

Underground Fuel Storage

Amiantit Fiberglass Tanks

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AMIANITIT PIPE SYSTEMS

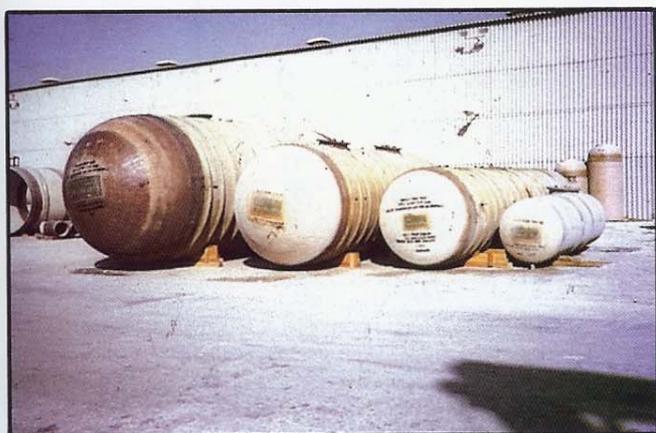
Fiberglass fuel storage tanks mean lower total cost and greater dependability over the life of your storage system.

There's one basic difference between Amiantit Fiberglass underground tanks and tanks made from steel. Fiberglass tanks won't corrode.

A Fiberglass underground tank will last the life of most facilities without corrosion-caused leaks or failures.

Corrosion-caused replacement costs are eliminated, as are periodic corrosion testing procedures, and the additional expense and concern over environmental problems due to leakage.

Fiberglass underground tanks...from Amiantit Fiberglass Industries Ltd.



Long Life

Fiberglass underground fuel storage tanks can be used to store gasoline, aviation fuel, gasohol (90% gasoline and 10% ethanol mixture), jet fuel, diesel fuel, potable water or waste water at ambient underground temperatures, or fuel oil at temperatures not to exceed 65°C. Tanks to be used to store any other materials should be cleared with Amiantit Fiberglass before purchase and installation.

Fiberglass tanks are impervious to the effects of external corrosion. Because they will not leak due to corrosion, Fiberglass underground tanks eliminate worries over pollution and related environmental problems.

Corrosion is caused by a direct current discharge from underground steel tanks. There are two sources of corrosion of steel tanks: galvanic action and stray electrical currents.

Galvanic action is an electrical cell phenomenon which produces current. It is caused by such things as dissimilar metal, varying steel tank surface conditions and non-homogeneous backfill. These conditions even vary within a single installation so that when testing soil resistivity, several tests must be made at different points of the same site over a period of time, to make the resistivity test results valid and useful. Conditions which indicate that corrosion will occur from galvanic action include: soil resistivity, soil pH, differential oxygen (different levels of oxygen exist at different points around steel tanks), new steel added to installation with old steel tanks, and anaerobic bacteria. Other variable factors, which may contribute to corrosion include: high water table, cinders, landfill, salts, fertilizers and septic tanks.

Stray electrical currents are man-made. Through grounding, these man-made electrical currents return to their source, taking the path of least resistance. The current will travel along underground steel tanks, taking metal ions from the tank as the current discharges or leaves the tank, resulting in corrosion. Underground steel tanks are vulnerable to stray electrical current corrosion, even with well-designed external protection. There is no steel tank protective system that is effective against stray current corrosion.

Internal corrosion, contributing to many steel tank leaks and failures, is also eliminated with Fiberglass underground tanks. External protection will do nothing to prevent internal corrosion. Factors which contribute to internal corrosion include: condensation from the product, oxygen, formation and deposition of sludge, climatic conditions and the presence of bacteria.

Maintenance Free:

Because Fiberglass tanks are not susceptible to corrosion, they're maintenance free. There's no need for periodic testing, record keeping or replacement of cathodic protection systems. You save the difference in time, money and concern over the service life of the tank and avoid potential financial liabilities.

Fiberglass underground tanks are made from polyester resins reinforced with glass fiber and silica sand. Petroleum products stored in Fiberglass tanks may be easily changed, without affecting either the tank, or the new product. Common additives in stored products will not change or damage tanks.

Strong and Durable

Properly installed, Fiberglass tanks are strong enough to withstand constant traffic from the heaviest over-the-road vehicle (H-20 axle loads-14,500 Kg/axle).

Fiberglass underground tanks are designed to meet specific performance criteria in dry or fully flooded holes when properly installed.

UL Listed

Amiantit Fiberglass Fuel Storage Tanks are the only tanks produced in the Middle East Listed by Underwriters Laboratories. An additional assurance of the high quality of AFIL tank.

All tanks must be vented, as tanks are designed for operation at atmospheric pressure only, except for use with vapor recovery systems provided the pressure or vacuum does not exceed 1 psi. Fiberglass tanks are designed for liquids with a specific gravity up to 1.5.

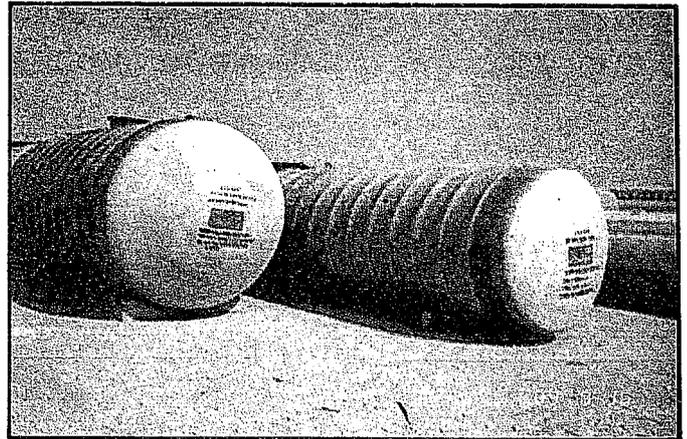
Economical

Fiberglass underground tanks offer incomparable performance benefits combined with quick, easy installation.

The performance of a Fiberglass underground tank means substantial savings over the life of the installation, compared to a steel tank. Fiberglass tanks mean no corrosion, no maintenance and no additional expense for tank replacement. In short, Fiberglass underground storage tanks are your lowest cost tanks.

Local Availability

A manufacturing plant located in Dammam, assures rapid delivery of Fiberglass tanks to any part of the Kingdom of Saudi Arabia as well as any other country.

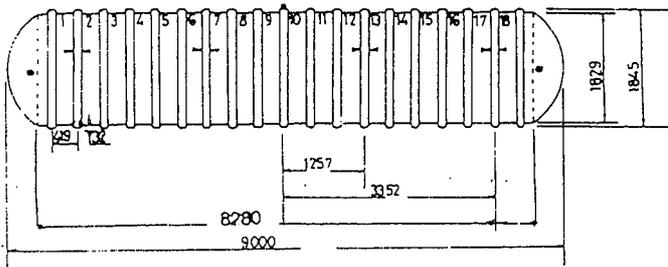


UL Listed Amiantit Fiberglass Tanks for the underground storage of petroleum products. The following diameters and models are covered.

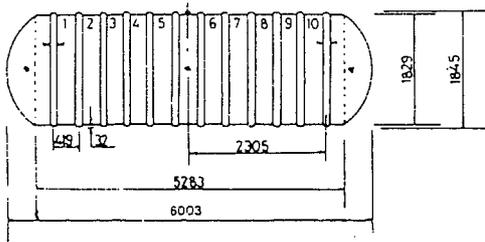
SIZE	Model	Capacity		Diameter	
		Liters	Gallons	mm	inches.
550	D 5	2000	530	1219	48
1000	D 5	3600	950	1219	48
2000	D 6	8060	2310	1829	72
3000	D 6	11430	3130	1829	72
4000	D 6	14870	3930	1829	72
6000	D 6	22745	6010	1829	72
4000	D 6	15260	4030	2337	92
6000	D 6	22400	5930	2337	92
8000	D 6	29630	7830	2337	92
10000	D 6	36820	9730	2337	92
12000	D 6	44020	11630	2337	92
15000	D 3	56750	14990	3000	118.1
20000	D 3	74520	19690	3000	118.1
25000	D 3	92650	24476	3500	137.8
30000	D 3	118120	31205	3500	137.8
40000	D 3	148370	39195	3500	137.8
48000	D 3	180420	47661	3500	137.8

Tank Model D - 6 Standard Tank Dimensions

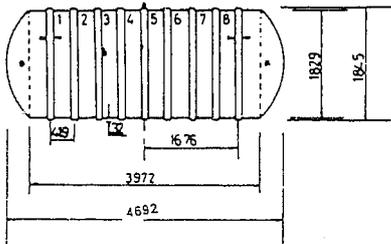
6,000 Gallon



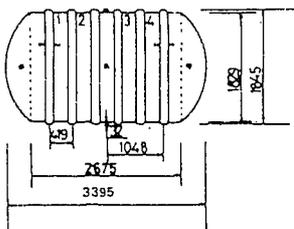
4,000 Gallon



3,000 Gallon

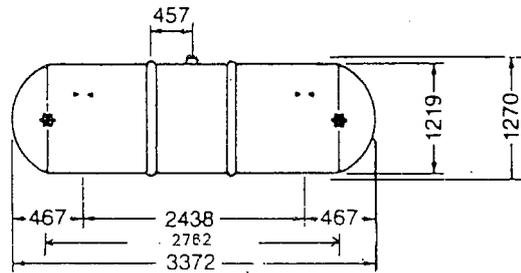


2,000 Gallon

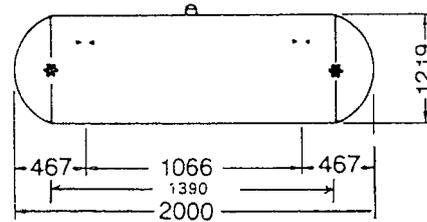


Tank Model D - 5 Standard Tank Dimensions

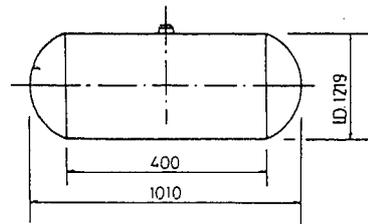
1,000 Gallon



550 Gallon



250 Gallon



Standard Tank Notes:

1. Hold down strap rib locations are indicated by arrows: ▶◀
2. FRP encapsulated steel deflector plate (300mm sq) under every fitting opening.
3. Fittings cannot be installed in locations marked: *
4. Manways cannot be located over end rib on any size tank.

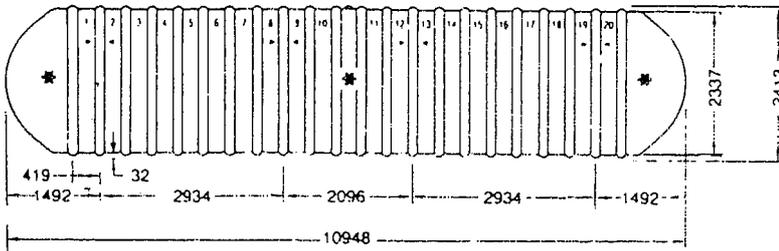
Note: All dimensions are in millimeters.

STANDARD TANK DATA

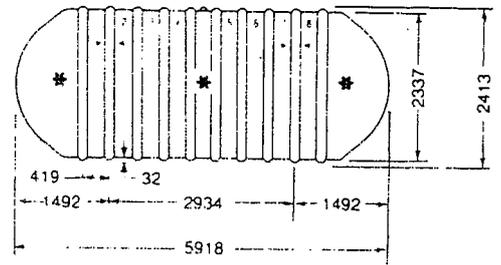
MODEL	NOMINAL CAPACITY (U.S. gals.)	ACTUAL CAPACITY U.S. gals./liters	STANDARD NPT FITTING POSITIONS	STANDARD MANWAY POSITION	TANK INSIDE DIAMETER (mm)	NOMINAL WEIGHT (Kgs.)
D6	6000	6010 / 22745	2,4,7,8,12,13	—	1829	924
D6	4000	3930 / 14870	1,3,5,6,9,10	—	"	640
D6	3000	3130 / 11430	2,4,5,7	—	"	554
D6	2000	2130 / 8060	1,2,3,5	—	"	393
D5	1000	950 / 3600	1,2,3, ctr	—	1219	186
D5	550	530 / 2000	1,2,3, ctr	—	"	133
D5	250	250 / 950	1,2, ctr	—	"	77

Tank Model G - 6 Standard Tank Dimensions

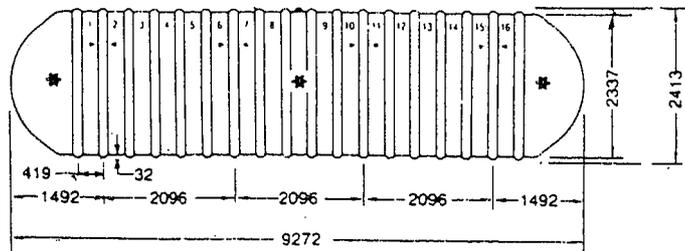
12,000 Gallon



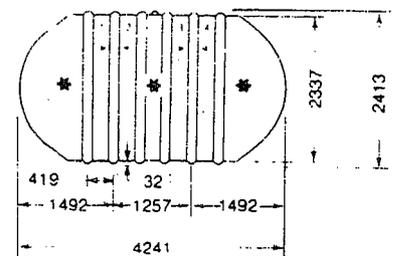
6,000 Gallon



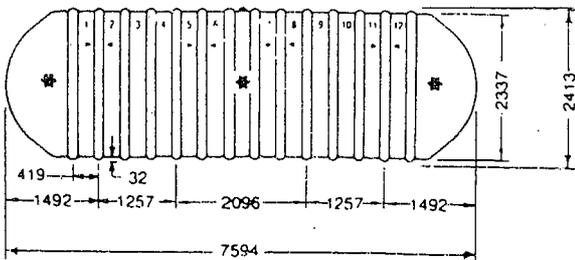
10,000 Gallon



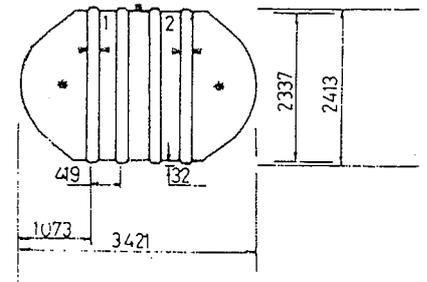
4,000 Gallon



8,000 Gallon



3,000 Gallon



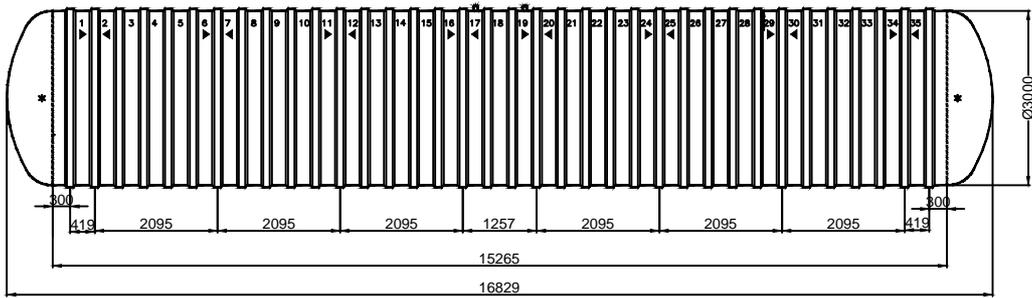
Note: All dimensions are in millimeters.

STANDARD TANK DATA

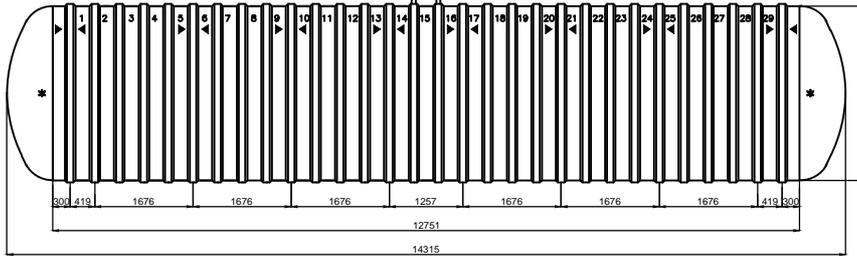
MODEL	NOMINAL CAPACITY (U.S. gals.)	ACTUAL CAPACITY U.S. gals./liters	STANDARD NPT FITTING POSITIONS	STANDARD MANWAY POSITION	TANK INSIDE DIAMETER (mm)	NOMINAL WEIGHT (Kgs.)
G6	15000	14,478 / 54,800	2,4,13,14,23,25	21-22	2337	2217
G6	12000	11,630 / 44,020	2,4,10,11,17,19	15-16	"	1717
G6	10000	9,730 / 36,820	2,4,8,9,14,15	12-13	"	1435
G6	8000	7,830 / 29,630	2,4,6,7,10,11	8-9	"	1195
G6	6000	5,930 / 22,440	2,3,4, ctr, 7,8	—	"	933
G6	4000	4,030 / 15,260	1,2, ctr, 4	—	"	643
G6	3000	3,130 / 11,850	1,2, ctr,	—	"	566

TANK MODEL D-3

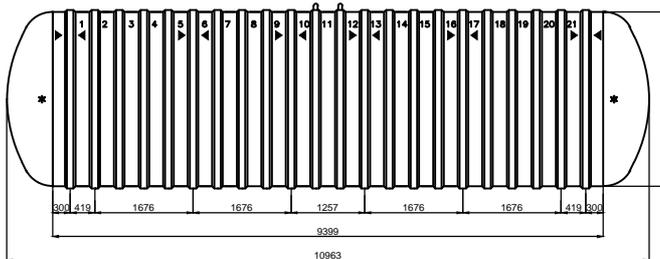
30000 GALLON



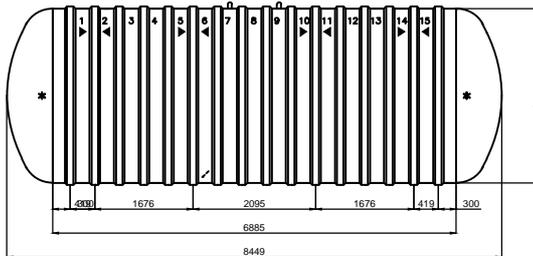
25000 GALLON



20000 GALLON



15000 GALLON



DIA 3000 U/G STANDARD TANK DATA

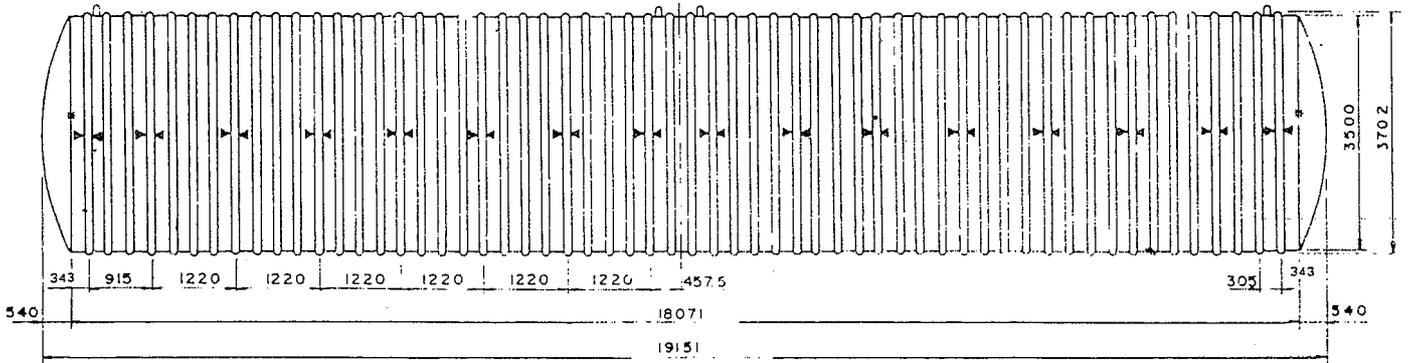
NOMINAL CAPACITY (US gals)	ACTUAL CAPACITY (US gals)	STANDARD NPT FITTING POSITIONS	STANDARD MANWAY POSITION	TANK INSIDE DIAMETER (mm)	NOMINAL WEIGHT (kgs)
30000	30415 / 115134	10,15,22,32	25-26	3000	
25000	25720 / 97363	6,10,11,25	22-23	3000	
20000	19460 / 73670	2,7,15,17	12-13	3000	
15000	14760 / 55899	4,5,13	8-9		

STANDARD TANK NOTES.

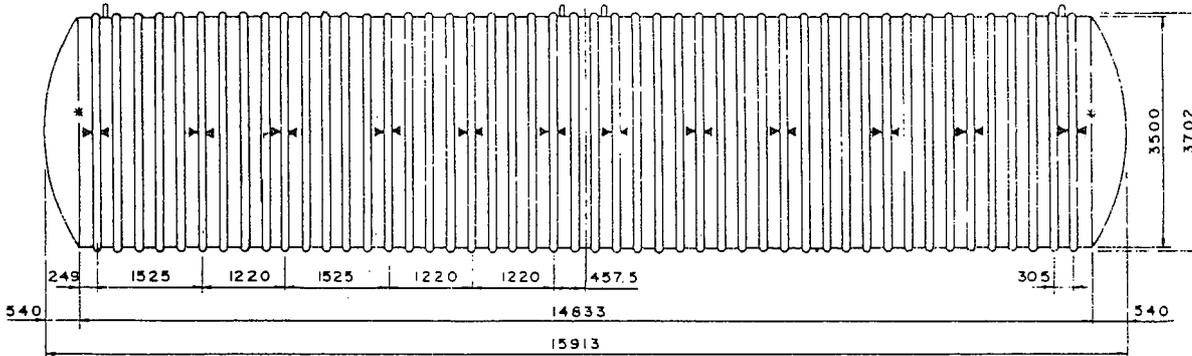
- 1) ALL DIMENSION ARE IN MM, UNLESS OTHERWISE NOTED.
- 2) DIMENSIONS SHOWN ARE LINE DIMENSIONS ONLY.
- 3) ALL THE PROJECTIONS OF NOZZLES / MANHOLES ARE FROM OUTSIDE OF THE TANK SHELL / REINFORCEMENTS AS NECESSARY.
- 4) OTHER DIMENSIONS SHALL BE CONSIDERED WITH RESPECT TO THICKNESS & REINFORCEMENTS.
- 5) TOLERANCES SHALL BE ON THICKNESS AND REINFORCEMENTS.
- 6) ALL FLANGE NOZZLES ARE DRILLED TO ANSI B 16.5 (OFF CENTER) WITH RATING #150
- 7) HOLD DOWN STRAP RIB LOCATIONS ARE INDICATED BY ARROWS ▶ ◀
- 8) FRP ENCAPSULATED STEEL DEFLECTOR PLATE (30cm²) WILL BE PROVIDED UNDER EVERY FITTING.
- 9) CRUSHED AGGREGATE OF SIZE 1/2" IS USED FOR BED AND BACKFILL.
- 10) MANWAYS CANNOT BE LOCATED OVER END RIB ON ANY TANK SIZE.
- 11) FITTINGS CANNOT BE INSTALLED IN LOCATIONS MARKED *

Tank Model D - 3 Standard Tank Dimensions

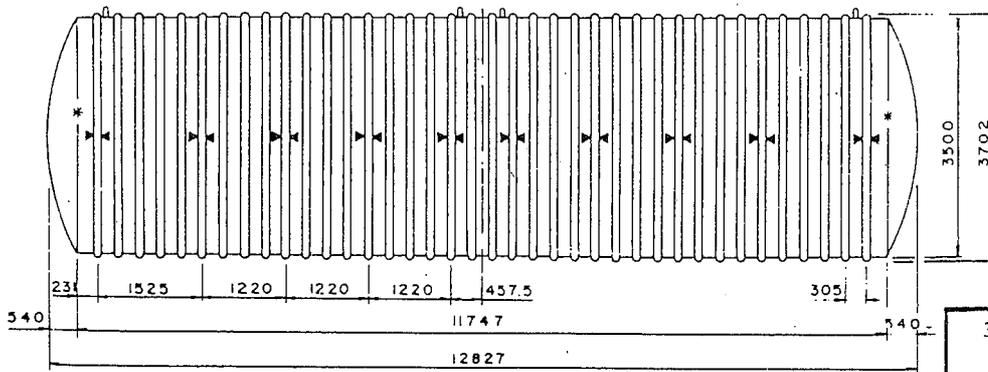
48,000 Gallon



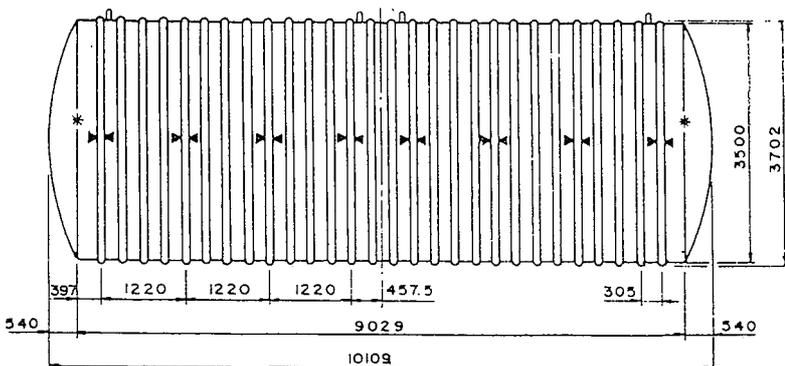
40,000 Gallon



30,000 Gallon



25,000 Gallon



3500 DIAMETER TANK DATA NOMINAL CAPACITY & MODEL	ACTUAL CAPACITY (gals.)	NORMAL WEIGHT (kgs.)
48,000 D-3	47,661	8,500
40,000 D-3	39,195	6,900
30,000 D-3	31,205	5,680
25,000 D-3	24,476	4,264

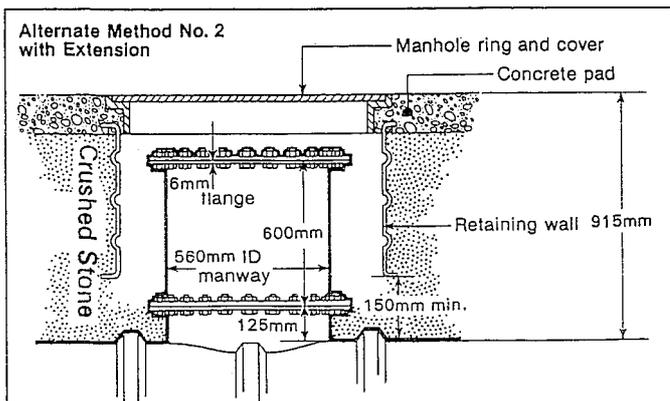
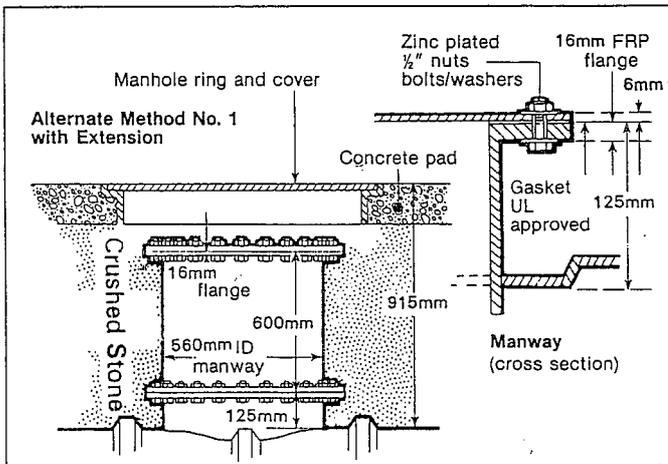
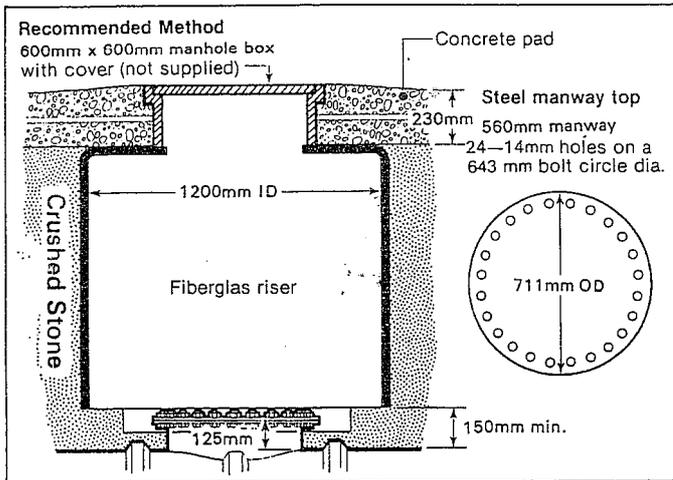
3500 Diameter made to-order tank notes

1. Hold-down strap rib locations are indicated by arrows ►►
2. Fittings cannot be installed in locations marked* Fittings cannot be installed in adjacent rib spaces.
3. All 3500 diameter tanks must have manways. Manways cannot be located over end rib on any size tank
4. FRP encapsulated steel deflector plate (300 mm sq.) under fitting opening for gauging tank must be specified.

Note: All dimensions are in millimeters.

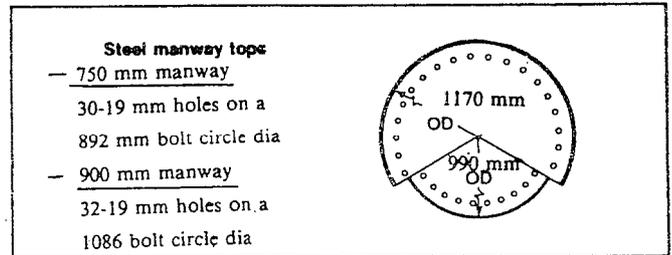
Fiberglass Standard Flanged Manways

Manways can be installed centered over any of the tank ribs except for end ribs, lift lug ribs or hold-down strap ribs. The standard manway (bearing loads to 550 Kg) is 560mm in diameter equipped with an epoxy painted carbon steel cover and includes a gasket and 24 zinc coated 1/2" x 1/2" bolts, nuts and washers. Fiberglass extension tubes 560mm diameter are available in 600mm length which include extra gasket and set of nuts, bolts and washers.



Large Diameter Manways for 2337mm, 3000 mm and 3500mm diameter tanks

A 750mm or 900mm Fiberglass flanged manway can be installed over any tank ribs, except over end ribs or hold-down strap ribs. 750mm and 900mm diameter extension tubes are also available in 600mm lengths which include extra gasket and set of nuts, bolts and washers.



Fiberglass Heavy-duty Flanged Manways

Heavy-duty 560mm manways (bearing loads to 1000 kg) are available. They can be installed in place of the standard 560mm manways previously detailed. All 750mm and 900mm manways are heavy duty.

Fiberglass heavy-duty manways must be specified on tanks equipped with helical heating coils, agitators or pumps with a total downward load greater than 560 kg but less than 1000 kg.

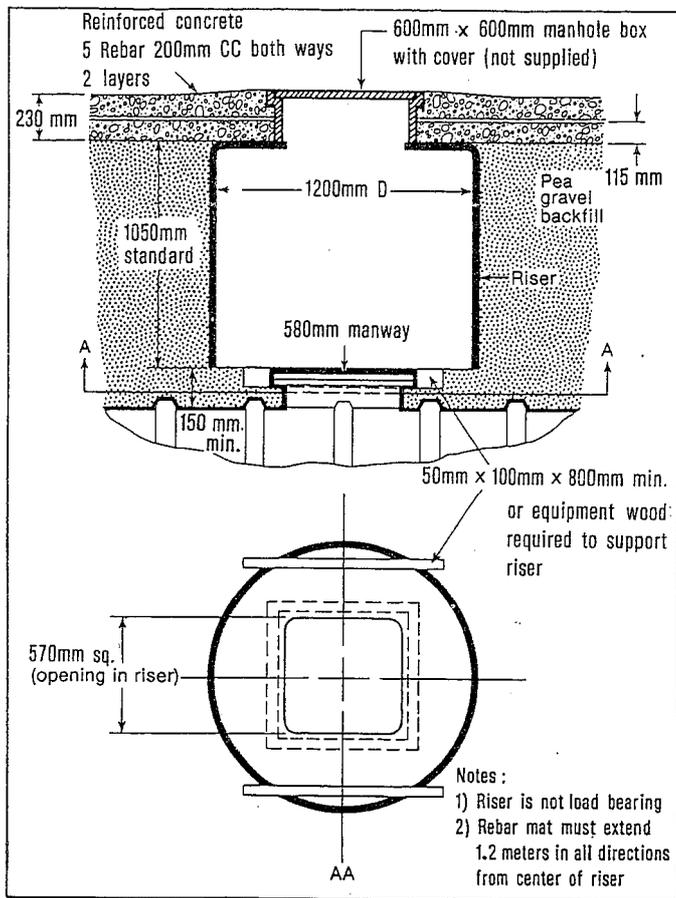
Fiberglass Manway Riser Pipe

The Fiberglass manway riser pipe provides a non-corroding, spacious, economical access from a manhole box and cover, (traffic areas require reinforced concrete road surface) down to the tank manway. Since the bottom is open, the manway riser will fill with water as water surrounds it on the outside.

The manway riser pipe is available in lengths from 750mm to 1350mm in 150mm increments, and consists of a 1200mm diameter tube, open at one end, and a 570mm centered square hole with rounded corners at the other end.

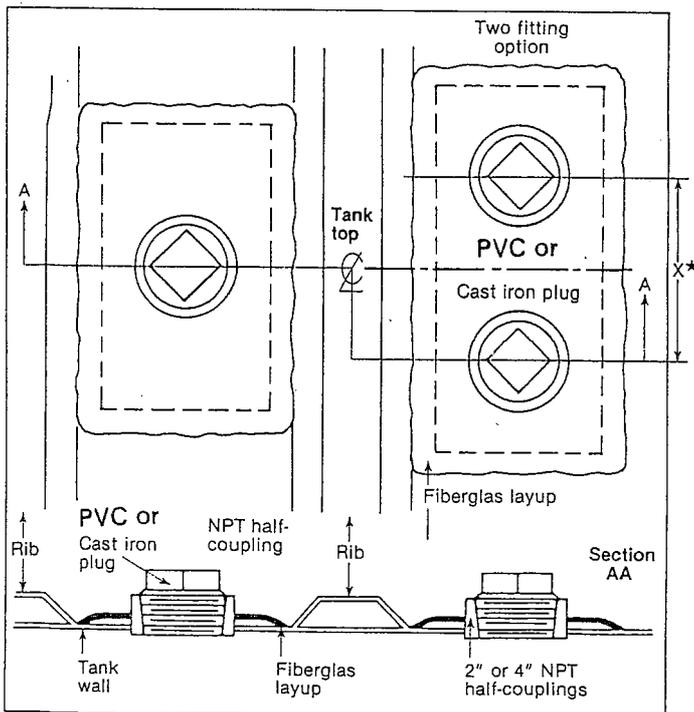
A maximum of two manway risers may be used with tank sizes of 10,000 gallons and larger. Only one riser is permitted with tank sizes less than 10,000 gallons due to possible buoyant forces.

The riser must be installed with 150mm min. clearance from the top of the tank. The bottom of the riser should be supported with 50x 100x900mm min, or equivalent wood pieces to rest on a minimum of 100mm backfill material from tank top.



Steel NPT fittings

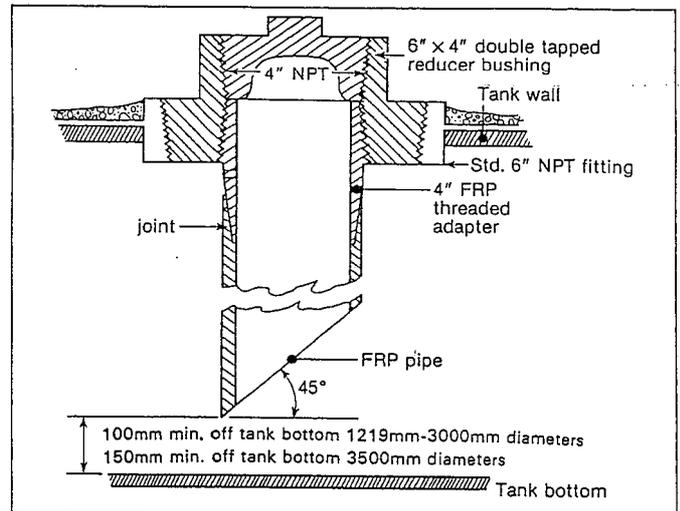
Steel NPT (National pipe thread) fittings are available in 2'', 4'', and 6'' sizes. The 2'' size is a full coupling, the 4'', and 6'' sizes are half couplings. Two 2'' fittings or two 4'' fittings may be located between the same two ribs perpendicular to the tank centerline. All other fittings are located along the top centerline of tank.



*"X" Dimension on Double 2" Fittings Equals 5"
*"X" Dimension on Double 4" Fittings Equals 9"

4'' Fiberglass Fill Tube for 6'' NPT fittings

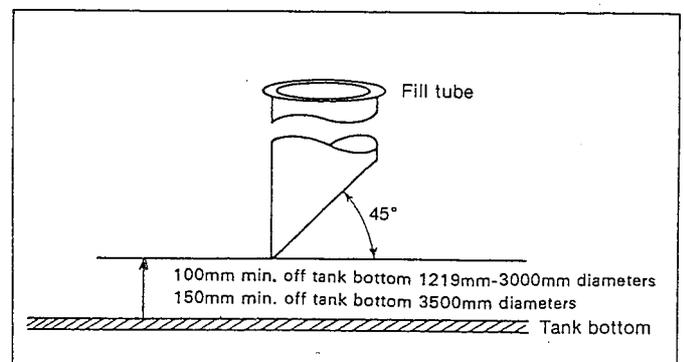
Fiberglass fill tubes screw into the bottom of a 6'' x 4'' double tapped reducer bushing which is inserted in a standard 6'' NPT half coupling. The bottom of the fill tube is located 100mm above the bottom of the tank with the end slanted at 45° (unless otherwise specified). The top of the four inch opening is closed with a 4'' threaded plug to facilitate shipment and testing.



Fill Tube - for 4'' NPT fittings

Fill tubes for 4'' fittings are not supplied by Amiantit Fiberglass, but are available from petroleum equipment distributors.

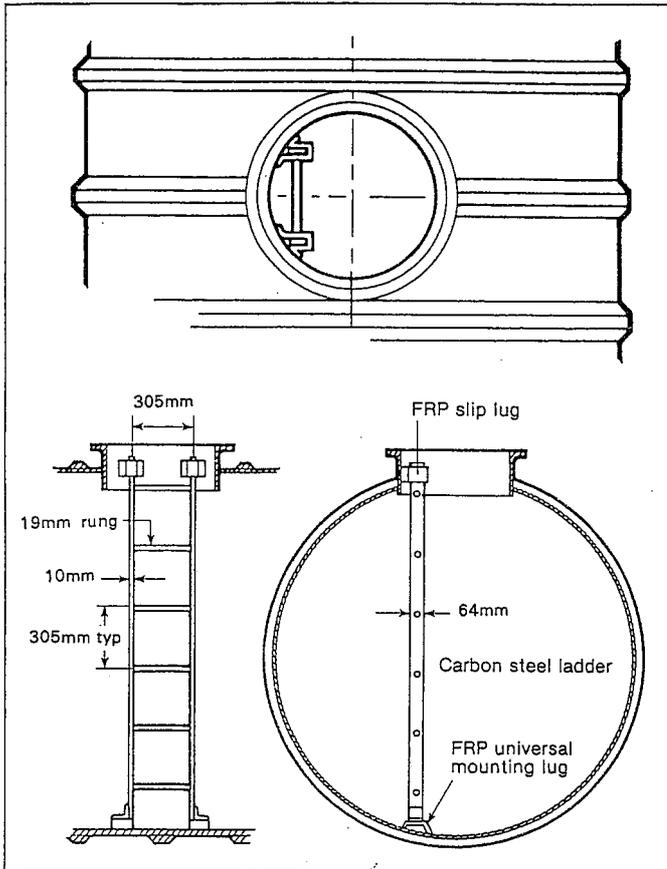
Tube slips inside fill pipe to permit product to be dropped near bottom of tank. Tubes are usually furnished in standard lengths - flared at one end, straight cut at other. The straight end should be cut on a 45° angle and located 100mm above the bottom of the tank.



Tank Ladders

Fiberglass tanks are available with a factory installed carbon steel ladder. Attached to the tank bottom with FRP mounting lugs, the ladders are retained at the top

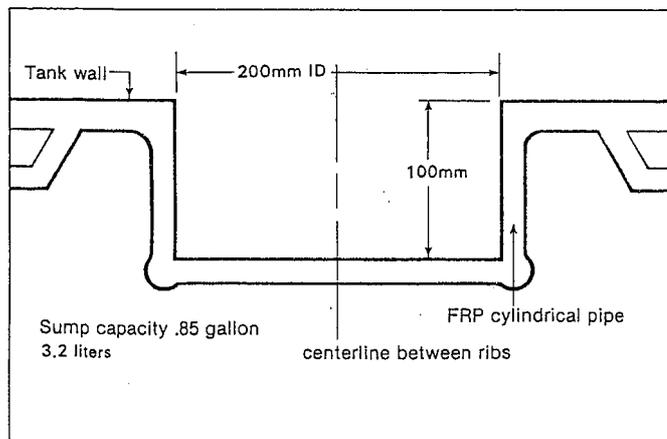
with FRP mounting lugs on the trunk of the manway to allow for contraction and expansion of metal ladders. (Manway and Ladder are sold separately).



Fiberglass Sumps

Fiberglass sumps are available to facilitate condensation removal. The sumps are 100mm deep, and must be installed between ribs along centerline of tank bottom and are limited to one sump per tank. Special installation procedures must be followed when installing tanks with sumps.

Sumps are available for all tank sizes.



Fiberglass Hold-down Straps

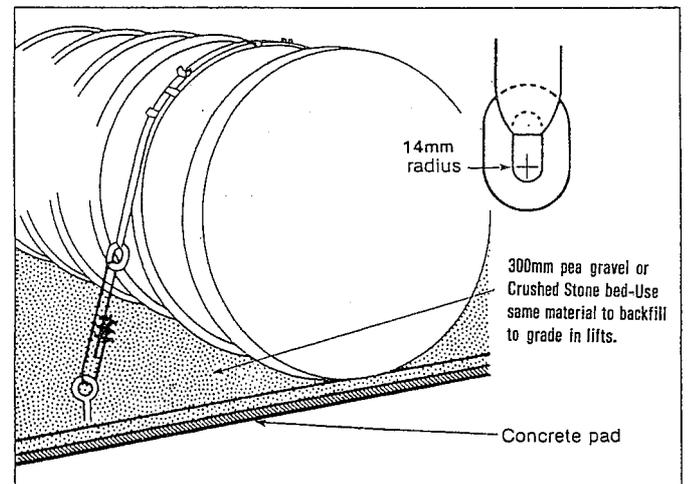
Fiberglass hold-down straps are available for all tanks. These straps are pre-shaped to the contour of the tank ribs.

CAPACITY U.S. GALLON	MODEL	STRAPS length	No. of STRAPS Required
250, 550, 1000	D-5	2223	2
2000,3000,4000	D-6	2997	2
3000,4000,6000	G-6	4318	2
6000	D-6	2997	4
8000,10000,12000	G-6	4318	4
15000	G-6	4318	6
15000	D-3	5486	4
20000,25000	D-3	5486	6
3000	D-3	5486	8
25000	D-3	6198	8
30000	D-3	6198	10
40000	D-3	6198	12
48000	D-3	6198	16

Guides located on the strap secure strap over rib. Guides located on top of the strap accommodate cables used in deadman type anchoring procedures. Black arrows on tank wall $\blacktriangleleft \blacktriangleright$ identify ribs on which hold-down straps must be installed, if required. (See drawings for strap locations.) Do not use straps or cables between ribs on tanks.

The anchor points on any tank type should not be less than X (mm) apart. See table below.

Tank Model	X (mm)
D-5	1530
D-6	2440
G-6	3050
D-3	3660
D-3	4270



Minimum Anchoring Requirements

Tank Diameter	1829mm or less	2337mm	3000mm & 3500mm
Wire rope (recommended 6 x 19 plow steel) diameter	10mm	12mm	12mm
Turnbuckle diameter			
Hook type	20mm	32mm	32mm
Jaw or Eye Type	12mm	20mm	20mm

NB:- Wire ropes, Turnbuckles and clamps are not supplied by tank manufacturer.

Installation Instructions

Fiberglass underground tanks must be installed according to these instructions and NFPA 30 and 31. Local codes may apply and should be consulted. Failure to follow these installation instructions will void the warranty and may result in tank failure. Proper installation of Fiberglass underground tank is required to prevent tank damage and to insure long-term corrosion-resistant service. It is imperative to read, understand and follow the instructions below.

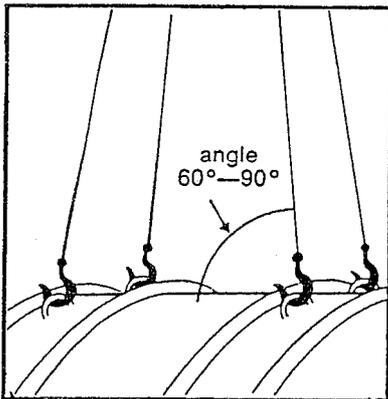
1) Handling

Lifting Tanks

Use installation lift lug (s) to lift tank. Larger tanks 3000 and 3500 mm dia. have multiple lift lugs; all must be used. Guide the tanks with guide lines. Do not use chains or cables around tank.

DO NOT ROLL OR DROP TANK.

Only use lifting equipment to move tanks. Capacity of lifting equipment must be checked before moving tanks. Set tanks on smooth ground, free of rocks and foreign objects and recheck. Do not stand on top of the tank while it is being lifted.

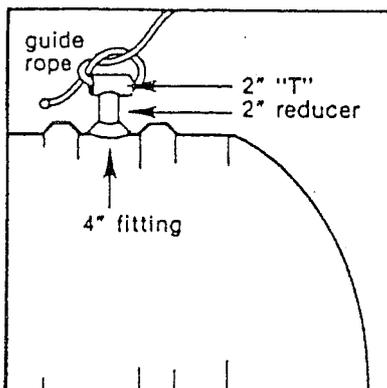


Guiding Tanks

When lifting, guidelines should be used at each end to control tanks.

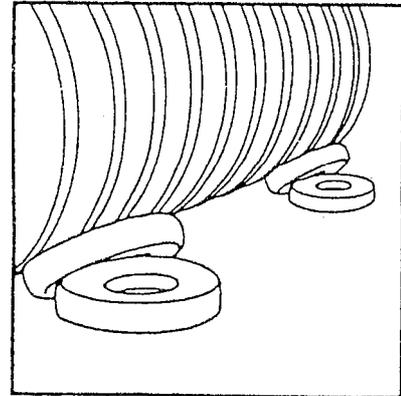
By inserting a bung with a 4" to 2" reducer with a "T" in each end fitting, a rope can easily be tied to the "T" for controlling the tank.

If high winds are anticipated, tanks must be tied down to prevent damages.



Chock Tanks

Tanks should not be dropped, rolled or impacted. Chock the tanks with rubber tires or sand until ready for installation and tie tanks down if high winds are expected. Use minimum 1/2" diameter nylon or hemp rope over each tank and tie to wooden stakes of adequate size to prevent tanks from being moved by high winds.



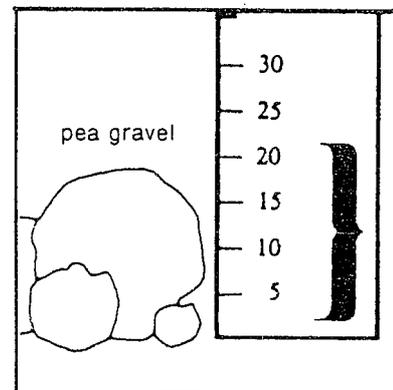
Fiberglass underground tanks require the backfill material to provide as much as 90% of the support. The installing contractor must use approved bed and backfill material and follow these instructions exactly.

If you have any questions call your local Amiantit Fiberglass tank representative. The tank warranty is void if other than approved bed and backfill materials are used without written approval from Amiantit Fiberglass, or if alternate materials do not achieve 90% Standard Proctor Density.

2) Bed and Backfill

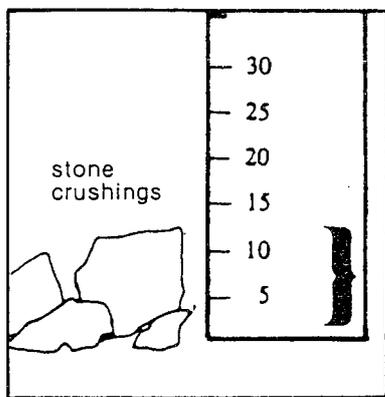
Gravel

A clean naturally rounded aggregate with a mix of particle sizes not less than 3mm or more than 20mm is required. This materials is commonly called pea gravel.



Stone or Gravel Crushings

Washed stone or gravel crushings with angular particle size not less than 3mm or more than 12mm are required. Note : All backfill materials must meet ASTM C-33 paragraph 7.1 for quality and soundness. The backfill should not have more than 3% passing a No. 8 sieve.



If your backfill does not meet the above requirements, alternate materials must be used under the following conditions.

1. Particle size shall be a mix and can not exceed 12 mm with no particles passing a No.200 sieve. The material must be free of organic materials, silt, dirt, or clay. The material must also meet the ASTM specification for hardness referenced above.
2. The material must be mechanically compacted in 300 mm lifts to achieve a 70% relative density to support the tank.
3. Verification of the 70% relative density must be furnished to the owner in writing.

Note: You should require your backfill supplier to certify that the backfill meets this specification.

3) Testing

Before installing tanks, tighten fitting plugs. Pressure test 1219 mm through 3000 mm diameter tanks to 5 psi. 3500 diameter tanks to 3 psi. Soap the entire tank and fittings. The air test is of little value without soaping and a careful inspection for bubbles. Test at least 30 minutes to insure there are no leaks as indicated by soap bubbles or a drop in pressure. Use an air gauge with half or quarter pound increments so that changes in pressure can be easily observed.

Before backfilling to grade it is recommended to conduct a low pressure air test on interconnecting pipes and fittings.

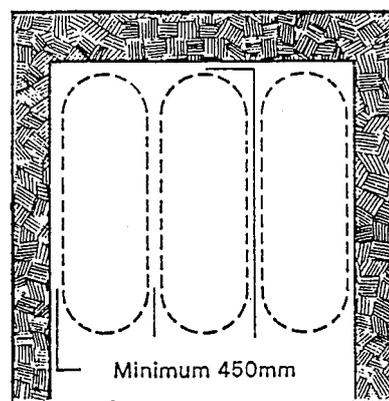
NOTE: Testing materials are not supplied by the tank manufacturer.

4) Hole Size

Stable Walls

1219mm - 3000mm diameter tanks
(550 - 30,000 gallon models)

In stable soil conditions the hole must be large enough to allow a minimum of 450mm (600mm preferred) between adjacent tanks at ribs and 450mm (600mm preferred) from ends and sides of tank to the walls of the hole.



1219 - 3000mm min. 450mm
3500mm minimum 600mm

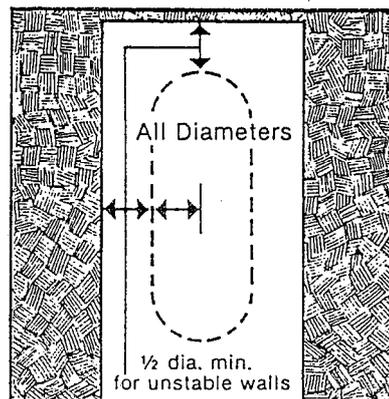
3500mm diameter tanks

(25,000 - 48,000 gallon models)

require 600mm between tanks hole and sides, and require 600mm between adjacent tanks.

Unstable walls (all size tanks)

In muck, bog, peat, swamp or landfill type areas where the soil is soft, a larger hole is required to support tanks. In these types of conditions the holes must be large enough to allow a minimum of 1/2 the tank diameter from ends and sides of tanks to hole walls.



Unstable soils are defined as those soils having less than 0.37 Kg./cm² cohesion as calculated from an unconfined compression test; or soils with an ultimate bearing capacity of less than 1.71 Kg./cm².

Unstable soils may require a reinforced concrete slab under the tank for support.

For unstable soils with less than 0.12 Kg./cm² cohesion or with an ultimate bearing capacity of less than 0.25 Kg./cm², a filter fabric hole liner is recommended to prevent backfill migration. Refer to Section 6.

5) Burial Depth and Cover

The tank hole must be deep enough to allow a minimum of 300mm required backfill bed over the hole bottom or concrete slab.

If the total burial depth from tank top is greater than 60% of the tank diameter, anchoring the tank is not required. (See Section 9 for details)



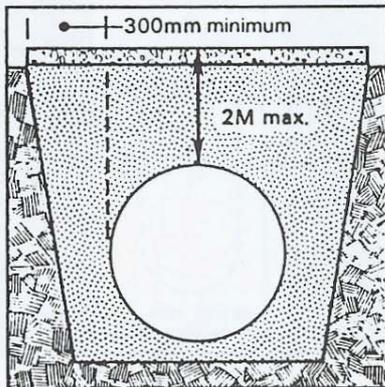
PAD DIMENSIONS

Paving must extend at least 300mm beyond tank outline in all directions.

MAXIMUM BURIAL DEPTH (ALL SIZE TANKS)

To comply with UL requirements, depth of cover for tanks in both traffic and no traffic conditions must not exceed 2m over tank top.

For burial depths beyond 2m, contact Amiantit Fiberglass.

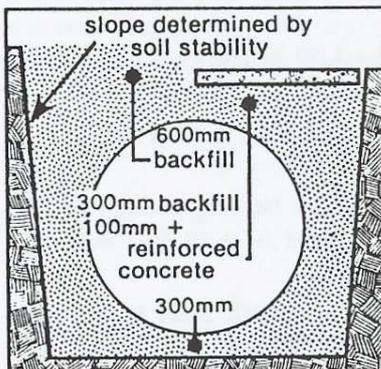


MINIMUM BURIAL DEPTH

No Traffic Loads

(550 - 30,000 gallon models)
(1219mm - 3000mm diameter)

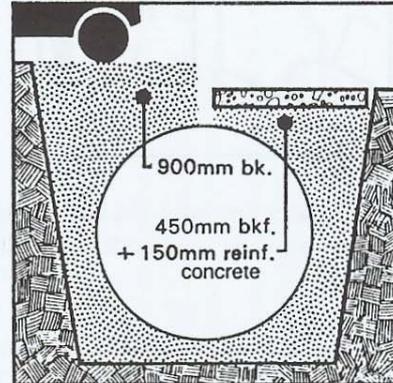
Tanks not subjected to traffic loads need a minimum cover of 600mm backfill; or 300mm backfill plus 100mm concrete reinforced with steel re-bars.



Traffic Loads

(550 - 30,000 gallon models)
(1219mm - 3000mm diameters)

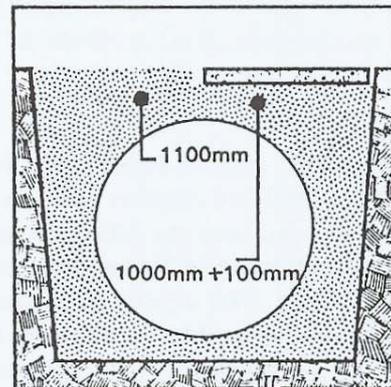
Tanks subjected to traffic loads must have a cover depth of 900mm backfill or 450mm minimum backfill, plus 150mm concrete reinforced with steel re-bars.



No Traffic Loads

(25,000 - 48,000 gallon models)
(3500mm diameters)

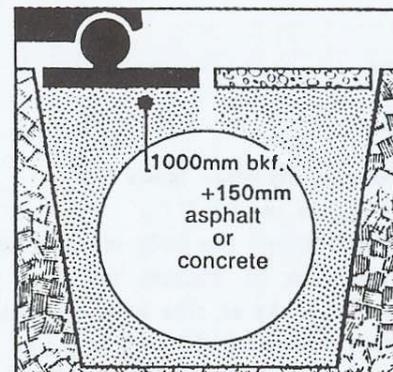
Tanks not subject to traffic loads need a minimum cover of 1100mm backfill; or 1000mm backfill plus 100mm reinforced concrete.



Traffic Loads

(25,000 - 48,000 gallon models)
(3500mm diameters)

Tanks subjected to traffic must have cover depth of 1000mm backfill, plus 150mm of asphalt, or 150mm re-bar reinforced concrete.



6) Filter Fabric - Wet Hole Liner

It is the responsibility of the tank owner or his representative to determine if filter fabric is appropriate for a specific tank installation.

Filter fabric prevents the migration of native soil into the pea gravel; it helps to maintain the integrity and stability of the backfill material. Amiantit Fiberglass recommends the use of filter fabric for the following types of installations:

1. Tidal conditions or areas subjected to frequently changing ground water levels.
2. Unstable soils (muck or landfills)
3. Water conditions with silty soil

Polyethelene is not considered an effective material to prevent migration of pea gravel and natives soil; it tears and will degrade in a wet hole environment.

Installation Procedure: Line the excavation sides and bottom with filter fabric. Overlap adjoining fabric panels at least 300mm. Place some backfill on top of the filter fabric in and around the excavation perimeter to hold the fabric in place.

In wet hole installation, backfill ballast is necessary to sink and hold the filter fabric to the bottom of the excavation.

7) Installation Procedure - Dry Hole

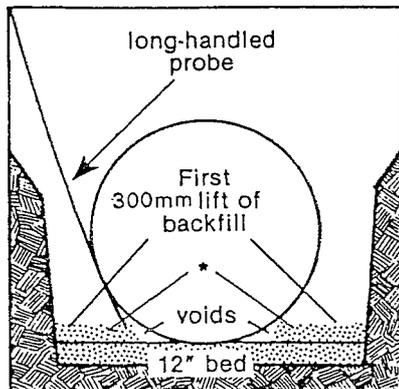
Bed

Provide a minimum of 300mm level approved backfill bed (see Section 2) over hole bottom or concrete slab. Set tanks on bed.

DO NOT PLACE TANKS DIRECTLY ON CONCRETE SLAB, TIMBERS, BEAMS OR CRADLES.

DO NOT MIX APPROVED GRAVEL WITH SAND OR NATIVE SOIL.

Always use approved gravel. Do not backfill in layers using sand or native soil. Regardless of the hole size, all excavated (or loose) native soil must be replaced with approved backfilling material.



* It's critical that this area offer full support under tank and end caps.

Use the same materials as bedding. Place first 300mm lift evenly around tanks. From the bank or adjacent tank top, backfill must be moved completely beneath tank bottom, between ribs and under endcaps to fill voids to provide necessary support. A long handled probe can be used to penetrate backfill and move it between all ribs and at three points under endcaps. The backfill may be shoveled beneath the tank. Place another 300mm lift of backfill evenly around tanks. Repeat the probing of backfill from the bank or adjacent tank top.

After completion of second lift, backfill can be brought to top of tanks or grade without additional hand work. (Compaction may be required for slab support.)

This method will not work in tight areas in straight-walled holes. The angle necessary to probe the backfill under the tank can not be made with the long handled probe. Straight-walled holes in tight areas will require a curved probe to backfill under the tanks.

The curved probe is a 1.2m section of the long handled aluminium probe bent on radius to match the tank curvature. A leveraging action on the long-handled probe creates a pushing action under the tank bottom.

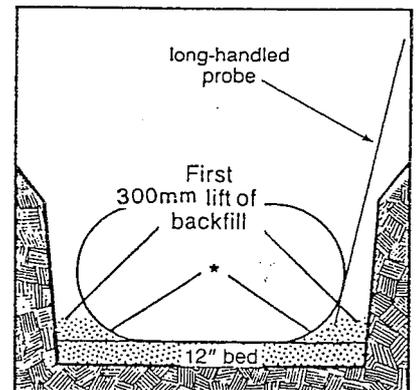
The following procedure is the most effective for the curved probe :

- a. After setting the tank on the gravel bed, probe the area tank bottom and around the endcaps,
- b. Place the first 300mm lift to backfill.
- c. Probe the entire tank bottom and endcaps again.
- d. Place the second 300mm lift of backfill.
- e. Switch to straight probe section and probe tank again.

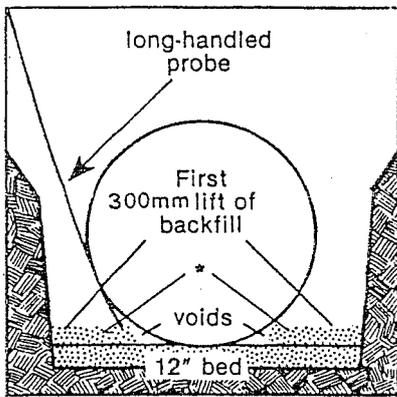
Backfilling

(550-48,000 gallon models)
(1219mm - 3000mm diameters)

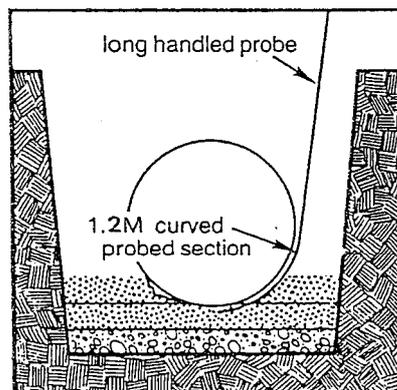
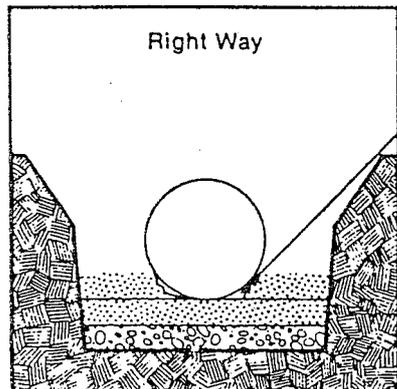
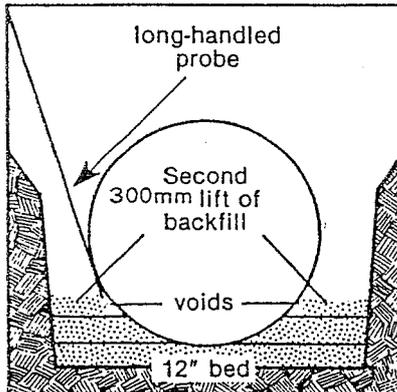
Note: TANKS INSTALLED WITH BACKFILL TO TOP OF TANK BUT WITHOUT BACKFILL TO GRADE SHOULD BE COMPLETELY FILLED WITH WATER OR PRODUCT AS BALLAST. DO NOT REPLACE WATER OR PRODUCT IN TANK UNTIL BACKFILL IS EVEN WITH TANK TOP.



* It's critical that this area offer full support under tank and end caps.



* It's critical that this area offer full support under tank and end caps.

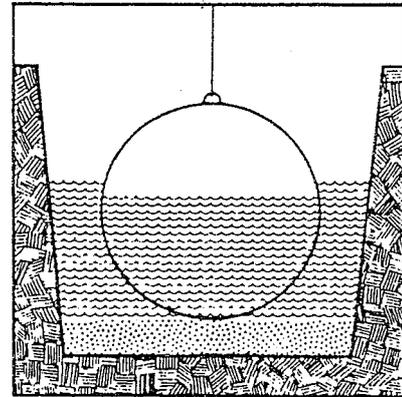


8) Installation Procedure -Wet Hole

A filter fabric separator may be appropriate to prevent gravel migration. Refer to Section 6 for details. Water level should be maintained at lowest practical level by using pumps with or without a well-point system. Prepare bed as outlined in Section 7.

Ballast

If the water can not be lowered, you will need to ballast tanks. Place tanks in the hole, adding only enough ballast to sink them. Ballast level in tanks must never exceed water level in hole during installation. While adding ballast, use only lifting cable to keep tanks in positions. Tanks should be free to roll slightly.



Backfilling

Distribute backfill evenly around tanks. Push backfill under tank after each drop using a long-handed probe as outlined in Section 7.

9) Anchoring

It is responsibility of the tank owner or his technical representative to determine if mechanical anchoring is required for a specific job site. All potential sources of water (underground water table, rain water table, rain water run-off, etc.) should be considered.

If water could enter the tank hole, Amiantit Fiberglass recommends the tanks be mechanically anchored unless the minimum burial depth from tank top as follows:

Tank Diameter	Minimum buried depth when Mechanical Anchoring is Not Required	
	Concrete Slab Thickness	Traffic Slab Thickness
1219mm	800mm	700mm
1829mm	1200mm	1100mm
2337mm	1400mm	1300mm
3000mm	1800mm	1700mm
3500mm	2100mm	2000mm

At the above burial depths, the overburden directly above the tank weighs more than the buoyancy of the empty tank with water to grade (safety factor equals 1.2)

For burial depths where mechanical anchoring is recommended, either of two common methods can be used: a concrete anchor pad or deadman anchors. Both methods include the use of Fiberglass anchor straps.

Strapping

Use Fiberglass hold-down straps on the top of all designed ribs $\blacktriangleright \blacktriangleleft$. Anchor points should be spaced equal to tank diameter plus 300mm each side of tanks, regardless of tank diameter. Anchor points at bottom of hole must be aligned with designated $\blacktriangleright \blacktriangleleft$ ribs ± 25 mm. All anchor straps must be uniformly tightened with turnbuckles, or come-a-longs. Straps should be snug but cause no tank deflection.

Deflection can be detected by checking tank diameter with a gauge stick before and after snugging straps.

Triple clamp the wire rope.

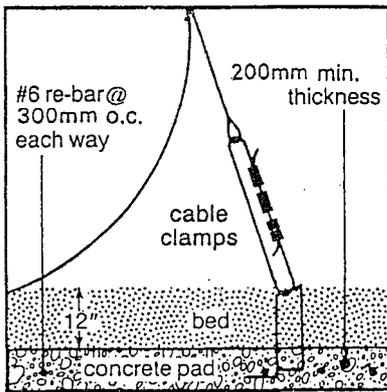
Note: Do Not Use Straps or Cables Between Ribs.

Concrete Anchor Pad

The weight of overburden on top of the concrete slab provides the anchoring force.

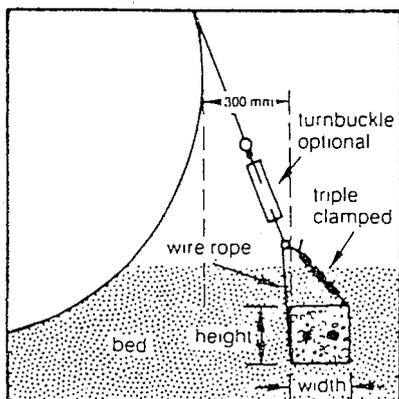
This pad design is strictly for bouyancy. Poor soil conditions may require increased reinforcement and slab size.

Anchor hold-down devices in concrete, attach them to ends of straps with wire cable (See table at end of this section) and clamp with at least three clamps. (Be sure there is a 300mm bed between concrete pad and tanks.)



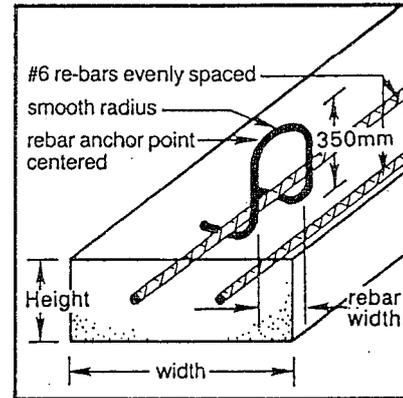
Deadmen Anchor

The weight of overburden on top of the deadman and tank provides the anchoring force. Lay deadman along each side and parallel to tank. The tank must not 'overshadow' the deadman anchor. Clamp wire with at least three clamps around deadman and through end of strap.



Deadmen are made with reinforced 2//6 rebar) concrete. The cross section dimensions may vary depending on burial depth. Contact Amiantit Fiberglass for details. If burial depth is 600mm deadman size is as follows :

Tank Diameter	Min. Height	Width*
1219mm	150mm	150mm
1824mm	300mm	300mm
3000mm	300mm	450mm
3500mm	200mm	900mm

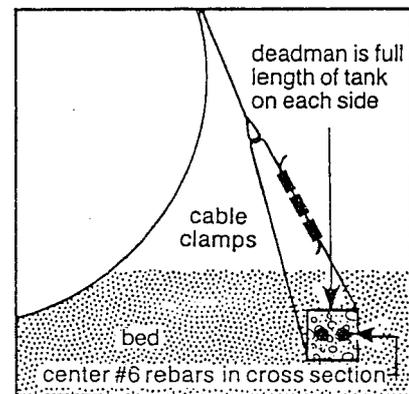


* A round cross section can be substituted if the diameter equals or exceeds the deadman width.

When using deadman anchors in multiple tank installations each tank will require two deadmen. If one deadman is used for adjacent tanks it must be doubled in width. A separate anchor point (hold down device) must be provided for each strap. Hold down devices are incorporated with their legs anchored under the re-bar reinforcement. Spacing for these hold-down devices is determined by the number of anchor points shown on tank drawings.

The hold down device can be fabricated from rebar as follows:

Tank Diameter	Rebar Size (1 strap/anchor point)
1219mm, 1829mm	No. 6
2337mm	No. 8
3000mm and 3500mm	No. 10



Turnbuckles (optional)

Hook, Jaw or eye-type turnbuckles may be used in place of all or a portion of the wire rope described in this section.

All Anchoring Methods

Minimum per anchor location.

Tank Diameter	(1219,1829mm)	(2337,3000,3500mm)
Drop-torged turn buckle diameter:		
Hook Type	20mm	32mm
Jaw Type	12mm	20mm
Eye Type	12mm	20mm
Wire Rope Diameter		
6 x 19 (improved plow steel)	10mm	12mm

Note: TANKS INSTALLED WITH BACKFILL TO TOP OF TANK, BUT WITHOUT BACKFILL TO GRADE SHOULD BE COMPLETELY FILLED WITH WATER OF PRODUCT AS BALLAST. DO NOT PLACE WATER OR PRODUCT IN TANK UNTIL BACKFILL IS EVEN WITH TANK TOP.

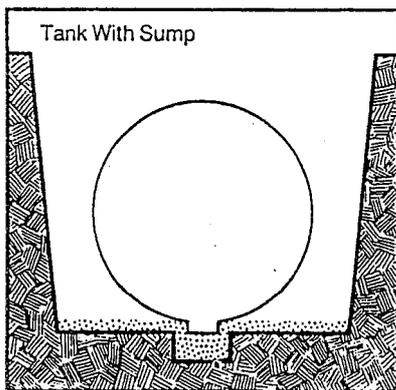
Fiberglass tanks can also be anchored safely by using burial depth and a surface slab to offset the buoyancy factors. For alternate anchoring methods refer to Amiantit Fiberglass.

10) Pumping and Sump Clearances

Tanks with sumps

When installing a tank equipped with a sump, excavating and bedding must be modified to provide a 300mm deep x 600mm diameter hole centered at the sump location.

After the tank is placed, the void surrounding the sump is to be hand backfilled and hand tamped prior to adding backfill around the tank.

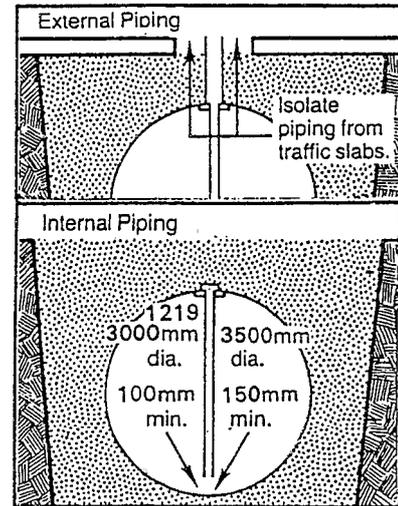


External Piping

The pump and attached piping must be free to move with the tank. Use a fill box or street box to isolate the piping from the traffic pad.

Internal Piping

Internal piping must be a minimum of 100mm from the tank bottom. 3500mm diameter tanks require a 150mm minimum clearance.



11) Filling Tanks

Do not fill until backfill is to the top of tank. Never add product or water for hold-down in dry hole conditions until backfilling is completed.

(Exception-See installation Procedure-Wet Hole)

12) Venting

All tanks must be vented, as tanks are designed for operation at atmospheric pressures only, except for use with vapour recovery systems provided the pressure or vacuum does not exceed 1 psi.

The vent opening should be the same diameter or larger than the piping to remove the product.

Pressurized deliveries are not recommended. If the delivery vehicle uses pumps to fill the tank, install over fill shut-off equipment in the tank and truck to prevent the tank from being over filled.

OVERFILLING THE TANK UNDER PRESSURE WILL DAMAGE THE TANK, EVEN IF THE TANK VENT IS UNRESTRICTED.

13) Barricades

Tank area must be barricaded to prevent any vehicle from travelling over the tanks until installation is complete.

14) Measuring Instruction

Measuring the inside diameter of tanks is a recommended way to monitor the quality of any installation.

Measurement 1 is the inside diameter of the tank at the gauge opening. Measure from the bottom of the tank to the bottom of the fitting. This measurement should be taken prior to placing any backfill. Record measurement 1.

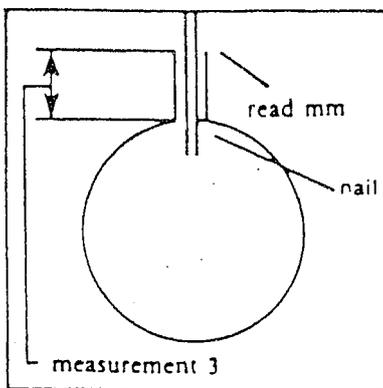
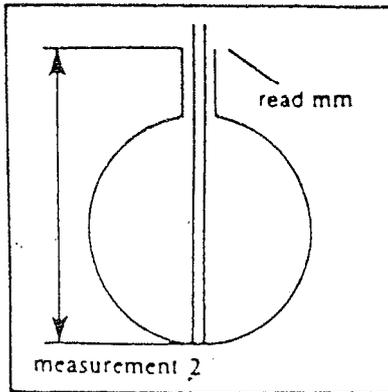
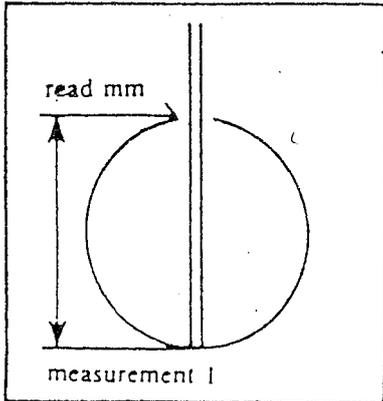
Measurement 2 is the distance from the bottom of the tank to the top of the fill tube. This measurement should be taken prior to insertion of the drop tube. Backfill should be to subgrade at this time. Record measurement 2.

Measurement 3 is the distance from the bottom of the fitting to the top of the fill tube. This measurement is taken by driving a nail into the 2.5mm point at a right angle to the dipstick.

Lower the dipstick down the fill tube far enough to extend below the bottom of the fitting. Lift the dipstick until the nail catches on the lip of the fitting. Read measurement at the top of fill pipe.

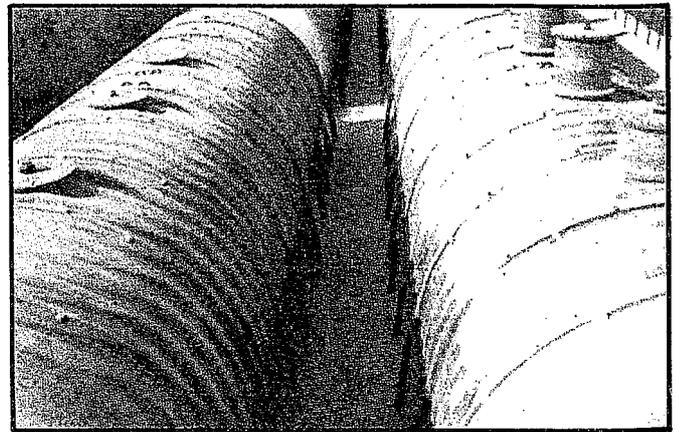
Subtract 2.5mm to allow for the point where nail is in the dipstick.

Subtract measurement 3 from measurement 2. The answer should equal measurement 1.



WARNING: If the answer exceeds the maximum allowable deflection value shown in the following chart, immediately contact manufacturer's representative prior to proceeding with the installation.

Tank diameter (mm)	maximum deflection (mm)
1829	16
2337	32
3000	38
3500	38



15) Specification

Short Form:

The contractor shall provide Fiberglass underground tanks in sizes and with fittings as shown on the drawings. The Tanks shall be manufactured by Amiantit Fiberglass. Tanks shall be tested and installed with pea gravel or approved alternate backfill material according to the current installation instructions provided with the tank.

GUIDE SPECIFICATION

AMIAANTIT FIBERGLASS

REINFORCED POLYESTER

UNDERGROUND STORAGE TANKS

Part I General

1.01 Quality assurance

A. Governing Standards:

- 1. ASTM Specification D4021
- 2. National Fire Protection Assoc. (NFPA 30) Flammable and Combustible Liquids Code and (NFPA 31) Standards for installation of Oil Burning Equipment.
- 3. Military Specification MIL-T-5277A, dated July 6, 1978 Tanks, Storage, Underground, Glass Fiber Reinforced Plastic. (Amiantit Fiberglass is using the same manufacturing process utilized by Owens Corning Fiberglas .Underground Fuel storage Tanks produced by Amiantit Fiberglass are U. L. Listed)

4. Submittals:

- a. Shop Drawing: Contractors shall submit copies of shop drawings for each tank. Drawings shall include all critical dimensions and show locations of all fittings and accessories, i, e., manways, ladders, hold-down straps, heating coils, etc. Materials of construction shall be in accordance with Section 1.01 of this specification.
- b. Catalog Data: Contractors shall submit copies of manufacturer's literature.
- c. Installation Instructions: Contractors shall submit ... copies of manufacturer's latest installation instructions.
- d. Calibration Charts: Contractors shall submit copies of manufacturer's latest calibration charts.

Part II Products

2.01 Fiberglass Underground Storage Tanks.

A. Loading Conditions - Tanks shall meet the following design criteria:

- 1. External hydrostatic pressure. Buried in ground with 2 meters of overburden over the top of the tank. The hole fully flooded and a safety factor of 2:1 against general buckling.
- 2. Surface loads: When installed according to manufacturer's installation instructions tanks will withstand surface H-20 axle loads (14500 Kg/axle).
- 3. Internal load: Tank shall withstand 3-5 psi air pressure test with 5 to 1 safety factor. Test prior to installation since this design condition is to test for leakage.
- 4. Tanks shall be designed to support accessory equipment such as heating coils, ladders, drop tubes, etc. when installed according to manufacturer's recommendations and limitations.

B. Product Storage Requirements:

- 1. All tanks must be vented. Tanks are designed for operation at atmospheric pressure only, except for use with vapor recovery system provided the pressure or vacuum does not exceed 1 psi.

- 2. Tanks shall be capable of storing liquids with specific gravity up to 1.5.
 - 3. Maximum temperature. Tanks shall be capable of storing gasoline, gasohol (90% gasoline and 10% ethanol mixture) jet fuel, diesel fuel or potable water at ambient underground temperatures, or fuel oil at temperatures not to exceed 65°C at the tank interior surface.
 - 4. Tanks shall be chemically inert to petroleum products.
- C. Dimensional Requirements (refer to Amiantit Fiberglass literature on tank capacities).
- 1. Nominal capacity of the tank shall be U.S. gallons
 - 2. Nominal diameter of the tank shall be mm
 - 3. Approximate overall length of the tanks shall be .. mm

2.02 Accessories

- A. Anchor Straps - Provide glass fiber-reinforced plastic anchor straps for each tank shown. Number and location of straps shall be as specified by manufacturer. Each strap shall be capable of withstanding the buoyancy load for tank model as shown.

D-5	1910 Kg	G-6	11360 Kg
D-6	8180 Kg	D-3	14540 Kg

Straps shall be standard as supplied by the tank manufacturer.

C. Flanged Manways

- 1. The standard manways to be 560mm I.D. The 750mm and 900mm Dia. manway to be installed in D-6, G-6, D-3, model tanks only.
- 2. All manways will be furnished complete with gaskets, bolts and steel cover.
- 3. Location - refer to drawings for location.
- 4. Manway risers 1200mm diameter and 1050mm high will be supplied to provide access to the manway lid. A 600mm x 600mm galvanized street box with a cover must be provided by contractor for at grade installation.
- 5. Fiber glass manway extension tubes 600mm long will be provided for the manways as outlined in section 1 above.

D. Fill Tubes

- 1. Tubes shall be fiber glass-reinforced plastic.
- 2. Tubes shall be factory installed 4'' diameter, and shall include a 6'' steel fitting with a double tapped reducer bushing to 4'' diameter.
- 3. Tubes shall be standard items as provided and installed by the tank manufacturer.
- 4. Location - refer to drawings for location.

E. Hotwells

- 1. Hotwell - Shall be standard item as manufactured and/or supplied by the tank manufacturer.
- 2. Location - refer to drawing for location.

E. Fittings-Threaded - NPT

1. All standard threaded fittings are 4'' in diameter and shall be half couplings. Reducers are to be used for smaller sizes where specified and provided by contractor.
2. Thread Standards - All threaded fittings shall have machine tolerances in accordance with the ANSI standard for each fitting size.
3. Strength - NPT fittings will withstand a minimum of 150 foot-pounds of torque and 1,000 foot-pounds of bending, both with 2:1 factor of safety.

6. Return Line - Shall be installed on site by the contractor. Diameter of pipe and grade and schedule as called out in other sections.
7. All rigid piping shall be terminated 100mm from the bottoms of all tank models.

F. Ladders - Shall be standard carbon steel supplied by the tank manufacturer. Refer to drawings for location.

G. Lifting Lugs - Provide lifting lug(s) on all tanks. Lugs shall be capable of withstanding weight of empty tank with a safety factor of 3 to 1.

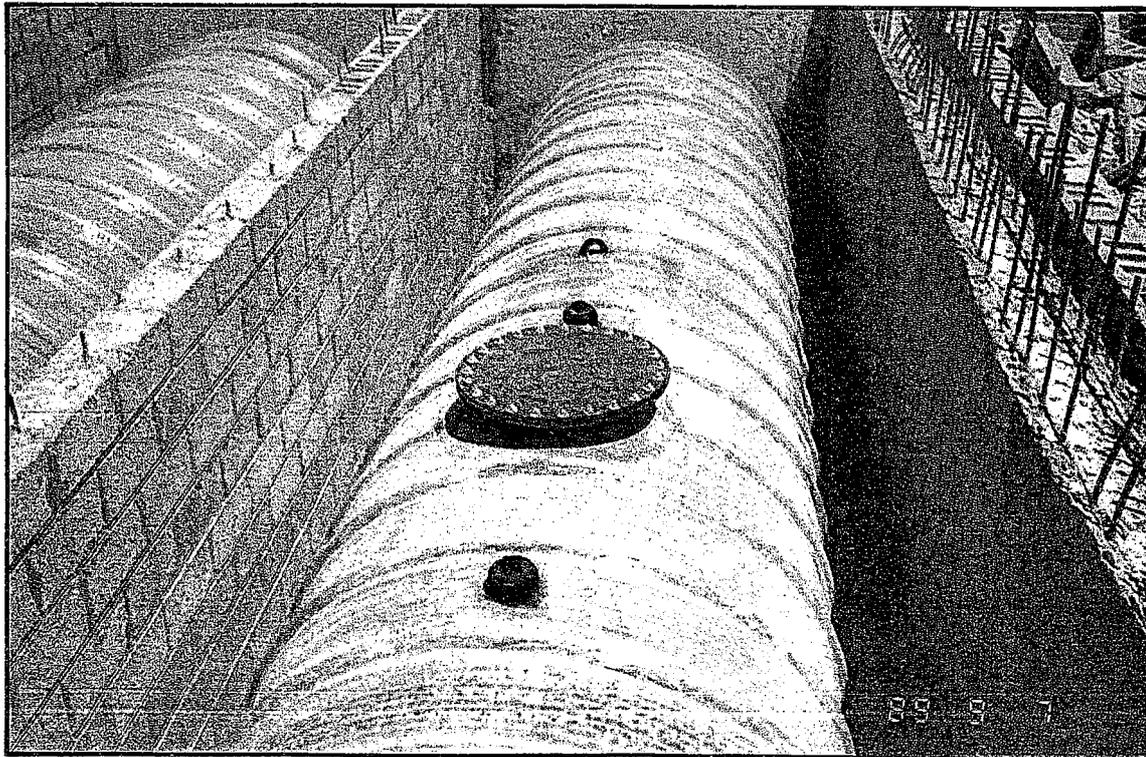
Sizes	Standard	Other	Sizes
Inlet	4''	
Outlet	4''	
Vent	4''	
Gauge	4''	
Fill	4''	

Part III Execution

3.01, 3.02 Installation and testing

Tanks shall be tested and installed in accordance with instruction provided with the tank.

4. Location - refer to drawings for location.
5. Suction Line - Shall be installed on site by the contractor.



OFFICES

Call today for additional information
or help with your specification :



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