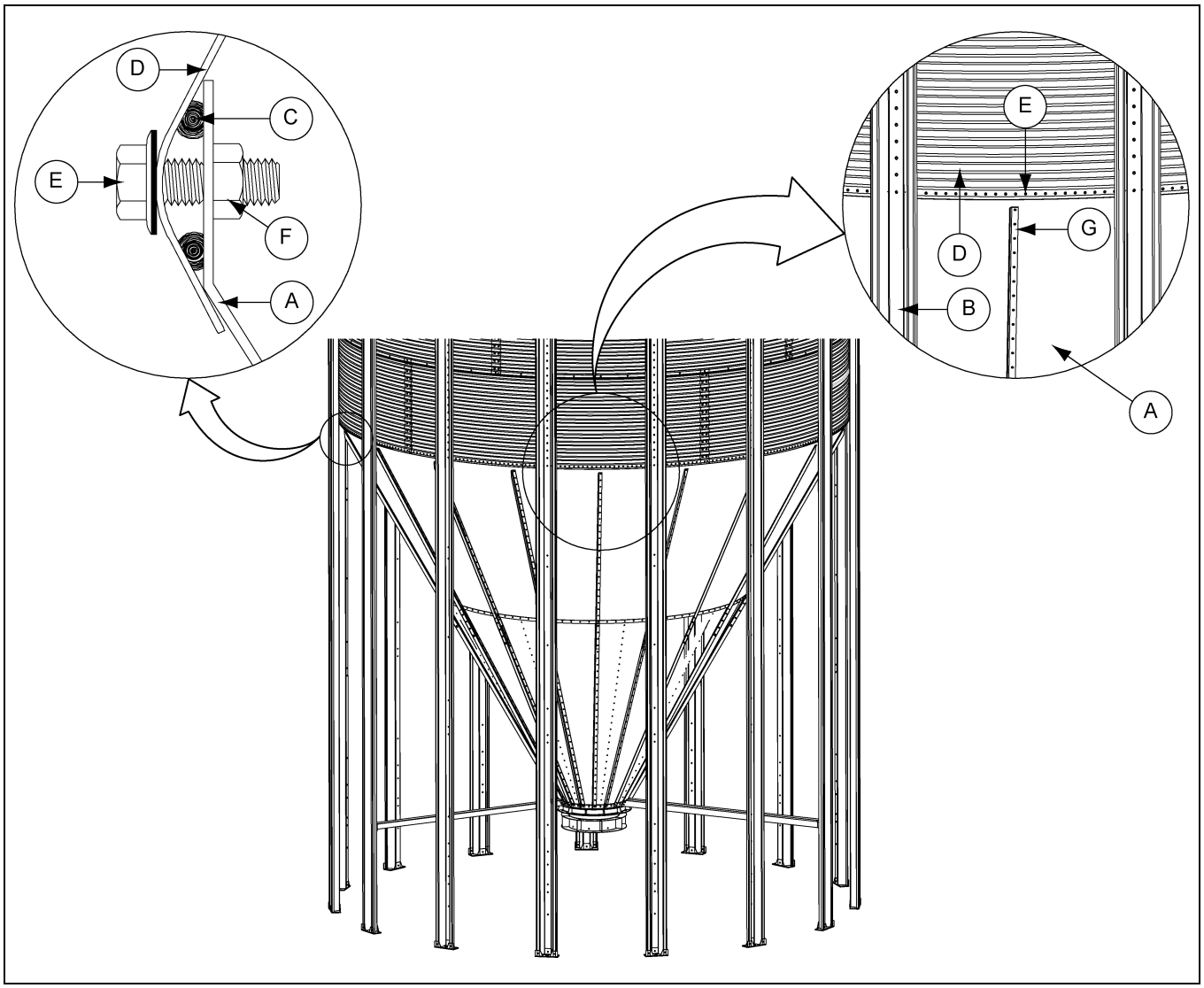


Figure 12B *Upper Hopper Panel to Sidewall Connection*

Ref #	Description
A	Upper Hopper Panel
B	Hopper Legs
C	Caulking
D	Sidewall Panel

Ref #	Description
E	5/16" x 3/4" Truss Head Bolt (S-10267)
F	5/16" Flange Nut (S-10268)
G	Upper Stiffener Angle

Installing the Upper Hopper Panels and Stiffener Angles (15' Only)

1. Use bolt (E) and nut (F) for all hopper panel to hopper panel connections.

   IMPORTANT: *Make sure the bolts are installed with the heads located on the **inside** of the bin.*

2. Install the upper stiffener angle (G) to the outside of the upper hopper panels (A) where the panels overlap.

3. Apply strip caulk (C) between each overlapping seam. *(See Figure 12C.)*

   NOTE: *Make sure the caulk is placed on both sides of the bolt holes along the full length of the seam.*

4. Repeat for all the upper hopper panels (A), overlapping in the same direction around the bin.

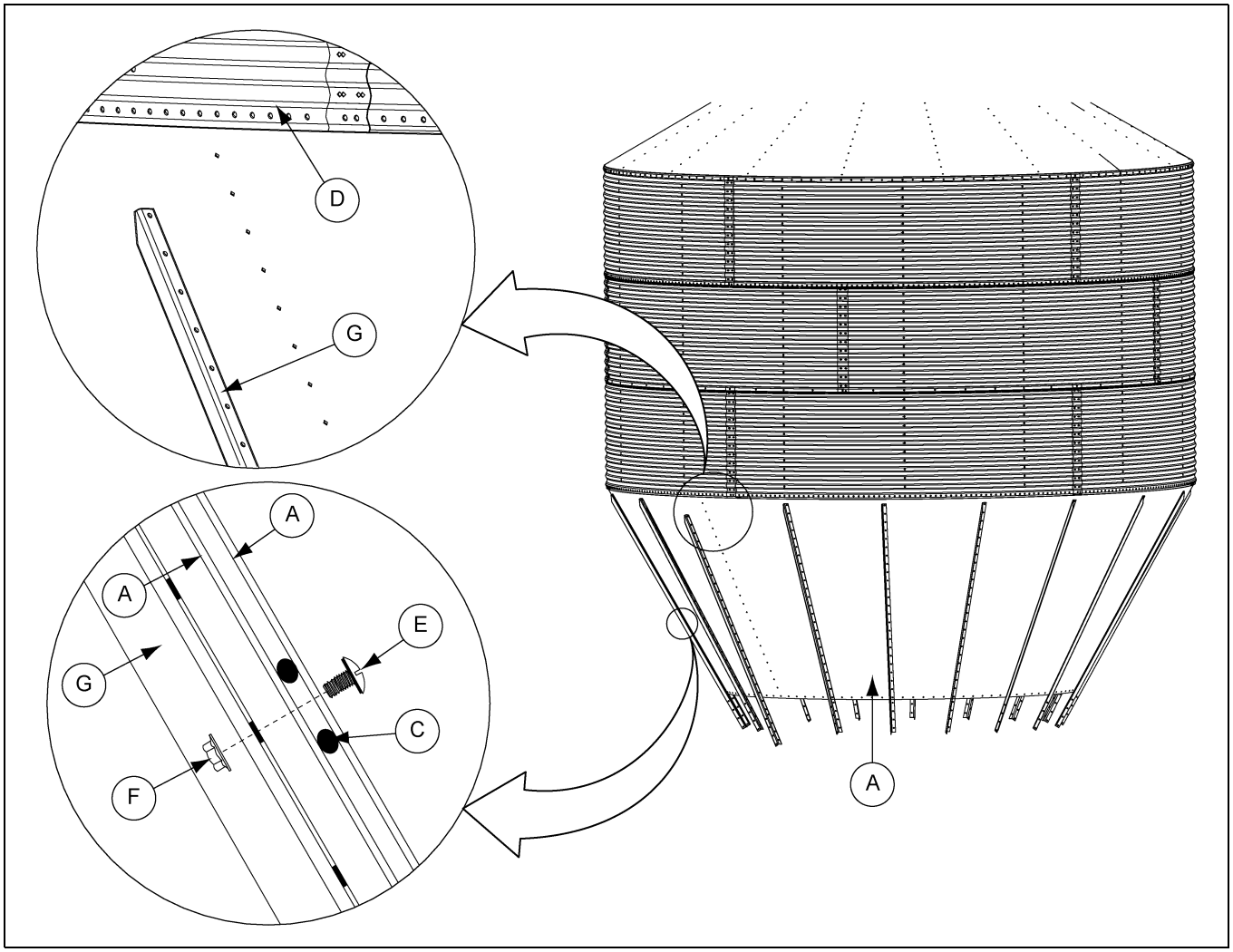


Figure 12C *Upper Hopper Panel Connection*

Ref #	Description
A	Upper Hopper Panel
C	Caulking
D	Sidewall Panel

Ref #	Description
E	5/16" x 3/4" Truss Head Bolt (S-10267)
F	5/16" Flange Nut (S-10268)
G	Upper Stiffener Angle

Installing the Lower Hopper Panels and Stiffener Angles (15' Only)

1. Align the lower stiffener angle (H) to the upper stiffener angle (G) using the four (4) holes located on the side of the angles (I). *(See Figure 12D.)*
2. Connect the angles using bolts (E) and nuts (F). *(See Figure 12E on Page 79.)*
3. Align the lower hopper panels (J) to the lower stiffener angles (H) and the upper hopper panels (A).
4. Connect the panels (A and J) and the lower stiffener angle (H) using bolts (E) and nuts (F).

IMPORTANT: *Make sure the bolts are installed with the heads located on the **inside** of the hopper.*

NOTE: *Make sure strip caulk (C) is placed on both sides of the bolt holes along the full length of the horizontal and vertical seams.*

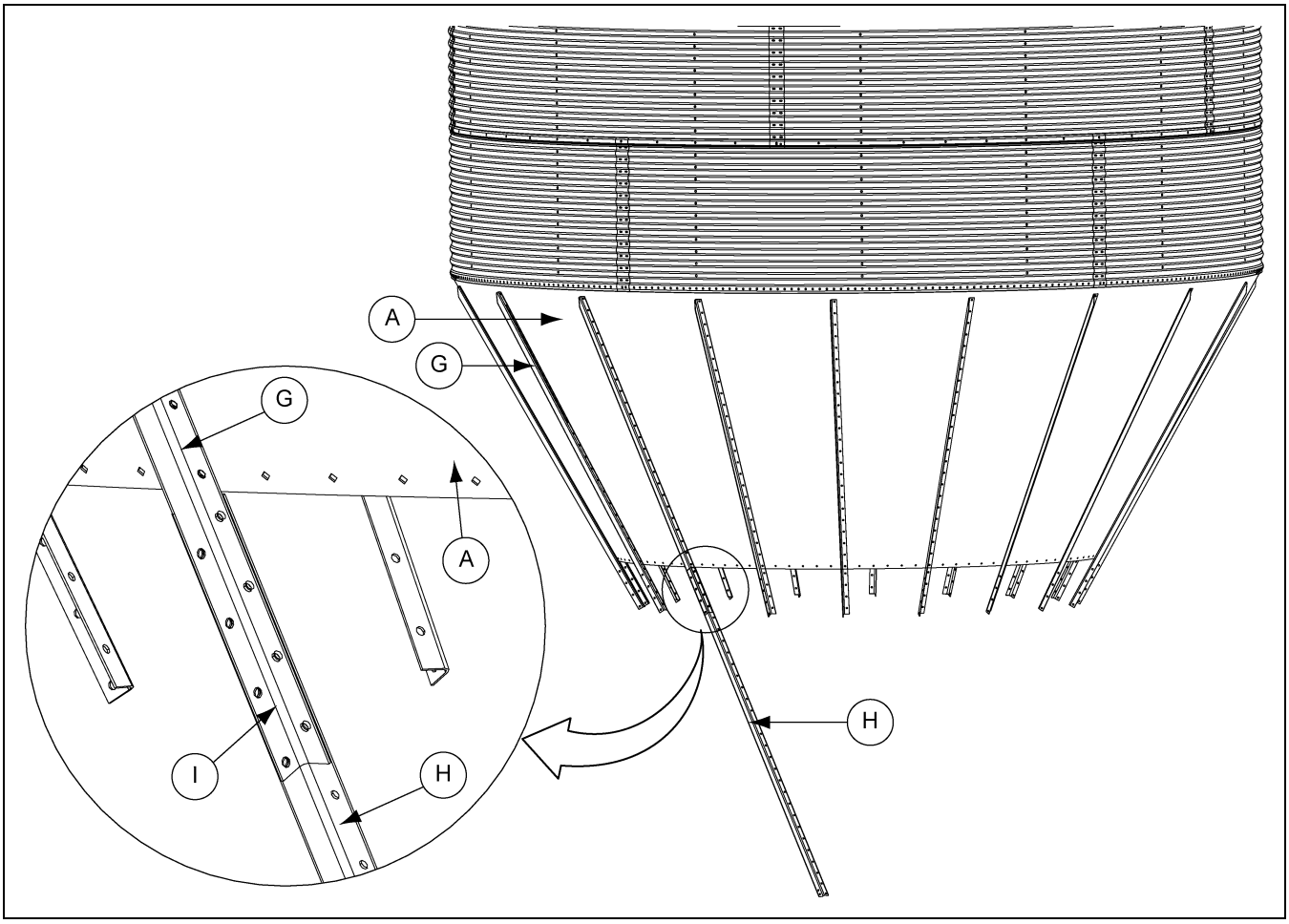


Figure 12D *Upper and Lower Stiffener Angles Connection*

Ref #	Description
A	Upper Hopper Panel
G	Upper Stiffener Angle
H	Lower Stiffener Angle
I	Side of the Angle

Installing the Lower Hopper Panels and Stiffener Angles (15' Only) (Continued)

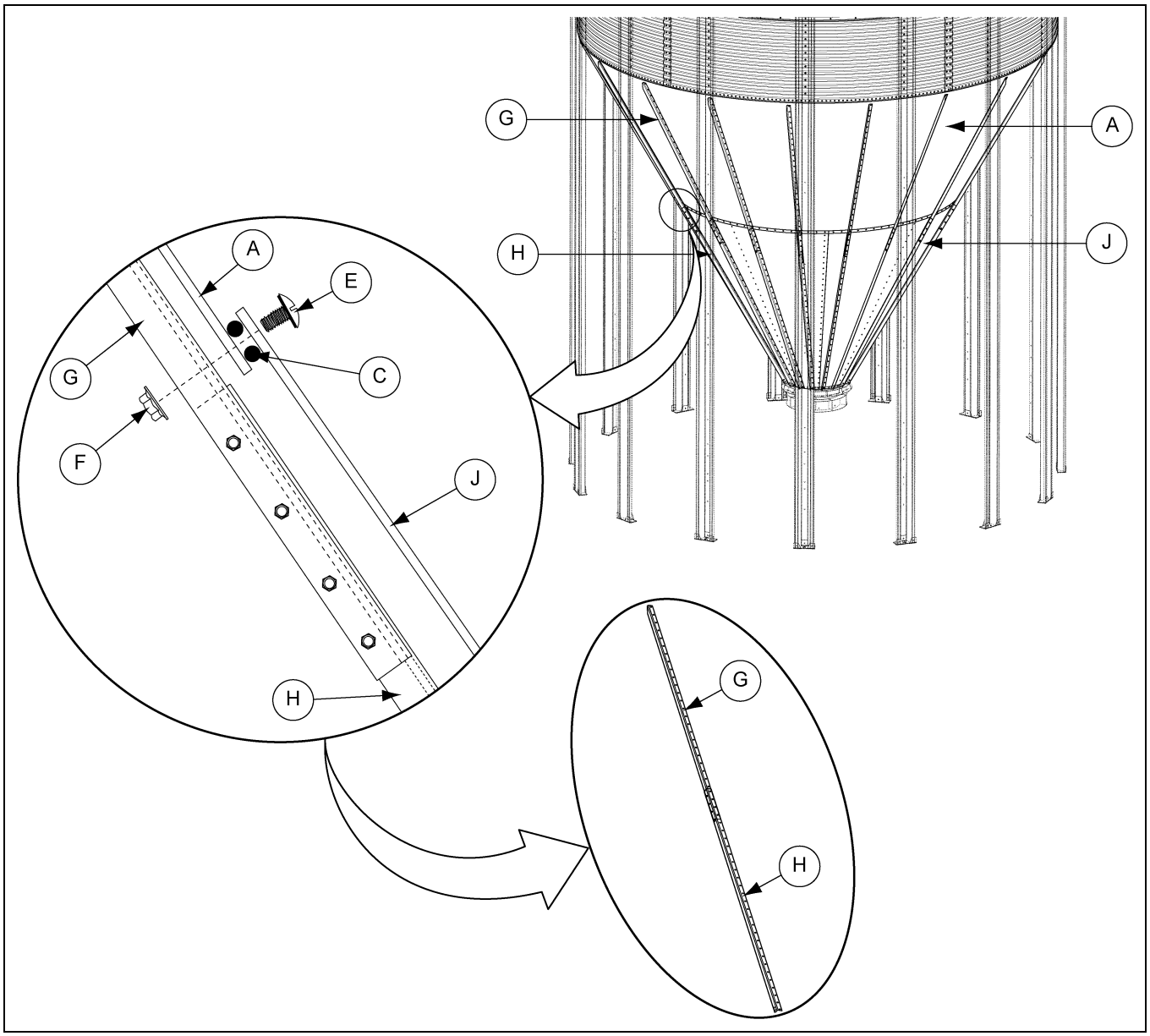


Figure 12E *Lower Panel to Upper Panel Connection*

Ref #	Description
A	Upper Hopper Panel
C	Caulking
E	5/16" x 3/4" Truss Head Bolt (S-10267)
F	5/16" Flange Nut (S-10268)
G	Upper Stiffener Angle
H	Lower Stiffener Angle
J	Lower Hopper Panel

15' Diameter 60° Hopper Collar Details

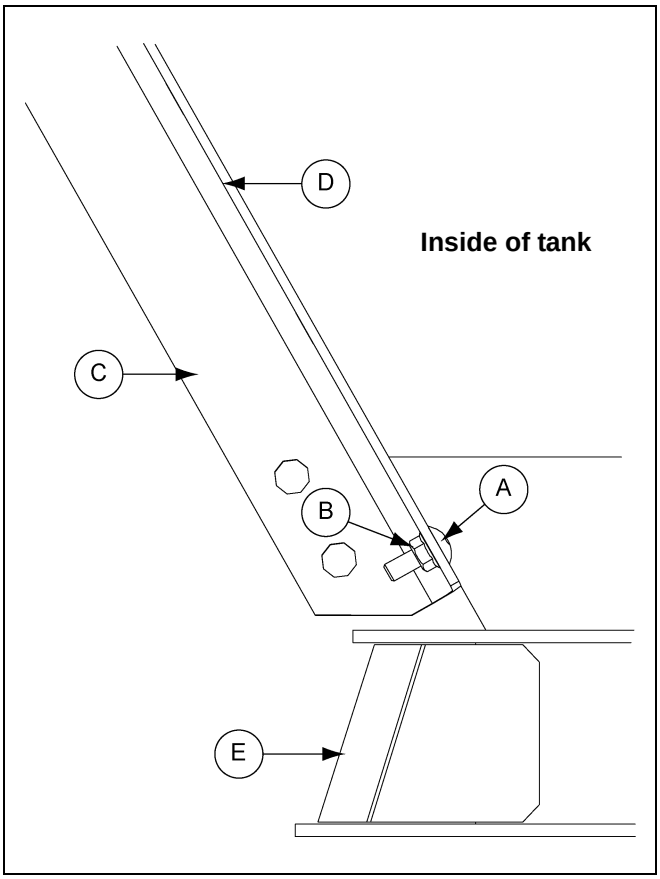


Figure 12F *22" 60° - Hopper Collar (BLK-13003)*

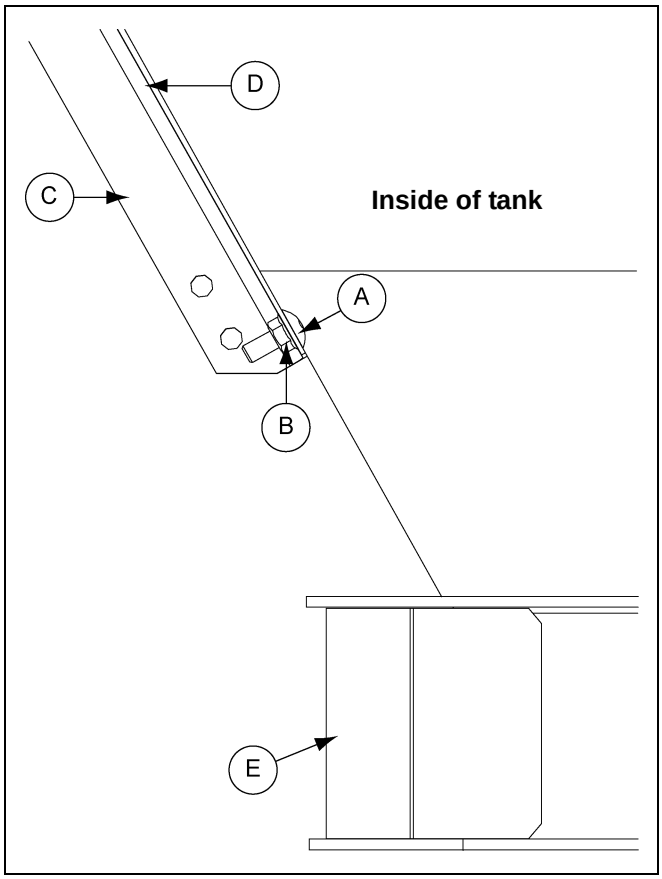


Figure 12G *16" 10-12 Gauge 60° Hopper Collar (BLK-12872)*

Ref #	Description
A	5/16" x 3/4" Truss Head Bolt (S-10267)
B	5/16" Flange Nut (S-10268)
C	Lower Stiffener Angle
D	Lower Hopper Panel
E	Hopper Collar

NOTE: ***Every hole in hopper sheet will be utilized.*** *Use 5/16" x 3/4" truss head bolt on hopper seams. (Truss head goes on inside of hopper.)*

18' Diameter 45° and 21' Diameter 45° Hopper Bin Assembly

Install hopper sections. When starting to attach hopper sheets to sidewall it is recommended that the first hopper sheet seam be positioned halfway between leg positions. Lap the hopper sheets as shown. Use 5/16" x 1" bin bolts (head to outside of tank) for attaching hopper sheets to bottom sidewall sheet. Use truss head bolts to attach hopper sheet to hopper sheet. Be sure to place the head of the truss head bolt on the inside of the hopper. Caulk all seams (double bead). Remember, the hopper collar must be installed before the last hopper section is in place. Clean any caulking, which may have squeezed out during assembly, off the inside of the hopper. After the collar is in place, attach the hopper braces and tighten all bolts.

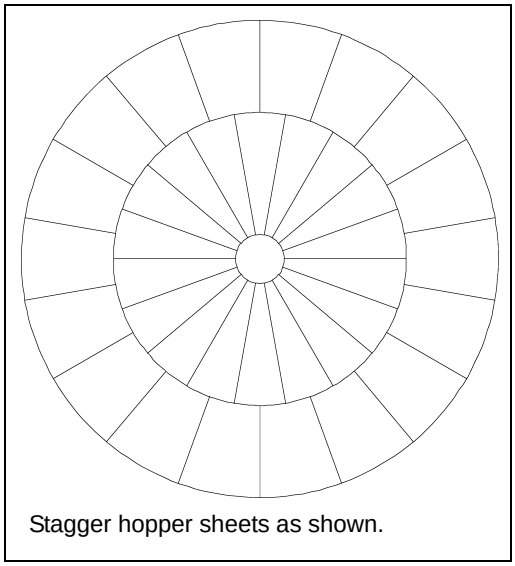


Figure 12H *18' and 21' Two-Piece Hopper Overhead View of 18' 45° and 21' 45° Hopper Sheet Assembly*

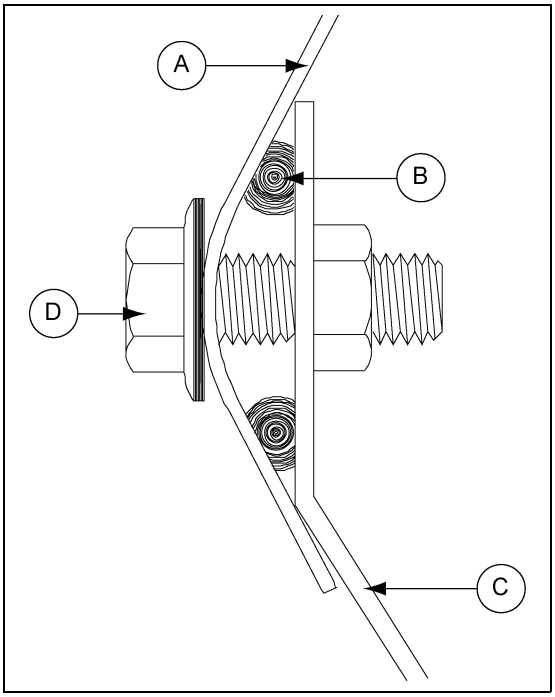


Figure 12I *Hopper Sheets (Inside of Tank)*

Ref #	Description
A	Sidewall Sheet
B	Use Two (2) Strips of Caulking
C	Hopper Sheet
D	Use 5/16" x 1" Bin Bolt (S-10260) **(Hopper sheet to sidewall sheet only.)**

NOTE: ***Every hole in hopper sheet will be utilized.*** *Use 5/16" x 3/4" truss head bolt on hopper seams. (Truss head goes on inside of hopper.)*

18' Diameter 45° and 21' Diameter 45° Hopper Bin Assembly (Continued)

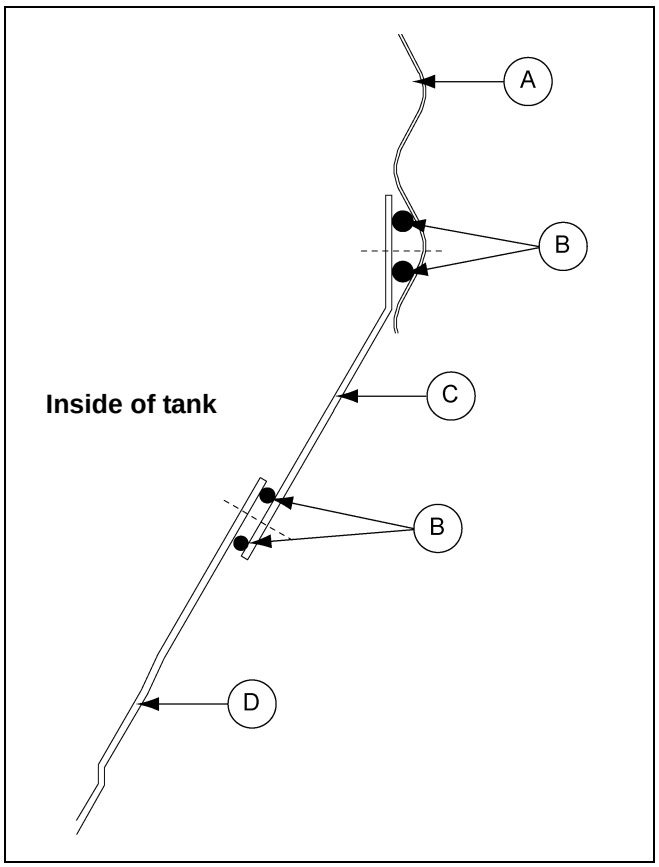


Figure 12J *18' 45° and 21' 45° Hopper Sheet Detail*

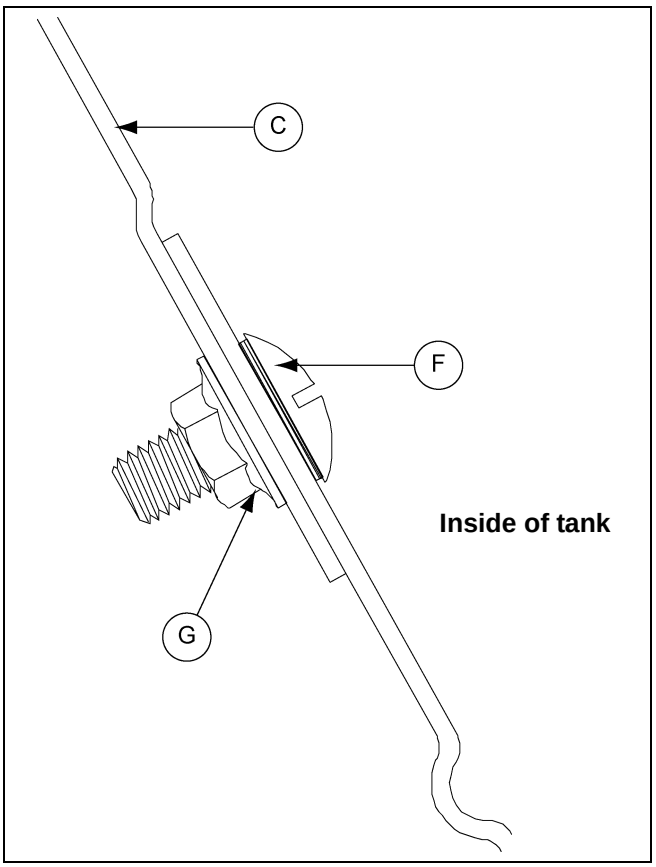


Figure 12K *18' 45° and 21' 45° Hopper Sheet Detail*

Ref #	Description
A	Bottom Sidewall Sheet
B	Caulking
C	Top Hopper Panel
D	Caulking
E	Bottom Hopper Panel
F	5/16" x 3/4" Truss Head Bolt (S-10267)
G	5/16" Flange Nut (S-10268)

18' Diameter 45° and 21' Diameter 45° Hopper Bin Assembly (Continued)

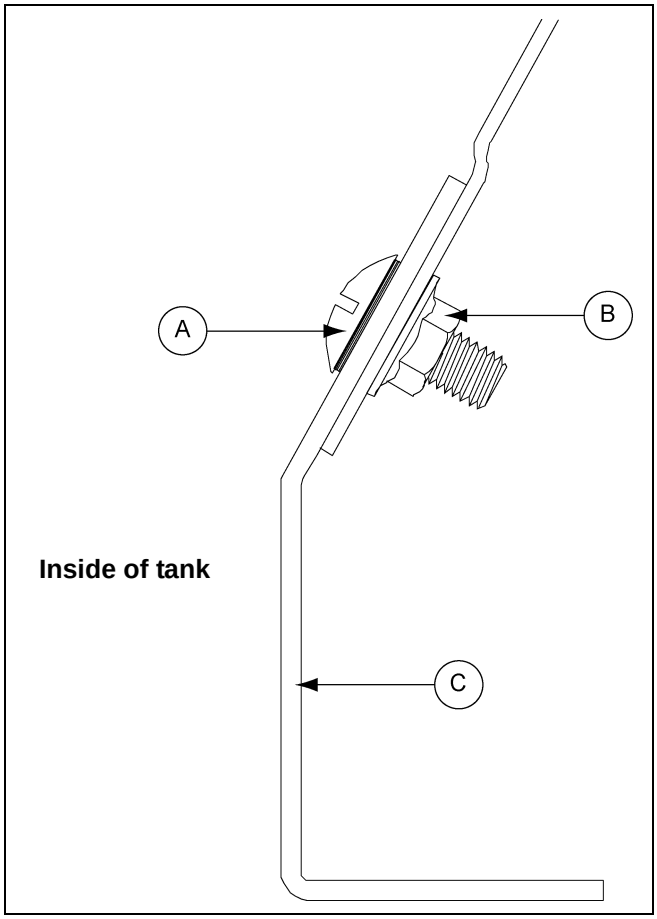


Figure 12L *22" Hopper Collar Detail*

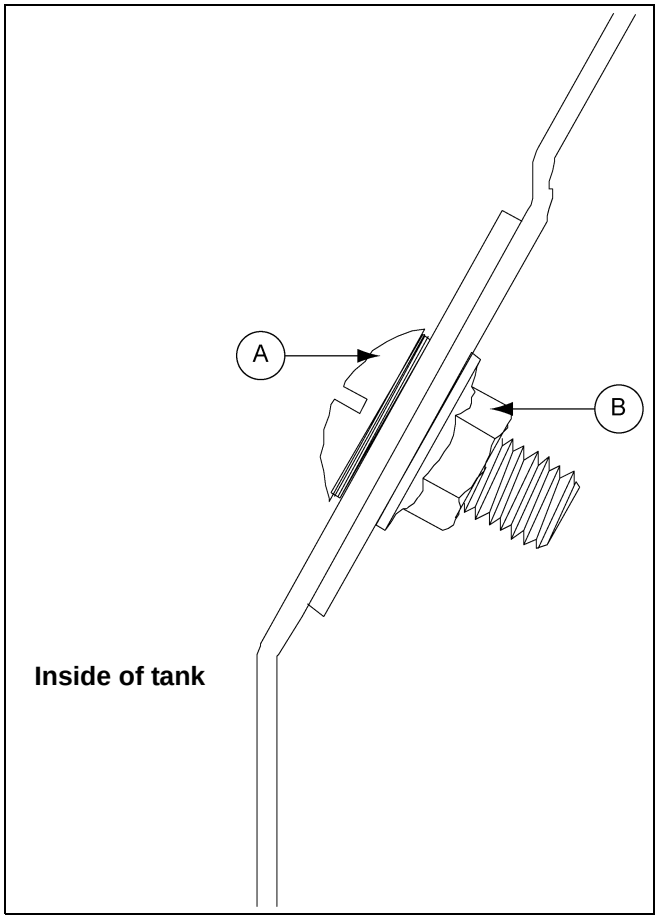


Figure 12M *16" Hopper Collar Detail*

Ref #	Description
A	5/16" x 3/4" Truss Head Bolt
B	Flange Nut
C	22" Hopper Collar

NOTE: ***Every hole in hopper sheet will be utilized.*** *Use 5/16" x 3/4" truss head bolt on hopper seams. (Truss head goes on inside of hopper.)*

Hopper Collar Assembly

22" 45° Hopper collar (BLK-10854)

22" 60° Hopper collar (BLK-10342)

22" 60° Hopper collar (BLK-13003) for 15' bin

Install hopper collar before all hopper panels are assembled. Use 5/16" truss head bolts on all hopper seams, as shown in the *Figure 12N*. Be sure to caulk between the hopper collar and hopper panels. Refer to *Figure 12O and Figure 12P on Page 85*.

16" 45° Hopper extension panel (BLK-10697) (three (3) required)

16" 45° Hopper collar (BLK-10696)

16" 60° Hopper extension panel (BLK-10487) (three (3) required)

16" 60° Hopper collar (BLK-10489)

16" 10-12 Gauge 60° Hopper collar for 15' bin (BLK-12872)

Prior to attaching the final hopper panel, assemble the hopper extensions (if utilized) on the hopper collar. Use 5/16" truss head bolts and caulk all joints on the hopper extensions and collar. After completing this assembly, attach to the hopper panels, using 5/16" truss head bolts. Be sure to caulk between hopper extensions and hopper panels. *(See Figure 12O and Figure 12P on Page 85.)*

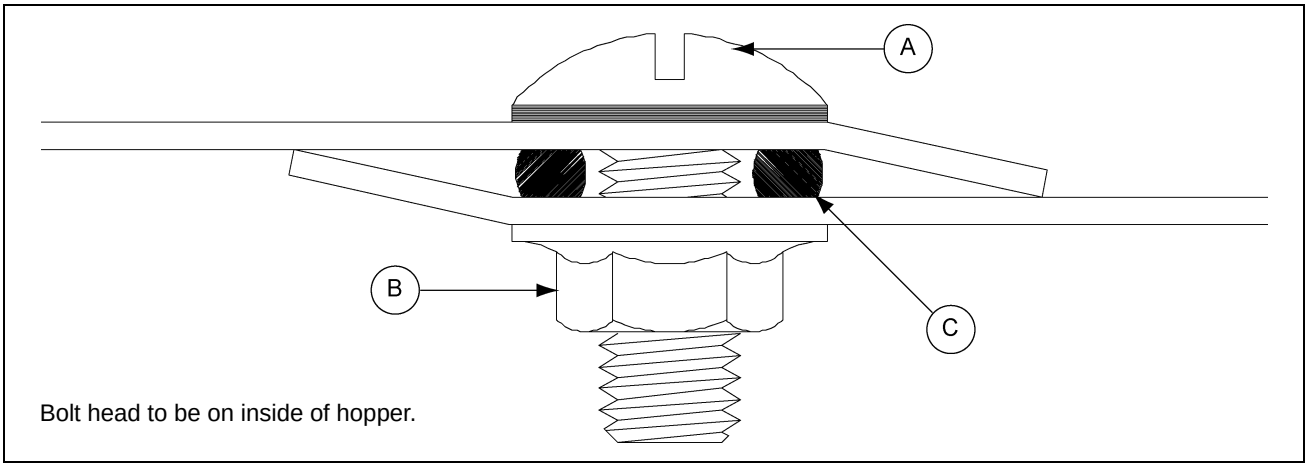


Figure 12N *Hopper Seam Overlap Detail*

Ref #	Description
A	5/16" x 3/4" Truss Head Bolt (S-10267)
B	5/16" Flange Nut (S-10268)
C	Caulking (Two (2) Strips)

Hopper Collar Assembly (Continued)

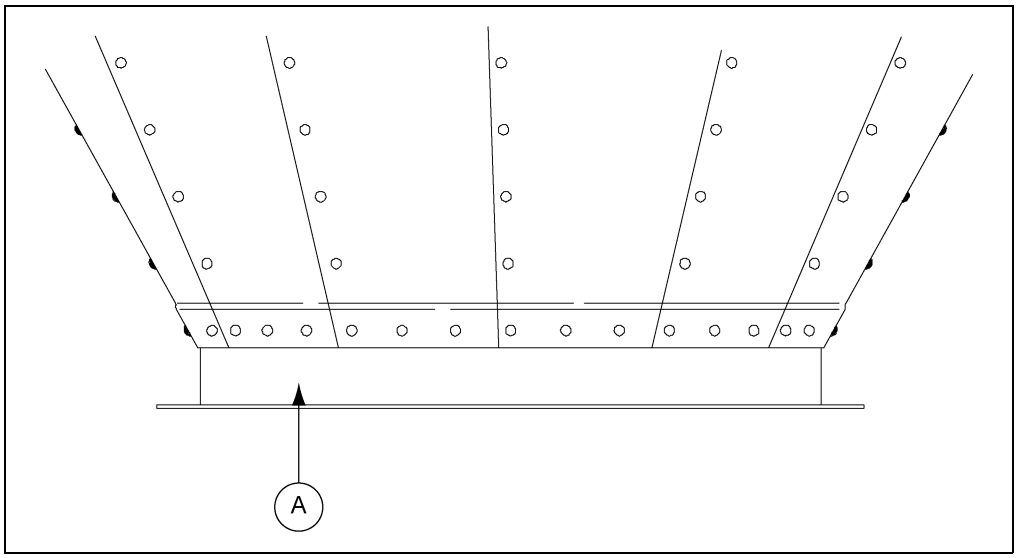


Figure 12O *22" Hopper Collar*

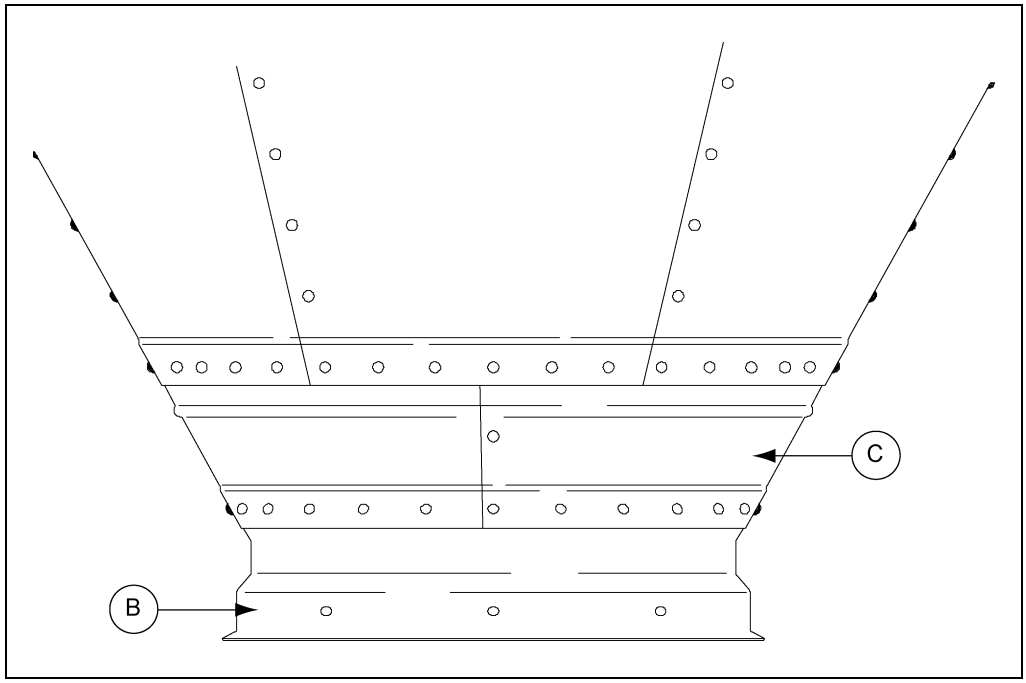


Figure 12P *16" Hopper Extensions and Collar*

Ref #	Description
A	22" Hopper Collar
B	16" Hopper Collar
C	22"-16" Hopper Extension

12' Only

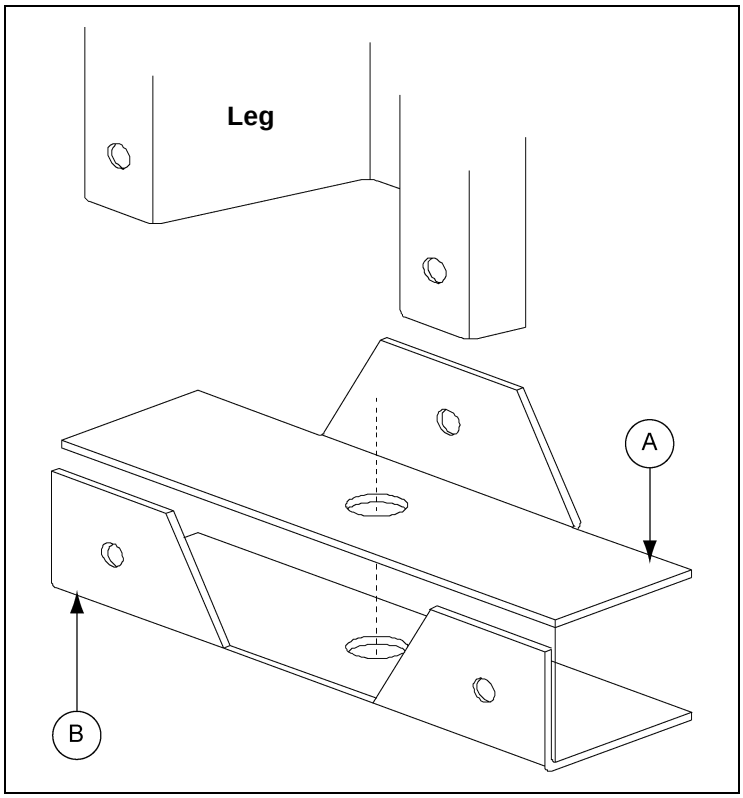


Figure 13A

Ref #	Part #	Description
A	BLK-10057	Back Leg Anchor Plate (has One Tab)
B	BLK-10058	Front Leg Anchor Plate (has Two (2) Tabs)

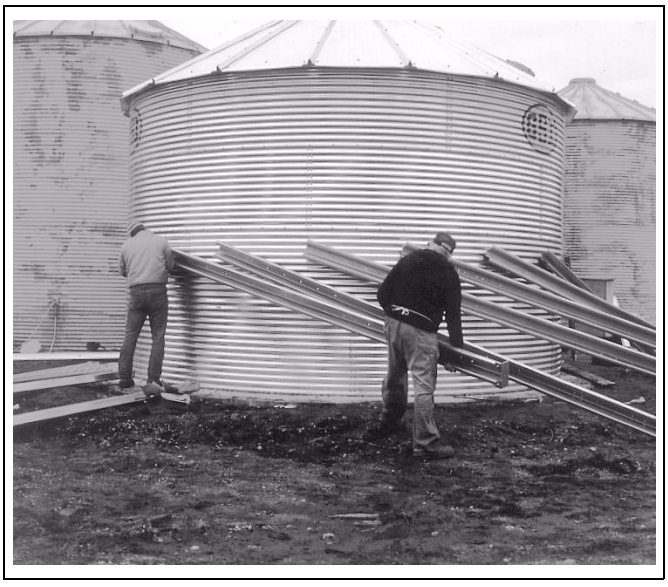


Figure 13B

Figure 13C

Installation of Leg to Sidewall

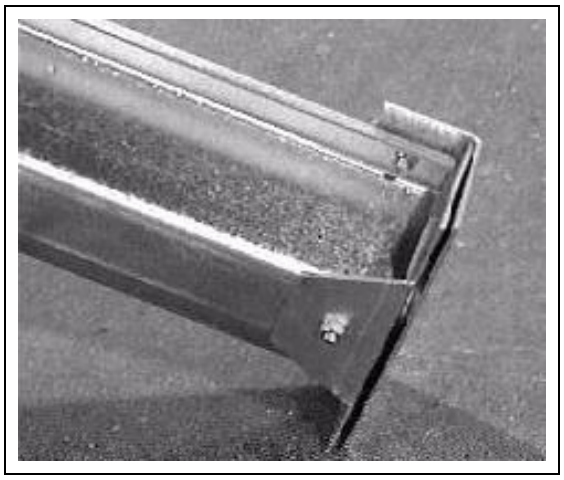


Figure 13D

Use 5/16" x 1" bin bolts and nuts when attaching the leg to base. Make sure the washer is used on the slot side of the leg.

When installing legs to sidewall, reverse normal insertion procedure on bolts. Place hex head and neoprene washer to inside of sidewall, leaving threaded portion of bolt protruding outward. This provides for a weather-tight seal at the leg attachment location. (See leg size chart *on Page 90* before attaching legs.)

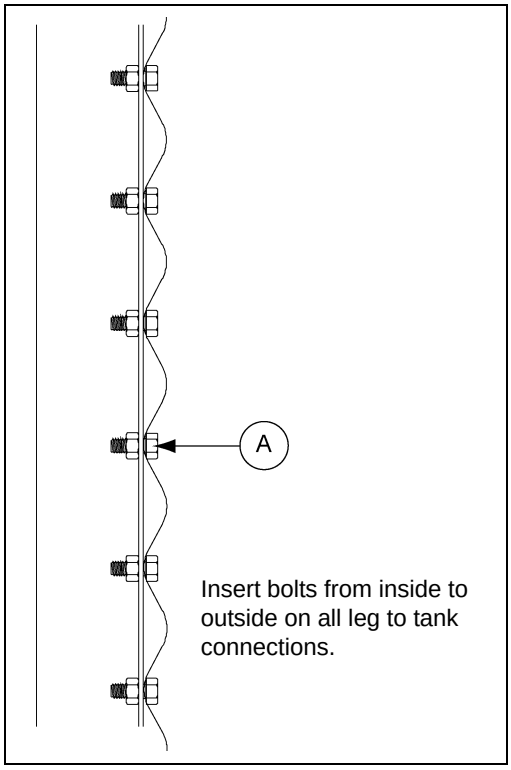


Figure 13E

Ref #	Description
A	5/16" x 1" Bin Bolt (S-10260)

Installation of Leg to Sidewall for 15', 18' and 21' BFT

When installing legs to sidewall, reverse normal insertion procedure on bolts. Place hex head and neoprene washer to inside of sidewall, leaving threaded portion of bolt protruding outward. This provides for a weather-tight seal at the leg attachment location.

NOTE: *Insert bolts from inside to outside on all leg to tank connections.*

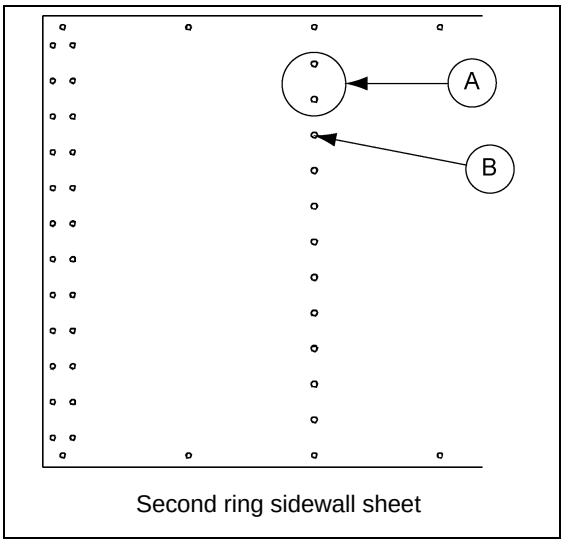


Figure 13F *Plug Holes*

Ref #	Description
A	Plug top two (2) holes above legs with 3/8" bolts (S-7487) and nuts (S-7489).
B	First leg attachment hole. (Except for 21'.)

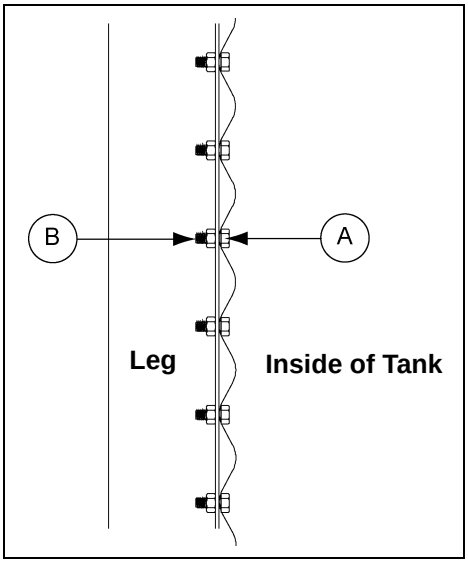


Figure 13G

Figure 13H *Installing legs to bin with bolt heads on the inside of bin and nuts on the outside.*

Ref #	Part #	Description
A	S-7487	3/8" x 1" Bin Bolt
B	S-7489	3/8" Nut

12'-21' Leg Bracing

Tank	“A”	“B”	“C”	“D”
12' 60°		36.962"	66.962"	112.359"
12' 45°	66.962"	36.962"		
15' 60°		50.596"	75.596"	138.250"
15' 45°	80.596"	50.596"		
18' 45°		50.596"	63.640"	120.237"
21' 45°		55.075"	66.075"	133.075"

See Pages 91-94 for attachment points of bracing. Use 3/8" nuts and bolts to attach cross ties to each other and to leg. Hopper braces are attached to legs with 3/8" nuts and bolts and to hopper collar with 5/16" hardware. Ladder standoffs are attached to legs with 5/16" nuts and bolts. *See Figure 13I below and Figure 13J on Page 90* show typical bracing attachment points to the leg. Do not tighten any hardware until all bracing is in place. See chart *above* for dimensions called out as shown in *Figure 13I below and Figure 13J on Page 90*.

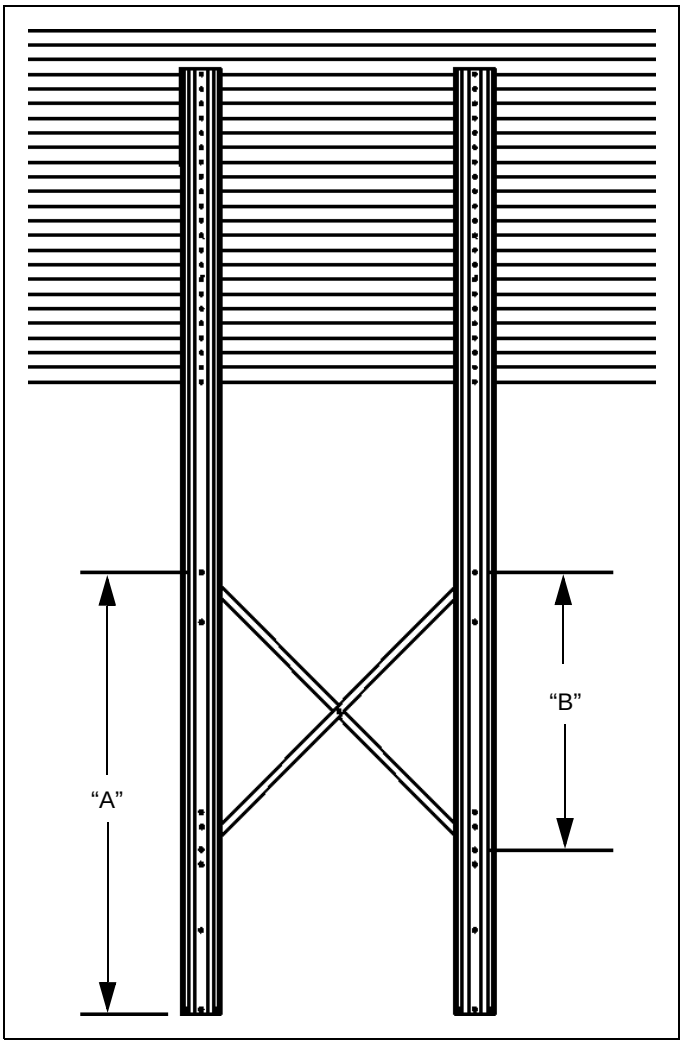


Figure 13I *Typical 12' and 15' 45° Bracing Layout*

12'-21' Leg Bracing (Continued)

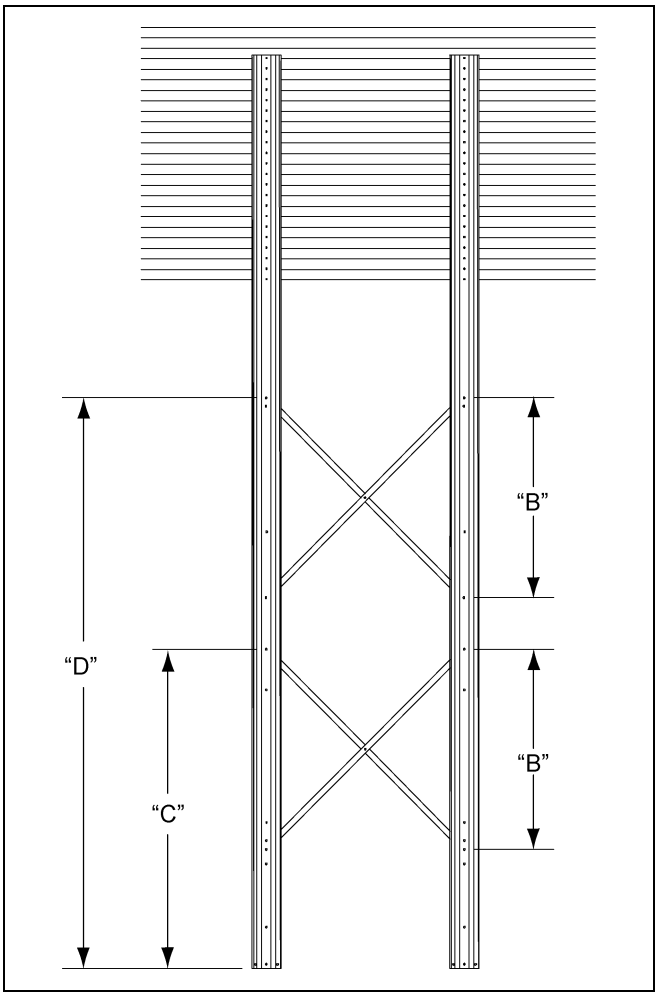


Figure 13J *Typical 18' and 21' 45° and 12' and 15' 60° Bracing Layout*

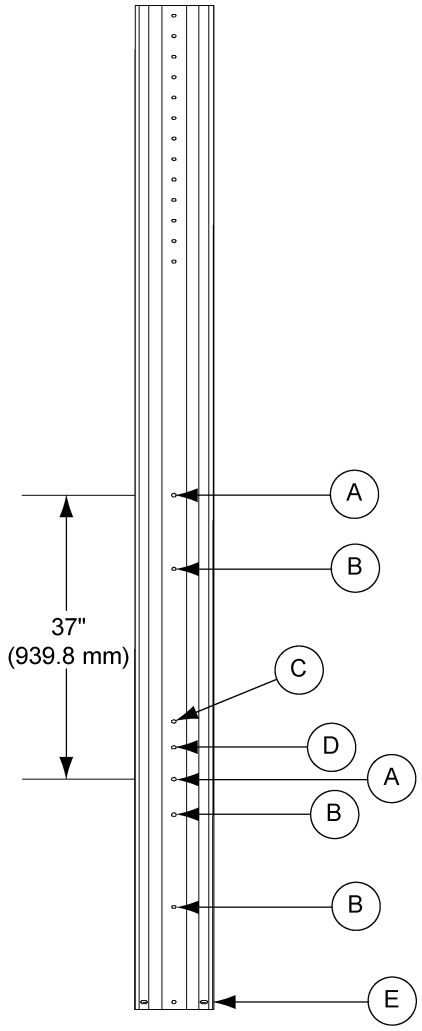
Leg Size Chart

Tank Size	Hopper	# of Rings	Length
12' Diameter Tank	45°	1-5 Rings	130-1/8"
12' Diameter Tank	45°	6-7 Rings	154-1/8"
12' Diameter Tank	60°	1-5 Rings	175-1/8"
12' Diameter Tank	60°	6-7 Rings	199-1/8"
15' Diameter Tank	45°	2-8 Rings	172-3/8"
15' Diameter Tank	60°	2-6 Rings	231"
18' Diameter Tank	45°	2-8 Rings	190-1/4"
21' Diameter Tank	45°	2-6 Rings	201-1/2"

Depending on the size of the Bulk Feed Tank you are assembling, the leg will cover either the bottom ring or 1-3/4 rings (56"). Refer to *above* chart to find the correct number of rings the legs will cover. **Put all legs on, but do not tighten bolts until all braces are in place**. Be sure to put leg braces on properly. *(See Pages 91-93.)*

Bracing Hole Layouts

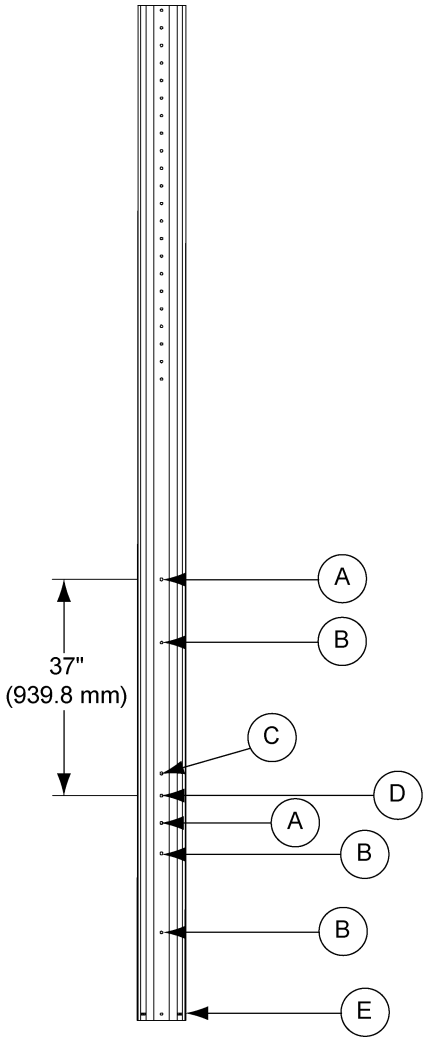
12' 45°
1-5 Rings
1 Ring coverage



BLK-12718
(Eight (8) required)
(130-1/8" Long)

Figure 13K

12' 45°
6-7 Rings
1-3/4 Ring coverage



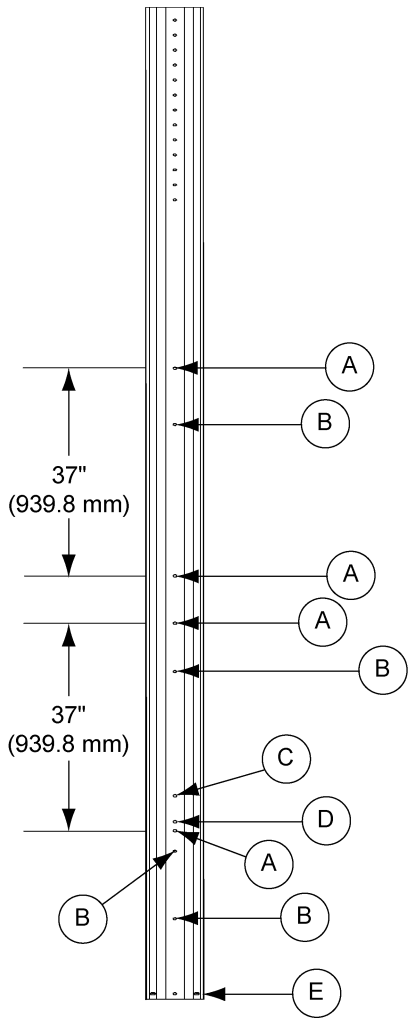
BLK-12045
(Eight (8) required)
(154-1/8" Long)

Figure 13L

Ref #	Description
A	Cross Tie
B	Ladder Standoff
C	22" Hopper Brace
D	16" Hopper Brace
E	Leg Anchor

Bracing Hole Layouts (Continued)

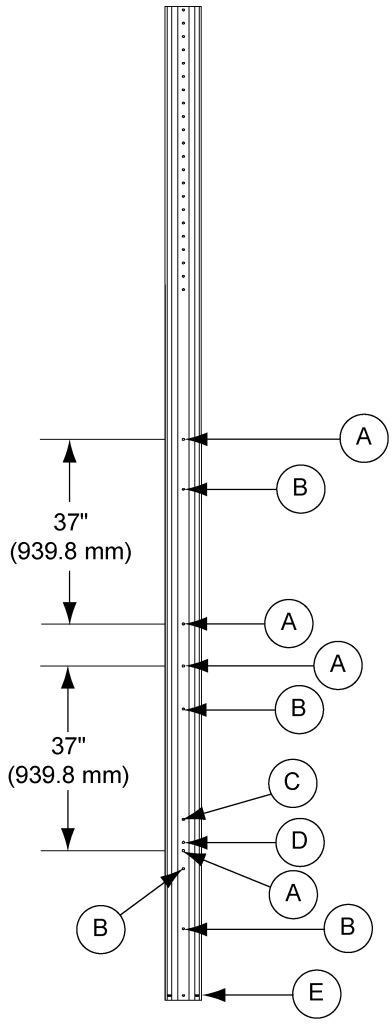
12' 60°
1-5 Rings
1 Ring coverage



BLK-12720
(Eight (8) required)
(175-1/8" Long)

Figure 13M

12' 60°
6-7 Rings
1-3/4 Ring coverage



BLK-12046
(Eight (8) required)
(199-1/8" Long)

Figure 13N

Ref #	Description
A	Cross Tie
B	Ladder Standoff
C	22" Hopper Brace
D	16" Hopper Brace
E	Leg Anchor

All leg to sidewall holes must be utilized for leg attachment.

Bracing Hole Layouts (Continued)

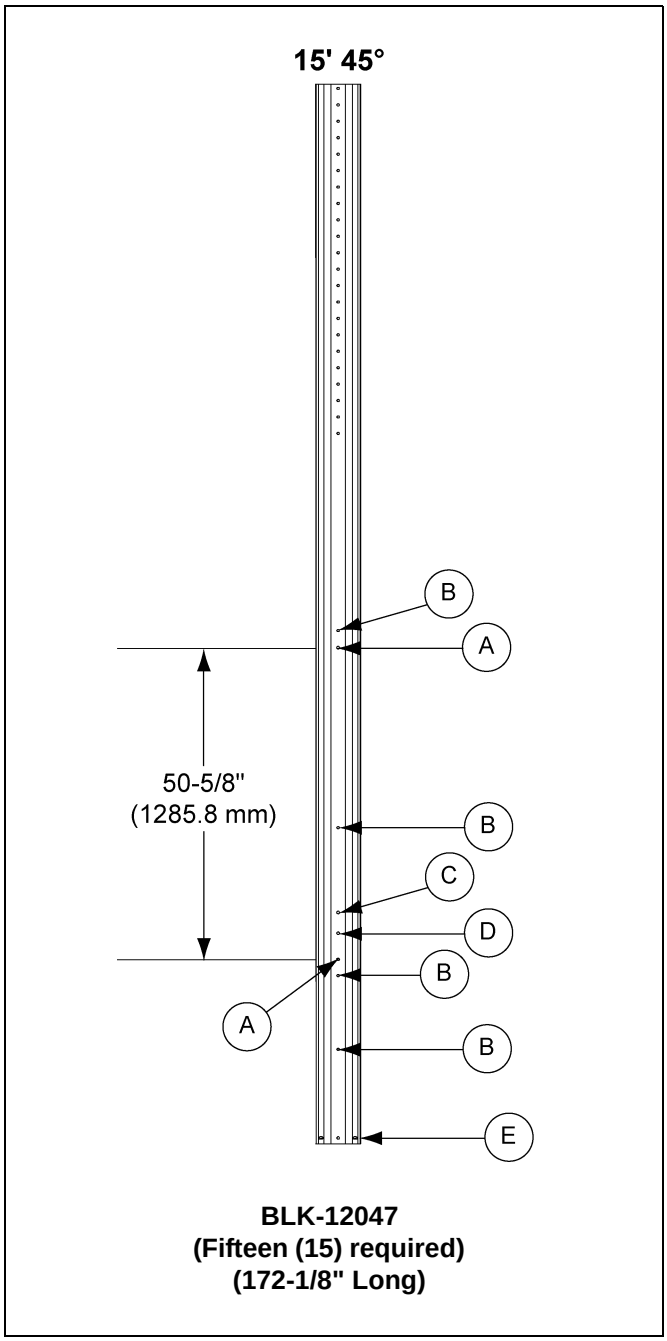


Figure 13O

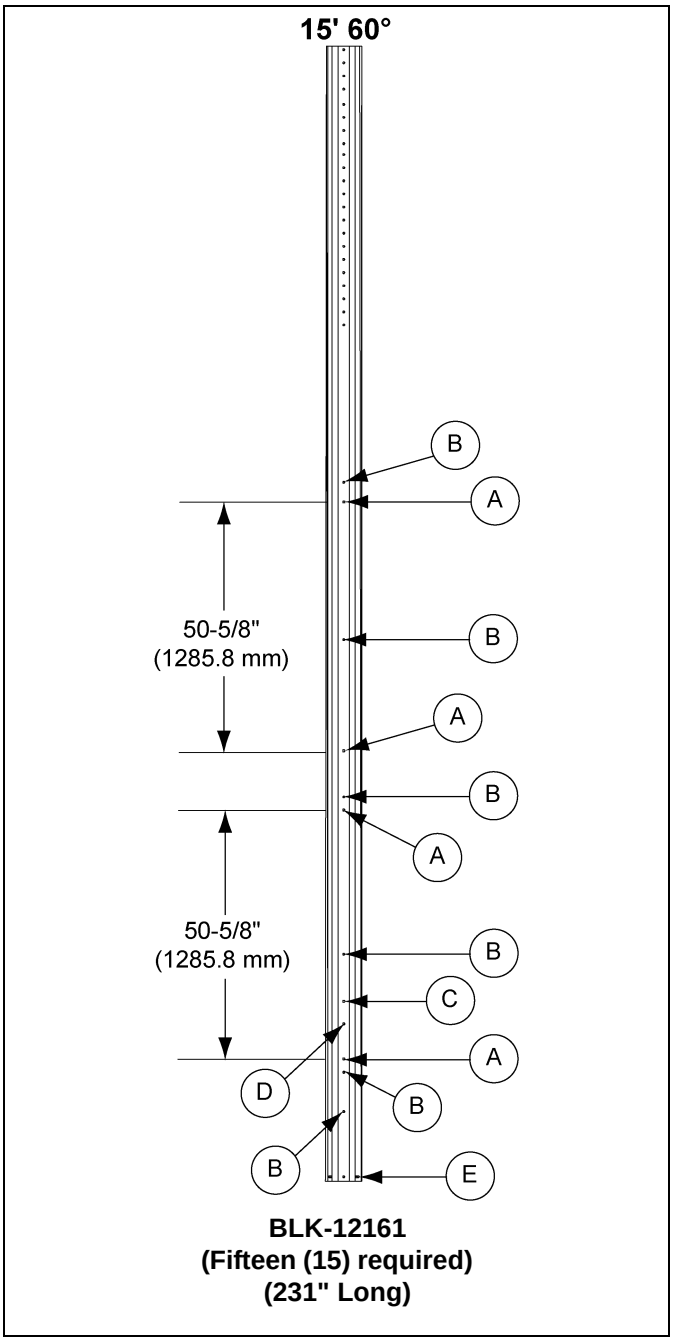


Figure 13P

Ref #	Description
A	Cross Tie
B	Ladder Standoff
C	22" Hopper Brace
D	16" Hopper Brace
E	Leg Anchor

All leg to sidewall holes (22 at 2.666" spacing) must be utilized for leg attachment.

Bracing Hole Layouts (Continued)

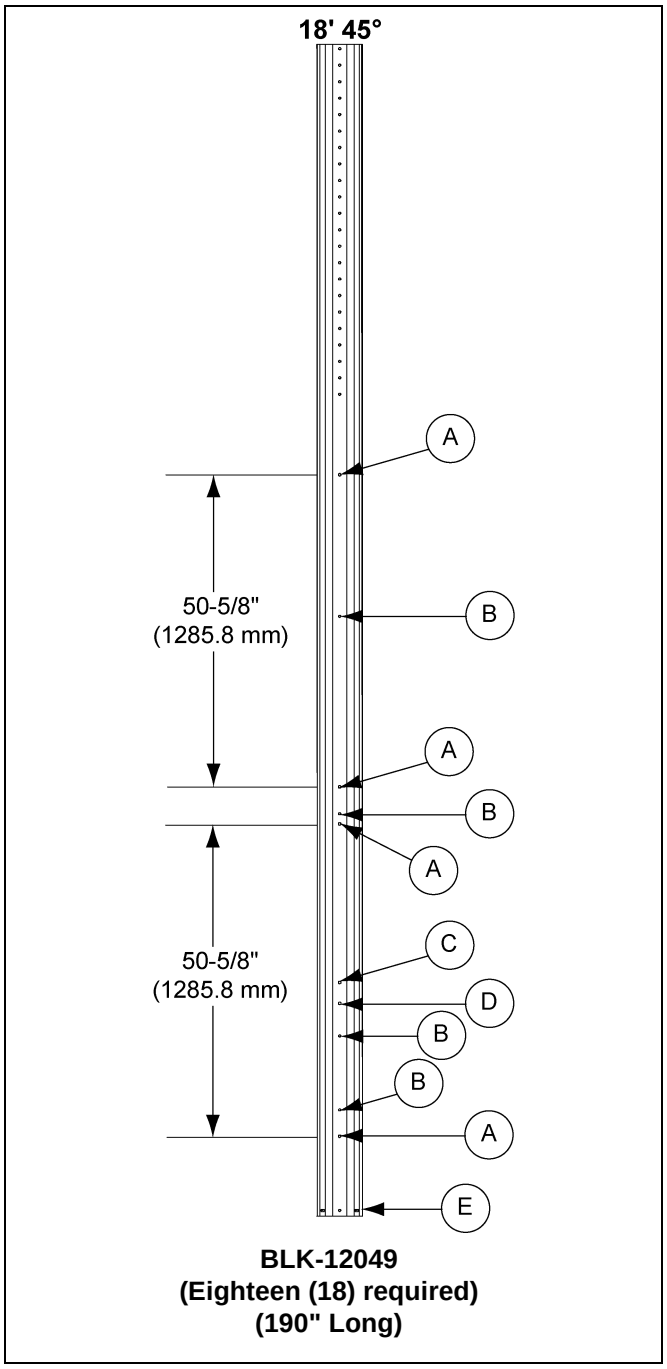


Figure 13Q

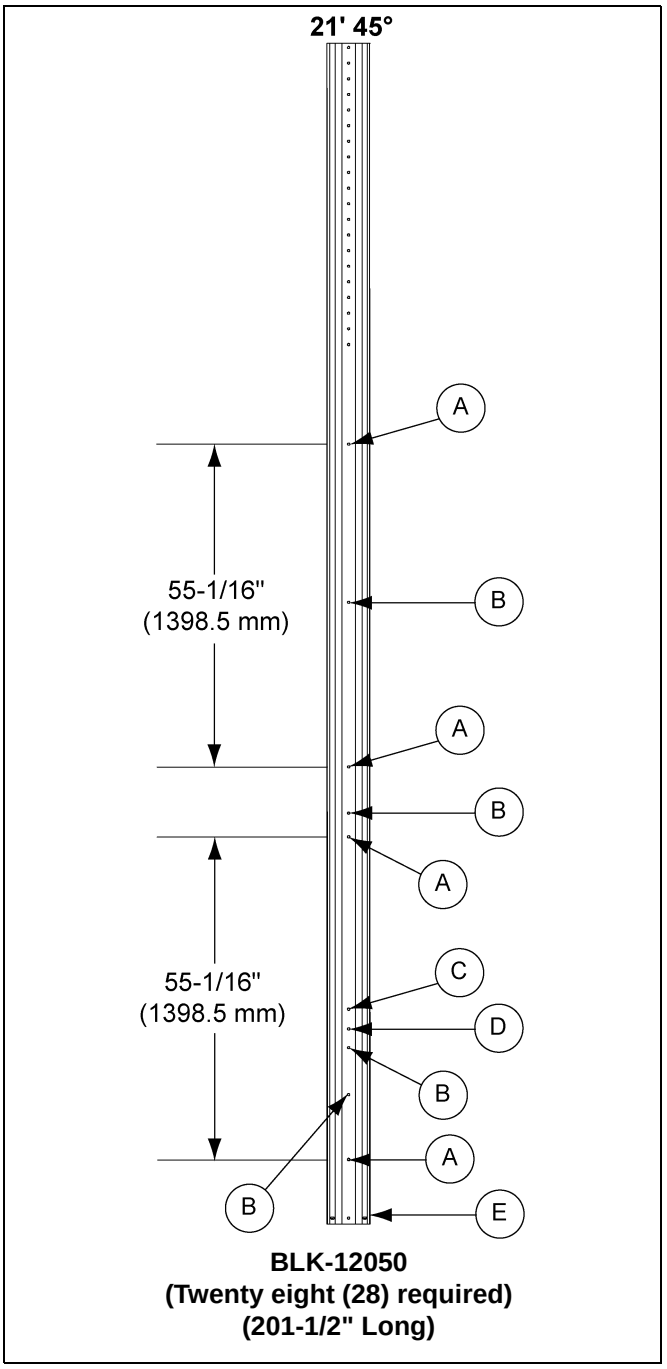


Figure 13R

Ref #	Description
A	Cross Tie
B	Ladder Standoff
C	22" Hopper Brace
D	16" Hopper Brace
E	Leg Anchor

All leg to sidewall holes (22 at 2.66" spacing on 18', 20 at 2.66" on 21') must be utilized for leg attachment.

Hopper to Leg Bracing for 12', 18' and 21'

Hopper braces are to be spaced equally around tank. Hopper braces are required on all hopper tanks. Refer to chart *below* for the quantities required.

NOTE: *Hopper braces attach between the legs and the collar/hopper horizontal seam. Never bolt the braces directly to the hopper seam above the collar.*

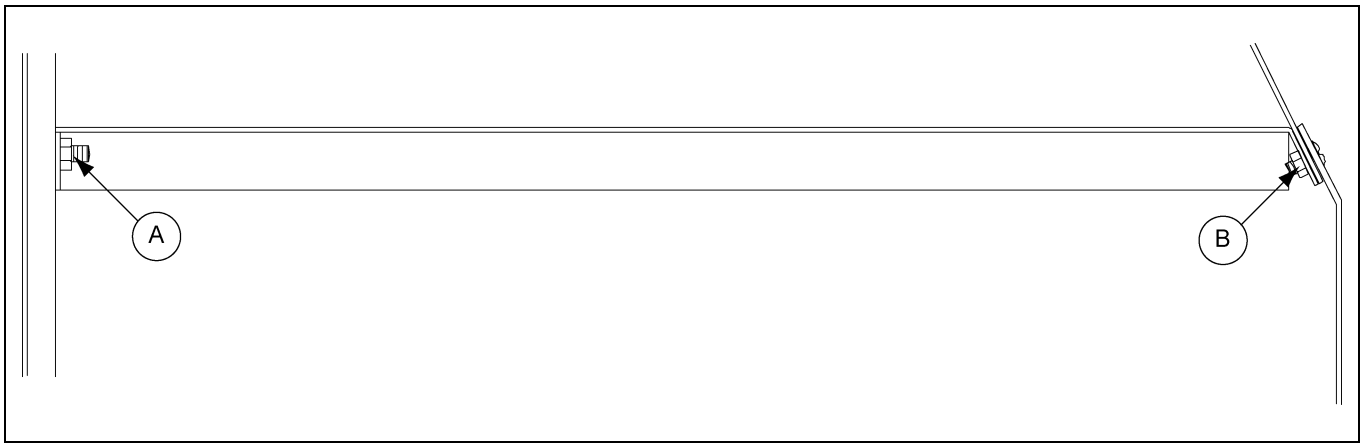


Figure 13S

Ref #	Description
A	3/8" x 1" Bolt (S-7485)
B	5/16" x 3/4" Truss Head Bolt (S-10267)

Description	16" Hopper Brace Part #	22" Hopper Brace Part #	Qty
12' Diameter 45° Hopper	BLK-12115	BLK-12116	8
12' Diameter 60° Hopper	BLK-12113	BLK-12114	8
18' Diameter 45° Hopper	BLK-12121	BLK-12122	3
21' Diameter 45° Hopper	BLK-12123	BLK-12124	4

Directions: Locate correct tank in far left column, braces are located across top of chart. Follow the column down to correct tank line and read the quantity required for that tank.

Cross Tie Brace Usage Chart

Description	Inside Cross Tie	Outside Cross Tie
12' Diameter 60° Hopper	16	16
12' Diameter 45° Hopper	8	8
18' Diameter 45° Hopper	36	36
21' Diameter 45° Hopper	56	56

Hopper to Leg Bracing for 15'

Hopper braces are to be spaced equally around tank. Hopper braces are required on all hopper tanks. Refer to chart *below* for the quantities required.

NOTE: *Hopper braces attach between the legs and the collar/hopper horizontal seam. Never bolt the braces directly to the hopper seam above the collar.*

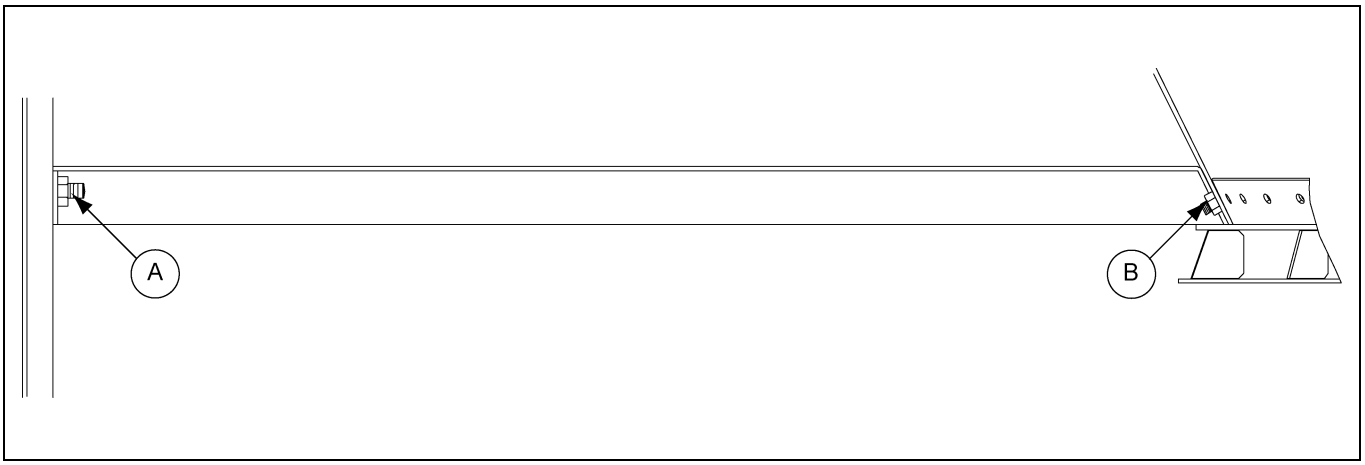


Figure 13T

Ref #	Description
A	3/8" x 1" Bolt (S-7485)
B	5/16" x 3/4" Truss Head Bolt (S-10267)

Description	16" Hopper Brace Part #	22" Hopper Brace Part #	Qty
15' Diameter 45° Hopper	BLK-12118	BLK-12120	3
15' Diameter 60° Hopper	BLK-12117	BLK-12119	3

Directions: Locate correct tank in far left column, braces are located across top of chart. Follow the column down to correct tank line and read the quantity required for that tank.

Cross Tie Brace Usage Chart

Description	Inside Cross Tie	Outside Cross Tie
15' Diameter 45° Hopper	15	15
15' Diameter 60° Hopper	30	30

Raising Bin to Set on Foundation

Be sure that all bolts are tightened properly. The Bulk Feed Tank can now be set up on foundation. A crane of adequate capacity attached to a spider assembly with cables connecting at each vertical sidewall seam just above the legs will usually do the job. Reference a qualified rigger.

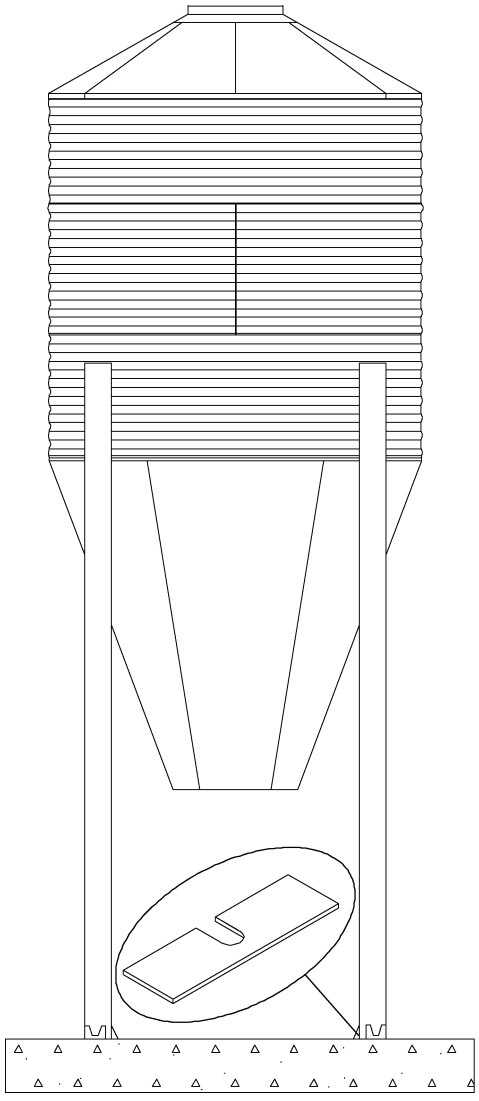
WARNING

Make sure there is enough clearance between the tank and surrounding power lines, electrocution may occur.

WARNING

All usual and customary precautions must be taken to ensure safety of personnel and property.

Standard Hopper Bin Anchoring



NOTE: *Leg shims are not standard equipment and must be obtained locally.*

Figure 14A

Anchoring Tank

Check all legs to see if shims are necessary to level the tank properly (shims are to be obtained locally). After Bulk Feed Tank is level and shimmed properly, anchor the tank down with 5/8" washers and nuts. *(See Figure 14B.)*

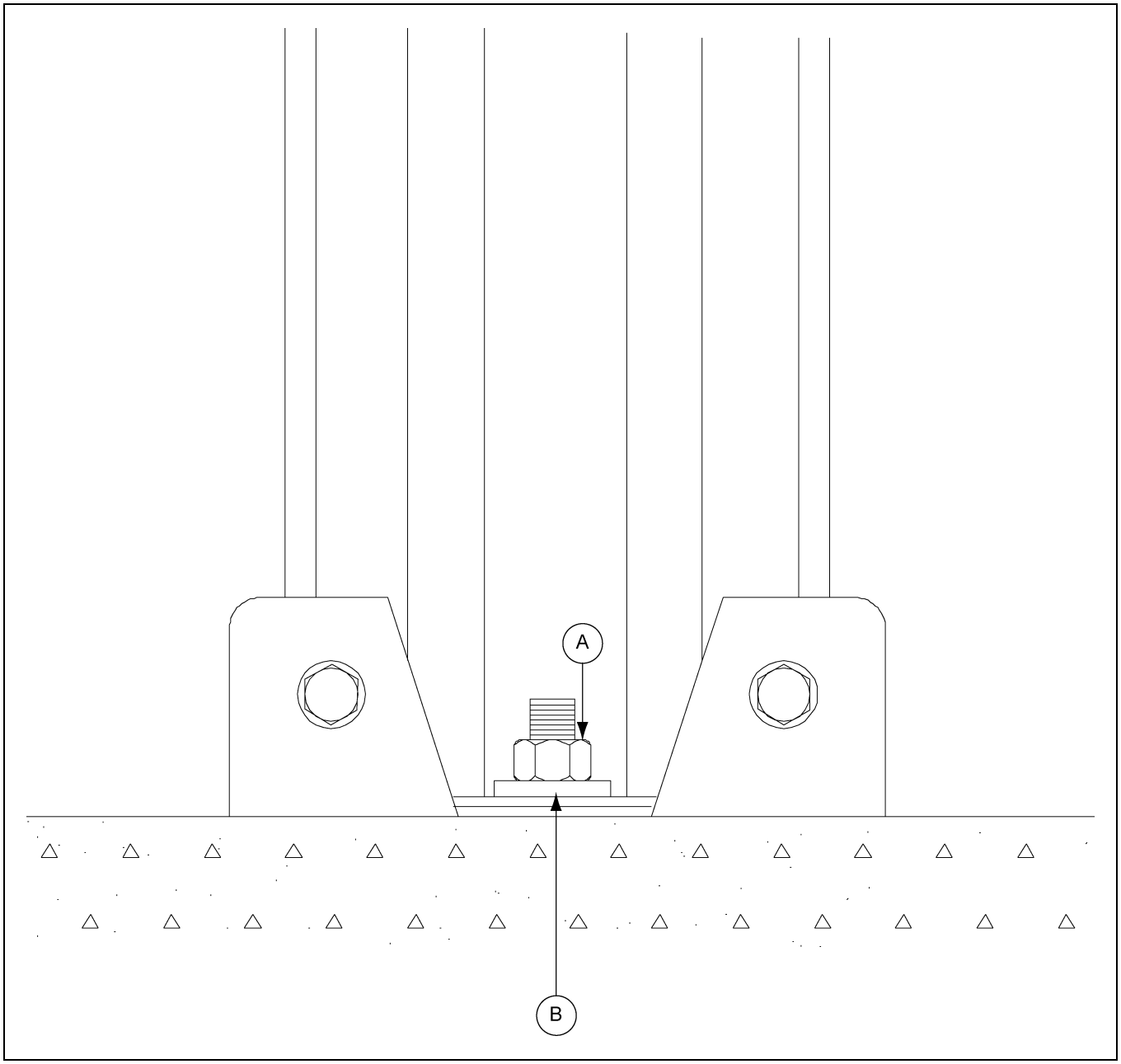


Figure 14B *Leg Base Detail*

Ref #	Part #	Description
A	S-836	5/8" Nut
B	S-858	5/8" Washer

Bin Grounding Instructions

NOTE: *Parts are not supplied by manufacturer. They should be purchased locally.*

All bins shall have two (2) ground connections. Ground clamps must be placed at equal distances around the bin.

Alternate Installation: Cables may be placed in the foundation or through PVC sleeve inserted in the slab during construction.

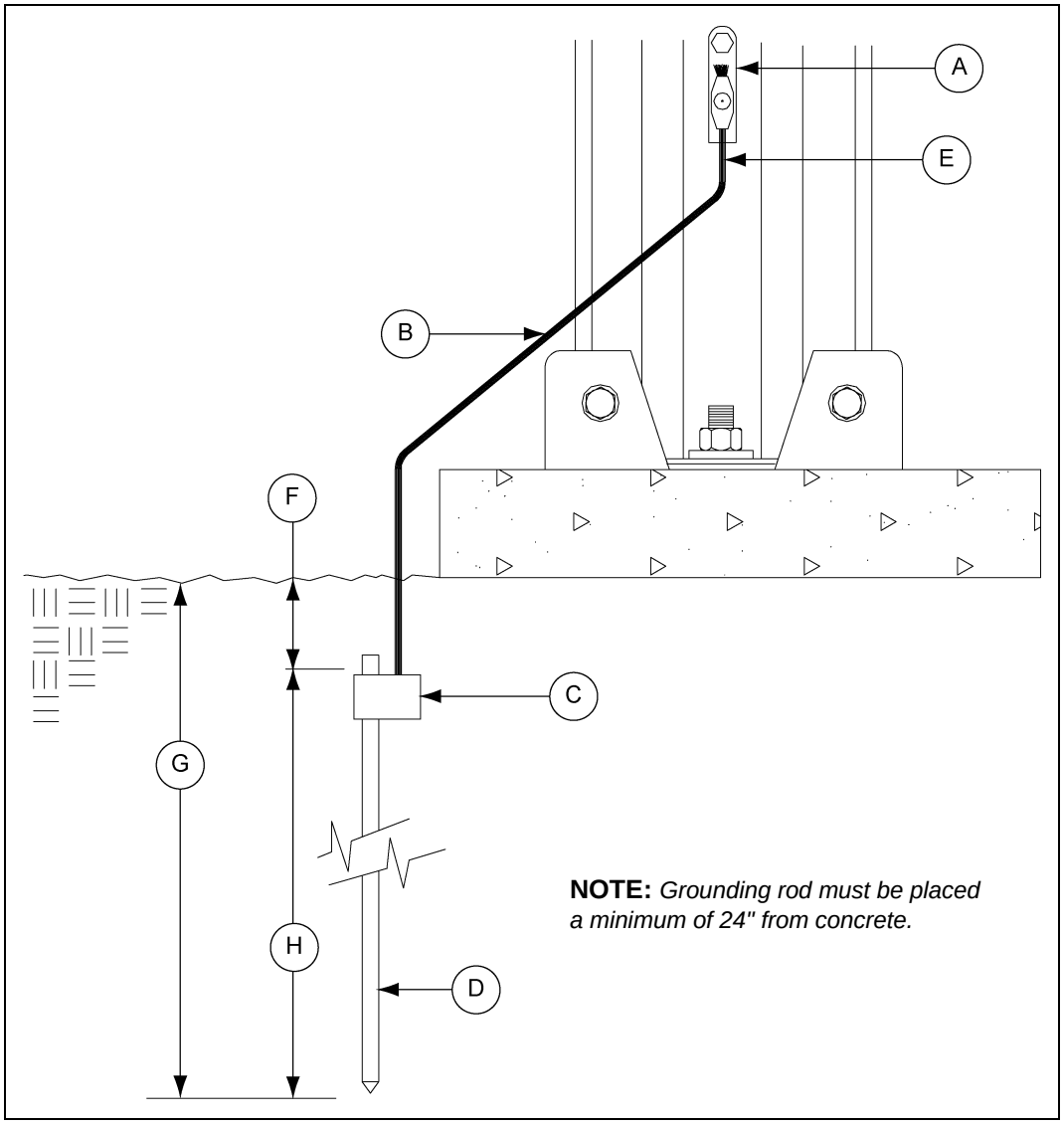


Figure 14C

Ref #	Description
A	Cable Clamp
B	5' (1524 mm) Copper Cable (Plain or Jacketed)
C	Ground Rod Clamp
D	Ground Rod 1/2" x 10' (3048 mm)

Ref #	Description
E	Number 2 Minimum (Typical)
F	12" (305 mm)
G	10'-0" Minimum (3048 mm)
H	9'-0" Minimum (2743 mm)

Pneumatic Fill Kit Assembly

NOTE: *Inlet and exhaust parts from roof eave upward supplied with kit.*

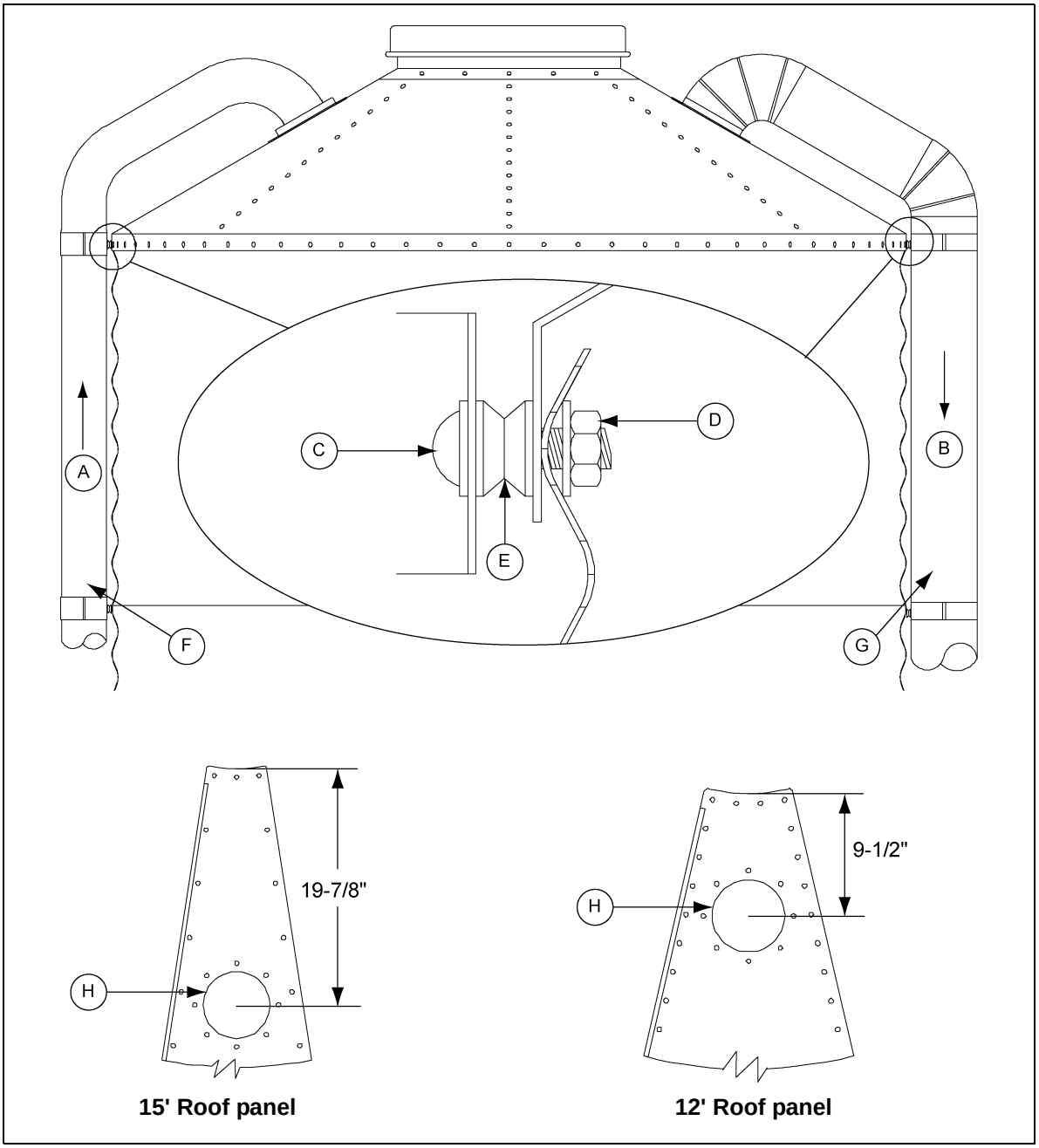


Figure 15A

Ref #	Description
A	Fill
B	Exhaust
C	5/16" Square Neck Bolt
D	Hex Nut 5/16"-18 JS Grade 5 (S-7484)

Ref #	Description
E	Cupped Washer
F	Fill tube is 4" diameter (Available)
G	Exhaust tube is 6" diameter
H	5-5/8" Diameter Hole

Roof Panel

Identical pre-punched roof panels are available from the GSI for inlet and outlet sections of pneumatic fill systems. Extruded lip of the panels provide for weather-tight installation. Caulking placed between angle rings virtually eliminates all leakage problems. Rubber seal must be utilized at roof cap area to prevent material “blow by” from pressurized systems.

To install fill kits in roof panels not pre-punched, cut 5-5/8" (143 mm) diameter holes in opposing roof panels as shown. Caulk sufficiently to provide weather-tight seal.

Refer to PNEG-1904, that is included in the pneumatic fill kits for information on installation of the cap latch and lid sealing components.

Figure 15B

NOTES

1. **12' Diameter 60° Hopper Bin Specifications -** *(See Pages 104 and 105.)*

2. **12' Diameter 60° Hopper Bin Hardware Specifications** - *(See Pages 106 and 107.)*

3. **12' Diameter 45° Hopper Bin Specifications -** *(See Pages 108 and 109.)*

4. **12' Diameter 45° Hopper Bin Hardware Specifications -** *(See Pages 110 and 111.)*

5. **15' Diameter 60° Hopper Bin Specifications -** *(See Pages 112 and 113.)*

6. **15' Diameter 60° Hopper Bin Hardware Specifications -** *(See Pages 114 and 115.)*

7. **15' Diameter 45° Hopper Bin Specifications -** *(See Pages 116 and 117.)*

8. **15' Diameter 45° Hopper Bin Hardware Specifications -** *(See Pages 118 and 119.)*

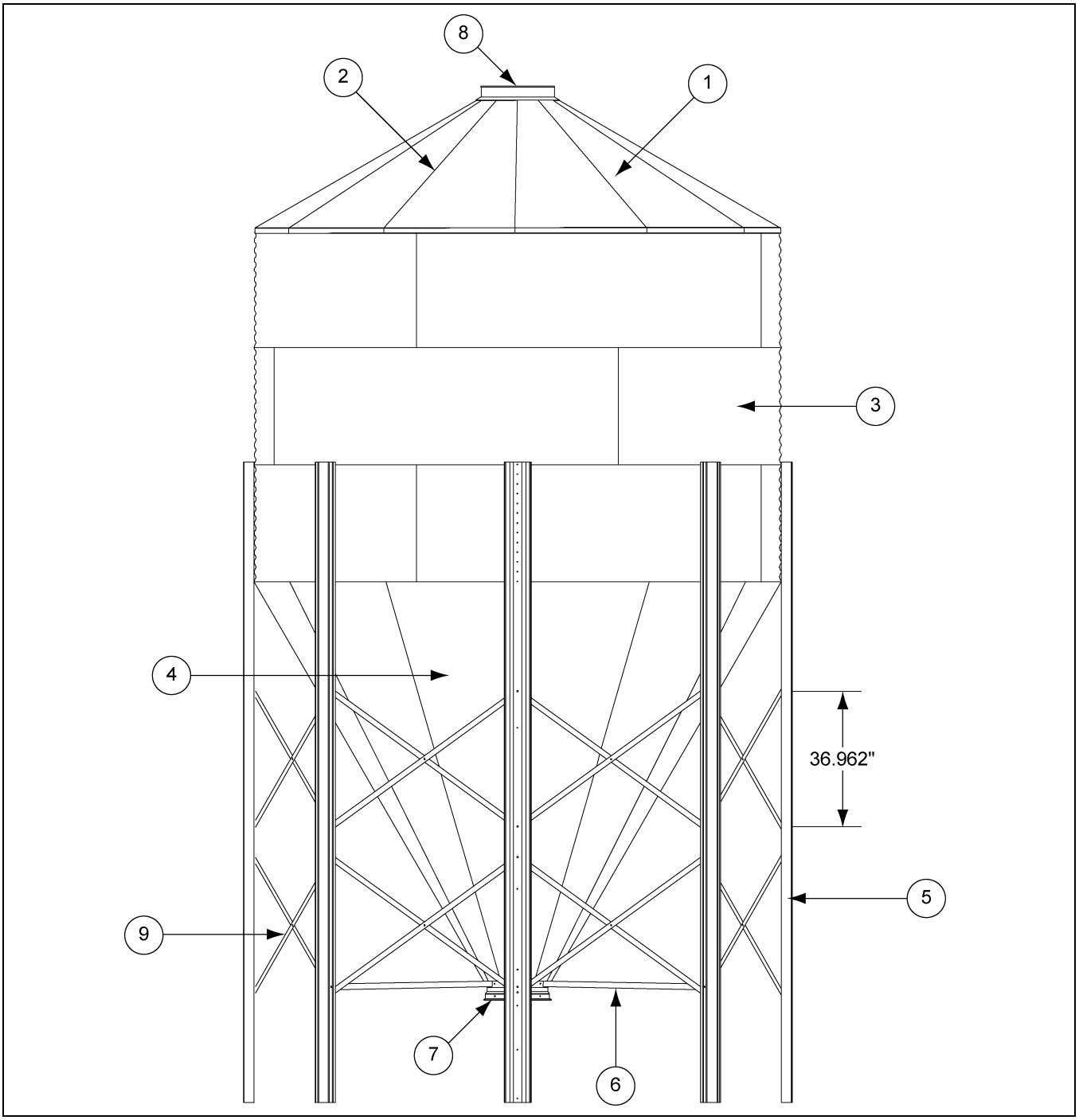
9. **18' Diameter 45° Hopper Bin Specifications -** *(See Pages 120 and 121.)*

10. **18' Diameter 45° Hopper Bin Hardware Specifications -** *(See Pages 122 and 123.)*

11. **21' Diameter 45° Hopper Bin Specifications -** *(See Pages 124 and 125.)*

12. **21' Diameter 45° Hopper Bin Hardware Specifications -** *(See Pages 126 and 127.)*

12' Diameter 60° Hopper Bin Specifications



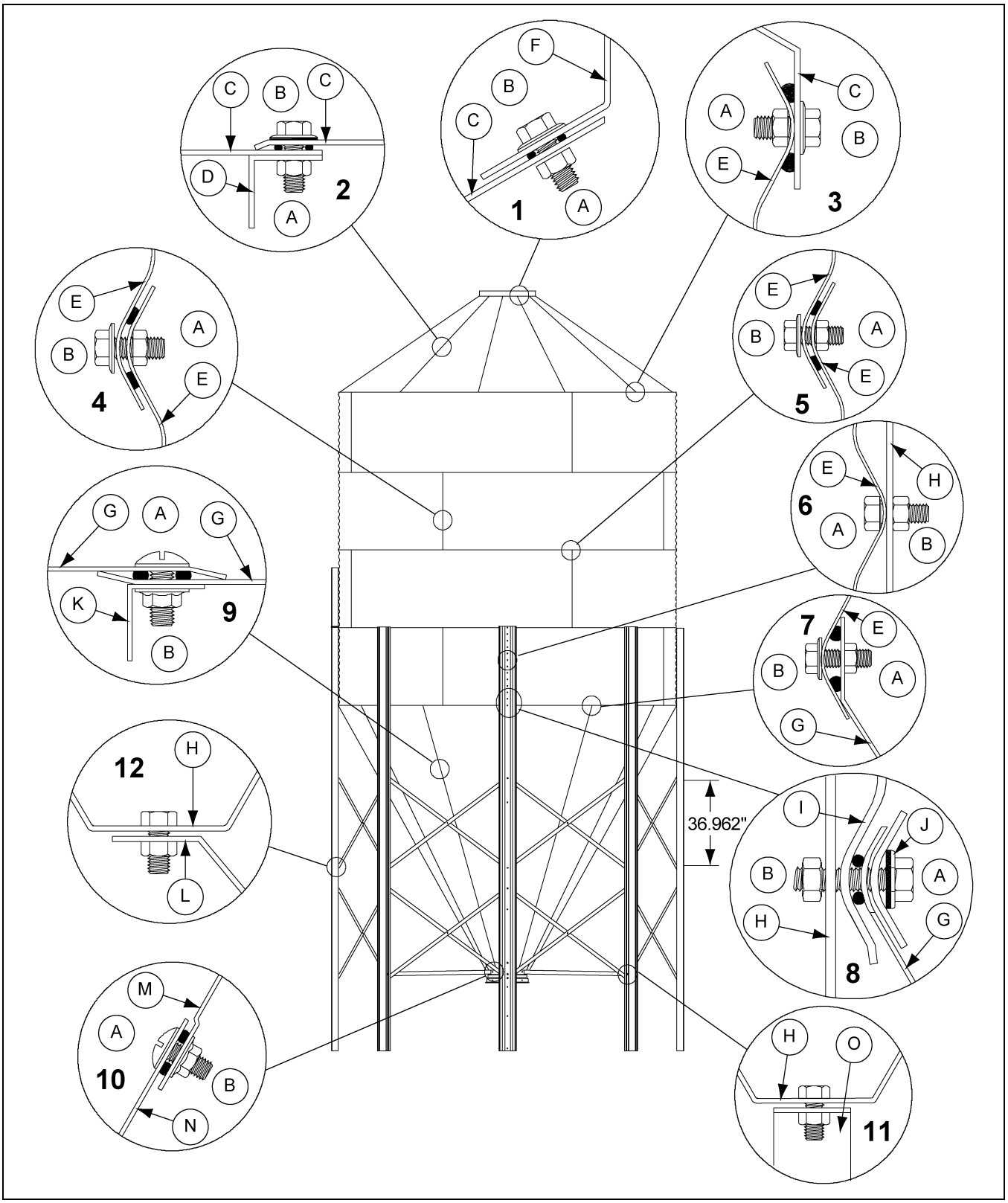
Under Collar Clearance	
16" Collar	31-3/16" (792 mm)
22" Collar	35-3/4" (908 mm)

IMPORTANT: *Bolt heads are inside of bin at the leg to body attachment and on all vertical seams on hopper panels. All bolts to be tightened from the nut side only. Refer to detail* *on Page 28* *for location of caulking.*

12' Diameter 60° Hopper Bin Specifications Parts List

Ref #	Part #	Description	Qty
1	BLK-12272	12' 30° Roof Panel (20 Gauge)	12
1	BLK-12275	12' 40° Roof Panel (20 Gauge)	12
2	BLK-12286	12' 30° Roof Stiffener Channel (18 Gauge)	12
2	BLK-12287	12' 40° Roof Stiffener Channel (18 Gauge)	12
3		**12' Sidewall Sheet**	**4 Per Ring**
3	SS40682012	20 Gauge (Top Punched Sidewall Sheet)	
3	SS41932012	20 Gauge (Top Punched Decal Sidewall Sheet)	
3	SS40692012	20 Gauge (Middle Punched Sidewall Sheet)	
3	SS40691812	18 Gauge (Middle Punched Sidewall Sheet)	
3	SS40691612	16 Gauge (Middle Punched Sidewall Sheet)	
3	SS40691512	15 Gauge (Middle Punched Sidewall Sheet)	
3	SS40701512	15 Gauge (Middle Leg Punched Sidewall Sheet)	
3	SS40701312	13 Gauge (Middle Leg Punched Sidewall Sheet)	
3	SS40721312	13 Gauge (Bottom Punched Leg Sheet)	
3	SS40721212	12 Gauge (Bottom Punched Leg Sheet)	
4	BLK-10155	12' 60° Offset Hopper Panel (14 Gauge)	12
5	BLK-12720	12' 60° (1-5 Ring) Leg 175-1/8" (12 Gauge) 1 Ring Coverage	8
5	BLK-12046	12' 60° (6-7 Ring) Leg 199-1/8" (10 Gauge) 1-3/4 Ring Coverage	8
6	BLK-12113	Hopper Brace for 16" Collar (Shown)	8
6	BLK-12114	Hopper Brace for 22" Collar	8
7	BLK-10587	16" 60° Hopper Extension Kit with Collar (Shown)	1
7	BLK-10342	22" 60° Hopper Collar (36 Holes)	1
8	BLK-11730	30° Roof Bulk Tank Peak Ring	1
8	BLK-12534	40° Roof Bulk Tank Peak Ring	1
9	BLK-12060	12' Inside Cross Tie Brace (67.788") (12 Gauge)	16
9	BLK-12061	12' Outside Cross Tie Brace (67.788") (12 Gauge)	16
N/S	BLK-12520	12' 60° Hopper Reinforcement Angle (Optional)	12

12' Diameter 60° Hopper Bin Hardware Specifications



Under Collar Clearance	
16" Collar	31-3/16" (792 mm)
22" Collar	35-3/4" (908 mm)

*** NOTE:** *Bolt listed first and nut second for each usage.*

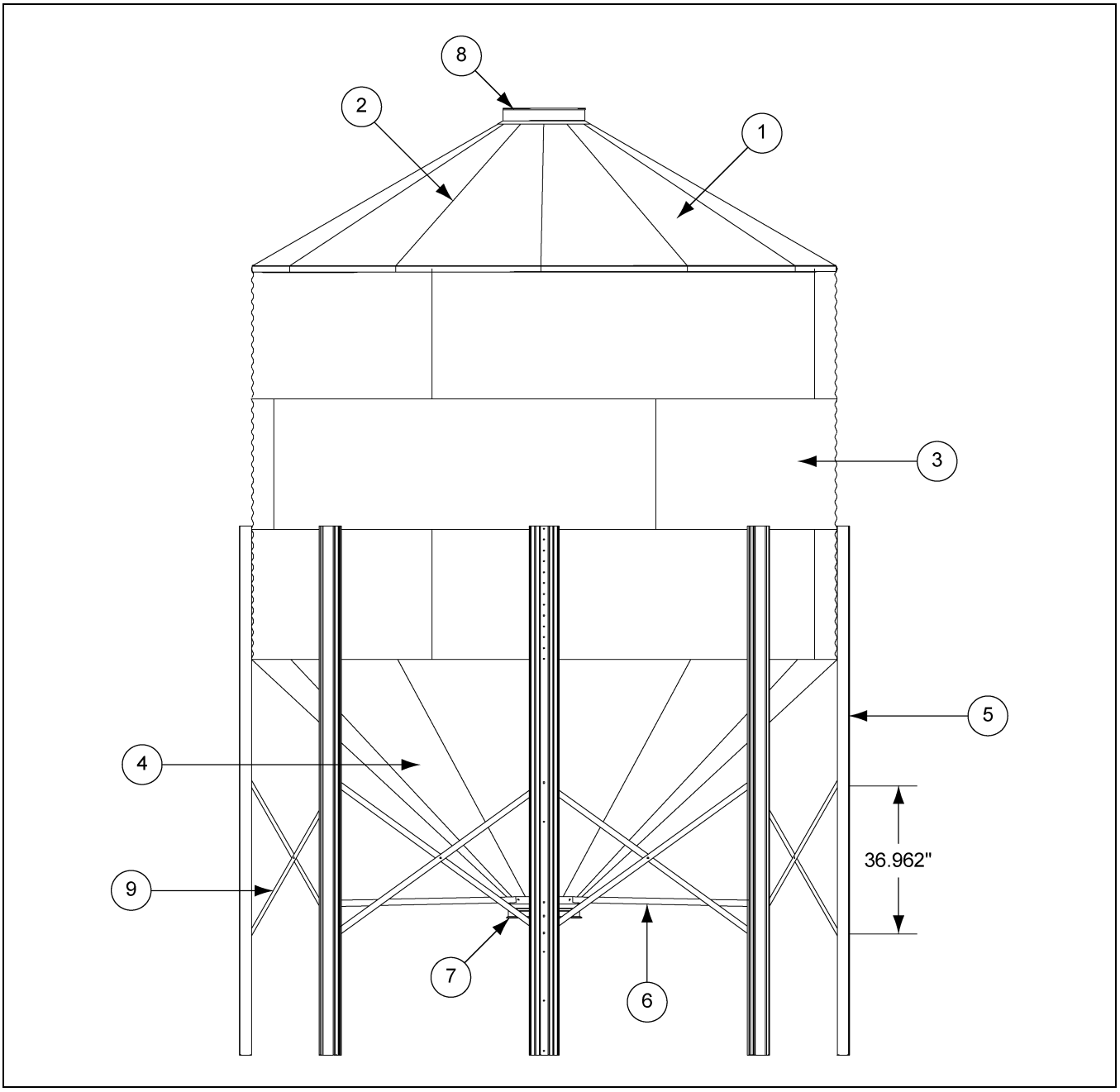
12' Diameter 60° Hopper Bin Hardware Specifications Parts List

Ref #	Part #	Description	Qty
1	S-10260	Bulk Tank Peak Ring to Roof Panels (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	36
1	S-7484		36
2	S-10260	Roof Panel to Roof Panel (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	240
2	S-7484		240
3	S-10260	Roof Panels to Top Sidewall Sheets (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	144
3	S-7484		144
4	S-10260	Vertical Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
4	S-7484		Varies
5	S-10260	Horizontal Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
5	S-7484		Varies
6	S-10260	Leg to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Heads to Inside of Tank.)**	96 or 168
6	S-7484		96 or 168
7	S-10260	Hopper Panels to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Head to Inside at Leg to Hopper to Sidewall Connection Only.)**	288
7	S-7484		288
8	S-10260	Leg to Body Sheet to Hopper Connection (Use 10 Gauge Washer under 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Head to Inside at Leg to Hopper to Sidewall Connection Only.)**	8
8	S-7484		8
8	BLK-12483		8
9	S-10267	Vertical Hopper Seams (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)**	420
9	S-10268		420
10	S-10267	Hopper Collar to Hopper Panel (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)** (16" Shown.)	36
10	S-10268		36
11	S-7485	Hopper Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	8
11	S-7489		8
12	S-7485	Cross Tie Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	48
12	S-7489		48

Ref #	Description
A	Inside
B	Outside
C	Roof Sheet
D	12' Roof Stiffener Channel
E	Body Sheet
F	Peak Ring Collar
G	Hopper Panel
H	Leg

Ref #	Description
I	Sidewall
J	Washer
K	Hopper Reinforcement Angle (Optional)
L	Leg Cross Tie
M	Offset Hopper Panel
N	Hopper Collar
O	Hopper Brace

12' Diameter 45° Hopper Bin Specifications



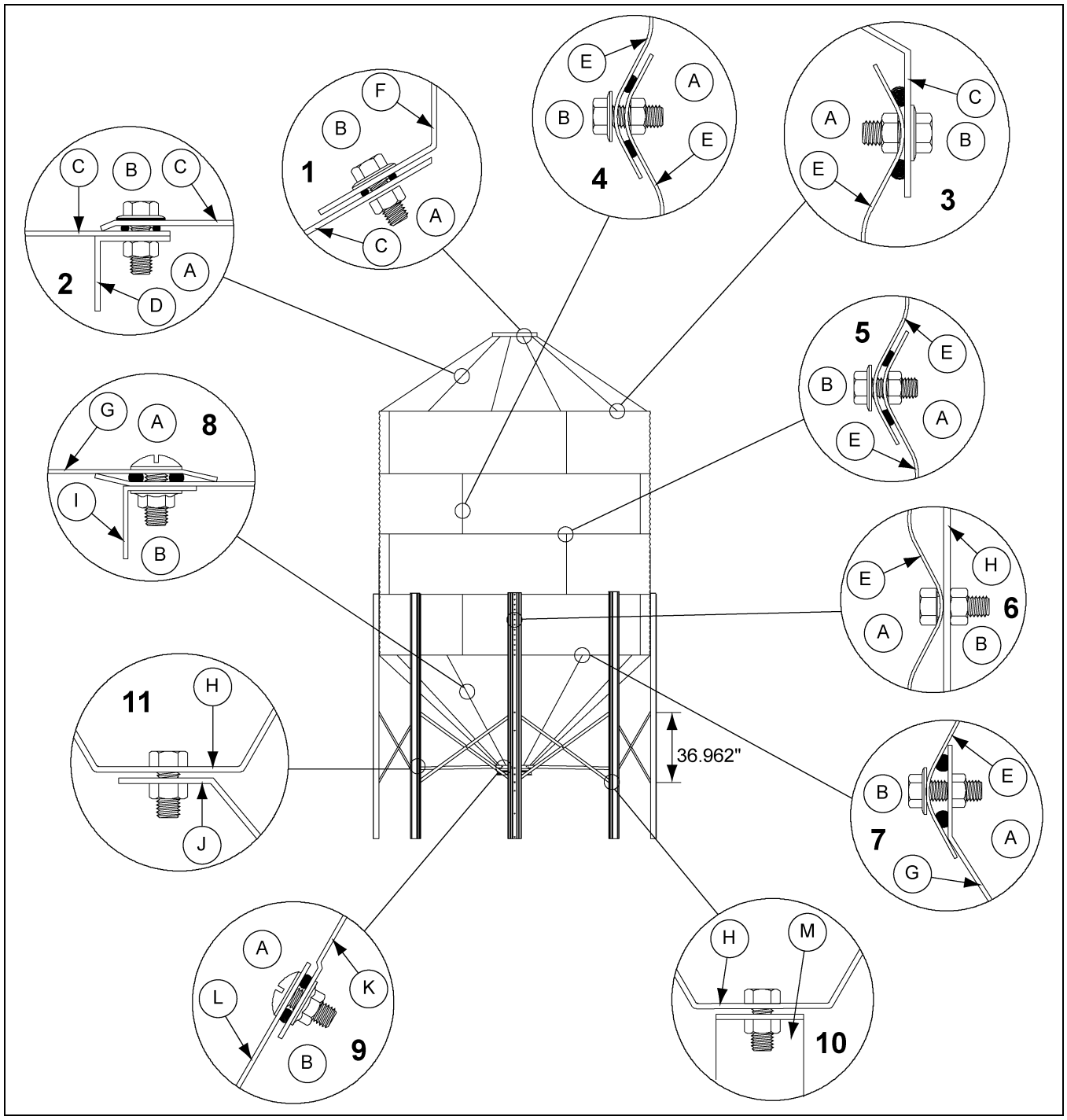
Under Collar Clearance	
16" Collar	34" (864 mm)
22" Collar	36-9/16" (929 mm)

IMPORTANT: *Bolt heads are inside of bin at the leg to body attachment and on all vertical seams on hopper panels. All bolts to be tightened from the nut side only. Refer to detail* *on Page 28* *for location of caulking.*

12' Diameter 45° Hopper Bin Specifications Parts List

Ref #	Part #	Description	Qty
1	BLK-12272	12' 30° Roof Panel (20 Gauge)	12
1	BLK-12275	12' 40° Roof Panel (20 Gauge)	12
2	BLK-12286	12' 30° Roof Stiffener Channel (18 Gauge)	12
2	BLK-12287	12' 40° Roof Stiffener Channel (18 Gauge)	12
3		**12' Sidewall Sheet**	**4 Per Ring**
3	SS40682012	20 Gauge (Top Punched Sidewall Sheet)	
3	SS41932012	20 Gauge (Top Punched Decal Sidewall Sheet)	
3	SS40692012	20 Gauge (Middle Punched Sidewall Sheet)	
3	SS40691812	18 Gauge (Middle Punched Sidewall Sheet)	
3	SS40691612	16 Gauge (Middle Punched Sidewall Sheet)	
3	SS40691512	15 Gauge (Middle Punched Sidewall Sheet)	
3	SS40701512	15 Gauge (Middle Leg Punched Sidewall Sheet)	
3	SS40701312	13 Gauge (Middle Leg Punched Sidewall Sheet)	
3	SS40721312	13 Gauge (Bottom Punched Leg Sheet)	
3	SS40721212	12 Gauge (Bottom Punched Leg Sheet)	
4	BLK-10695	12' 45° Offset Hopper Panel (14 Gauge)	12
5	BLK-12045	12' 45° (1-5 Ring) Leg (154-1/8") (12 Gauge) 1 Ring Coverage	8
5	BLK-12045	12' 45° (6-7 Ring) Leg (154-1/8") (10 Gauge) 1-3/4 Ring Coverage	8
6	BLK-12115	Hopper Brace for 16" Collar (62.7") (Shown)	8
6	BLK-12116	Hopper Brace for 22" Collar (60.1")	8
7	BLK-10847	16" 45° Hopper Extension Kit with Collar (Shown)	1
7	BLK-10854	22" 45° Hopper Collar (36 Holes)	1
8	BLK-11730	30° Roof Bulk Tank Peak Ring	1
8	BLK-12534	40° Roof Bulk Tank Peak Ring	1
9	BLK-12060	12' Inside Cross Tie Brace (67.788") (12 Gauge)	8
9	BLK-12061	12' Outside Cross Tie Brace (67.788") (12 Gauge)	8
N/S	BLK-12520	12' 45° Hopper Reinforcement Angle (Optional)	12

12' Diameter 45° Hopper Bin Hardware Specifications



Under Collar Clearance	
16" Collar	34" (864 mm)
22" Collar	36-9/16" (929 mm)

IMPORTANT: *Bolt heads are inside of bin at the leg to body attachment and on all vertical seams on hopper panels. All bolts to be tightened from the nut side only. Refer to detail* *on Page 28* *for location of caulking.*

NOTE: *Bolt listed first and nut second for each usage.*

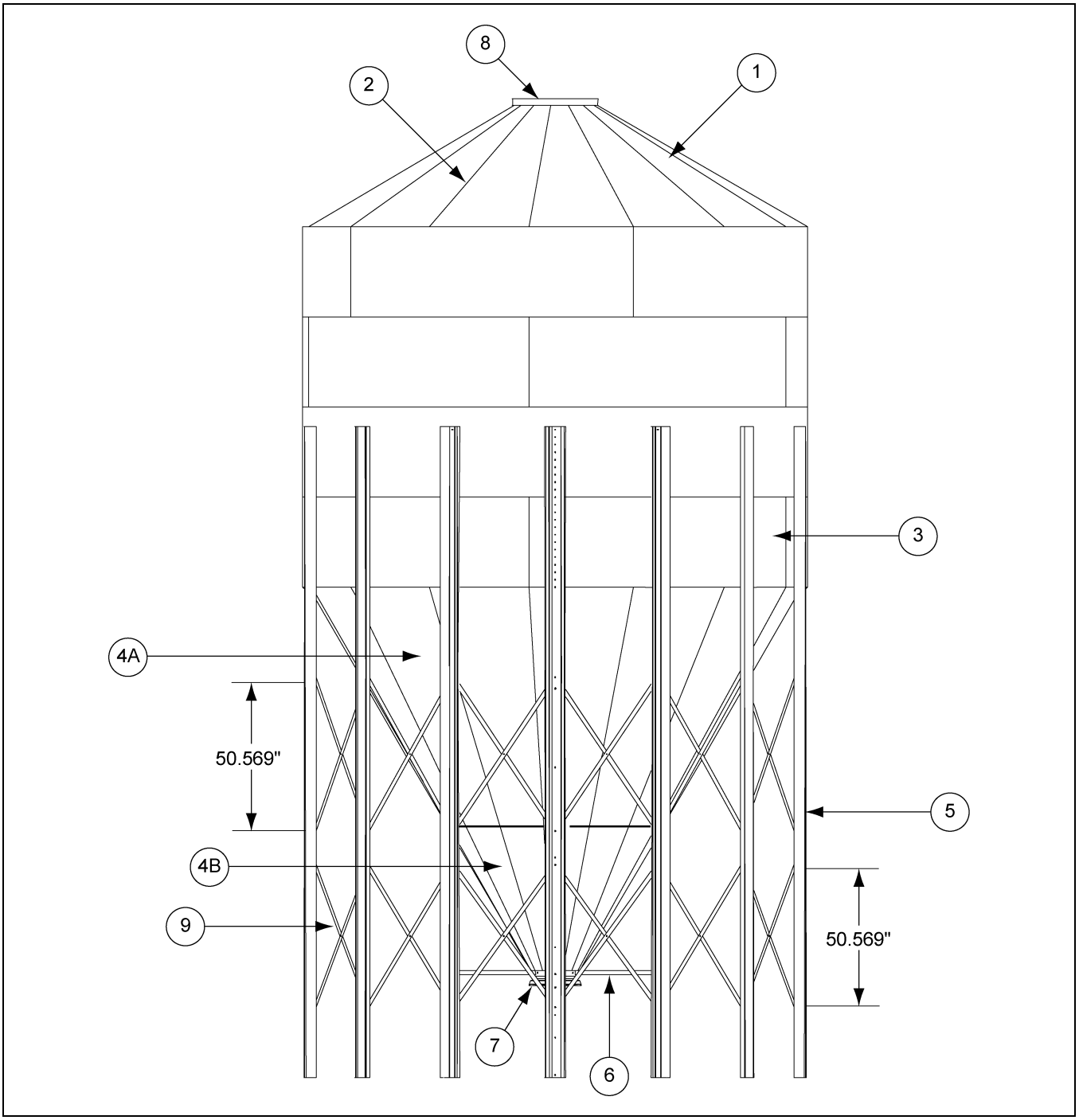
12' Diameter 45° Hopper Bin Hardware Specifications Parts List

Ref #	Part #	Description	Qty
1	S-10260	Bulk Tank Peak Ring to Roof Panels (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	36
1	S-7484		36
2	S-10260	Roof Panel to Roof Panel (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	240
2	S-7484		240
3	S-10260	Roof Panels to Top Sidewall Sheets (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	144
3	S-7484		144
4	S-10260	Vertical Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
4	S-7484		Varies
5	S-10260	Horizontal Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
5	S-7484		Varies
6	S-10260	Leg to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Heads to Inside of Tank.)**	96 or 168
6	S-7484		96 or 168
7	S-10260	Hopper Panels to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Head to Inside at Leg to Hopper to Sidewall Connection Only.)**	288
7	S-7484		288
8	S-10267	Vertical Hopper Seams (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)**	300
8	S-10268		300
9	S-10267	Hopper Collar to Hopper Panel (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)** (16" Shown.)	36
9	S-10268		36
10	S-7485	Hopper Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	8
10	S-7489		8
11	S-7485	Cross Tie Brace (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	24
11	S-7489		24

Ref #	Description
A	Inside
B	Outside
C	Roof Sheet
D	12' Roof Stiffener Channel
E	Body Sheet
F	Peak Ring Collar
G	Hopper Panel

Ref #	Description
H	Leg
I	Hopper Reinforcement Angle (Optional)
J	Leg Cross Tie
K	Offset Hopper Panel
L	Hopper Collar
M	Hopper Brace

15' Diameter 60° Hopper Bin Specifications



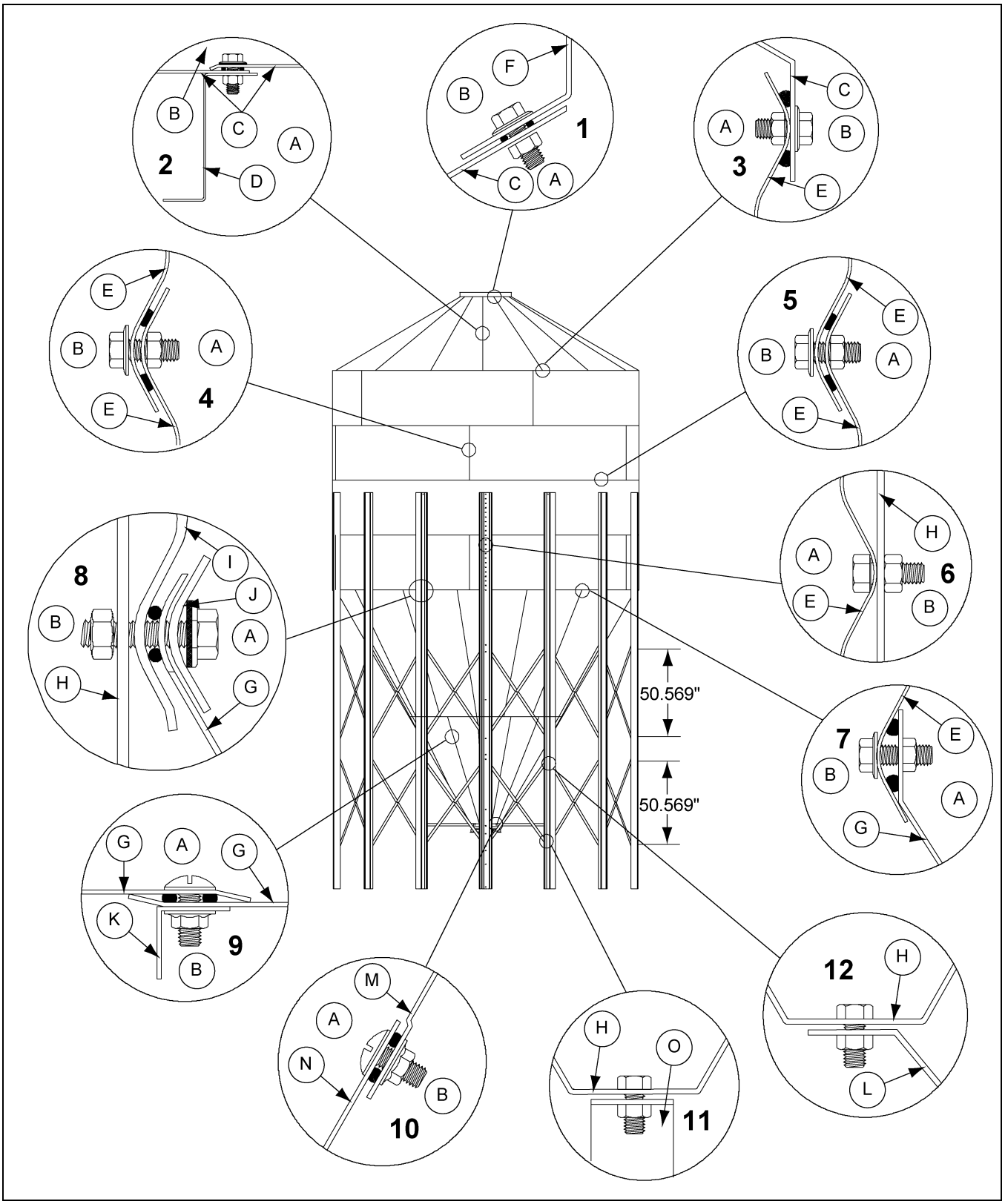
Under Collar Clearance	
16" Collar	33" (838 mm)
22" Collar	37-9/16" (954 mm)

IMPORTANT: *Bolt heads are inside of bin at the leg to body attachment and on all vertical seams on hopper panels. All bolts to be tightened from the nut side only. Refer to detail* *on Page 28* *for location of caulking.*

15' Diameter 60° Hopper Bin Specifications Parts List

Ref #	Part #	Description	Qty
1	BLK-12278	15' 30° Roof Panel (20 Gauge)	18
2	BLK-12288	15' 30° Roof Stiffener Channel	18
3		**15' Sidewall Sheet**	**5 Per Ring**
3	HT38742015	20 Gauge (Top Punched Sidewall Sheet)	
3	HT38752015	20 Gauge (Top Punched Decal Sidewall Sheet)	
3	HT43421815	18 Gauge (Top 3 Leg Punched Sidewall Sheet)	
3	HT43431815	18 Gauge (Top 3 Leg Punched Decal Sidewall Sheet)	
3	SS00151815	18 Gauge (Middle Punched Sidewall Sheet)	
3	HT33911815	18 Gauge (Middle 3 Leg Punched Sidewall Sheet)	
3	SS00151615	16 Gauge (Middle Punched Sidewall Sheet)	
3	HT33911615	16 Gauge (Middle 3 Leg Punched Sidewall Sheet)	
3	SS00151415	14 Gauge (Middle Punched Sidewall Sheet)	
3	HT33911415	14 Gauge (Middle 3 Leg Punched Sidewall Sheet)	
3	HT43691415	14 Gauge (Bottom 3 Leg Punched Sidewall Sheet)	
3	HT43691215	12 Gauge (Bottom 3 Leg Punched Sidewall Sheet)	
4A	BLK-11209	15' 60° Upper Hopper Panel (14 Gauge)	18
4B	BLK-11210	15' 60° Lower Hopper Panel (16 Gauge)	9
5	BLK-12048	15' 60° Leg 231.00" (10 Gauge)	15
6	BLK-12117	Hopper Brace for 16" Collar (Shown)	3
6	BLK-12119	Hopper Brace for 22" Collar	3
7	BLK-10587	16" 60° Hopper Extension Kit with Collar (Shown)	1
7	BLK-10324	22" 60° Hopper Collar (36 Holes)	1
8	BLK-11730	Bulk Tank Peak Ring	1
9	BLK-12062	15' Inside Cross Tie Brace (64.4") (12 Gauge)	30
9	BLK-12063	15' Outside Cross Tie Brace (64.4") (12 Gauge)	30

15' Diameter 60° Hopper Bin Hardware Specifications



IMPORTANT: *Bolt heads are inside of bin at the leg to body attachment and on all vertical seams on hopper panels. All bolts to be tightened from the nut side only. Refer to detail* *on Page 28* *for location of caulking.*

*** NOTE:** *Bolt listed first and nut second for each usage.*

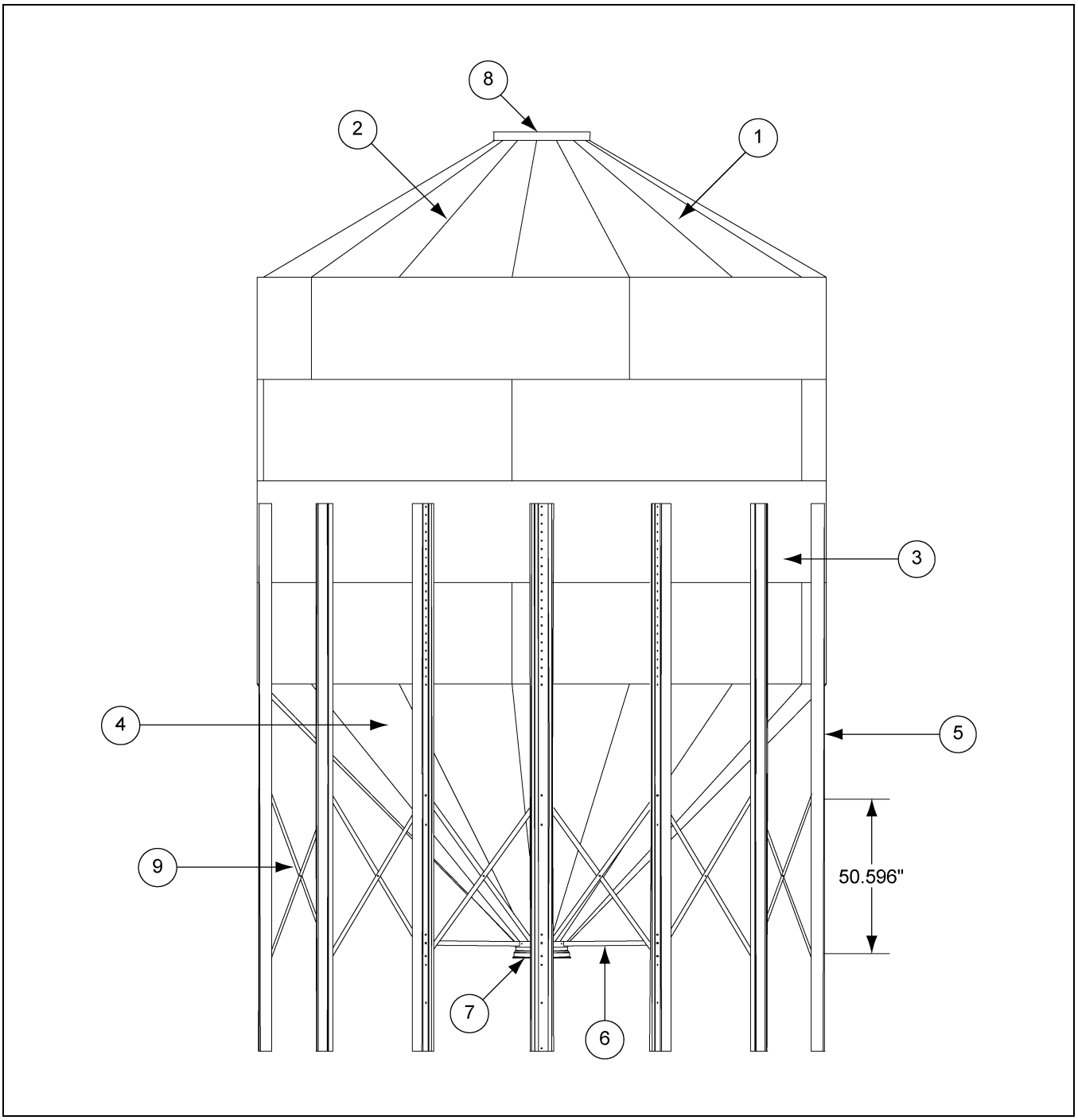
15' Diameter 60° Hopper Bin Hardware Specifications Parts List

Ref #	Part #	Description	Qty
1	S-10260	Bulk Tank Peak Ring to Roof Panels (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	36
1	S-7484		36
2	S-10260	Roof Panel to Roof Panel (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	414
2	S-7484		414
3	S-10260	Roof Panels to Top Sidewall Sheets (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	180
3	S-7484		180
4	S-10260	Vertical Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
4	S-7484		Varies
5	S-10260	Horizontal Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
5	S-7484		Varies
6	S-10260	Leg to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Heads to Inside of Tank.)**	330
6	S-7484		330
7	S-10260	Hopper Panels to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Head to Inside at Leg to Hopper to Sidewall Connection Only.)**	360
7	S-7484		360
8	S-10267	Leg to Body Sheet to Hopper Connection (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Head to Inside at Leg to Hopper to Sidewall Connection Only.)**	15
8	S-7484		15
8	BLK-12483		15
9	S-10267	Vertical Hopper Seams (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)**	850
9	S-10268		850
10	S-10267	Hopper Collar to Hopper Panel (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)** (16" Shown.)	36
10	S-10268		36
11	S-7485	Hopper Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	3
11	S-7489		3
12	S-7485	Cross Tie Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	90
12	S-7489		90

Ref #	Description
A	Inside
B	Outside
C	Roof Sheet
D	15' Roof Stiffener Channel
E	Body Sheet
F	Peak Ring Collar
G	Hopper Panel
H	Leg

Ref #	Description
I	Sidewall
J	Washer
K	Hopper Reinforcement Angle (Optional)
L	Leg Cross Tie
M	Offset Hopper Panel
N	Hopper Collar
O	Hopper Brace

15' Diameter 45° Hopper Bin Specifications



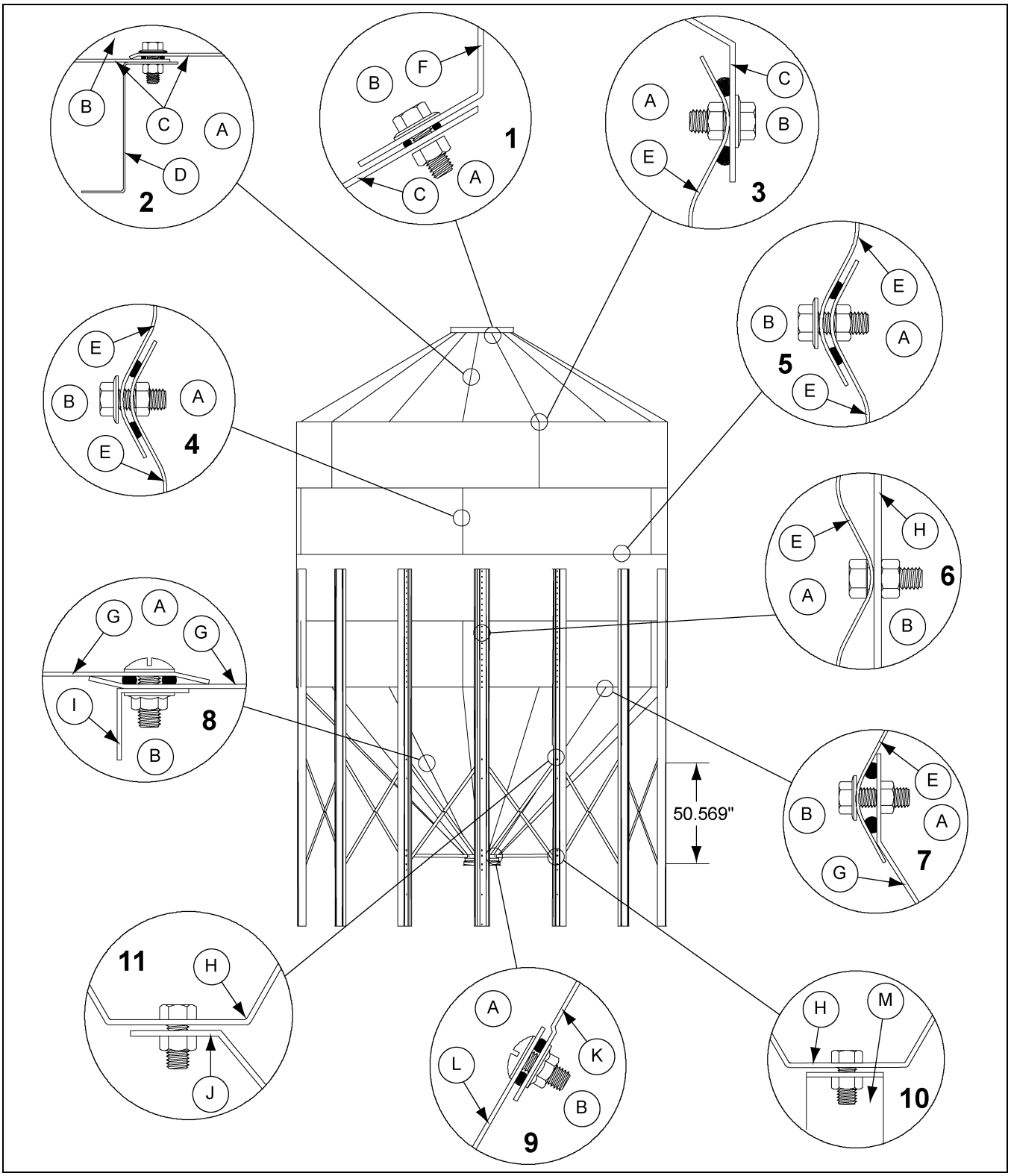
Under Collar Clearance	
16" Collar	34-1/16" (865 mm)
22" Collar	36-5/8" (930 mm)

IMPORTANT: *Bolt heads are inside of bin at the leg to body attachment and on all vertical seams on hopper panels. All bolts to be tightened from the nut side only. Refer to detail* *on Page 28* *for location of caulking.*

15' Diameter 45° Hopper Bin Specifications Parts List

Ref #	Part #	Description	Qty
1	BLK-12278	15' 30° Roof Panel (20 Gauge)	18
2	BLK-12288	15' 30° Roof Stiffener Channel	18
3		**15' Sidewall Sheet**	**5 Per Ring**
3	HT38742015	20 Gauge (Top Punched Sidewall Sheet)	
3	HT38752015	20 Gauge (Top Punched Decal Sidewall Sheet)	
3	HT43421815	18 Gauge (Top 3 Leg Punched Sidewall Sheet)	
3	HT43431815	18 Gauge (Top 3 Leg Punched Decal Sidewall Sheet)	
3	SS00151815	18 Gauge (Middle Punched Sidewall Sheet)	
3	HT33911815	18 Gauge (Middle 3 Leg Punched Sidewall Sheet)	
3	SS00151615	16 Gauge (Middle Punched Sidewall Sheet)	
3	HT33911615	16 Gauge (Middle 3 Leg Punched Sidewall Sheet)	
3	SS00151415	14 Gauge (Middle Punched Sidewall Sheet)	
3	HT33911415	14 Gauge (Middle 3 Leg Punched Sidewall Sheet)	
3	HT43691415	14 Gauge (Bottom 3 Leg Punched Sidewall Sheet)	
3	HT43691215	12 Gauge (Bottom 3 Leg Punched Sidewall Sheet)	
4	BLK-10845	15' 45° Hopper Panel (14 Gauge)	18
5	BLK-12047	15' 45° Leg 172-1/8" (10 Gauge)	15
6	BLK-12118	Hopper Brace for 16" Collar (Shown)	3
6	BLK-12120	Hopper Brace for 22" Collar	3
7	BLK-10847	16" 45° Hopper Extension Kit with Collar (Shown)	1
7	BLK-10854	22" 45° Hopper Collar (36 Holes)	1
8	BLK-11730	Bulk Tank Peak Ring	1
9	BLK-12062	15' Inside Cross Tie Brace (64.4") (12 Gauge)	30
9	BLK-12063	15' Outside Cross Tie Brace (64.4") (12 Gauge)	30

15' Diameter 45° Hopper Bin Hardware Specifications



Under Collar Clearance	
16" Collar	34-1/16" (865 mm)
22" Collar	36-5/8" (930 mm)

*** NOTE:** *Bolt listed first and nut second for each usage.*

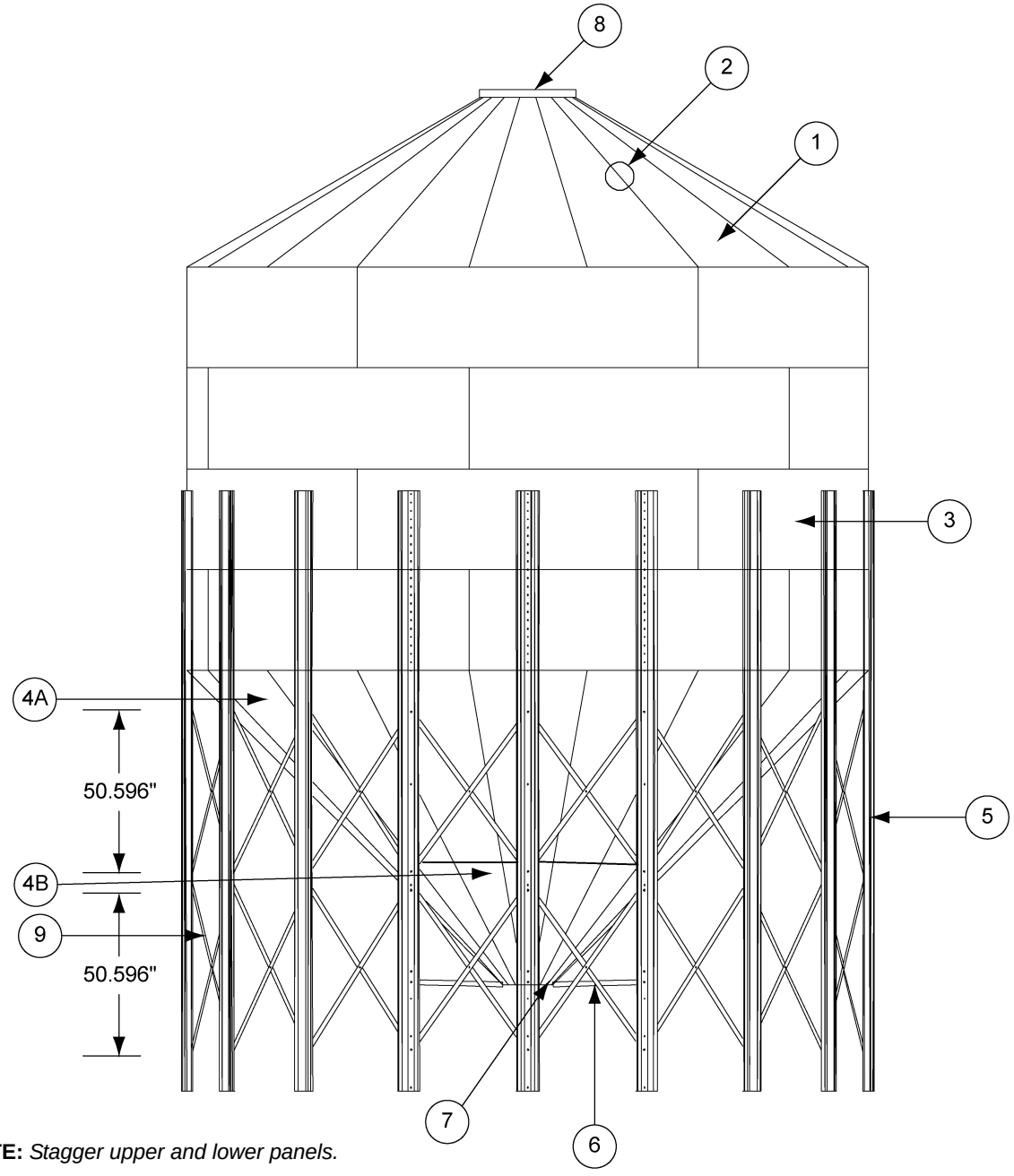
15' Diameter 45° Hopper Bin Hardware Specifications Parts List

Ref #	Part #	Description	Qty
1	S-10260	Bulk Tank Peak Ring to Roof Panels (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	36
1	S-7484		36
2	S-10260	Roof Panel to Roof Panel (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	414
2	S-7484		414
3	S-10260	Roof Panels to Top Sidewall Sheets (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	180
3	S-7484		180
4	S-10260	Vertical Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
4	S-7484		Varies
5	S-10260	Horizontal Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
5	S-7484		Varies
6	S-10260	Leg to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Heads to Inside of Tank.)**	330
6	S-7484		330
7	S-10260	Hopper Panels to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Head to Inside at Leg to Hopper to Sidewall Connection Only.)**	360
7	S-7484		360
8	S-10267	Vertical Hopper Seams (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)**	720
8	S-10268		720
9	S-10267	Hopper Collar to Hopper Panel (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)** (16" Shown.)	36
9	S-10268		36
10	S-7485	Hopper Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	3
10	S-7489		3
11	S-7485	Cross Tie Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	45
11	S-7489		45

Ref #	Description
A	Inside
B	Outside
C	Roof Sheet
D	15' Roof Stiffener Channel
E	Body Sheet
F	Peak Ring Collar
G	Hopper Panel

Ref #	Description
H	Leg
I	Hopper Reinforcement Angle (Optional)
J	Leg Cross Tie
K	Offset Hopper Panel
L	Hopper Collar
M	Hopper Brace

18' Diameter 45° Hopper Bin Specifications



NOTE: *Stagger upper and lower panels.*

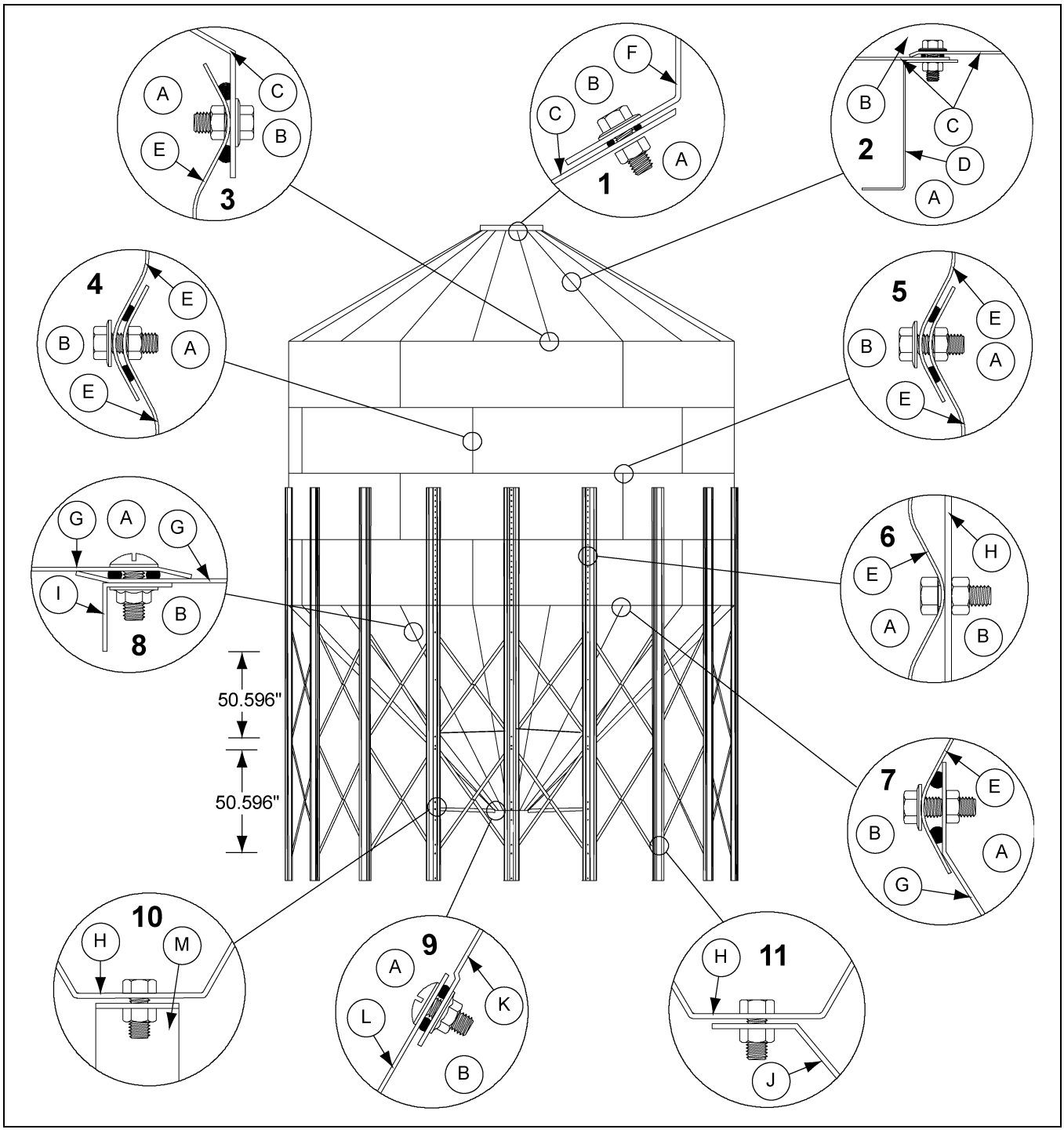
Under Collar Clearance	
16" Collar	34-3/8" (873 mm)
22" Collar	36-15/16" (938 mm)

IMPORTANT: *Bolt heads are inside of bin at the leg to body attachment and on all vertical seams on hopper panels. All bolts to be tightened from the nut side only. Refer to details on Page 28 for location of caulking.*

18' Diameter 45° Hopper Bin Specifications Parts List

Ref #	Part #	Description	Qty
1	BLK-12281	18' 30° Roof Panel (20 Gauge)	18
2	BLK-12286	18' 30° Roof Stiffener Channel	18
	18' Sidewall Sheet	**6 per Ring**	
3	HT38742018	20 Gauge (Top Punched Sidewall Sheet)	
3	SS00152018	20 Gauge (Middle Punched Sidewall Sheet)	
3	SS00151818	18 Gauge (Middle Punched Sidewall Sheet)	
3	HT43421618	16 Gauge (Top 3 Leg Punched Sidewall Sheet)	
3	HT33911618	16 Gauge (Middle 3 Leg Punched Sidewall Sheet)	
3	SS00151618	16 Gauge (Middle Punched Sidewall Sheet)	
3	HT33911418	14 Gauge (Middle 3 Leg Punched Sidewall Sheet)	
3	HT33921218	12 Gauge (Bottom 3 Leg Punched Sidewall Sheet)	
3	HT33921018	10 Gauge (Bottom 3 Leg Punched Sidewall Sheet)	
4A	BLK-11887	18' 45° Upper Hopper Panel (12 Gauge)	18
4B	BLK-10846	18' 45° Lower Hopper Panel (14 Gauge)	18
5	BLK-12049	18' 45° Leg (190.0") (10 gauge)	18
6	BLK-12121	Hopper Brace for 16" Collar (Shown)	3
6	BLK-12122	Hopper Brace for 22" Collar	3
7	BLK-10847	16" 45° Hopper Extension Kit w/ Collar (Shown)	1
7	BLK-10854	22" 45° Hopper Collar (36 Holes)	1
8	BLK-11730	Bulk Tank Peak Ring	1
9	BLK-12062	18' Inside Cross Tie Brace (12 Gauge)	36
9	BLK-12063	18' Outside Cross Tie Brace (12 Gauge)	36

18' Diameter 45° Hopper Bin Hardware Specifications



Under Collar Clearance	
16" Collar	34-3/8" (873 mm)
22" Collar	36-15/16" (938 mm)

IMPORTANT: *Bolt heads are inside of bin at the leg to body attachment and on all vertical seams on hopper panels. All bolts to be tightened from the nut side only. Refer to details* *on Page 28* *for location of caulking.*

NOTE: *Bolt listed first and nut second for each usage.*

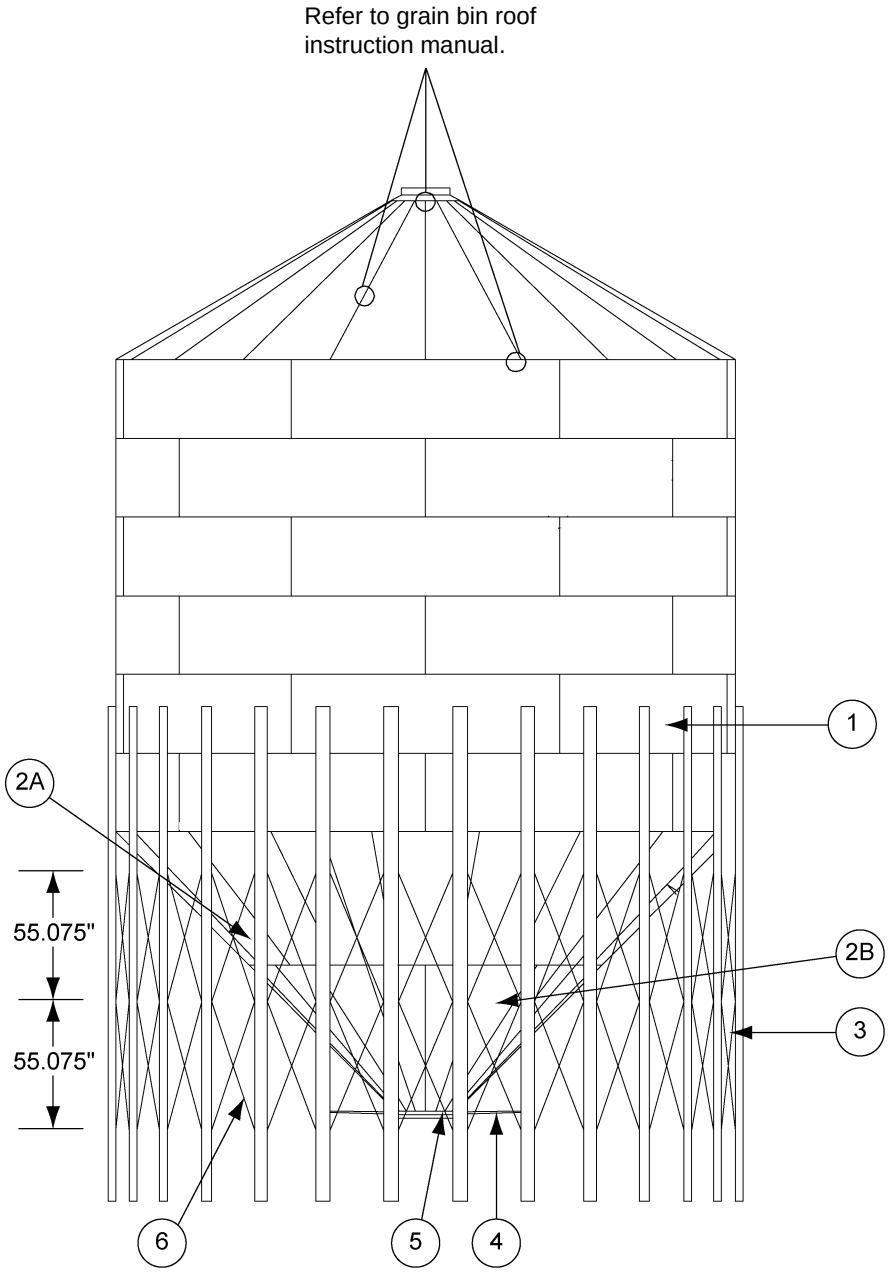
18' Diameter 45° Hopper Bin Hardware Specifications Parts List

Ref #	Part #	Description	Qty
1	S-10260	Bulk Tank Peak Ring to Roof Panels (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	36
	S-7484		36
2	S-10260	Roof Panel to Roof Panel (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	504
	S-7484		504
3	S-10260	Roof Panels to Top Sidewall Sheets (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	216
	S-7484		216
4	S-10260	Vertical Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
	S-7484		Varies
5	S-10260	Horizontal Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
	S-7484		Varies
6	S-10260	Leg to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Heads to Inside of Tank.)**	396
	S-7484		396
7	S-10260	Hopper Panels to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Head to Inside at Leg to Hopper to Sidewall Connection Only.)**	288
	S-7484		288
8	S-10267	Vertical Hopper Seams (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)**	1260
	S-10268		1260
9	S-10267	Vertical Hopper Seams (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)** (16" Shown.)	36
	S-10268		36
10	S-7485	Hopper Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	3
	S-7489		3
11	S-7485	Cross Tie Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	108
	S-7489		108

Ref #	Description
A	Inside
B	Outside
C	Roof Sheet
D	18' Roof Stiffener Channel
E	Body Sheet
F	Peak Ring Collar
G	Hopper Panel

Ref #	Description
H	Leg
I	Hopper Reinforcement Angle (Optional)
J	Leg Cross Tie
K	Offset Hopper Panel
L	Hopper Collar
M	Hopper Brace

21' Diameter 45° Hopper Bin Specifications



NOTE: *Stagger upper and lower panels.*

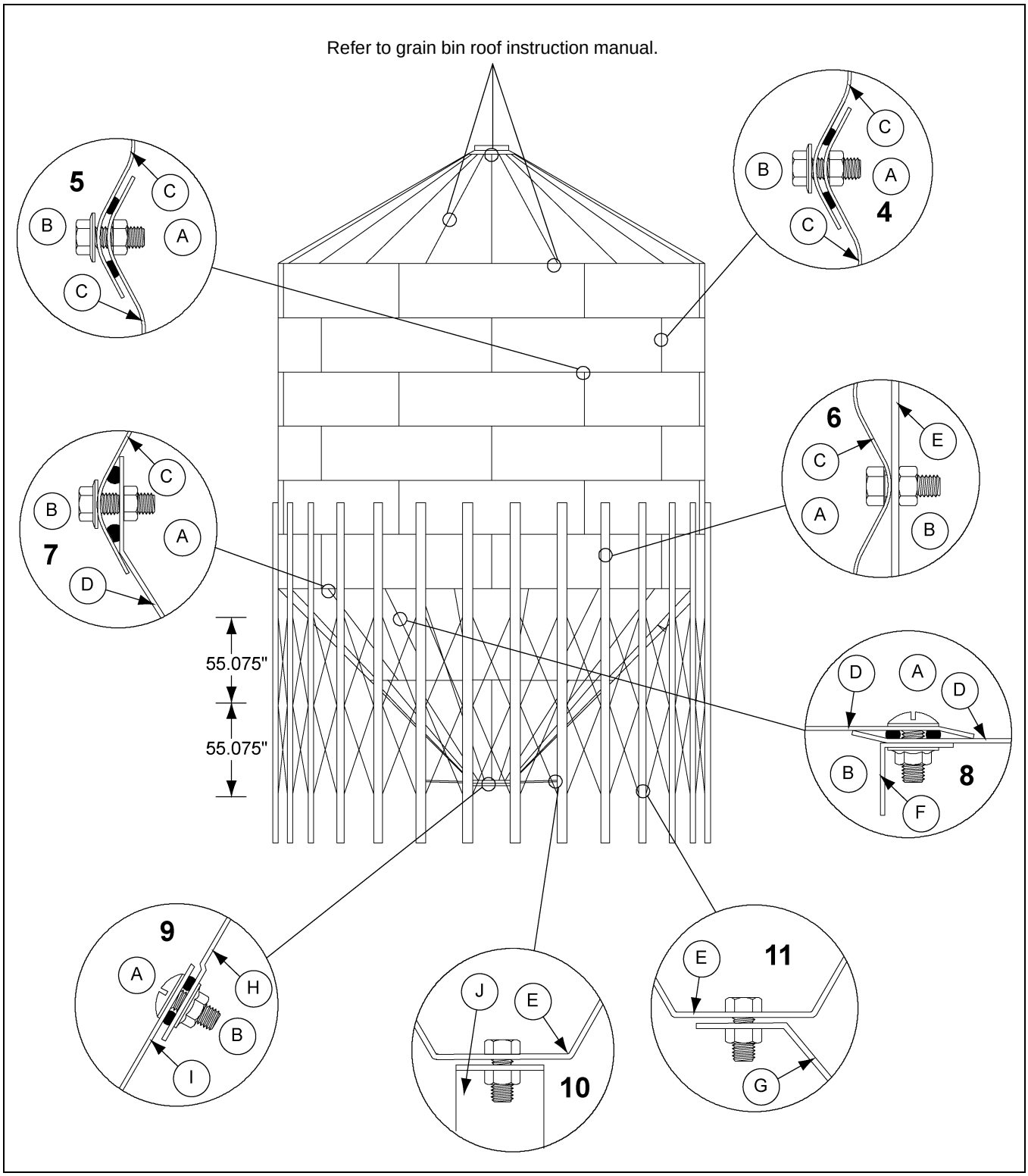
Under Collar Clearance	
16" Collar	33-15/16" (862 mm)
22" Collar	36-1/2" (927 mm)

IMPORTANT: *Bolt heads are inside of bin at the leg to body attachment and on all vertical seams on hopper panels. All bolts to be tightened from the nut side only. Refer to details* *on Page 28* *for location of caulking.*

21' Diameter 45° Hopper Bin Specifications Parts List

Ref #	Part #	Description	Qty
	Grain Bin Roof	Utilizes Grain Bin Style Roof, See 30° Grain Bin Roof Erection Manual	
	21' Body Sheets	**7 per Ring**	
1	SS22012021	20 Gauge (Decal Sheet)	
1	SS00152021	20 Gauge (Middle Sheet)	
1	SS00151721	17 Gauge (Middle Sheet)	
1	SS00151621	16 Gauge (Middle Sheet)	
1	SS60141621	16 Gauge (Middle Leg Sheet)	
1	SS60131021	10 Gauge (Bottom Sheet)	
2A	BLK-11244	21' 45° Upper Hopper Panel (12 Gauge)	18
2B	BLK-10846	21' 45° Lower Hopper Panel (14 gauge)	18
3	BLK-12050	21' 45° Leg 201-1/2" (10 Gauge)	28
4	BLK-12123	Hopper Brace for 16" Collar (Shown)	4
4	BLK-12124	Hopper Brace for 22" Collar	4
5	BLK-10847	16" 45° Hopper Extension Kit with Collar (Shown)	1
5	BLK-10854	22" 45° Hopper Collar (36 Holes)	1
6	BLK-12066	21' Inside Cross Tie Brace (12 Gauge)	56
6	BLK-12067	21' Outside Cross Tie Brace (12 Gauge)	56

21' Diameter 45° Hopper Bin Hardware Specifications



Under Collar Clearance	
16" Collar	33-15/16" (862 mm)
22" Collar	36-1/2" (927 mm)

NOTE: *Bolt listed first and nut second for each usage.*

21' Diameter 45° Hopper Bin Hardware Specifications Parts List

Ref #	Part #	Description	Qty
	Grain Bin Roof Hardware	Utilizes Grain Bin Style Roof - See 30° Grain Bin Roof Instruction Manual.	
4	S-10260	Vertical Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
	S-7484		Varies
5	S-10260	Horizontal Sidewall Sheet Seams (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.)	Varies
	S-7484		Varies
6	S-10260	Leg to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Heads to Inside of Tank.)**	532
	S-7484		532
7	S-10260	Hopper Panels to Sidewall Sheet (Use 5/16" x 1" Hex Head Bin Bolts and 5/16" Hex Nuts.) **(Bolt Head to Inside at Leg to Hopper to Sidewall Connection Only.)**	504
	S-7484		504
8	S-10267	Vertical Hopper Seams (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)**	1700
	S-10268		1700
9	S-10267	Hopper Collar to Hopper Panel (Use 5/16" x 3/4" Truss Head Bin Bolts and 5/16" Flanged Whiz Nuts.) **(Bolt Heads to Inside of Tank.)** (16" Shown.)	36
	S-10268		36
10	S-7485	Hopper Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	4
	S-7489		4
11	S-7485	Cross Tie Brace to Leg (Use 3/8" x 1" Flange Head Bolts and 3/8" Hex Nuts.)	168
	S-7489		168

Ref #	Description
A	Inside
B	Outside
C	Body Sheet
D	Hopper Panel
E	Leg

Ref #	Description
F	Hopper Reinforcement Angle (Optional)
G	Leg Cross Tie
H	Offset Hopper Panel
I	Hopper Collar
J	Hopper Brace

NOTES

GSI Group, LLC Limited Warranty

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

Warranty Extensions:

The Limited Warranty period is extended for the following products:

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

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

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

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

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

Conditions and Limitations:

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

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

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

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

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

9101239_1_CR_rev8.DOC (revised January 2014)

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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