

**Assembly Instructions  
for  
Vertical Dispenser Tanks  
with  
Optional Base Beam and Crash Post Assembly**



## **SIGHT PREPARATION**

Prior to receipt of the tank and supporting components, the site for installation should be planned and prepared. Appendix "A" has installation instructions for various types of footings that are shown in Figures 18 and 19. Any of the dispenser tanks can be directly mounted using the concrete block foundation shown in Figure 18. When the #29005 base beam assembly and #22774 crash post and rail assembly is selected for use with the 1150, 1250 or 1600 gallon tanks, then either a slab or footing type foundation should be provided as shown in Figure 19.

These installations have been designed and approved by a Professional Engineer registered in the states of California and New York. They are designed to withstand seismic zone 4 earthquake conditions and category 3 hurricane force winds up to 120 mph. The calculations are on file and will be provided upon request. It is essential that local building and fire officials be contacted for compliance to any specific requirements (permits) that must be satisfied. It may also be necessary to hire a structural or civil engineer operating in the area for assistance and endorsement of site installation plans.

## **BASE BEAM ASSEMBLY (#29005)**

Upon receipt, the components for this assembly are steel banded as shown in Figure 1. Cut the bands with a band cutter to expose one ten foot long "I" beam and two short five foot "I" beams. In addition, there are two splice plates 6" x 18" and twenty 5/8" diameter x 1-1/2" NC Grade 8 bolts, hex nuts and plain washers. Place the 10' long beam in working position with the supporting feet in contact with the ground. Use wood to block up and level the two short 5' beams that are positioned perpendicular to the long beam at the center. (Figure 2.) Slide the short beam in so that the holes on the trimmed web are aligned with the gusset welded to the center of the long beam. Use two of the 5/8" diameter bolts, washers and hex nuts to tighten securely. Repeat this procedure for the other short 5' beam. Place one of the splice plates on each of the top and bottom flanges. Use the remaining 16 bolts, washers and nuts to tighten securely so the completed assembly is as shown in Figure 3.

**NOTE:** It may be desirable at this point to install the tank on the base beam assembly before proceeding. If so, see the section on tank placement that follows.

## **CRASH POST AND RAIL ASSEMBLY (#22774)**

The two semi-circular components making up this assembly are received with the upper and lower rails steel banded together. (Figure 4) Remove these bands after placing each semi-circular rail on the base beam assembly. Wood may be used to support the ring until it becomes bolted.

Two of the four pipe posts on each semi-circle have angle connection plates at the bottom with two holes each. (Figure 5) Align these with the holes provided on the ends of the base beam assembly

and secure with two of the 5/8" diameter bolts supplied. A total of eight bolts is required for the entire assembly. Next, use one of the 3" x 10" x 1/4" splice brackets at each of the four junctions - this includes both the top and bottom. (Figure 6) The complete assembly is depicted in Figure 7.

NOTE: The beam support structure has been redesigned utilizing a pipe riser as shown in Figure 8. Thus the support shown in Figures 1 and 7 is no longer used.

## **TANK PLACEMENT**

The tank is shipped with the valves and gauges boxed and strapped to the inside of the steel cross support bolted to the bottom of the angle legs as shown in Figure 9. This is used to maintain leg alignment during shipping plus it can be used as a template for locating anchor bolts when mounting the tank directly to a concrete block foundation. The tank can be off loaded from the truck trailer using slings as shown in Figure 10 or with the lift lugs provided on the top head and side walls of the tank. Once the tank is positioned vertically on the ground, the rigger connects a second hook to the top lift lug provided and begins to lift the tank. It is then lowered slowly to position it over the base beam assembly (Figure 11) or pre-positioned anchor bolts in the block foundation. After setting the tank, the 5/8" dia. x 1-1/2" NC bolts are used to secure the tank to the base beam assembly. Since these tanks must comply with all provisions of NFPA Pamphlet 58, the tank legs must be protected with a 2-hour rated fire resistant material. A recommended method of meeting this requirement is as follows:

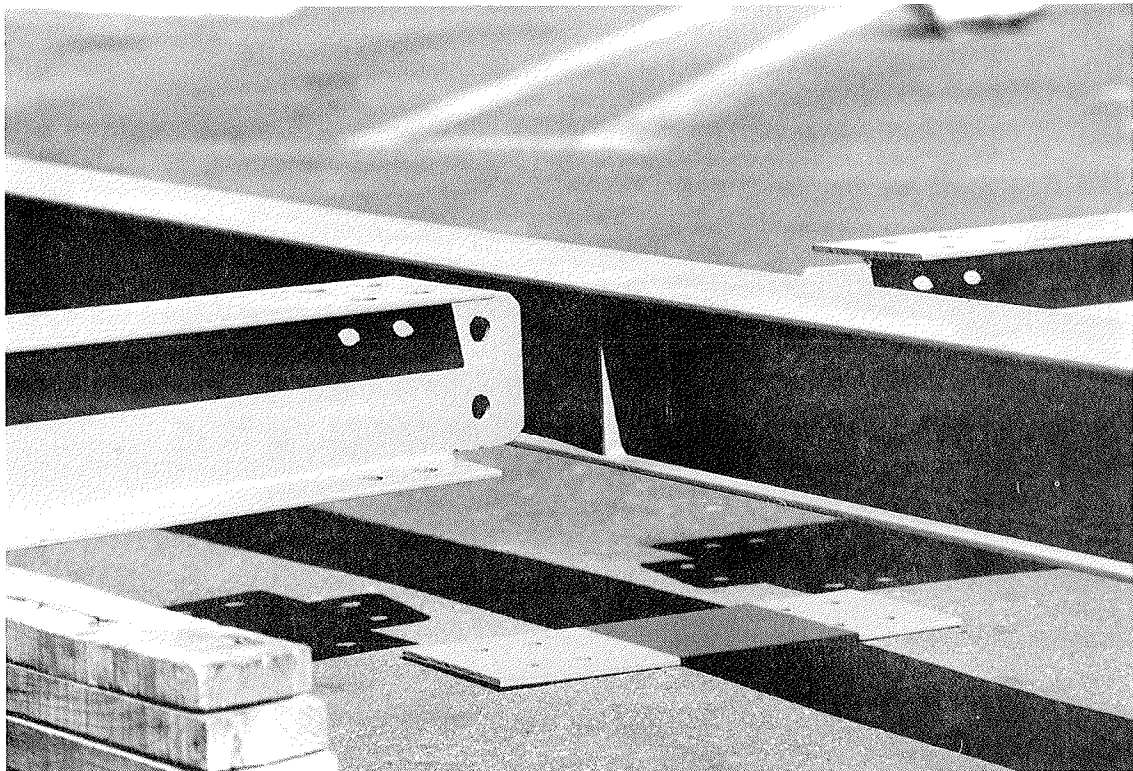
Wrap the legs to where they join the bottom head with a 3.4 lb/sq. yard galvanized metal lath such as one having a diamond mesh configuration. Overlap the lath and tie-off with No. 18 SWG galvanized steel wire ties spaced on 12" centers. Tiny 1/8" diameter holes need to be drilled in the leg to facilitate this (Figure 12). The coating to be applied, by spraying or troweling, is Pyrocrete 241. This product is cementitious and is available in 50# bags from the Carbolite Co. in St. Louis, MO. It is to be prepared by adding 5 gallons of water to the 50# bag and blended in a mixer for 5 minutes. It is then applied to a coating thickness of 3/8" as measured from the underlying surface of the leg. (Figure 13) When dry, the film thickness will shrink to 5/16" thick. To protect against corrosion under the coating, seal the top interface with silicone caulking.

Upon completion of the tank installation and any additional crash post protection, the pump and fuel dispenser equipment can be added and piped in compliance with Pamphlet 58.

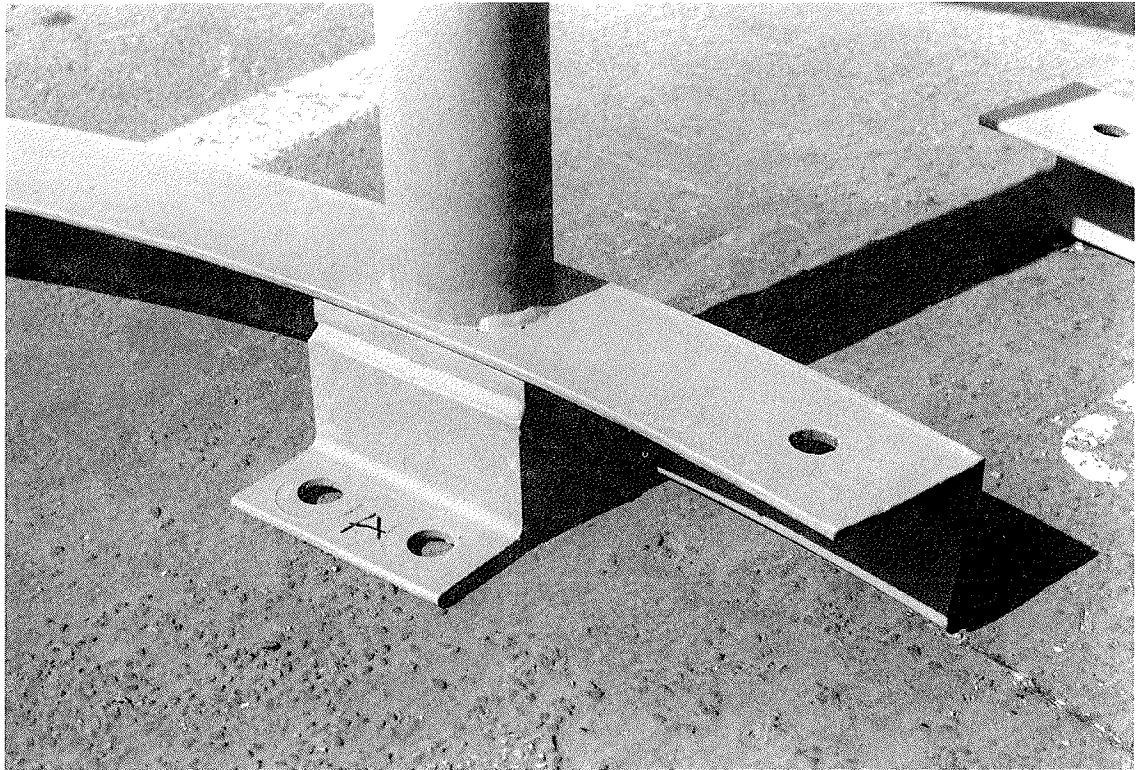
A typical piping arrangement is shown in Figure 14 where the liquid dispensing line is flanked by the pump equalization line and vapor separation line to provide passage of liquid only to the meter. A summary of the valves and gauges included with each size tank is found in Appendix B and their respective location is shown in Appendix A, Figure 16. In addition, the five sizes available, along with capacity, working pressure, tare weight and part number are provided for reference. The liquid level gauges are basically small face and provide direct gallonage readings from 5% to 80%. The larger 1600 and 2000 gallon tanks have a larger 4" diameter face gauge to facilitate reading from a vantage point on the ground. An operational depiction of their operation is shown in Figure 17. Placarding and warning signs may be applied at this time along with means to maintain a safe system and prevent vandalism. A typical completed installation is as shown in Figure 15.



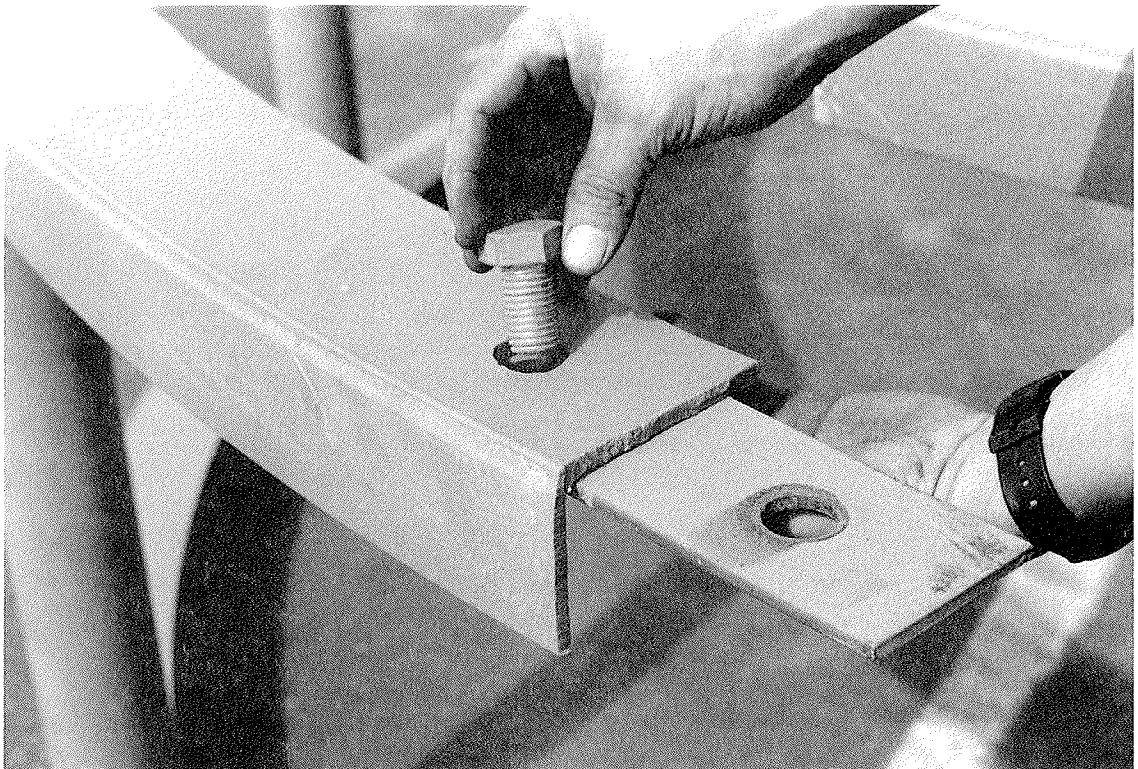
**FIGURE 1 PACKAGING OF BASE BEAM**



**FIGURE 2 ASSEMBLY OF BEAMS FOR BOLTING**

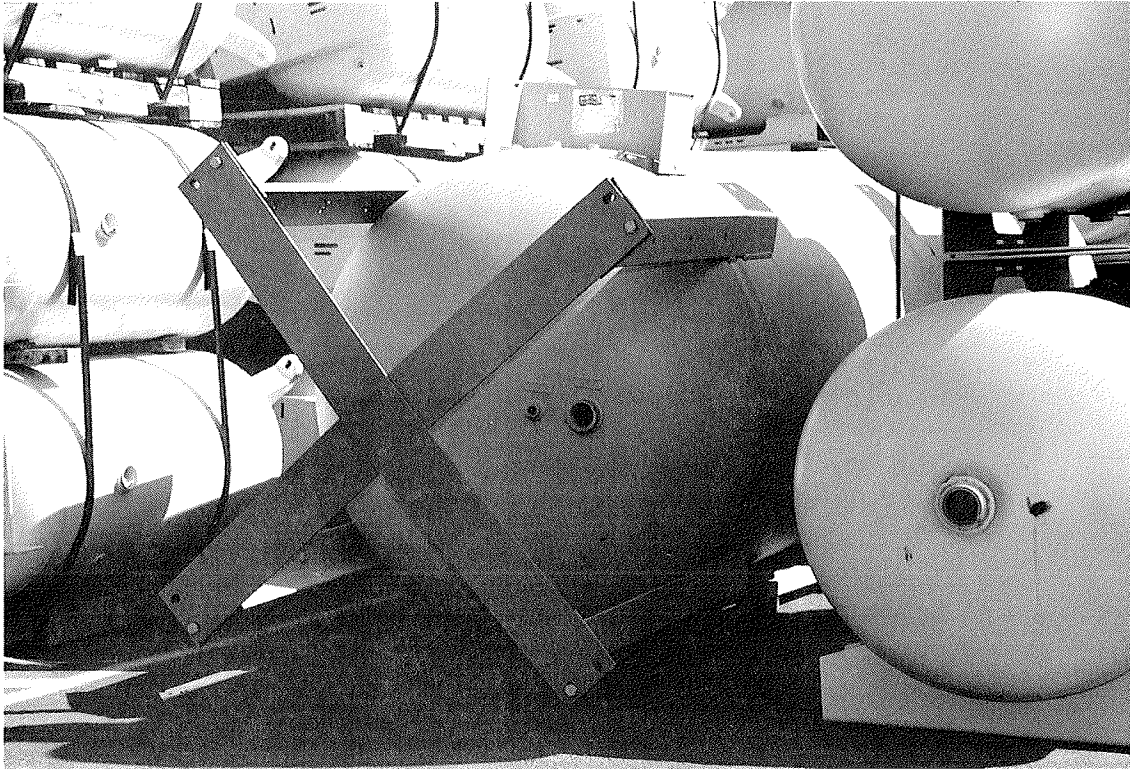


**FIGURE 5 CRASH POST ANGLE BRACKET FOR BOLTING TO BASE BEAM**

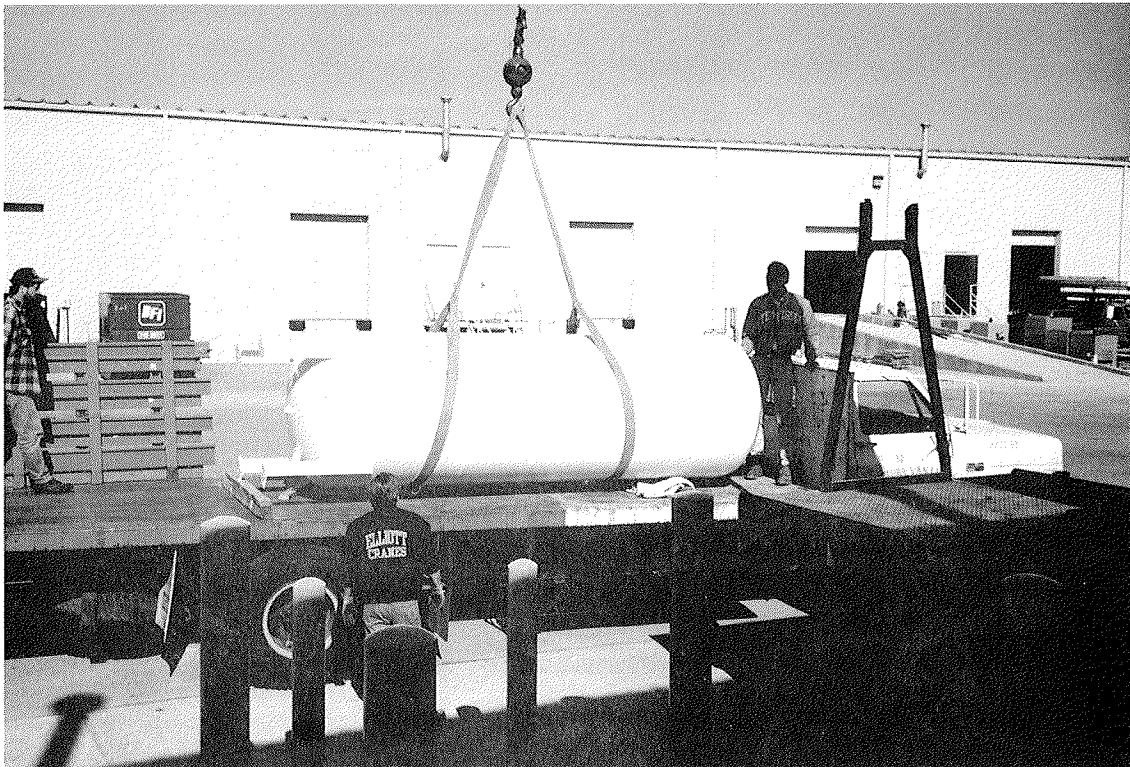


**FIGURE 6 SPLICE PLATE FOR ASSEMBLY OF UPPER RAIL**





**FIGURE 9 SHIPPING BRACE FOR ANGLE LEGS**



**FIGURE 10 OFFLOADING TANK WITH SLINGS**

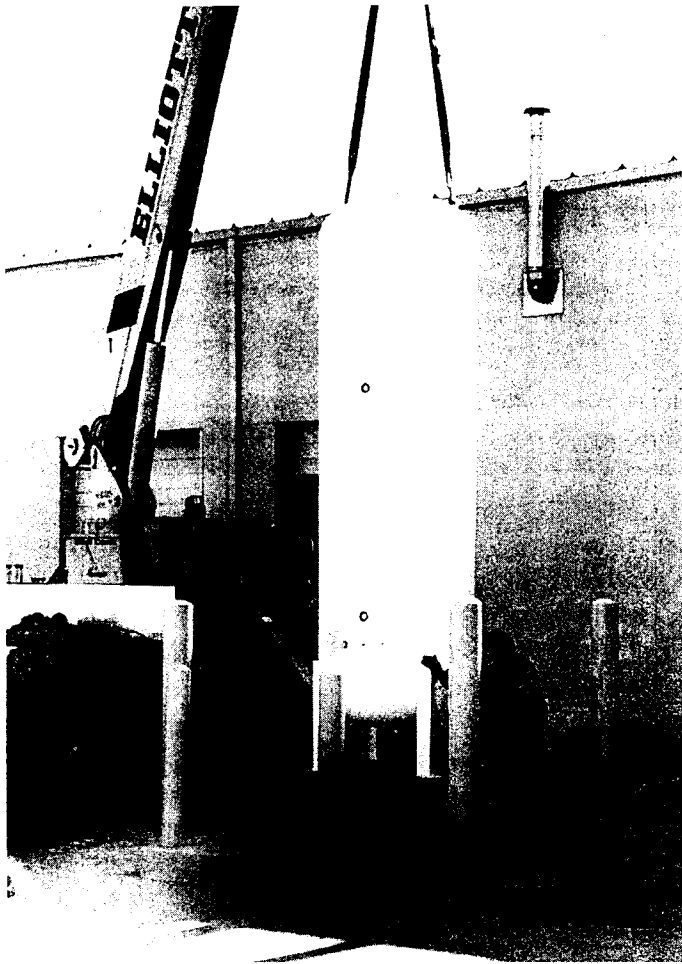
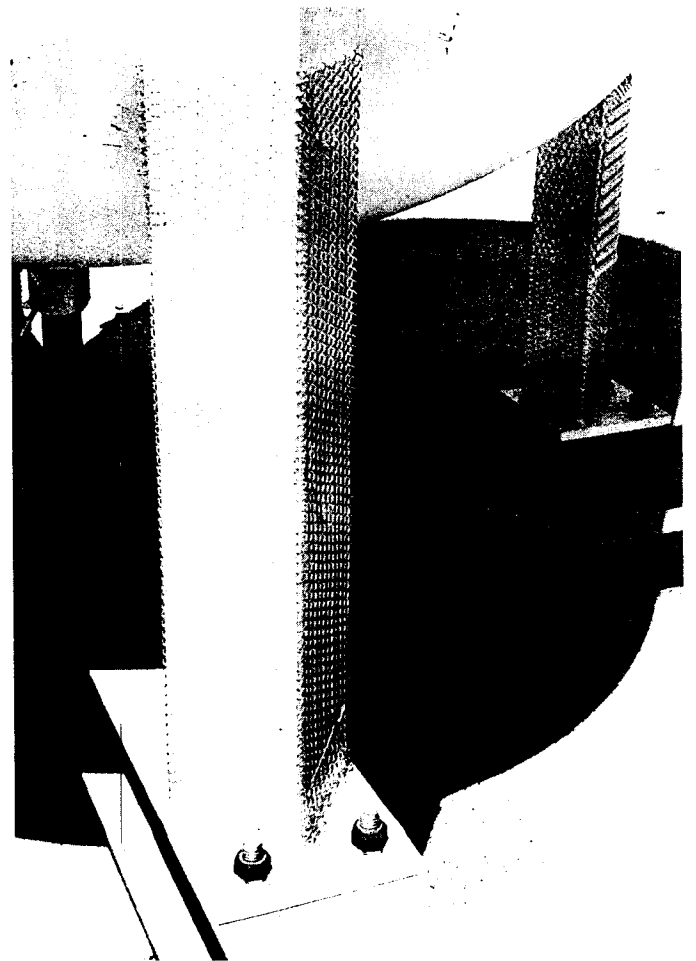
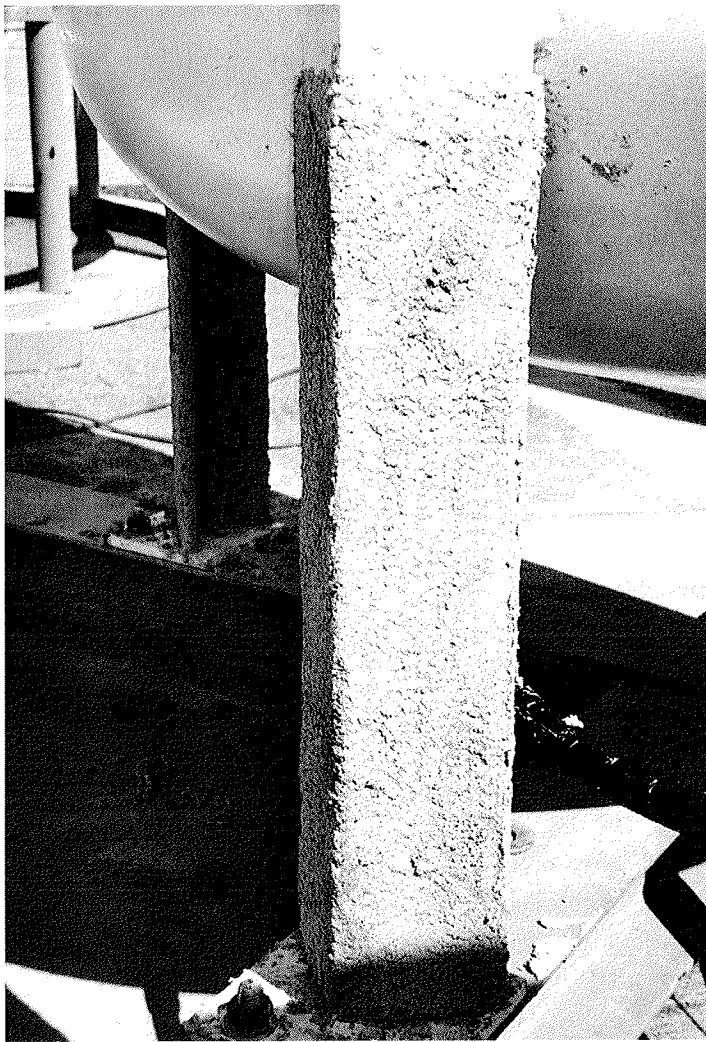


FIGURE 11  
LOWERING TANK  
TO BASE BEAM ASSY

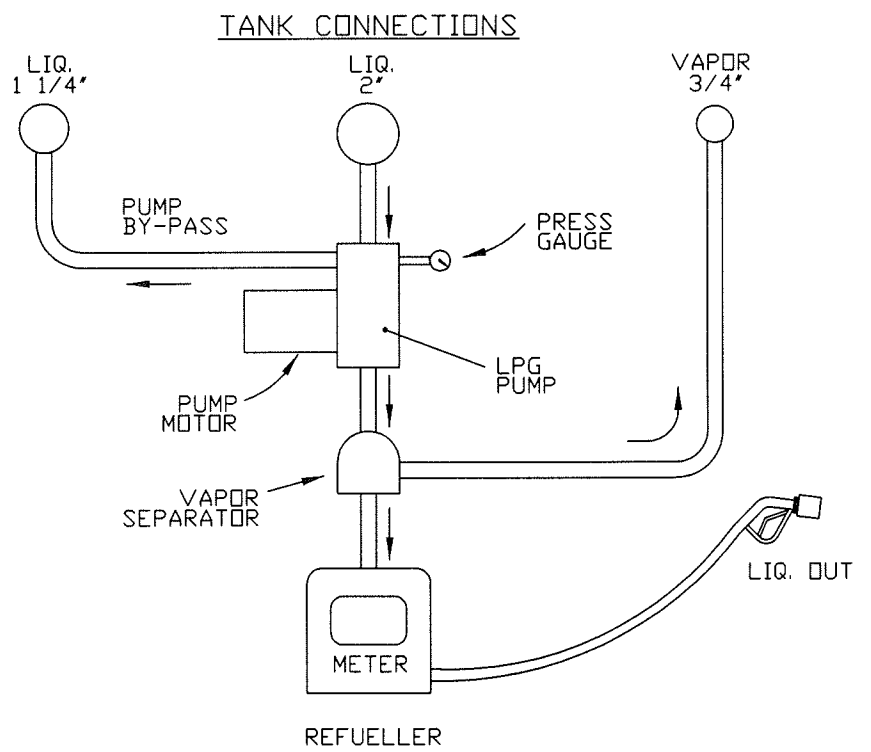
FIGURE 12  
GALVANIZED MESH  
APPLIED TO LEG





**FIGURE 13**  
**LEG WITH PYROCRETE**

**FIGURE 14**  
**TYPICAL**  
**PIPE**  
**ARRANGEMENT**



## APPENDIX A

### Foundation Instructions

The Manchester Dispenser System provides for the efficient installation of high capacity liquid petroleum gas (LPG) storage tanks and dispensing systems in minimum ground surface areas. The systems can be erected on a variety of foundation types in relatively short time. The following is the recommended sequence of installation steps.

1. Locate the position for the center of the vertical tank on the property, taking into consideration access for filling and for dispensing the fuel as well as required clearances from property lines and structures as may be dictated by the local agencies (building and zoning departments of the City and/or County that the property is located in. Permits from these agencies will be a requirement before you begin the installation.)
2. Select the type of foundation you wish to use for supporting and anchoring the tank system. Three basic types are recommended by Manchester; however, if unusual conditions prevail or you so desire, other foundation types can be designed by a local civil engineer by your engagement. First determine if you will be installing the entire tank, base frame and barrier post assembly or if the local jurisdictional agency requires that the barrier posts be separately installed in the ground, in which case you will only be installing the storage tank on the four legs already attached to it (use block foundation, Figure 18).
  - A. Footings: If the assembly is to be mounted in an unpaved area or an area having asphalt pavement or unreinforced concrete pavement, each leg must be supported on an individually excavated and poured concrete footing of the dimensions shown in Table A, Figure 19. From the center selected in step one above, draw a circle having a radius of four feet, seven and one half inches (4'-7 ½") and approximately select the locations of the four corner supports as they will be positioned on that circle. Then, precisely mark one of the four corners. Next, measure across exactly nine feet and three inches (9'- 3") and precisely mark the opposite corner. Then, from each of those two points, measure exactly six feet six and one half inches (6'- 6 ½") both ways (left and right) to locate the center points of the other two footings. Finally, check that the distance between those last two points is also precisely nine feet and three inches (9'-3") across the circle. These four points are the centers of the footings and can now be excavated to the required sizes and depths. Before pouring concrete, the tops of the footings should be formed to identical elevations and the anchor bolts must be precisely positioned and rigidly secured in place using a template suspended over each excavation.
  - B. Slab: The assembly may be erected upon an existing concrete slab if the slab is a minimum of 6" thick and is reinforced with either ½" reinforcement bars at 12" spacing in both directions at half depth of the slab or with 6 x 6-2/2 or 4 x 4-4/4 welded wire fabric at half depth. The slab must also be a minimum of 10' by 10' centered on the installation. The installation must rest on only one slab section and cannot span an expansion joint. If no such slab exists, you may elect to construct one instead of using alternative "A" (Footings) described above. Attach to approved expansion bolts or chemical bolts in drilled-in holes. The bolts must be capable of developing the required working tension and shear forces shown in Table B of Figure 19, and must be approved for such application. Ordinary expansion bolts are not acceptable for this project. Consult the local building department for acceptable



types. If the slab is to be constructed by you, you may drill-in the anchor bolts or you may cast-in 5/8" diameter bolts of at least A307 quality with the heads at least 4" below the top of the slab, using a 1/4" minimum thickness steel plate drilled for the bolts as a common washer, with at least one 4 x 4 reinforcing bar lying across the plate. The area below the bolt heads should be excavated to provide a minimum of two inches of concrete under the heads. The layout of the precise centers of the anchor positions follows the steps described in Section A (Footings) above. MTE will not be responsible if these steps for preparation of a slab are not precisely followed.

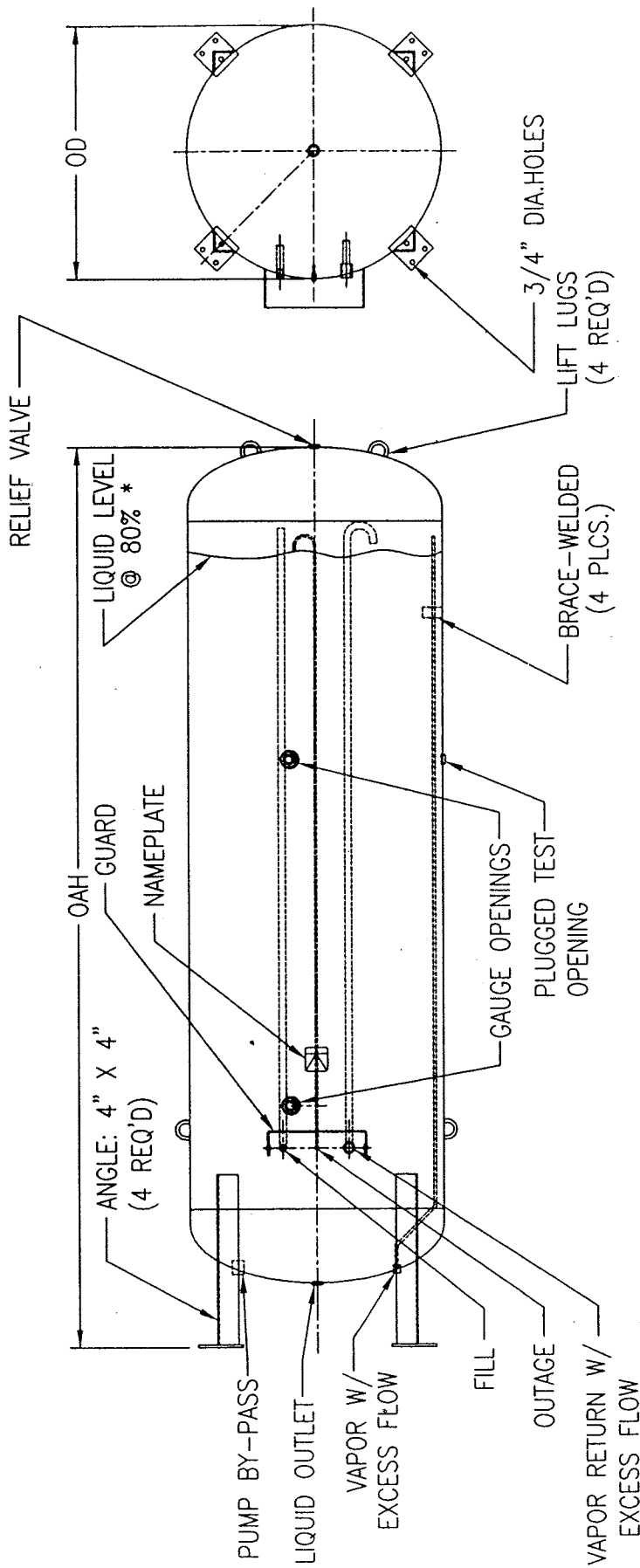
- C. Block Foundation: If the tank is to be placed directly on the foundation without the base assembly, it is necessary that a square slab be constructed of the size and thickness noted in Table C of Figure 18 and having reinforcement of #4 bars at 12" centers each way at mid-depth. Anchor bolts should be cast into the 2000 psi rated concrete by suspending them over the excavation in their precise locations by use of appropriate templates to prevent their displacement during concrete pouring operations. Barrier posts must then be installed in the ground at the appropriate locations to protect the tank from vehicle impact.
- D. With the foundations and anchor bolts in place, assembly and installation of the tank and its base components should not present any difficulties. The base assembly (or tank in the case of tank-only installations) must be leveled on the anchor bolts using leveling nuts so that the tank will stand precisely vertical. The baseplates shall then be grouted in place between the foundation concrete and the bottom of the baseplate with dry pack grout or expansive grout. The leveling nuts and the anchoring nuts shall both be in place during grouting.

## APPENDIX "B"

### Table of Valves & Gauges

	660	<u>1150</u>	<u>1250</u>	<u>1600</u>	<u>2000</u>
1. Liquid Outlet	<	1-1/4" Steel Plugged	>	< 2" plugged	>
2. 1-1/4" Pump Bypass	<	Steel Plugged			>
3. 3/4" Vapor w/excess flow	<	YES			>
4. 1-1/4" Fill	<	YES			>
5. 1/4" Outage	<	YES			>
6. 3/4" Vapor Return	<	YES			>
7. 3/4" Internal Relief Valve	---	----	-----	YES	YES
1" Internal Relief Valve	---	----	-----	-----	-----
1-1/4" Internal Relief Valve	YES	YES	YES	YES	YES
2" Liq. Level Gauge	YES (2)	YES (2)	YES (2)	YES(1)	YES(1)
4" Liq. Level Gauge	----	----		YES (1)	YES(1)

# FIGURE 16



PART NO.	OD X OAH	W.C.	LP CAP	W.P.	TARE WT.
29014	42 X 119	660	528	250	2025
22014	48 X 171	1150	920*	250	2878
29011	48 X 184	1250	1000	250	3500
29016	48 X 228	1600	1280	250	4015
23354	54 X 235.1/2	2000	1600	250	4540
TANK BASE					
29005	10' X 10'	FOR 22014 OR 29016		650#	
CRASH POST & RAILING					
22774	10' OD	FOR USE WITH TANK BASE		433#	



H:M-2958

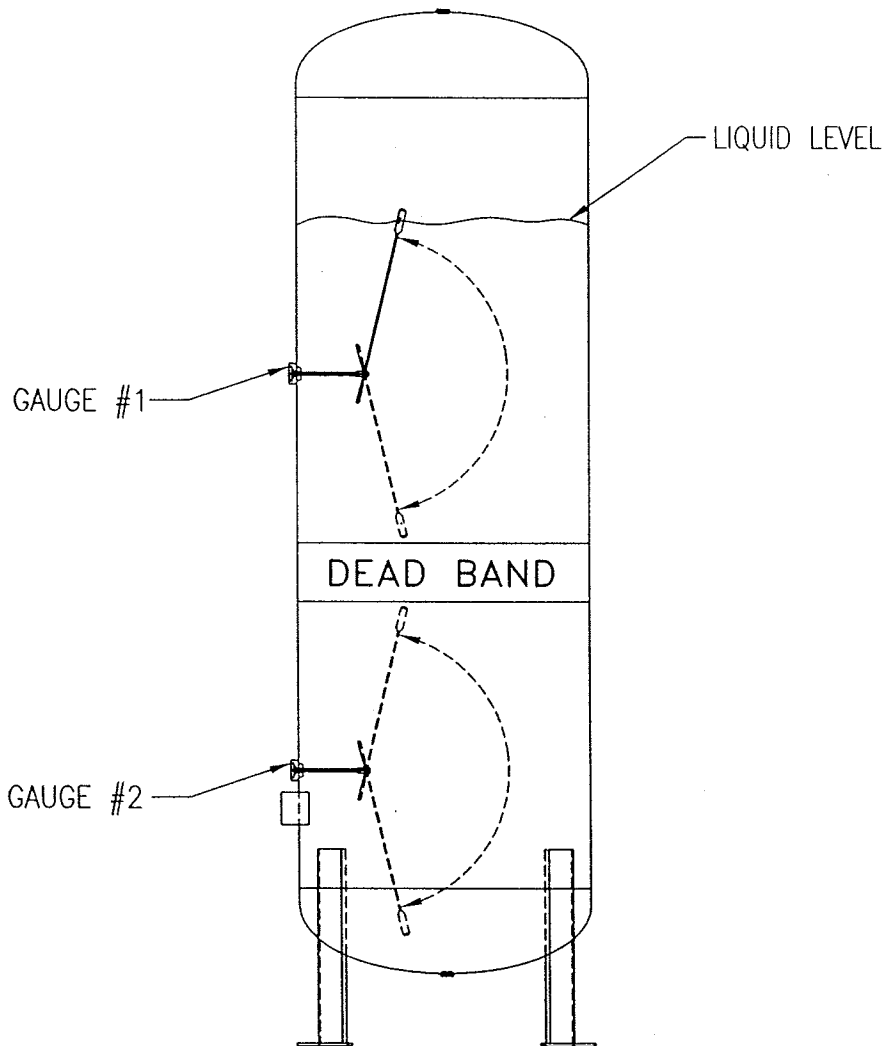
## VERTICAL LPG DISPENSER TANKS & VALVING

DRAWN BY: MR	DATE: 11-06-95	SCALE: NONE
APPR. BY: JD	DATE APPR: 11-06-95	DWG: M-2958

\*CA VERSION 22814 IS FILLED TO 86.5%

# FIGURE 17

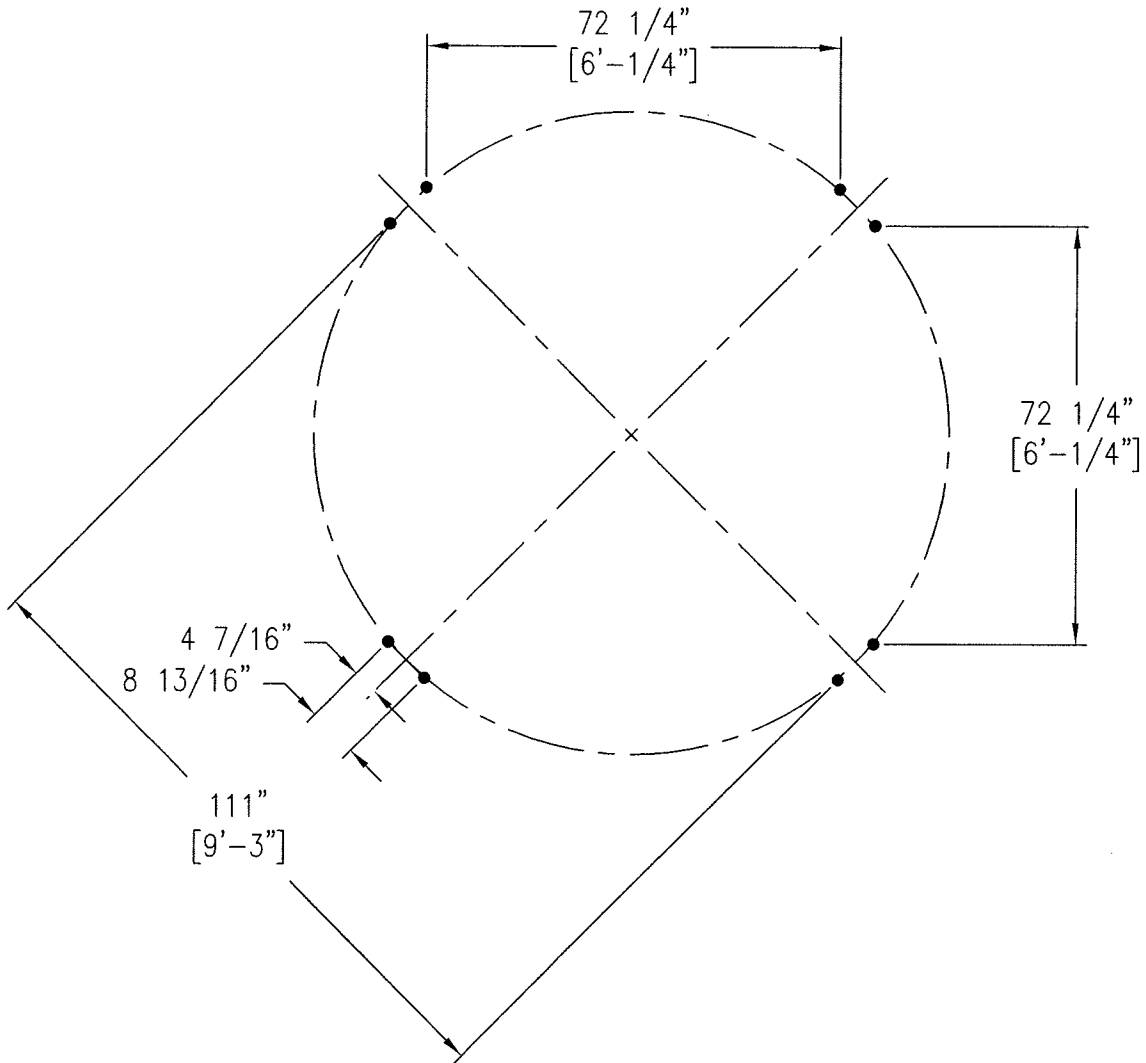
## OPERATION OF LIQUID LEVEL GAUGES



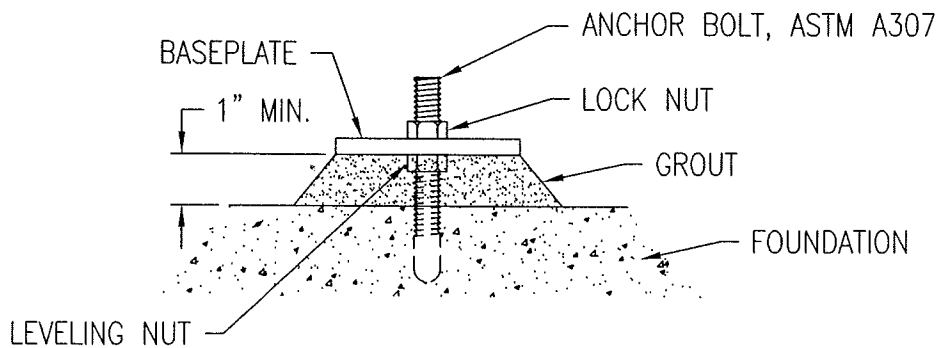
GAUGES SHOWN INDICATE THE DIRECT LIQUID GALLON LEVEL IN THE TANK. GAUGE #1 AND #2 BOTH READ MAXIMUM WHEN TANK IS FILLED TO 80% LIQUID LEVEL . AS LIQUID IS EVACUATED, GAUGE #1 RECEDES SLOWLY READING GALLONS DIRECTLY UNTIL APPROXIMATELY HALF FULL. DEPENDING UPON THE TANK THERE IS A "DEAD BAND" WHERE NO GAUGE MOVEMENT OCCURS. FINALLY, THE LOWER GAUGE #2 BEGINS TO READ GALLONS DIRECTLY UNTIL A 5% LEVEL IS REACHED SIGNALING TIME TO REFUEL. FOR EASIER READING, UPPER GAUGE #1 HAS A 4" DIAMETER FACE ON THE 1600 AND 2000 GALLON TANKS.

# INSTALLATION DETAILS

## FIGURE-18A



### LAYOUT BASE/BEAM ASY.

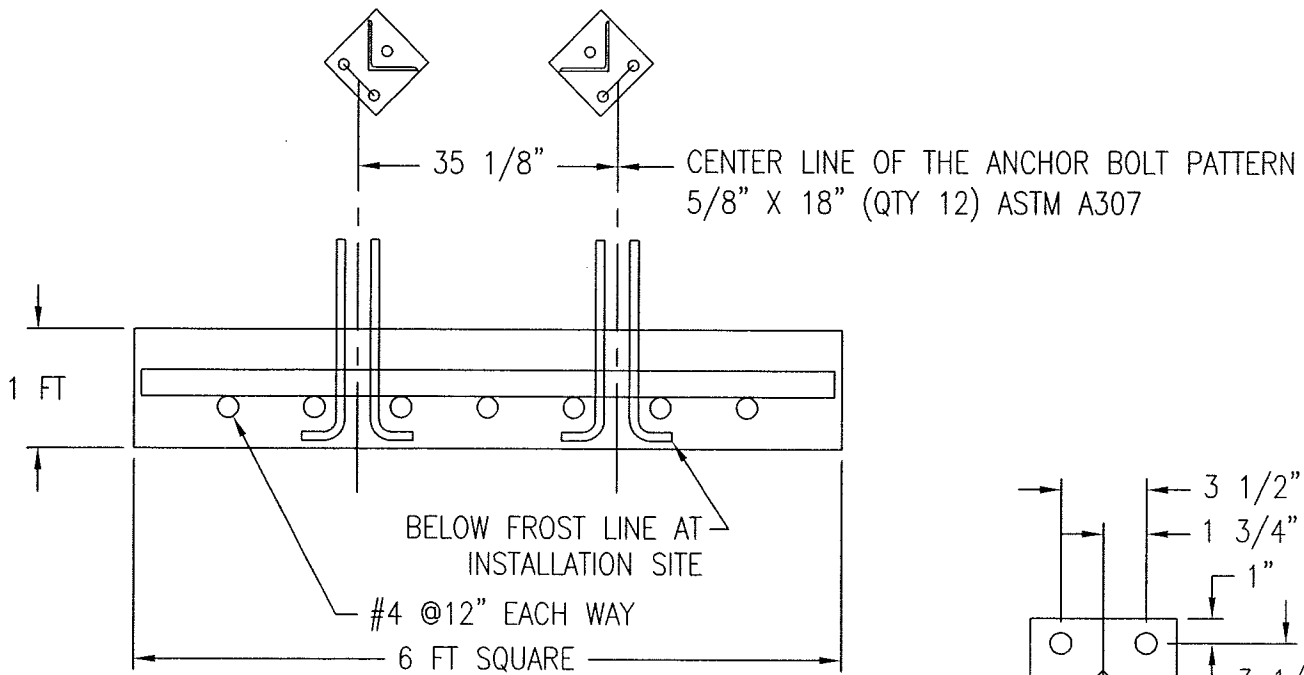


### GROUTING DETAIL

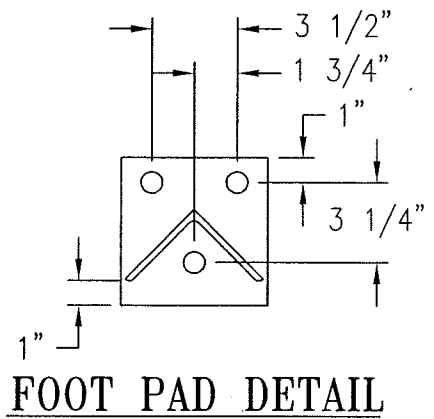


# INSTALLATION DETAILS

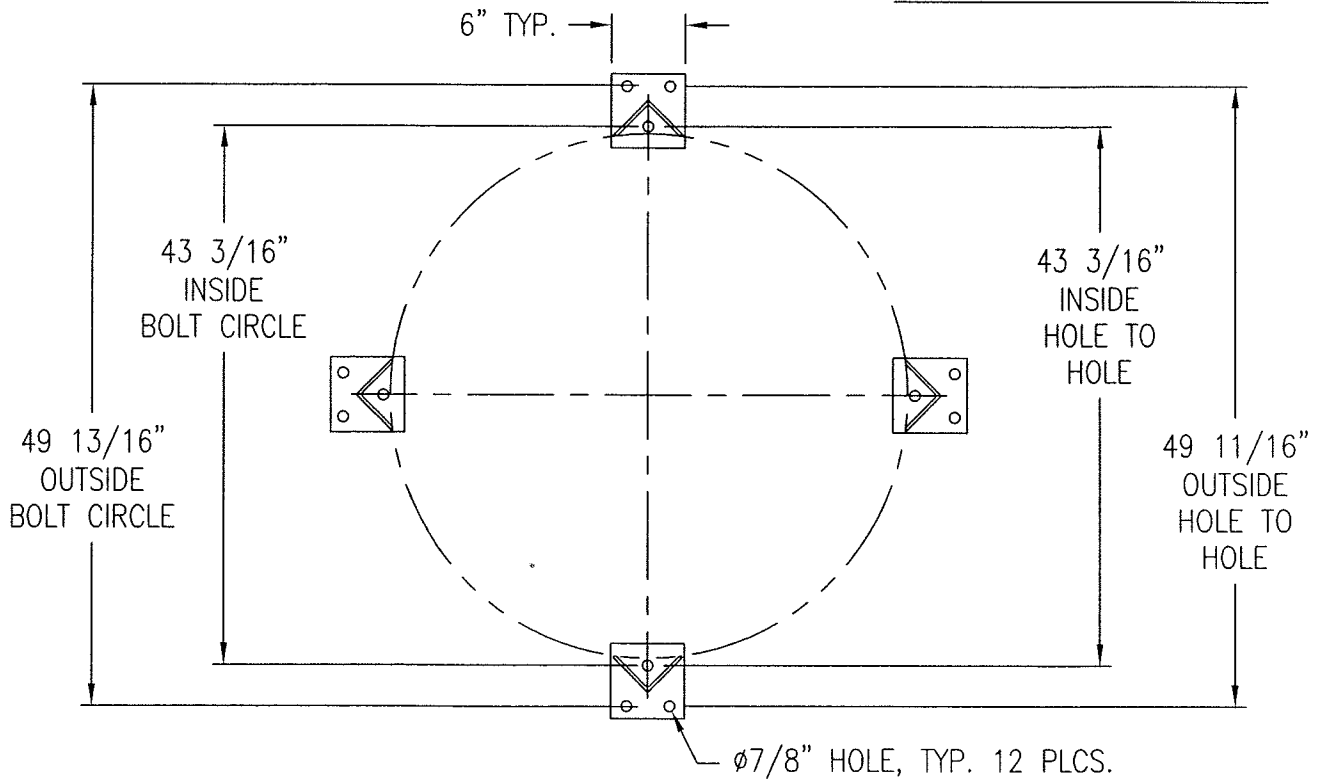
## FIGURE-18B FOR 660 GAL TANK



**SLAB/REBAR/ANCHOR BOLT DETAIL**

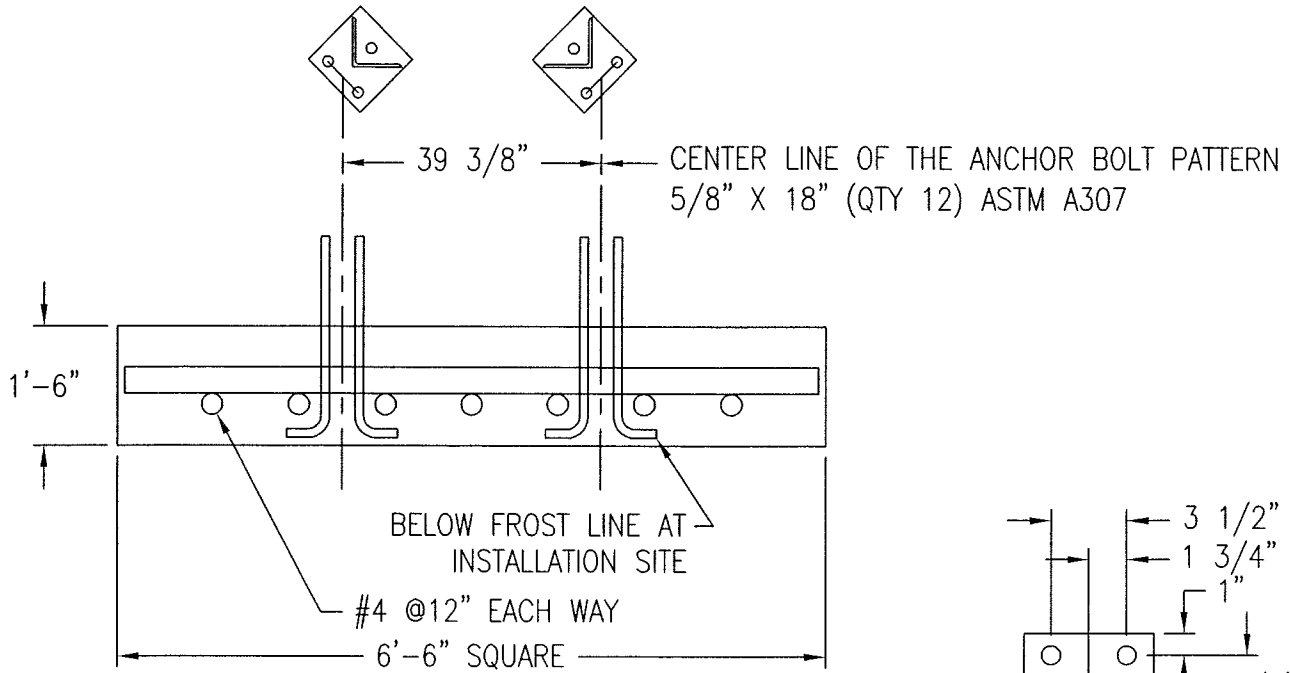


**FOOT PAD DETAIL**

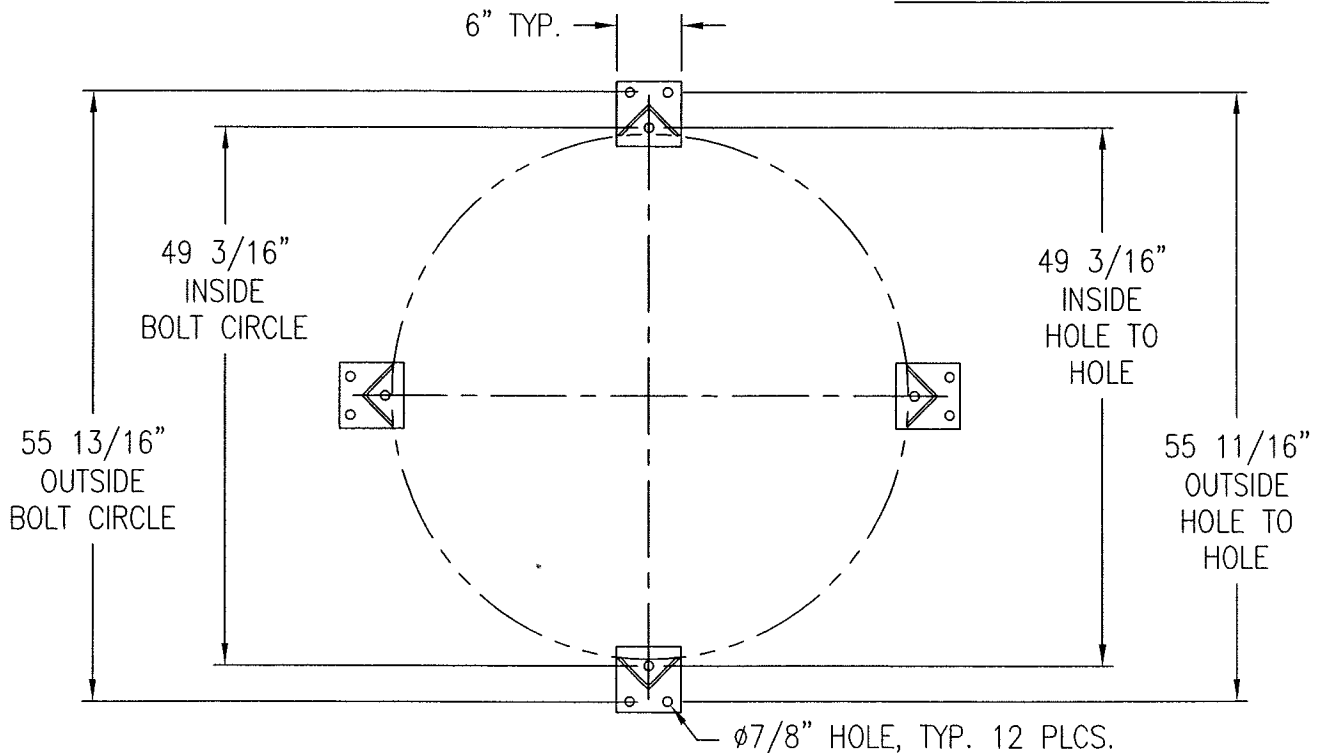
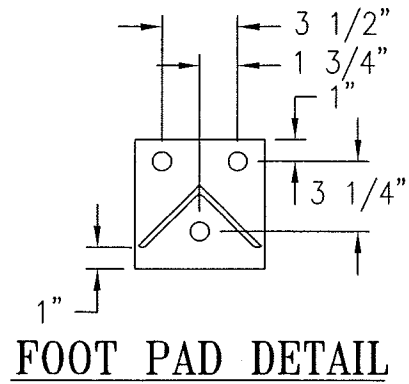


# INSTALLATION DETAILS

## FIGURE-18C FOR 1150 GAL TANK

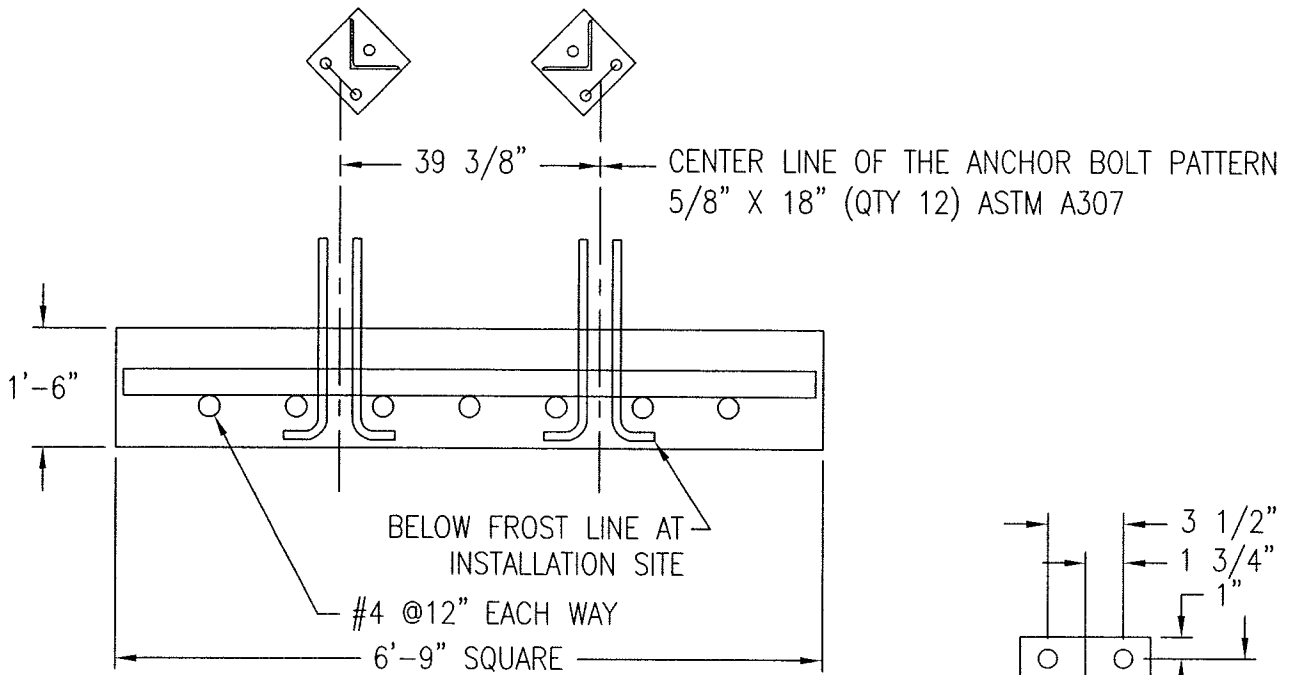


**SLAB/REBAR/ANCHOR BOLT DETAIL**

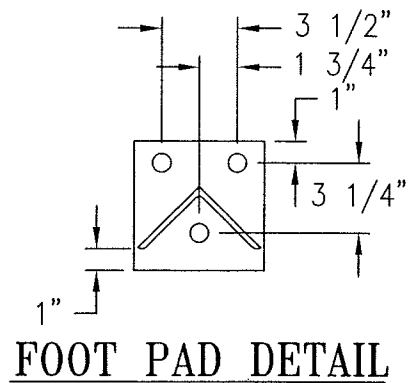


# INSTALLATION DETAILS

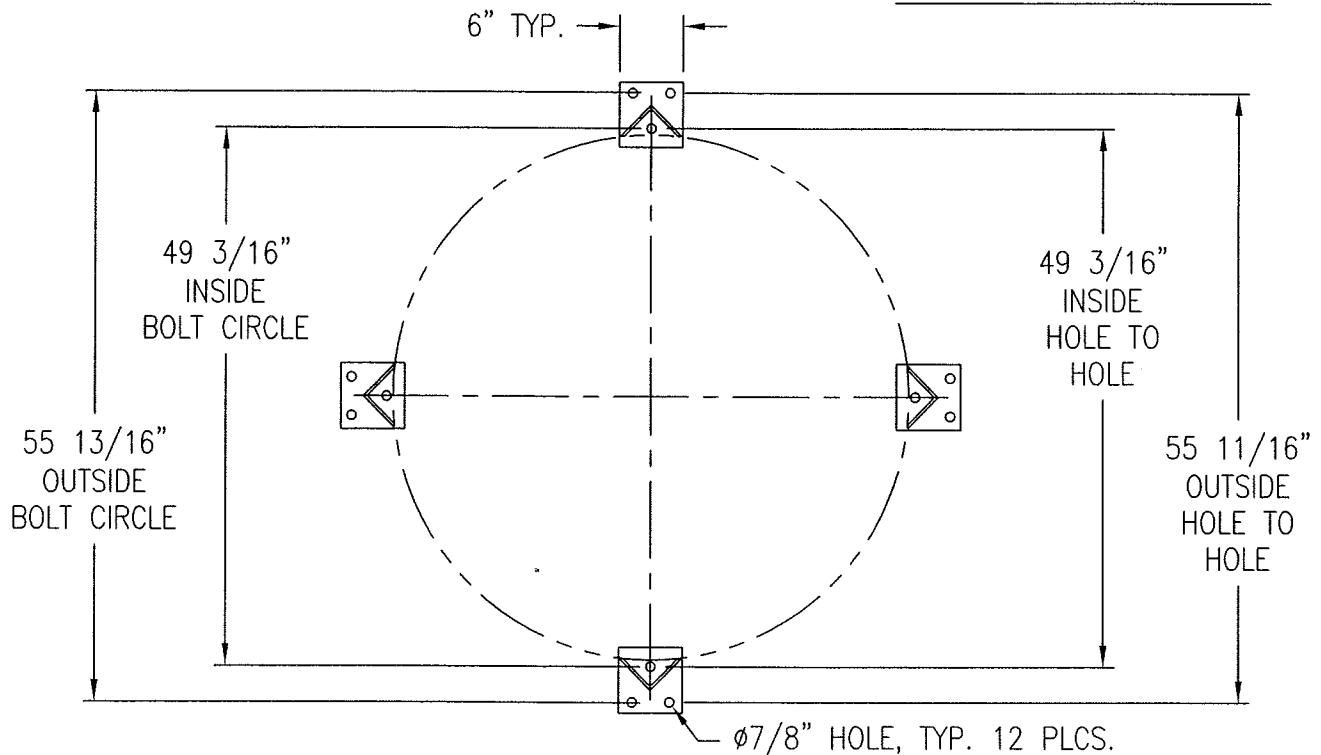
## FIGURE-18D FOR 1250 GAL TANK



**SLAB/REBAR/ANCHOR BOLT DETAIL**

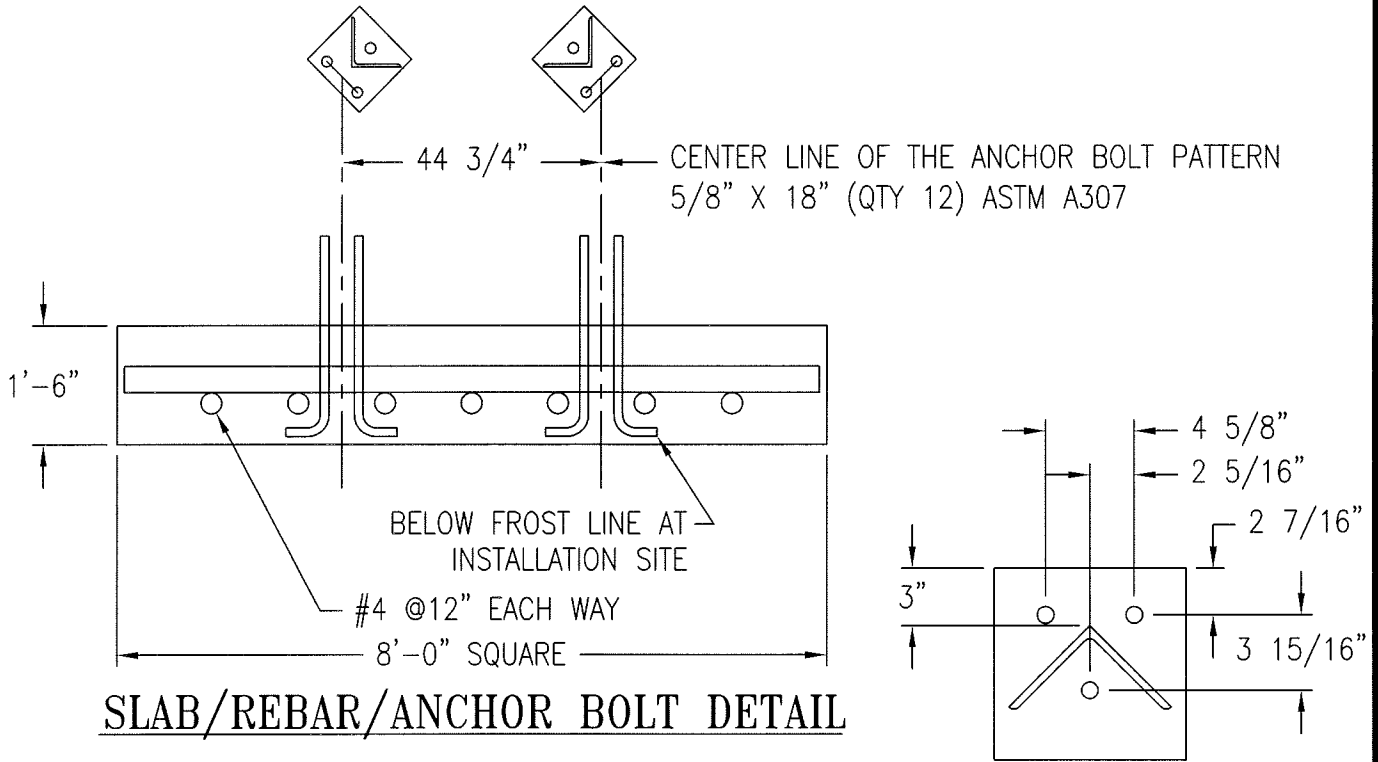


**FOOT PAD DETAIL**



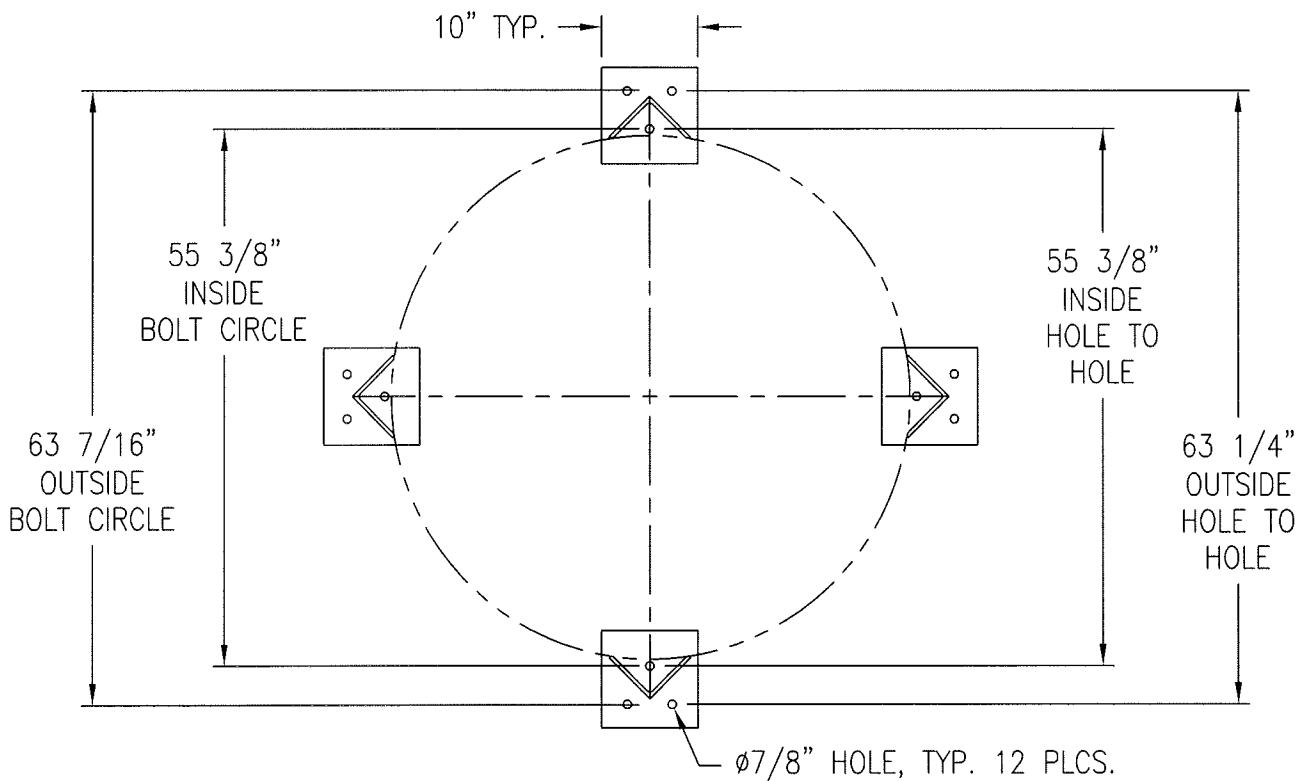
# INSTALLATION DETAILS

## FIGURE-18F FOR 1999 GAL TANK



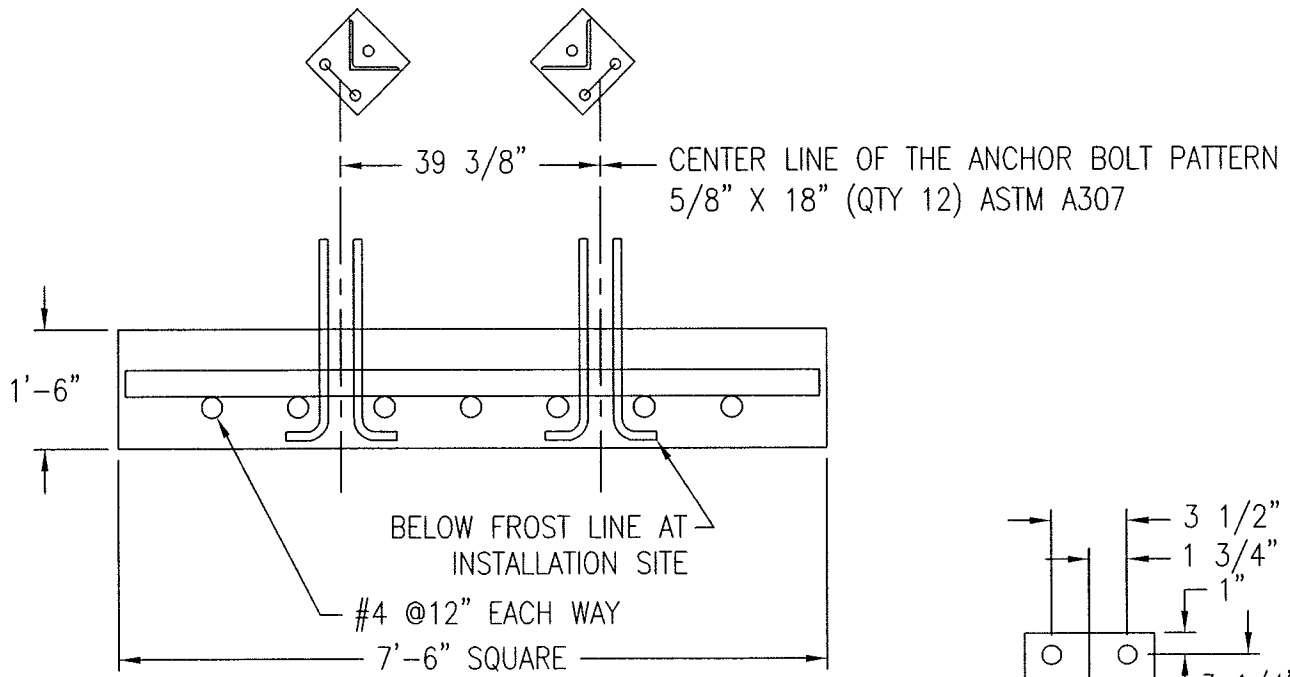
**SLAB/REBAR/ANCHOR BOLT DETAIL**

**FOOT PAD DETAIL**

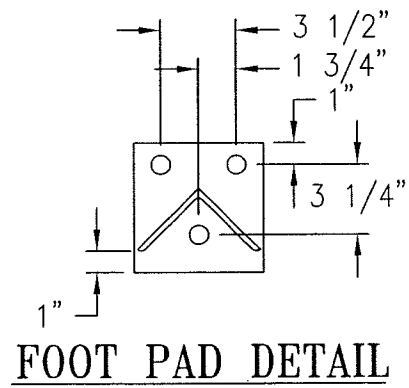


# INSTALLATION DETAILS

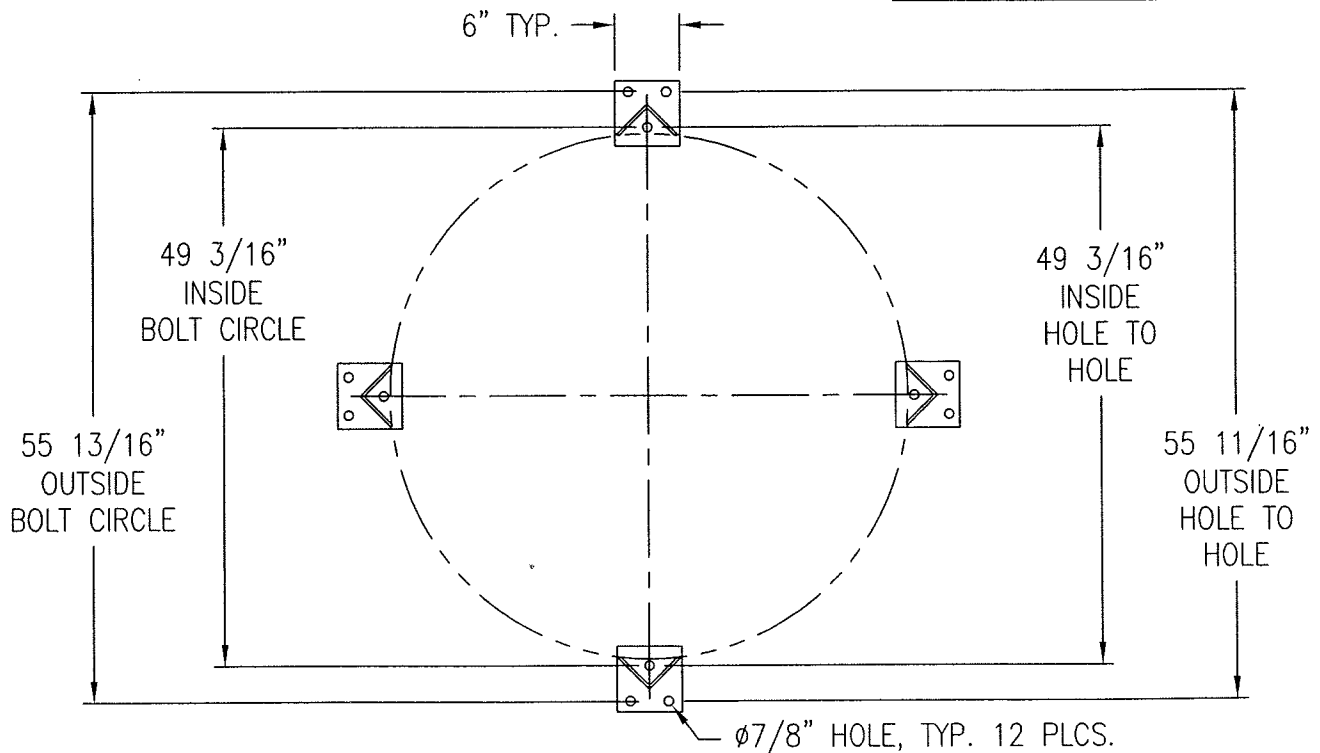
## FIGURE-18E FOR 1600 GAL TANK



**SLAB/REBAR/ANCHOR BOLT DETAIL**

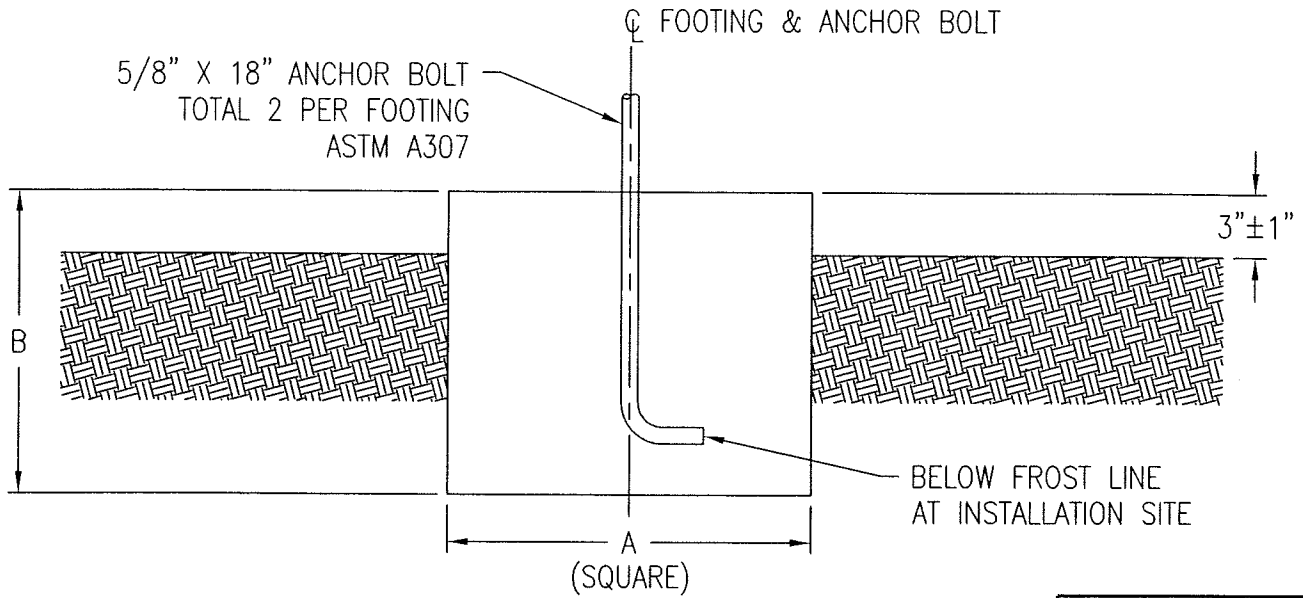


**FOOT PAD DETAIL**



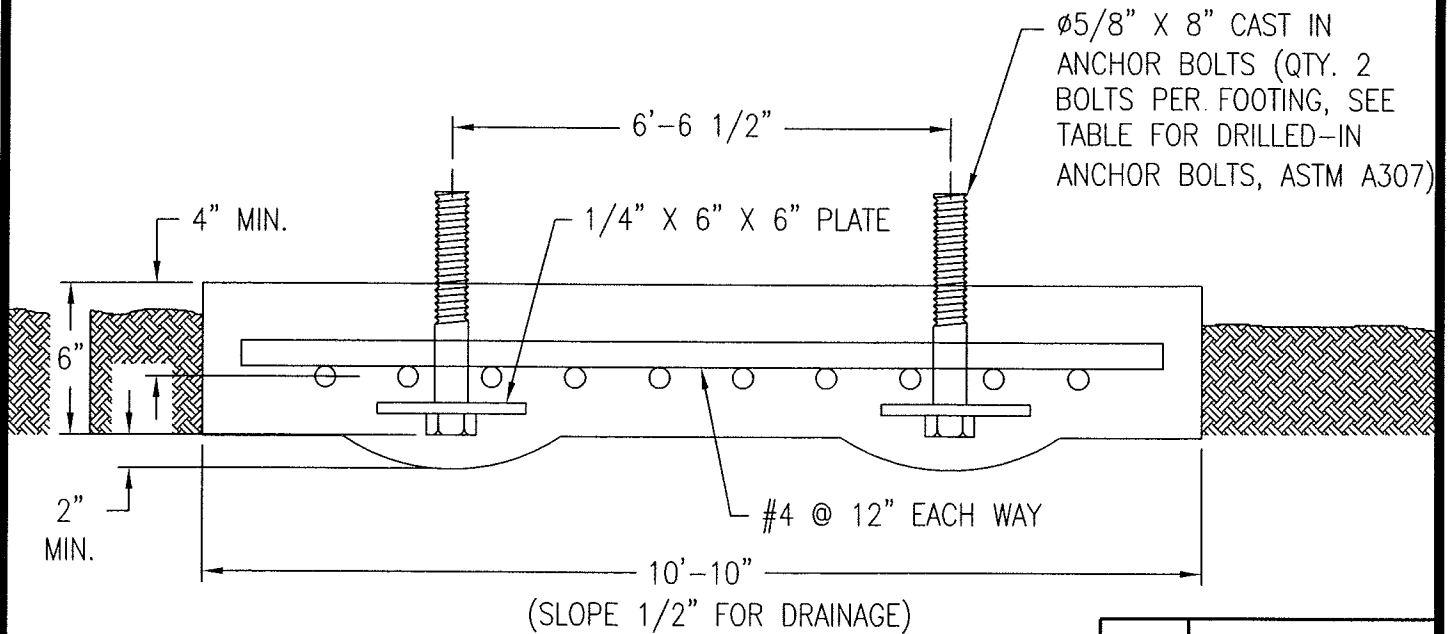


**FIGURE-19**



TANK	A	B
1150	2'-0"	2'-0"
1250	2'-4"	2'-0"
1600	3'-0"	2'-3"

**FOOTINGS**  
(USED WITH BASE BEAM ASSY)



**SLAB FOUNDATION**  
(USED WITH BASE BEAM ASSY)

TANK	REQUIRED BOLT BOLT STRENGTHS	
	TENSION	SHEAR
1150	595#	428#
1250	793#	449#
1600	1478#	562#