Operation and Maintenance Manual



for Fiberglass Tanks

Perry Fiberglass Products, Inc.

Perry Fiberglass Products, Inc.

HANDLING AND INSTALLATION INSTRUCTIONS

ABOVE GROUND STORAGE TANKS

The following handling and installation instructions are intended to help customers install tanks properly and efficiently.

Handling and installation instructions are only recommendations. They do not relieve the purchaser from full responsibility for proper inspection, handling and installation. Improper handling or installation, which results in damage or tank failure, is the sole responsibility of the purchaser. Failure by the customer to comply with the handling or installation instructions will void the tank warranty. Unknown situations or conditions are also the burden of the purchaser.

The presence of Perry Fiberglass, Inc. personnel or an authorized representative at the installation site does not relieve the purchaser of their responsibilities.

INSPECTION

At the time of delivery the customer shall be responsible for inspecting the tank for damage during transit. Both the inside and the outside of the tank must be inspected. If damage has occurred it should be noted on the delivery receipt prior to signing acceptance, and a claim should be immediately filed by the customer with the delivering carrier. The customer accepts all future responsibility for a damaged tank if the procedures set forth are not followed.

Minor damage can be repaired at the delivery site.

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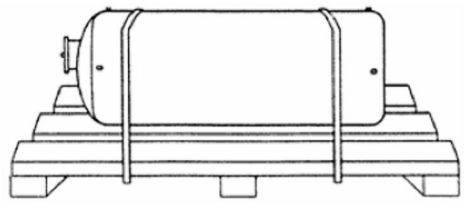
HANDLING AND INSTALLATION INSTRUCTIONS

Perry Fiberglass tanks are designed to withstand normal handling. Note the following handling precautions.

1. NEVER roll or slide a tank. Lift the tank using a crane or other approved method.
2. Operators of hoist equipment should follow proper rigging procedures at all times. NEVER allow tank to swing out of control.
3. Do not drop or allow hard impact from tools, spreader bars, etc.
4. Avoid the use of equipment inside the tank that could scratch or damage the inner corrosion barrier
5. NEVER use cables or chains around tank.
6. NEVER lift tank by using fittings. Use designated lifting lugs.
7. If tanks are being stored prior to installation, be sure to lay on padded surface and tie down securely.

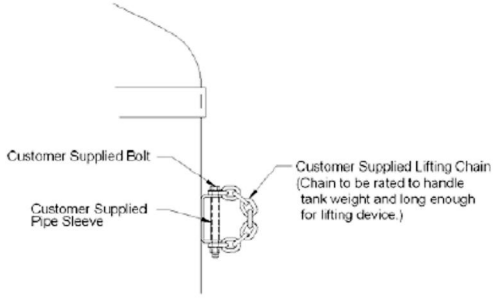
HANDLING TANKS SHIPPED HORIZONTALLY

Small tanks shipped by common carrier are palletized to facilitate handling by forklift. To remove tank, pull on the bottom of the skid. DO NOT PULL ON THE TANK.



LIFTING / HANDLING LUGS

The lugs are designed for equal load on both ear tabs of the lug. Perry Fiberglass recommends using a pipe spacer between the ear tabs to achieve equal load and lifting chain to allow the tank to easily rotate from horizontal to vertical.



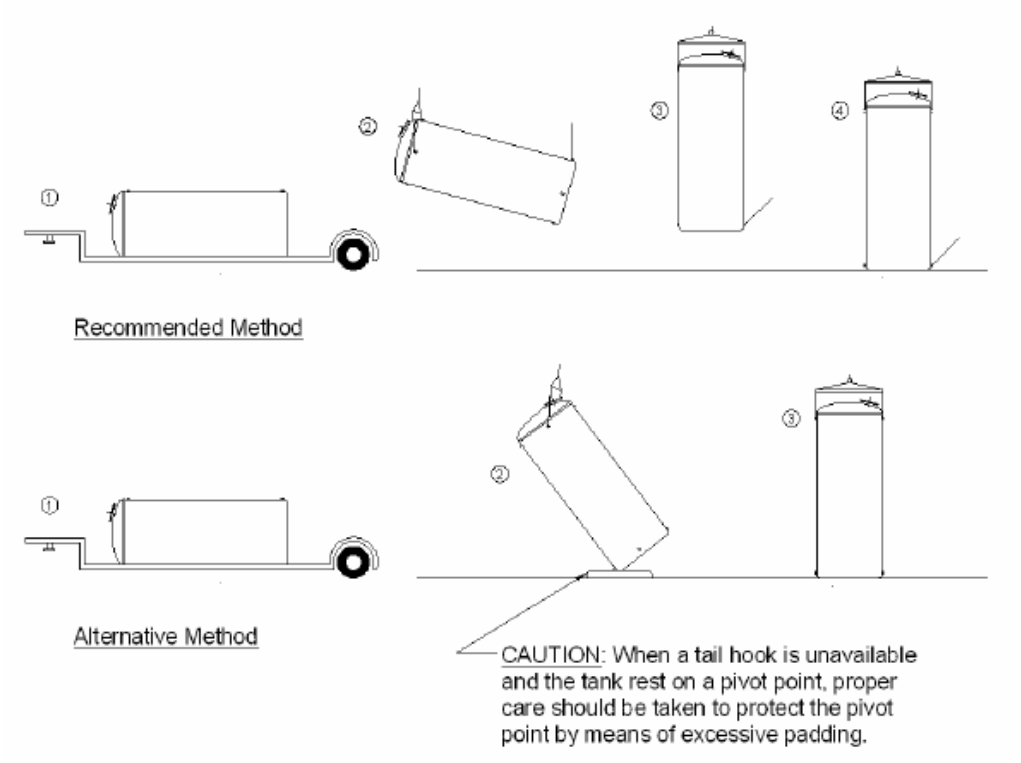
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HANDLING AND INSTALLATION INSTRUCTIONS

FLAT BOTTOM TANKS

Larger tanks shipped by special built trailers, require a spreader bar and slings attached to the appropriate lifting lugs to unload tanks. Use a guide line to keep the load under control.

Use a spreader bar and lines attached to appropriate lifting lugs to hoist the tank to an upright position and place the tank on its foundation. Control the tank with guide lines to ensure the tank is gently set on its base.

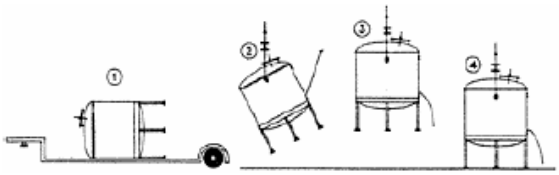


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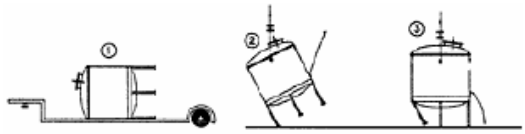
HANDLING AND INSTALLATION INSTRUCTIONS

DISHED OR CONE BOTTOM TANKS

NOTE: When standing a tank with legs, DO NOT pivot tank on legs. Lift the entire tank. Rotate to a vertical position. Set straight down on all legs.



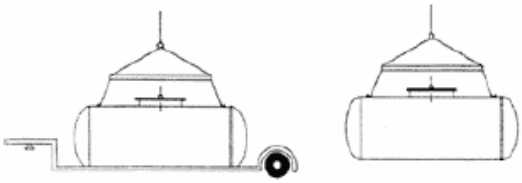
Proper



Improper

See Installation Page 10

HORIZONTAL TANKS



Proper

See Installation Page 11

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HANDLING AND INSTALLATION INSTRUCTIONS

TANK BOTTOM SUPPORT PAD

PERRY FIBERGLASS flat bottom and slope bottom tanks require continuous bottom support. The most common support pad is a concrete slab. However, any other support structure with sufficient strength to support the combined weight of the tank and its contents, with a reasonable factor of safety, is acceptable. Design for bearing strength of support pad is the responsibility of the purchaser. The support pad must exceed tank diameter by 6" minimum, and be flat within +/- 1/16".

INSTALLATION NOTE: Support pad must be clean and free of all foreign objects prior to settling tank in place.

TANK BOTTOM BUFFER PAD

Liquid grout such as concrete, epoxy, etc., MUST NOT be used under standard flat bottoms. PERRY FIBERGLASS recommends a buffer pad between the tank support and tank bottom: flexible elastomer or a minimum of two layers of 30 pound roofing felt. When applying the roofing felt, be sure there are no overlaps or wrinkles causing ridges under the bottom. It is the responsibility of the purchaser to see that tanks are properly installed. Any deviation from the above outlined procedure must be approved by PERRY FIBERGLASS or it will void your warranty.

PIPE CONNECTIONS

Flexible pipe connections should be used wherever possible. If rigid piping must be used, be certain it is self-supporting. If rigid piping is used and is not self-supporting, and results in damage to a tank fitting, your warranty will be void. CAUTION: METALLIC FITTINGS MUST NOT BE USED ON FRP NIPPLES OR COUPLINGS.

WATER FILL TESTING

PERRY FIBERGLASS recommends that each tank be water filled (hydro tested) for a minimum 2 hour period at atmospheric pressure, after the tank is installed and prior to use.

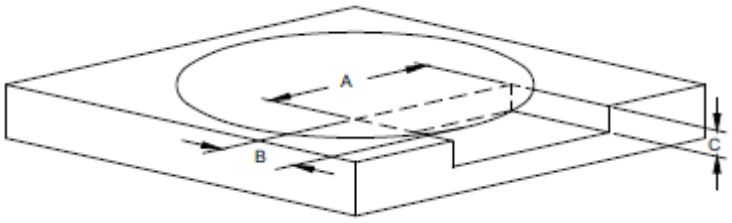
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HANDLING AND INSTALLATION INSTRUCTIONS

SIDE BOTTOM FLANGE PAD CUT OUT:

CAUTION: When installing any PERRY FIBERGLASS tank with a side bottom flange, your pad cut-out dimensions must conform to the specifications as detailed below. Any deviation without the written consent of PERRY FIBERGLASS may cause serious damage and will void warranty.

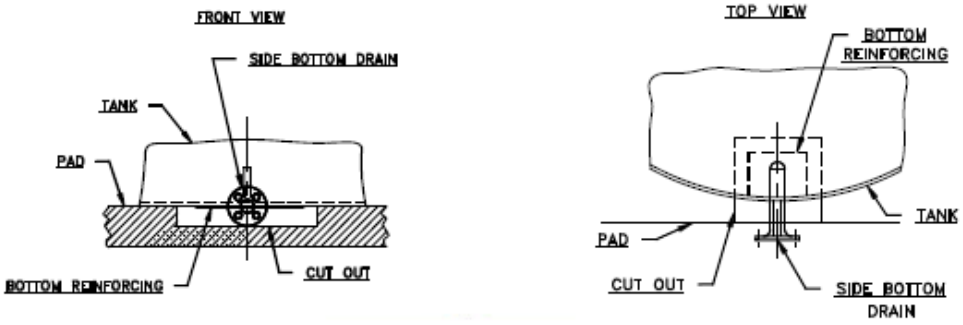
Consult the factory if you have any questions. 1-321-609-9036.



Dimension "B" is taken from the sidewall of the tank.

Drain Size	A	B *	B **	B ***	C
2"	9	8	9	10-1/2	3-3/4
3"	10	8	9	10-1/2	4-1/4
4"	11	8	9	10-1/2	5-1/4
6"	13	8	9	10-1/2	6-1/4
8"	15	8	9	10-1/2	7-1/2
10"	18	8	9	10-1/2	8-3/4
12"	21	8	9	10-1/2	10-1/4

* Tank Diameter < 120" ** Tank Diameter 120" to 144" *** Tank Diameter > 144"



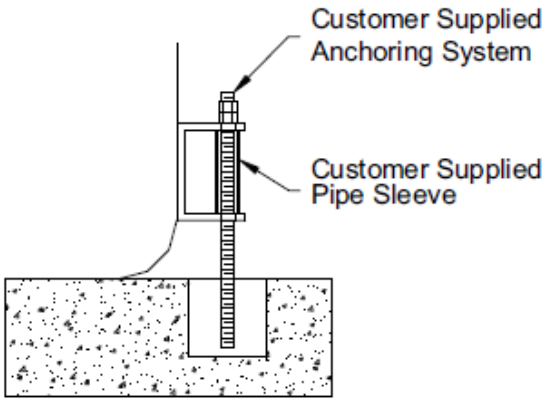
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HANDLING AND INSTALLATION INSTRUCTIONS

HOLD DOWN LUGS - Standard

The required hold down lugs are supplied as standard equipment on all PERRY FIBERGLASS tanks. Anchor bolts and hold down hardware are supplied by the customer. Preferred Method of Anchor Installation:

Preferred Method of Anchor Installation:



Expansion anchor or resin capsule anchor.

PERRY FIBERGLASS recommends the use of two nuts on the top of the lug. When the tank is EMPTY, hand tighten the first nut onto the top of the lug. Hand tighten the second "JAM" top nut onto the bottom nut. Then, using two wrenches lock the bottom nut onto the top nut. Do not adjust after the tank is filled.

Do not over tighten hold down lugs.

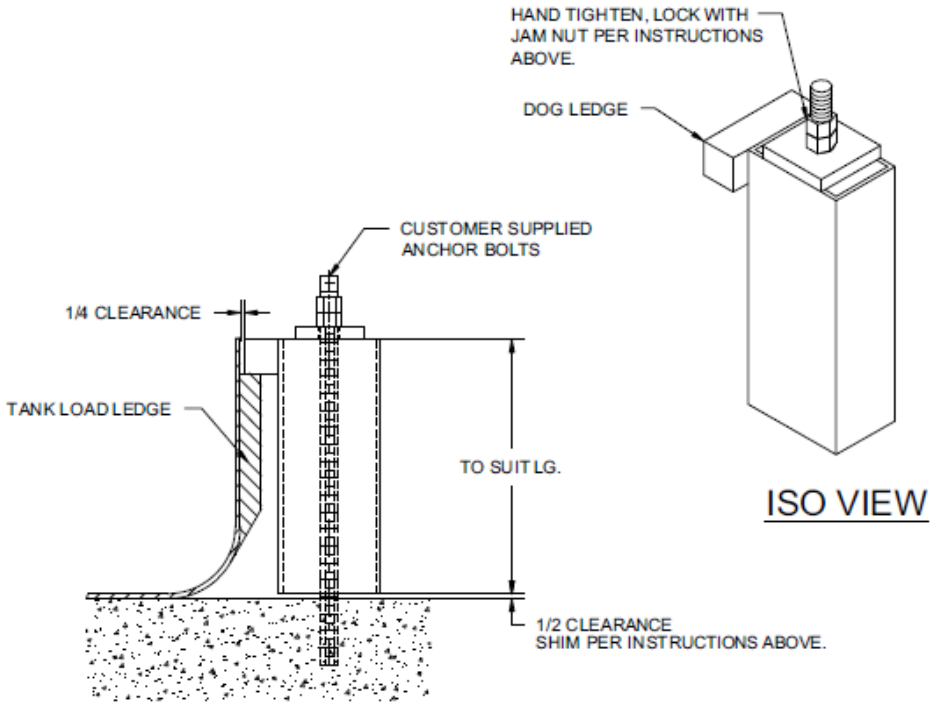
INSTALLATION NOTE: Do not locate or pre-set anchor holes/bolts in the tank pad before receipt of tank PERRY FIBERGLASS will not be responsible for pre-set anchor holes/bolts.

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HANDLING AND INSTALLATION INSTRUCTIONS.

HOLD DOWN LUGS – Anchor "DOG" / Load Ledge

1. Position & set Anchors -- See Tank Drawing for position.
2. Minimum height of anchors above tank base = height of "DOG" + top plate + height of (2) nuts + ½" minimum.
3. Position anchor "DOGS" over anchor bolts; locate dog ledge ¼" away from sidewall and on top of load ledge & level "DOGS"; -- shim if needed.
4. When tank is empty fill anchor "DOG" box with non-shrink grout.
5. Put cover plate over anchor "DOG" box and hand- tighten bottom nut.
6. Hand tighten second "JAM" top nut onto the bottom nut.
7. Lock bottom nut onto the top nut. Do not adjust after tank is filled.



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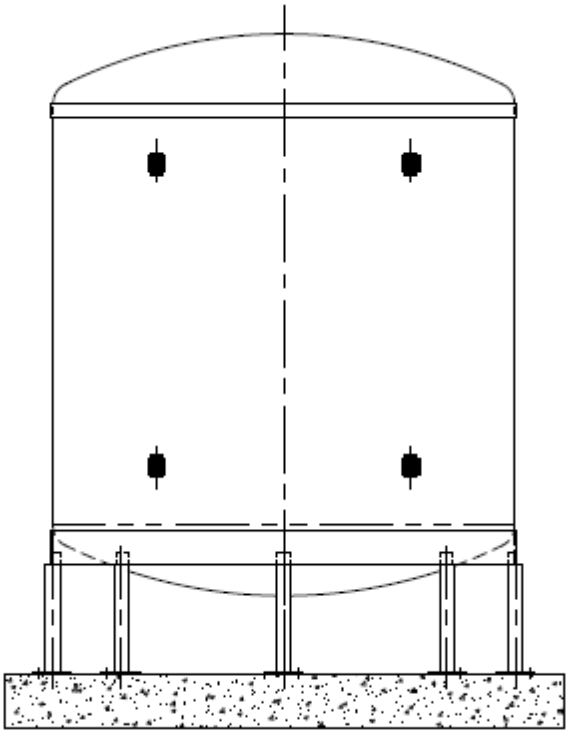
HANDLING AND INSTALLATION INSTRUCTIONS

DISHED BOTTOM TANKS

The pad surface must be smooth and level. Consideration must be given to the concentrated nature (4-12 points) of the loading, the magnitude of which could require footings beneath each leg to spread the load over a larger area. The design of footings is the responsibility of the purchaser.

The tank is designed to rely upon firm even support at each of its legs. In order to allow for uneven pads, floors, and legs, the floor pads on each leg may require shims to insure uniform support.

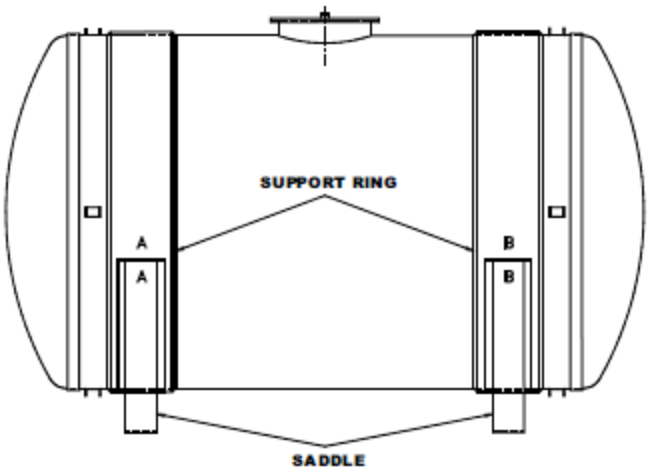
Consult factory if you have any questions. (1-321-609-9036)

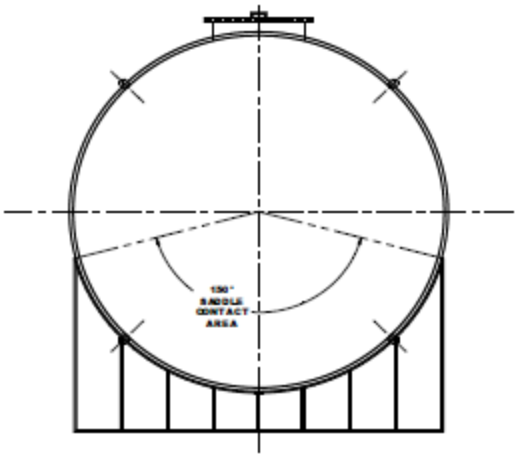


HANDLING AND INSTALLATION INSTRUCTIONS

HORIZONTAL TANK INSTALLATION

Installation of horizontal tanks is much the same as the dished bottom. Tanks are supplied with the required number of steel support saddles. These saddles are to be placed under the designated support rings. The saddles should be centered on the support ring and through the centerline of the tank. Caution must be taken to insure that the tank support rings are in contact with the bottom of the saddles.





Caution: Modification of saddles in any way voids your warranty.

Perry Fiberglass Products, Inc.

OPERATION AND MAINTENANCE INSTRUCTIONS

Because of FIBERGLASS REINFORCED PLASTIC tanks unique, physical and structural characteristics; they are flexible, lightweight, corrosion resistant, and stronger than tanks made of other plastic materials.

Care, however, should be taken to follow the Handling and Installation instructions. Once the tank has been properly installed and placed in service, Perry Fiberglass recommends regular routine inspections as a part of your preventative maintenance program.

The care and operation of FRP vessels rely mostly on common sense. To maximize trouble free service, Perry Fiberglass recommends:

1. Inspect your vessel thoroughly upon receipt.
2. Follow the Handling and Installation instruction.
3. Wash your vessel thoroughly w/detergent and rinse before putting in service (see FDA Requirements)

AFTER THE TANK IS PUT IN SERVICE:

1. Keep the vessel clean. a. It will remain more aesthetically pleasing. b. If the tank is ever damaged, it will be evident.
2. Make a visual tank inspection inside and outside the tank every 6-12 months.

TANKS FOR FOOD APPLICATION:

Perry Fiberglass tanks will comply with U.S. Food, Drug and Cosmetic Act, as amended, and applicable FDA regulations (21 cfr 177.2420). These tanks may be used as components intended for repeated use in contact with food, subject to certain limitations described in that regulation.

Perry Fiberglass tanks are chemically acceptable in processing or storage areas for contact with meat or poultry food products prepared under federal inspection and used at temperatures below 180° F. This acceptance has been given by the United States Department of Agriculture.

Prior to shipping your tank, Perry Fiberglass applies a (4) hour heat cure followed by a water rinse to the tank interior.

After installation and before your tank is put into service, attention to the following procedures is important to achieve FDA compliance:

1. After tank installation, steam-treat or steep tank with hot water for 8-16 hours at 160° – 180° F. This should remove all residual styrene from the laminate surface.
2. Wash the tank thoroughly with detergent and rinse it thoroughly.
3. Check state and local regulations for required compliance in addition to the above recommendations.

Perry Fiberglass Products, Inc.

OPERATION AND MAINTENANCE INSTRUCTIONS

AIR LOADING

"Tanks are often filled with liquids from tanker trucks by pressurizing the headspace above the liquid within the tanker with compressed air to force tanker contents into the receiving tank. This is most typically done when the liquid being transferred is a corrosive chemical, which could damage a pump. Although such a procedure eliminates the need for a pump, a possibility does exist that the pressurized air within the tanker will follow the liquid into the receiving tank, and destroy the tank, due to excessive pressure.

Generally speaking, the tanker is connected to the receiving tank by a hose. The compressed air pushing down on the liquid forces the liquid through the hose and into the receiving tank. The frictional resistance offered by the hose and the fitting limits the maximum velocity of the liquid moving through the hose to a reasonable value. The air displaced by the liquid entering the tank escapes through the normal vent provided on the tank.

However, when the last of the liquid passes through the hose, the compressed air within the tanker rushes through the hose at an extremely high velocity, because this air does not meet significant frictional resistance in the hose, as the liquid does. This air enters the headspace in the receiving tank and expands with almost explosive speed and force. The conventional tank vent cannot relive this excessive pressure within the tank. When the pressure within the receiving tank exceeds that for which the tank is designed, either the tank head blows off or some other portion of the tank ruptures.

Preferably, the person operating the tanker will interrupt the liquid flow before the last of the liquid leaves the tanker, preventing the compressed air from entering the tank. However, through inattention or carelessness, the operator will occasionally forget to interrupt the liquid at the "appropriate time"…RESULT…POSSIBLE TANK FAILURE."

The quoted description above is the possible occurrence when the tank is air loaded…IMPROPERLY; proper procedure requires that the operator interrupt the liquid at the appropriate time. PROPER PROCEDURE WILL NOT CAUSE TANK FAILURE.

To guard against tank failure when the tank is air loaded, opening the manhole cover is suggested. This precaution, if the tank is air loaded improperly, does NOT eliminate the possibility of tank failure…but it may lessen the possibility.

TO ELIMINATE TANK FAILURE DUE TO IMPROPER AIR LOADING:

A.BUILD A PRESSURE VESSEL, OR
B.ELIMINATE THE POSSIBILITY OF THE AIR PAD PRESSURE IN THE TANKER FROM REACHING THE TANK EXTERIOR BY:

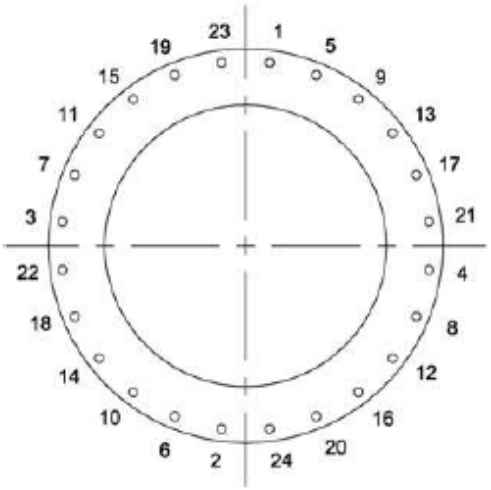
1. Suspending the fill line above the manway (i.e. line is not to enter tank), OR…
2. Monitoring a flow meter to determine when the tanker will be empty, OR…
3. Install a "No-Flow" switch in tandem with a control valve.

Note: Perry Fiberglass recommends consulting with a reputable firm in reference to flow meters and no flow switches. If you have any questions or special circumstances that require discussion, please feel free to contact us at… 1-321-609-9036.

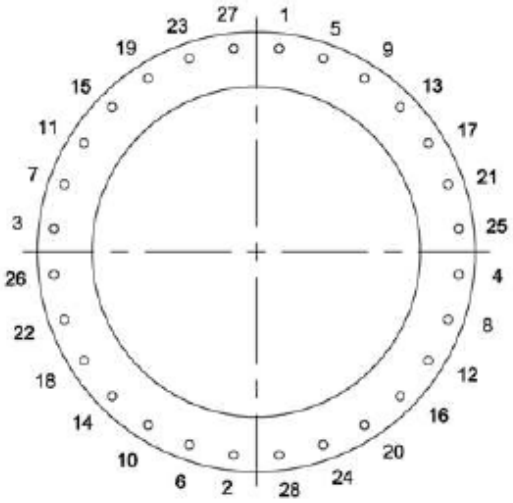
Perry Fiberglass Products, Inc.

OPERATION AND MAINTENANCE INSTRUCTIONS

MANHOLE BOLTING SEQUENCE



20" Side Manhole



24" Side Manhole

Drawings not to scale

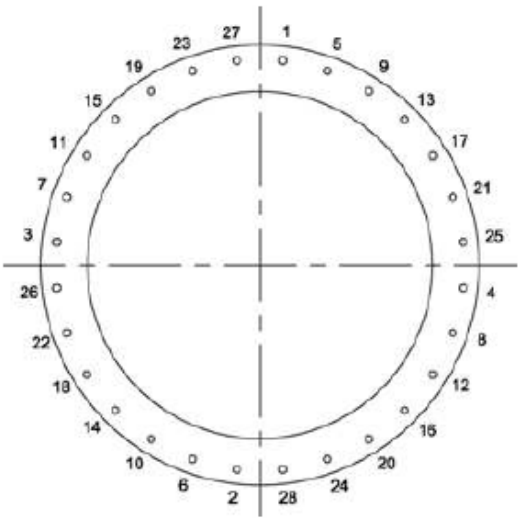
Side Manhole Maximum Bolt Torque

	Manhole PSI Rating (See Drawing)							
Diameter	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**
20"	3 ft. lbs.	6 ft. lbs.	10 ft. lbs.	13 ft. lbs.	16 ft. lbs.	19 ft. lbs.	20 ft. lbs.	20 ft. lbs.
24"	3 ft. lbs.	7 ft. lbs.	11 ft. lbs.	15 ft. lbs.	19 ft. lbs.	20 ft. lbs.	20 ft. lbs.	20 ft. lbs.

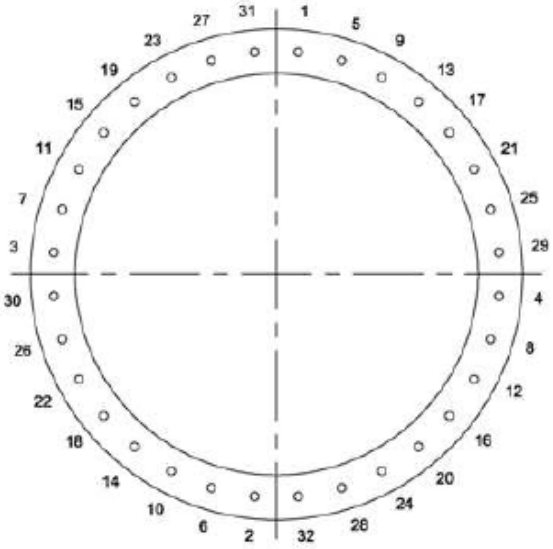
Perry Fiberglass Products, Inc.

OPERATION AND MAINTENANCE INSTRUCTIONS

MANHOLE BOLTING SEQUENCE



30" Side Manhole



36" Side Manhole

Drawings not to scale

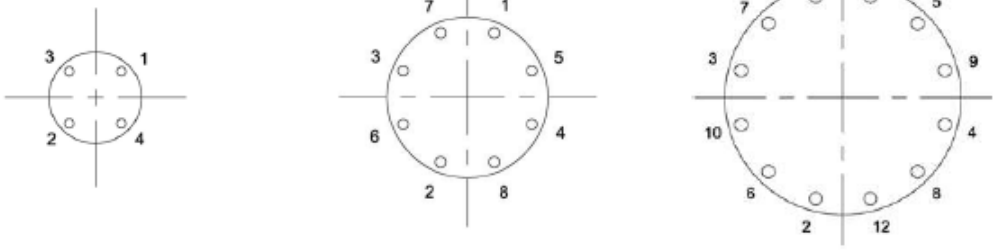
Side Manhole Maximum Bolt Torque

	Manhole PSI Rating (See Drawing)							
Diameter	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**
30"	7 ft. lbs.	14 ft. lbs.	21 ft. lbs.	28 ft. lbs.	35 ft. lbs.	42 ft. lbs.	43 ft. lbs.	43 ft. lbs.
36"	7 ft. lbs.	13 ft. lbs.	20 ft. lbs.	27 ft. lbs.	33 ft. lbs.	39 ft. lbs.	43 ft. lbs.	43 ft. lbs.

Perry Fiberglass Products, Inc.

OPERATION AND MAINTENANCE INSTRUCTIONS

FLANGED NOZZLE BOLTING SEQUENCE



4 Bolt 8 Bolt 12 Bolt

Drawings not to scale

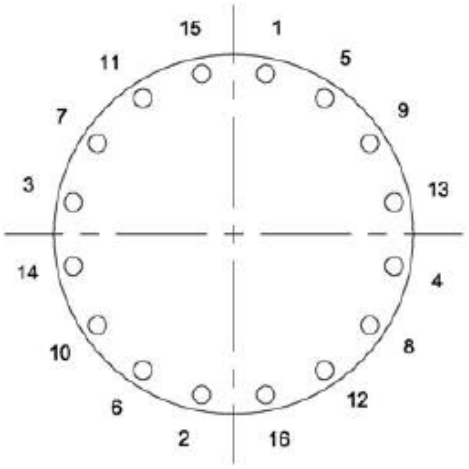
Flanged Nozzle PSI Rating & Maximum Torque

Diameter	PSI Rating	Maximum Torque
1”	125	3 ft. lbs.
1-1/2”	125	6 ft. lbs.
2”	125	12 ft. lbs.
2-1/2”	125	17 ft. lbs.
3”	125	21 ft. lbs.
4”	125	18 ft. lbs.
6”	100	32 ft. lbs.
8”	50	26 ft. lbs.
10”	50	31 ft. lbs.
12”	50	45 ft. lbs.
14”	25	33 ft. lbs.

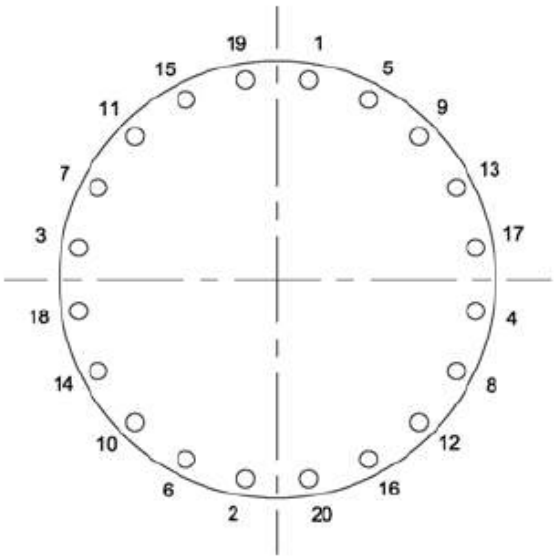
Perry Fiberglass Products, Inc.

OPERATION AND MAINTENANCE INSTRUCTIONS

FLANGED NOZZLE BOLTING SEQUENCE



16 Bolt



20 Bolt

Drawings not to scale

Flanged Nozzle PSI Rating & Maximum Torque

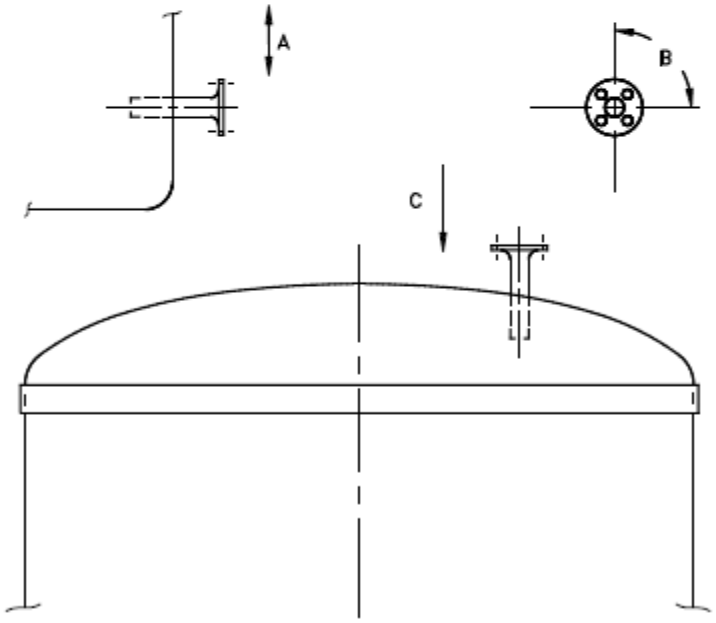
Diameter	PSI Rating	Maximum Torque
16”	25	32 ft. lbs.
18”	25	43 ft. lbs.
20”	25	42 ft. lbs.
24”	25	67 ft. lbs.

Perry Fiberglass Products, Inc.

OPERATION AND MAINTENANCE INSTRUCTIONS

Flanged Nozzle Allowable Loads Without Gussets

Size	A	B	C
1	30 LBS.	50 FT./LBS.	30 LBS.
1-1/2	50 LBS.	50 FT./LBS.	50 LBS.
2	50 LBS.	50 FT./LBS.	50 LBS.
3	50 LBS.	50 FT./LBS.	50 LBS.
4	50 LBS.	50 FT./LBS.	50 LBS.
6	50 LBS.	50 FT./LBS.	50 LBS.
8	100 LBS.	50 FT./LBS.	100 LBS.
10	100 LBS.	50 FT./LBS.	100 LBS.
12	100 LBS.	50 FT./LBS.	100 LBS.



OPERATION AND MAINTENANCE INSTRUCTIONS

TANK USAGE

This tank has been sold for a specific chemical storage application. Before changing the chemical environment, consult with Perry Fiberglass (your warranty may be void without written authorization from Perry Fiberglass)

Perry Fiberglass standard tanks are NOT designed for pressure or vacuum other than liquid head. Be sure tanks are properly vented to avoid accidental pressure or vacuum.