

PETROLEUM STORAGE

UNDERGROUND FIBERGLASS TANKS



CONTAINMENT
SOLUTIONS®

WHY OUR TANKS ARE YOUR BEST INVESTMENT

In the early 1960s, the American Petroleum Institute challenged Containment Solutions, Inc. (CSI) to develop a rustproof underground storage tank that would be safe and strong enough to satisfy the petroleum industry's most stringent long-term storage demands.

Our engineers accepted the challenge and pioneered the underground fiberglass tank technology. Our innovative design work resulted in the UL 1316 specification which governs underground fiberglass tank manufacturing.

Major oil companies have responded to our achievement by specifying fiberglass tanks for approximately 95% of their underground fuel storage installations. Their keen awareness of the limitations of a steel tank in a corrosive environment and their confidence in fiberglass tank technology has helped us earn a reputation for safe, rust-free, long-term underground storage.

50 years and more than 300,000 tank installations later, we continue to improve upon those processes utilizing today's automation to develop new applications and products. What started from petroleum storage needs has expanded into the handling of lubrication oils, water, waste water and alternative biofuels such as ethanol and biodiesel.

Containment Solutions is proud to be the

largest American fiberglass tank manufacturer.

▼ MULTIPLE LOCATIONS ACROSS THE COUNTRY

TABLE OF CONTENTS

Introduction	1
Manufacturing Processes	3
Research & Development	4
Double-Wall Storage Tanks	5
Retail Gasoline System Overview	7
Standard Tank Sizes	9
Additional Storage Options	11
Accessories	13
Field Services	16
Specifications	17



WE WILL CONTINUE TO LEAD, FAR INTO THE FUTURE, THANKS TO THE VISION OF EVERYONE ON OUR TEAM

Our success is a direct result of our commitment to offering the highest quality products backed by the highest level of service. You can expect more than just a product from CSI, you can also count on:

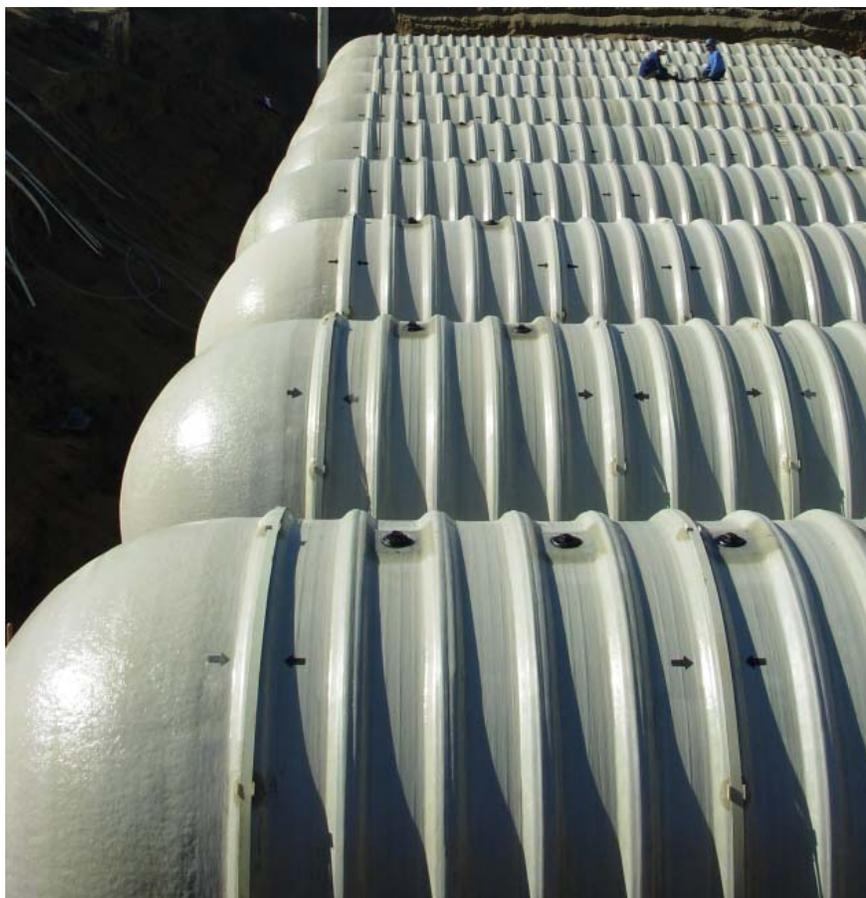
- *Dedication to research and development.* We focus our talents on pushing the limits of what is possible in order to provide you with quality products that meet your needs at a competitive price.
- *Technologically superior manufacturing process.* We utilize the finest materials and methods to produce high-quality products that have led the industry for over four decades.
- *Environmentally focused.* We are committed to providing environmentally conscious designs and products. As a member of the U.S. Green Building Council, we promote proper fluid management and sustainable site development.
- *Industry-leading support.* We have the most knowledgeable sales force and the only national field service organization staffed by full-time company employees. Our technical support group promptly and clearly answers technical questions about our products or services. They, along with our exceptional inside sales department, are committed to supplying “value-added” service that complements our exceptional products.

Containment Solutions invites you to review our state-of-the-art products at three conveniently located manufacturing facilities in Bakersfield, California; Conroe, Texas; and Mt. Union, Pennsylvania.

▼ CONTRACTOR APPROVED



SIZES AND CAPACITIES TO MEET YOUR NEEDS ▼



Our tanks carry the Underwriters
Laboratories listing.



AUTOMATED MANUFACTURING PROCESS

We use steel mandrels (cylindrical molds) to build our tanks from the inside out. The molds provide a firm and consistent surface upon which we apply materials to make our tank. The rotating mandrel and the application of the materials are controlled by a computer, custom designed to manufacture underground tanks. As the mandrel rotates; resin, glass and specially treated silica are precisely metered onto the mandrel from above.

Tank thickness is determined with an instrument that magnetically senses the metal mold surface through the fiberglass reinforced plastic laminate. This method accurately measures the thickness of the laminate using specific points all over the surface of the tank wall and is more exact than the ultrasonic methods used by other manufacturers. The result is a closely controlled process and a very consistent tank wall composition providing uniform integrity.

DIFFERENT PROCESS, BETTER RESULTS

The inside-out approach to manufacturing tanks is a superior process with unique advantages. Inner Surface: The initial material forming against the steel mold produces an incredibly polished finish, free of surface variations. The smooth inside surface in our process is not exposed to air as it cures thus eliminating air inhibited cure issues. The result is a well cured, high gloss inner surface without the need for interior liners. Other manufacturing methods rely on inferior hand sprayed wax coatings to combat surface cure problems. Outer Surface: Exterior stiffening ribs are applied in optimal locations and constructed of the most efficient reinforcing materials. We can also modify a tank by adding filament winding glass in tension, glass woven roving, glass mat, or any other materials in specific locations on the outside of the tank wall. Our entire shell wall surface is manufactured with the same corrosion resistant resin. With our homogeneous tank shell, you can be assured the exterior surface has the same compatibility properties as the interior surface. We do not use liners or special coatings on any tank surface.

Another important advantage of our inside-out manufacturing process is a consistent inner diameter. Using a mold as a frame insures a set dimension and capacity. If additional tank wall is necessary, we simply add thickness to the outside surface. In contrast, an outside-in process by definition relies upon a fixed outer diameter and variable inner diameter. To add thickness using this process glass, resin and hand sprayed liners are applied to the inner surface sacrificing maximum tank capacity. Simply put, our process allows for a more versatile and dependable product.



Containment Solutions' commitment to excellence begins in the Research and Development Center. No other tank manufacturer has invested the amount of time and resources, to not only product development but product enhancement. Our engineers use the latest technology to analyze tank compatibility for alternative fuels and unique fluids like Urea DEF. For our experts, tank testing is a science measured in decades.

We focus our talents on
pushing the limits of what **is possible.**

ENGINEERED AND TESTED CORROSION RESISTANCE

The Containment Solutions' tank wall is composed of resin, glass and a specially treated silica that together result in a composite matrix compatible with petroleum industry products including:

All Octanes of Gasoline

AV-Gas

Ultra Low Sulfur Diesel (ULSD)

Fuel oil

Oxygenated Motor Fuels

Jet Fuel

Motor Oil

Renewable Diesel and Bio-Diesel

Ethanol, all blends up to 100%

Kerosene

Containment Solutions instituted and perfected the use of a specially treated silica in our laminate matrix. The unique silica is an engineered component enhancing the performance of our laminate. Our exclusive laminate has been thoroughly tested to meet the requirements of UL 1316 and CUL S-615.

Long-term corrosion and material properties testing is done at our Research and Development Center (R&D). Laminate testing includes current fuels, blends and other oxygenates, but we do not stop there. We also test alternative products and blends that could be stored in our tanks in the future; as fuel options change, your storage tank compatibility will not.

Many of the newest industry fuels and biofuels are alcohol based. Alcohol blends, including ethanol, increase the likelihood of water in a storage tank, resulting in rust and microbial-induced corrosion (MIC) in steel tanks. The inherent non-corrosive nature of a fiberglass CSI tank eliminates the possibility of rust on all tank wall surfaces. Extensive corrosion testing allows us to confidently offer an industry leading 30-year warranty while most steel tank manufacturers have reduced their warranties to 10 years.

CSI R&D has authored patents and expert reports introducing cutting-edge products like double-wall sumps and the first independently verified Urea DEF underground tank. Since the first non-corrosive tank was designed back in the 1960s, we have maintained the highest quality standards and have utilized advanced technologies to engineer and build the world's premier fiberglass storage tank.

DOUBLE-WALL TANKS

CSI's advanced double-wall technology gives storage tank owners, municipalities, counties, provinces, and states proven protection against petroleum contamination of underground water supplies. In addition to our UL listing, our tanks comply with the EPA's recommendation for secondary containment systems wherever underground tanks are located near underground water supplies.

Containment Solutions double-wall tanks give you two levels of protection, so you have twice the assurance and twice the risk management that any single-wall tank can offer. The primary tank is designed to contain your fuel. In the unlikely event that there is a breach in this wall, the secondary wall is designed to contain your product and prevent seepage into the environment.

HYDROSTATIC MONITORING

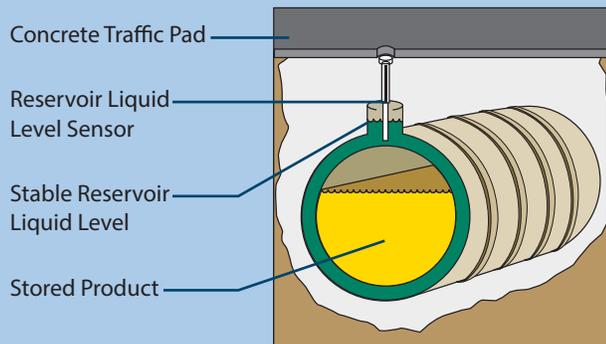
For the most effective double-wall storage tank protection, we recommend hydrostatic monitoring. The cavity between the inner and outer tank walls (interstitial space), as well as a factory mounted reservoir, is filled with a non-toxic colored brine solution. Hydrostatic pressure is continuously applied to the interstitial space, enabling monitoring of the primary and secondary tanks. An electronic sensor in the tank reservoir will send an alarm if the brine level changes beyond a predetermined level.

The CSI Hydrostatic Monitoring System offers a leak detection capability superior to other methods because of our unique tank construction. The independent tank wall design ensures that 100% of the primary and secondary tank walls are in contact with monitoring fluid. This open environment allows brine to move freely through the interstitial space, unimpeded by glass fabric bonded to the tank walls typically used in competitive designs. Since the unblocked interstitial space does not hinder communication, the CSI Hydrostatic Monitoring System is fast and effective.

HYDROSTATIC MONITORING detects leaks in either the primary or secondary tank walls in all installed conditions.

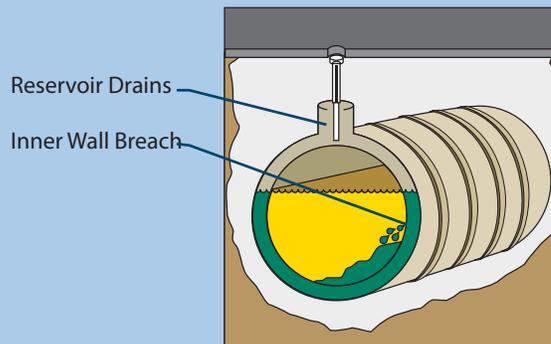
NORMAL CONDITIONS

The reservoir liquid level will be stable if both the inner and outer tank are tight. The reservoir sensor will activate an alarm if the reservoir drains or overfills.



INNER WALL BREACH

Monitor fluid drains into the primary tank causing the reservoir to drain. The petroleum product remains safely contained in the primary tank.



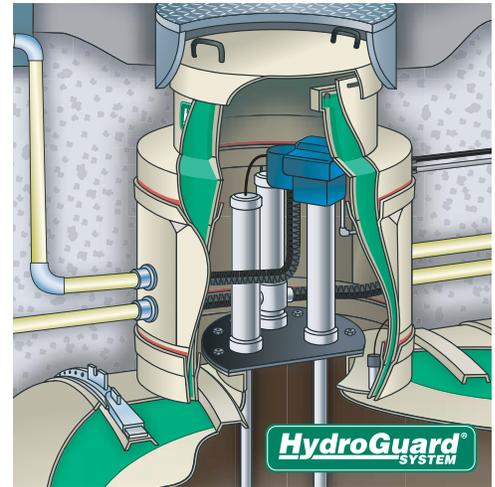
SUPERIOR PROTECTION WITH HYDROGUARD®

The HydroGuard® System is the most dependable storage system available. HydroGuard combines the UL listed double-wall tank and double-wall tank sumps for a fully integrated hydrostatically monitored storage system. HydroGuard also comes with a deadman anchoring system, completing the underground storage solution.

As the name suggests, the HydroGuard System utilizes hydrostatic pressure to provide a proven means of monitoring for leaks 24 hours a day, 7 days a week. In fact, our hydrostatic monitoring system has been certified as a continuous leak detection system by the National Work Group on Leak Detection Evaluations, (NWGLDE).

Unlike typical storage systems, HydroGuard provides 360° secondary containment of not only the stored product in the tank but the critical piping components above the tank. CSI's double-wall tank sumps are state-of-the-art including built-in brine reservoirs and street accessible reservoir sensor housing. The turbine and fill/vapor sumps are continuously monitored for the ultimate in underground fuel storage protection.

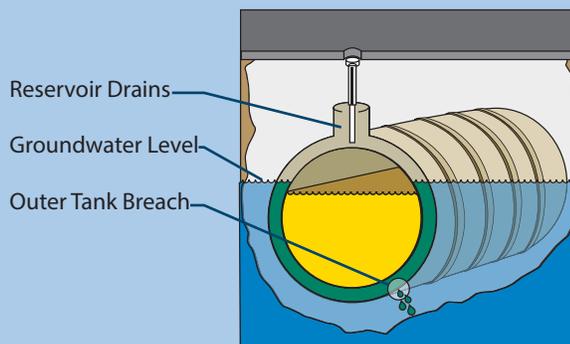
The HydroGuard System was designed to exceed the most stringent regulations and storage requirements, like California's AB 2481; and also comes with our 30-year structural and corrosion warranty.



The HydroGuard System is a complete hydrostatically monitored double-wall storage system.

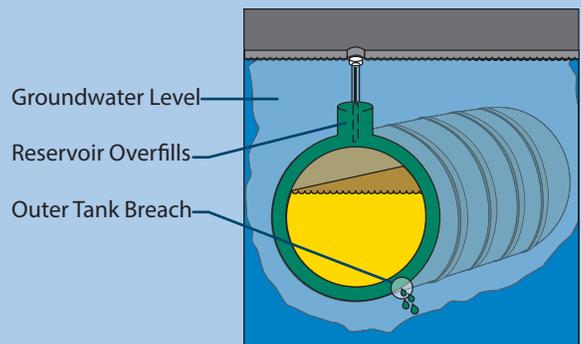
OUTER WALL BREACH

If the groundwater is below the tank top, the non-toxic monitor fluid drains into the ground causing the reservoir to drain.



HIGH GROUNDWATER

If the groundwater is over the tank top, the reservoir will overflow with groundwater and activate the high level alarm on the reservoir sensor.



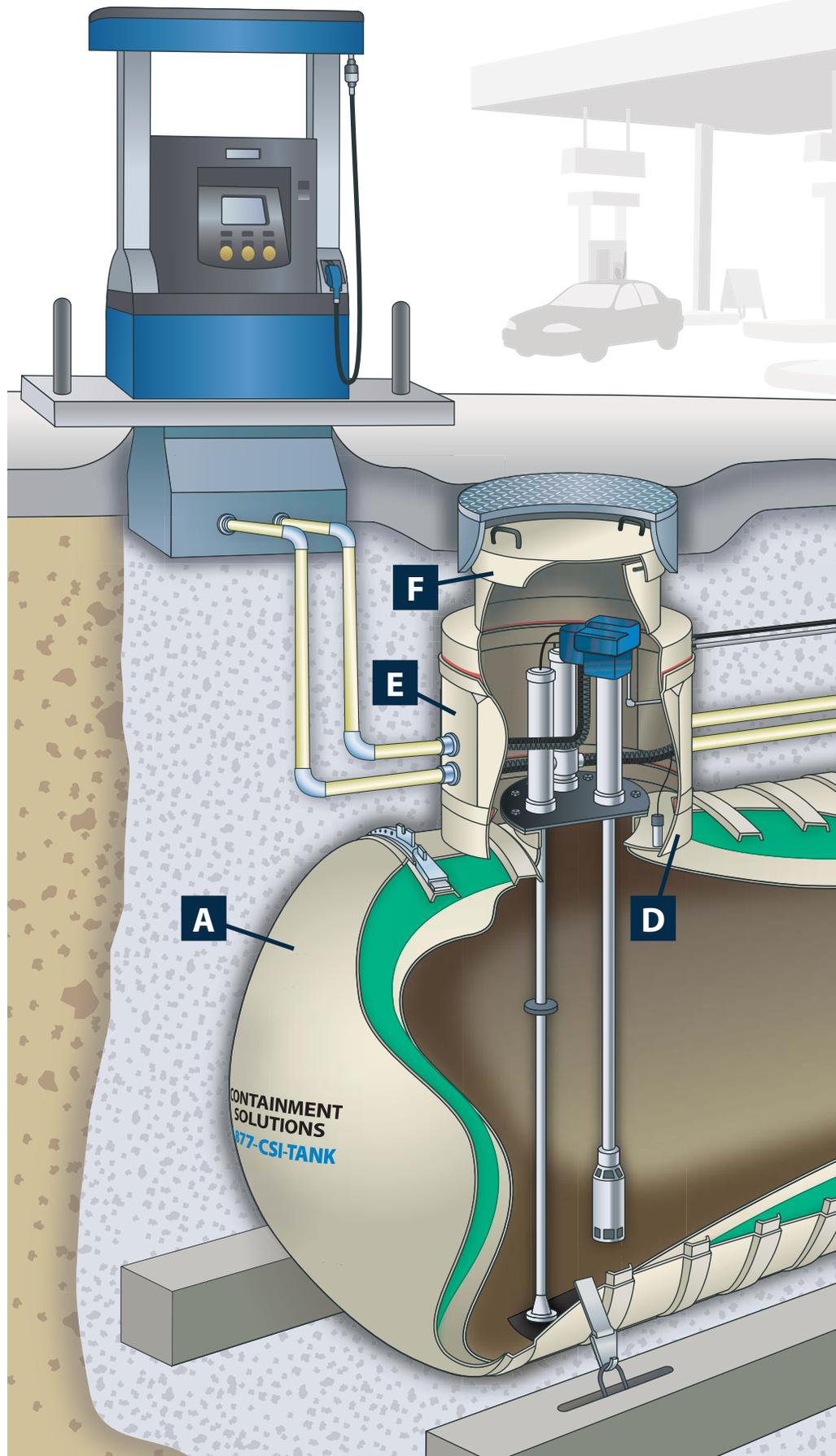
STANDARD FEATURES

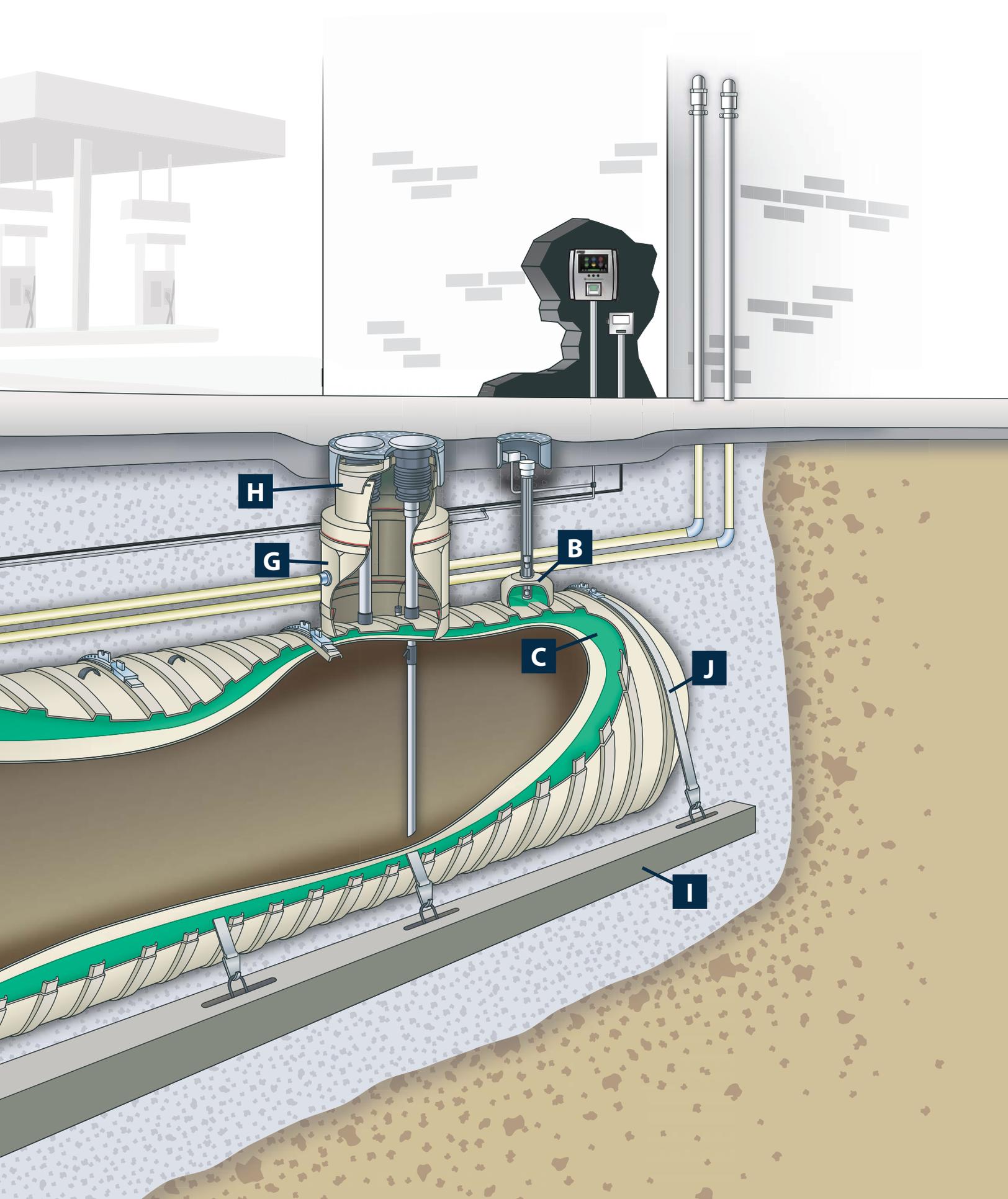
- A. Double-Wall Tank
- B. Hydrostatic Reservoir
- C. Monitoring Fluid
- D. Containment Collars
- E. Turbine Tank Sump
- F. Turbine Sump Lid
- G. Fill / Vapor Tank Sump
- H. Fill / Vapor Sump Lid
- I. Deadman Anchor System
- J. Split-Strap System

Innovative Manufacturing Process

Using an automated process, our tank laminate is consistent in thickness and composition and is fabricated with an inner surface that is not air-inhibited. The resulting tank can safely store petroleum fuel products, alcohols and alcohol gasoline mixtures of virtually any blend.

Our proven performance and high quality products have led the industry for 50 years.





STANDARD AMERICAN TANK SIZES

The following table represents the most popular tank sizes in the United States at the various tank diameters. Dimensions are based on double-wall brine filled tank designs and gallon capacities.

	Nominal Capacity (US Gallons)	Actual Capacity (US Gallons)	Length (Feet / Inches)	Weight (Pounds)	Number of Straps
4' Dia.	550	548	6' 7"	895	2
	600	676	7' 3"	975	2
	1,000	1,334	11' 1"	1,235	2
6' Diameter	2,000	2,107	6'	2,200	2
	2,500	2,689	13' 9"	2,650	2
	3,000	3,323	16' 9"	3,000	2
	4,000	3,958	19' 9"	3,550	2
	5,000	5,068	24' 9"	4,350	4
	6,000	6,179	30' 3"	5,100	4
8' Diameter	4,000	3,998	13'	3,150	2
	5,000	4,947	16' 9"	3,600	2
	6,000	5,897	19' 6"	4,050	2
	8,000	7,796	25'	5,000	4
	10,000	9,696	30' 6"	5,950	4
	12,000	11,595	36'	7,050	4
	15,000	14,545	44' 6"	9,350	6
10' Diameter	10,000	10,257	20' 11"	7,500	3
	12,000	11,873	23' 8"	8,600	4
	15,000	15,104	29' 2"	10,500	4
	20,000	19,951	37' 5"	13,550	6
	25,000	24,970	46'	17,100	8
	30,000	29,816	54' 3"	20,400	8
	35,000	34,835	62' 9"	24,350	8
	40,000	39,854	71' 4"	27,750	10
	45,000	44,872	79' 10"	31,250	10
	50,000	49,743	88' 2"	34,750	12

STANDARD CANADIAN TANK SIZES

The following table represents the most popular tank sizes in Canada at the various tank diameters. Dimensions are based on double-wall brine filled tank designs and liter capacities.

	Nominal Capacity (Liters)	Actual Capacity (Liters)	Length (Millimeters)	Weight (Kilograms)	Number of Straps
4' Dia.	2,000	2,074	2,007	400	2
	2,500	2,560	2,438	450	2
	5,000	5,050	4,546	600	2
	7,500	7,571	6,147	925	4
6' Dia.	10,000	10,111	4,166	1,225	2
	20,000	20,051	7,950	2,075	4
	25,000	25,623	10,071	2,450	4
8' Diameter	15,000	15,135	4,267	1,450	2
	20,000	20,252	5,461	1,800	2
	25,000	25,479	6,680	2,050	2
	30,000	30,821	7,925	2,400	4
	35,000	34,849	8,877	2,600	4
	40,000	40,296	10,135	3,000	4
	45,000	45,633	11,379	3,425	6
	50,000	50,970	12,623	3,925	6
	55,000	55,059	13,564	4,250	6
	60,000	60,124	14,707	4,825	8
	65,000	65,570	16,026	5,325	8
	75,000	75,155	18,263	6,200	8
10' Diameter	50,000	50,596	8,001	4,275	4
	60,000	60,233	9,322	5,000	4
	65,000	65,980	10,109	5,450	4
	75,000	75,523	11,404	6,150	6
	80,000	81,269	12,205	6,700	6
	85,000	85,345	12,750	7,000	6
	90,000	90,721	13,487	7,500	8
	95,000	96,744	14,325	8,025	8
	100,000	100,264	14,807	8,250	8
	125,000	125,286	18,186	10,500	8
	150,000	150,863	21,742	12,600	10

ADDITIONAL STORAGE OPTIONS

Every installation is unique, sometimes involving single-wall tanks, triple-wall tanks, or compartment tanks. Containment Solutions has a complete range of products and accessories to meet our customer's needs.

SINGLE-WALL TANKS

The very first fiberglass underground petroleum storage tank was a single-wall design and for 45 years single-wall tanks were installed around the world. As petroleum regulations changed single-wall tanks were phased out and although CSI no longer produces single-wall tanks for fuel storage, the original design is still utilized in other applications like water storage and separators / interceptors. Single-wall tanks use the same manufacturing methods and laminate matrix as our double-wall designs.

Functioning legacy single-wall tanks can be upgraded or modified to meet changing standards and storage requirements. For more information on our extensive enhancement services, see the CSI Field Services section of this brochure or contact a sales representative today.

TRIPLE-WALL TANKS

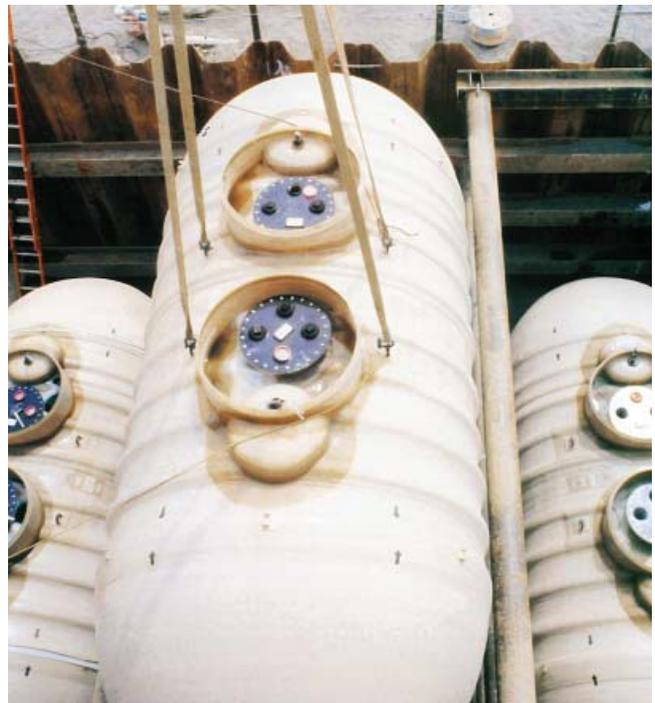
In 1997, CSI designed the first UL listed triple-wall fiberglass tank for use in environmentally sensitive areas where tertiary containment is required. Triple-wall tanks offer three levels of protection: the proven strength and performance of a primary fiberglass tank, and in the unlikely event that there is a breach, secondary and tertiary walls designed to contain the fuel and prevent any spill into the environment.

Triple-wall petroleum tanks, like double-wall models, come with a standard 30-year structural and corrosion warranty.

▼ SINGLE-WALL WATER STORAGE INSTALLATION



TRIPLE-WALL STORAGE ▼



COMPARTMENT TANKS

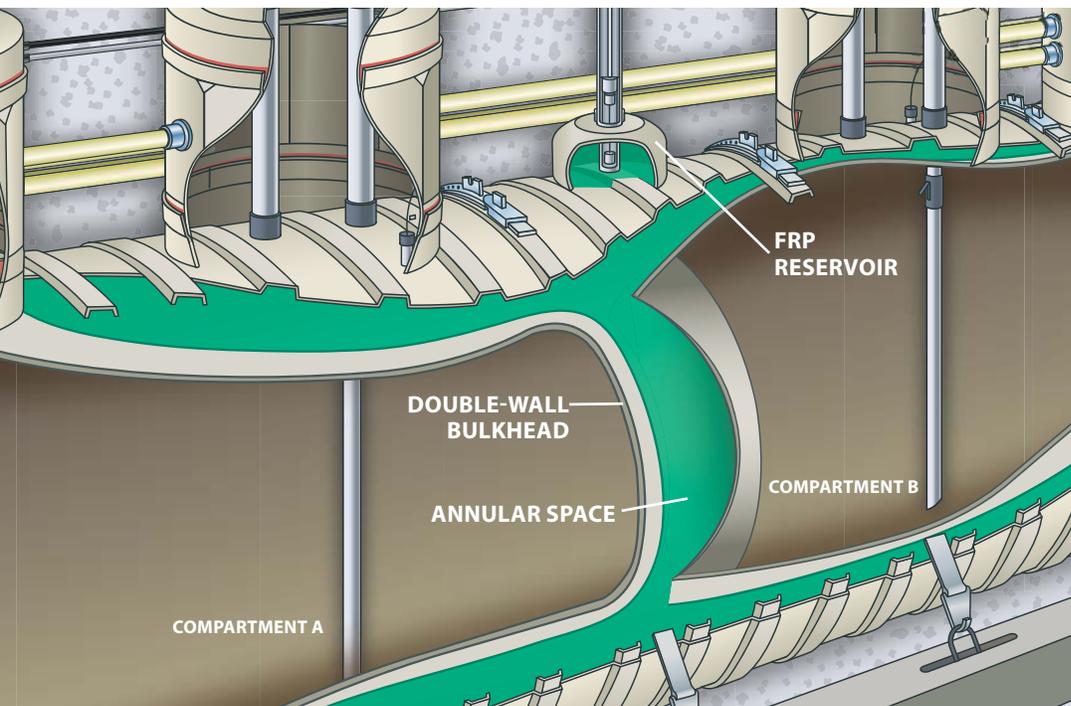
Compartment tanks are built by dividing a storage tank with a single-wall or double-wall bulkhead, creating two or more independent storage areas. They are a popular choice for retail petroleum marketers interested in storing multiple blends of fuel, including diesel. Since compartment tanks can be divided to accommodate two or more grades of fuel, they allow the site designer to plan for any ratio of fuel storage. These tanks are often used for sites where property is limited and installing multiple tanks is difficult. The design versatility of a CSI compartment tank can meet unique customer requests as well as local requirements.

Standard double-wall compartment tanks consist of one bulkhead but complex designs can include additional bulkheads forming multiple storage areas.



This compartment tank includes 2 bulkheads, an alternative in this limited space to installing 3 individual tanks.

▼ DOUBLE-WALL COMPARTMENT TANK WITH DOUBLE-WALL BULKHEAD



BENEFITS OF COMPARTMENT TANKS

- Reduced shipping costs with fewer tanks
- Fewer labor hours during installation with fewer tanks
- Smaller excavation sites needed for fewer tanks
- Site is more adaptable to changing consumer demands

FIBERGLASS TANK SUMPS

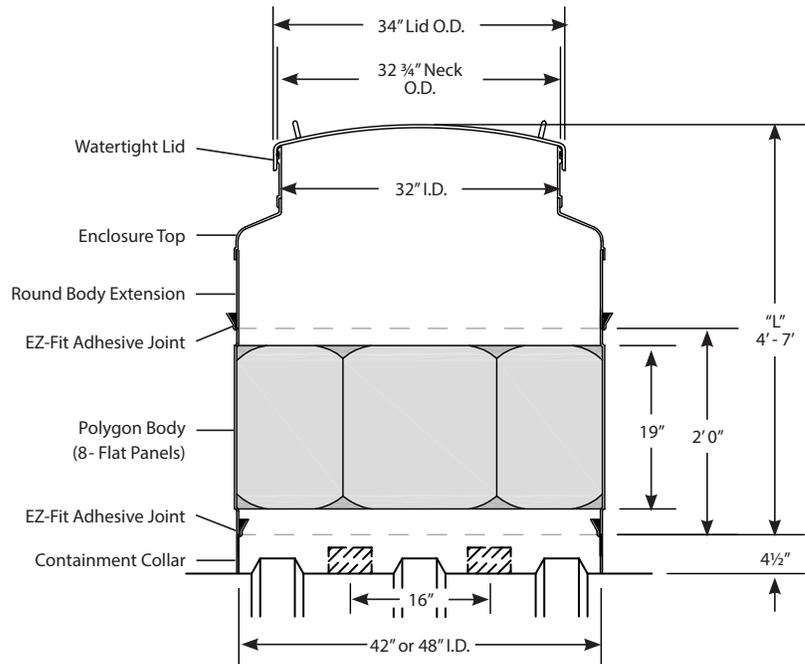
Protecting your storage system and the surrounding environment includes protecting the components that connect to the tank. Pumps and piping often require annual or semi-annual maintenance and testing. Without a sump, buried components are difficult to access and service.

Tank sumps are protective enclosures for pumps, piping and other accessories above the tank top. CSI provides a full line of fiberglass tank sumps in round and polygon designs, available in 42" or 48" diameter. 54" diameter sumps are available for applications such as backup generators at hospitals or data centers. CSI sumps can be ordered in single or double-wall construction.

For 20 years CSI has been perfecting the tank sump design and installation process, creating the most reliable and contractor friendly sump line available. Our proven technology has been utilized in thousands of installations.

CONTAINMENT COLLARS

The protection of system components above the tank top begins with the containment collar. CSI collars are factory bonded to the tank wall, and engineered to fit the single or double-wall tank sump specified. The collars feature a built-in adhesive channel making field bonding installation easier than ever.



SINGLE-WALL TANK SUMP WITH WATERTIGHT LID



FIBERGLASS TANK SUMPS

CSI tank sumps are manufactured and shipped as individual components such as sump bodies, enclosure tops, lids and adhesive kits. Each sump is then assembled in the field using our unique adhesive channels.

With 42", 48", and 54" sump diameters available and multiple lid configurations; CSI offers the widest range of options for protecting your tank top hardware and piping.

TANK SUMP LIDS

Turbine tank sump lids are used at the submersible turbine end of the tank when access is infrequent and the area must be watertight. The turbine lid is made of rigid fiberglass and fits into place by simply pushing down on the lid. Comfort grip handles make removal of the lid convenient.

Fill/Vapor tank sump lids are available for the fill-end of the tank when multi-port manholes are used. We offer two access opening options to accommodate the most popular shroud boots and spill containment systems. Both configurations include an observation port allowing easy access for internal sump inspections. Quad fill lids are also available on 48" and 54" tank sumps.



Turbine Lid



Fill/Vapor Lid
w/ 15" Access Openings



Fill/Vapor Lid
w/ 13" Access Openings



Quad fill Lid

WATERTIGHT TESTED

Lid assemblies are tested to 1' of hydrostatic head pressure to ensure a watertight seal. Access and removal of lids is possible through a standard street boxes.

100% SECONDARY CONTAINMENT

Several competitive products bond the sump walls together using glass fabrics, this can result in triggering false alarms due to poor communication in the monitoring system. CSI Double-wall tank sumps are built with two completely independent walls. This open environment offers the perfect communication pathway for hydrostatic monitoring which means reliable 360° protection.

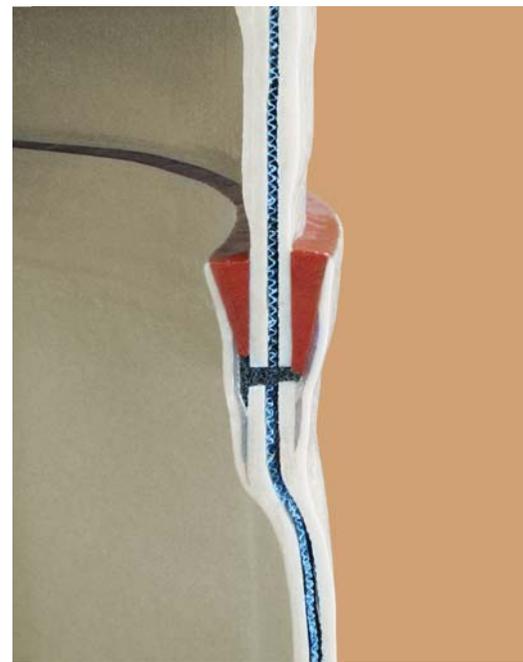


WATERTIGHT DEPENDABILITY

An alternative to the traditional lay-up, the unique CSI EZ-Fit adhesive channel facilitates a permanent and watertight joint which protects against leaks. The no mess installation is an easier and more effective way to ensure a watertight connection.

DOUBLE-WALL TANK SUMP EZ-FIT JOINT ►

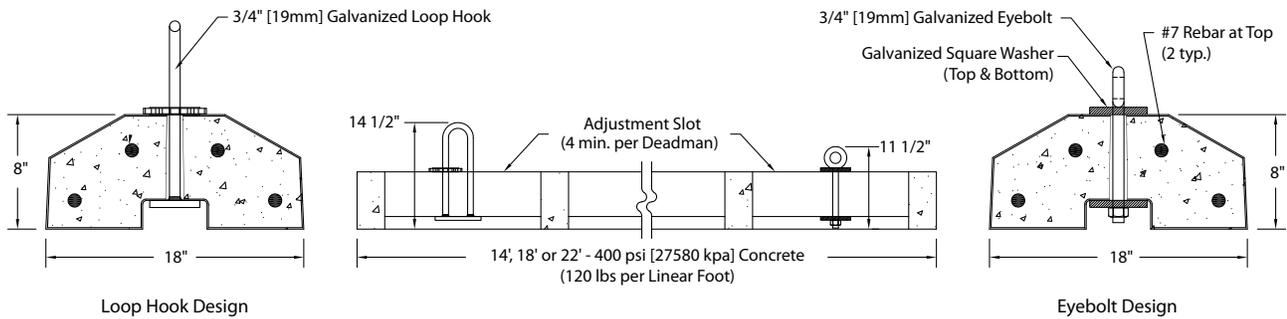
◀ SINGLE-WALL TANK SUMP EZ-FIT JOINT



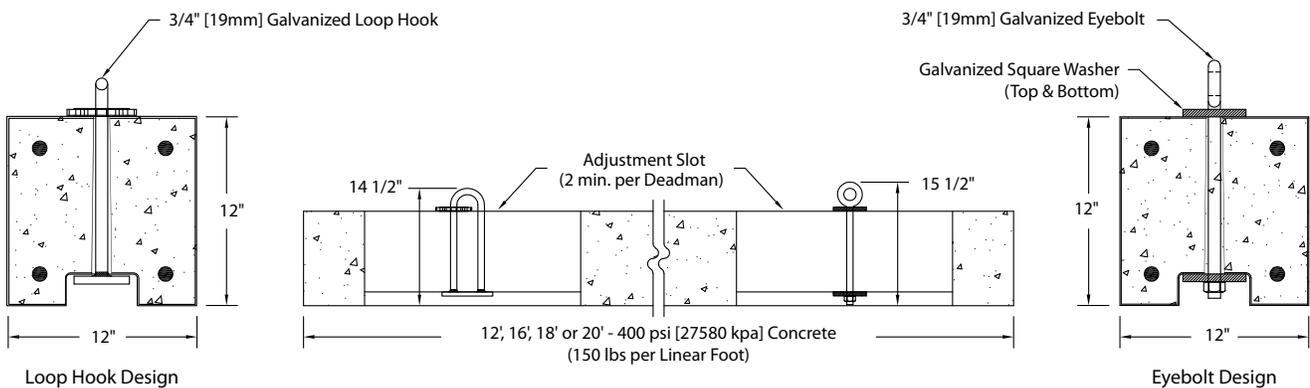
DEADMEN TANK ANCHORS

Containment Solutions can provide factory deadmen tank anchors, engineered to American Concrete Institute (ACI) standards, for fiberglass storage tanks. Deadmen anchoring systems prevent storage tanks from floating when excessive ground water is present. Ordering a complete CSI deadmen system, with turnbuckles and straps, is a ready-made solution for your tank anchoring needs. Typically the entire package is delivered on the same truck as the tank, saving you construction time and shipping costs. Each anchoring system is sized for your specific tank configuration and arrives ready to install.

LOW-PROFILE 18" X 8" DEADMAN

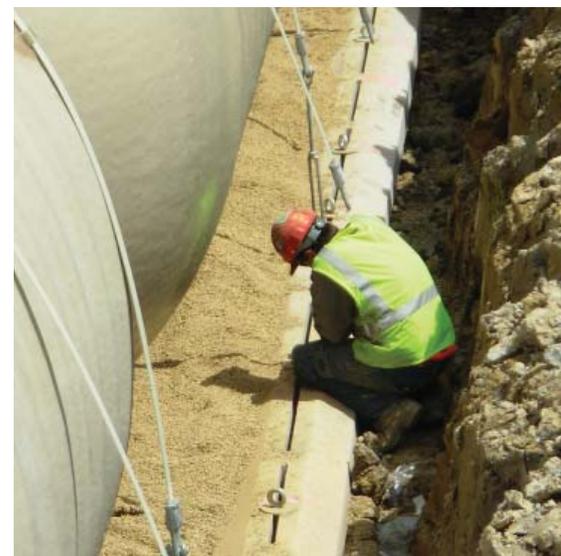


12" X 12" DEADMAN



FEATURES & BENEFITS

- Designed to ACI code
- Adjustable anchor points
- Works with all tank diameters and lengths
- Ships alongside most tanks, reducing freight cost
- Fiberglass split straps available for man-out-of-hole installation



CSI FIELD SERVICES

We proudly stand behind our products which is why we have an entire division fully staffed by experienced CSI technicians for field services. We are the only major manufacturer of fiberglass storage products with a full time staff and we service not only our products but our competitors' products as well.

RETANK®

ReTank® is an on-site retrofit system which allows you to turn any Containment Solutions, Owens Corning or other manufacturers' fiberglass single-wall tank into a hydrostatically monitored double-wall tank. The benefits include reducing the costs of tank replacement and using existing tanks for multiple types of fuel.

With CSI's ReTank system, a fiberglass inner tank is constructed in sections and then installed in your existing tank, still in the ground. While in your tank, CSI technicians perform a full inspection, upgrade all fittings to current standards, and install all the safeguards of our newest double-wall tanks. ReTank is UL Listed and includes a new 30-year warranty on the constructed inner tank.

BTU® - BIOFUEL TANK UPGRADE

The BTU®, Biofuel Tank Upgrade, is a cost-effective solution for upgrading existing fiberglass single-wall tanks to meet new regulations. Many of the earliest generation fiberglass tanks were not tested nor were they warranted for either biodiesel or ethanol blends exceeding 10%.

What makes BTU different from other upgrades? BTU is a tank enhancement, it is not a spray-on liner. Tank liners have an unfortunate history of failure which is why you should only trust a tank manufacturer with future upgrades. The BTU service is completed by CSI field technicians who are experts in fiberglass tank manufacturing techniques. BTU can be applied in combination with other tank modifications like sumps and collars or as a stand-alone service.

COMPARTMENT TANK UPGRADES

CSI Field Service can add a bulkhead to an existing underground storage tank creating a multi-compartment tank. Modifying existing tanks can expand the available product offering for a fraction of the cost of tank replacement. A CSI compartment tank upgrade will not affect the tank warranty and minimizes dispenser down time. The multi-compartment tank will be operational in a few days and is fully compatible with the same fuels as all other CSI tanks.

▼ RETANK® PROCESS



MANWAY UPGRADE ▼



FIBERGLASS UNDERGROUND STORAGE TANK SPECIFICATIONS

SHORT FORM SPECIFICATION

The contractor shall provide the appropriate single, double or triple-wall fiberglass storage tank and accessories as indicated on tank drawings. Capacity, dimensions and fitting locations will be indicated on tank drawings. Tanks shall be manufactured by Containment Solutions, Inc. The tank must be tested and installed according to manufacturer's current installation instructions.

LONG FORM SPECIFICATION

1. GENERAL

1.1. Quality Assurance

1.1.1. Acceptable Manufacturers:

Containment Solutions, Inc., (CSI), Conroe, Texas

1.1.2. Governing Standards, as applicable:

- 1.1.2.1. Underwriters Laboratories Inc. Standard 1316, Glass-Fiber Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures.
- 1.1.2.2. Underwriters Laboratories of Canada standard ULC-S615, Reinforced Plastic Underground Tanks for Flammable & Combustible Liquids.
- 1.1.2.3. National Fire Protection Association codes and standards:
 - NFPA 30 Flammable and Combustible Liquids Code
 - NFPA 30A Motor Fuel Dispensing Facilities and Repair Garages Code
 - NFPA 31 Installation of Oil-Burning Equipment Standard
- 1.1.2.4. City of New York Department of Buildings M.E.A., 71-85-M
- 1.1.2.5. American Concrete Institute standard ACI 318, Building Code Requirements for Structural Concrete.

1.2. Submittals

- 1.2.1. Contractor shall submit ____ copies of: shop drawings, manufacturer's product brochures, installation instructions and calibration charts.

2. PRODUCTS

2.1. Double-Wall or Triple-Wall

Fiberglass Underground Storage Tanks

- 2.1.1. Loading Conditions - Tanks shall meet the following design criteria:
 - 2.1.1.1. External hydrostatic pressure: Buried in ground with 7' of over burden over the top of the tank, the excavation fully flooded and a safety factor of 5:1 against general buckling.
 - 2.1.1.2. Surface Loads: When installed according to manufacturer's current installation instructions, tanks shall withstand surface HS-20 axle loads (32,000 lbs/axle).
 - 2.1.1.3. Internal Load: Primary and secondary tanks shall withstand 5 psig (35 kPa) air pressure test with 5:1 safety factor.
 - 2.1.1.4. 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.
- 2.1.2. Product-Storage Requirements
 - 2.1.2.1. All primary tanks must be vented. Tanks are designed for operation at atmospheric pressure only, except for use with vapor recovery systems at a pressure or vacuum not to exceed 1 psig (7 kPa).
 - 2.1.2.2. Tanks shall be capable of storing liquids with specific gravity up to 1.1.

2.1.2.3. Tank shall be capable of storing the following products:

- Diesel fuel oils for oil burning equipment at temperatures not to exceed 150°F.
- Gasoline, jet fuel, aviation gasoline, motor oil (new or used), kerosene, diesel motor fuel at ambient temperatures.
- Alcohol-gasoline blend motor fuels at ambient temperatures:
 - Gasoline-ethanol blends with up to 100% ethanol.
 - Gasoline-methanol blends with up to 100% methanol.
- Oxygenated motor fuels at ambient temperatures with up to 20% (by volume) methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE), di-isopropyl ether (DIPE), tertiary butyl alcohol (TBA), tertiary amyl methyl ether (TAME), or tertiary amyl ethyl ether (TAE).
- Biodiesel-diesel blends with up to 100% biodiesel (B100 per ASTM) at ambient temperatures.

2.1.3. Materials

2.1.3.1. The tank shall be manufactured as a matrix of premium resin, glass fibers and silane-treated silica that together result in a composite providing improved corrosion protection.

2.1.3.2. The tank inner wall shall be fabricated against a mold to produce a non-air inhibited and high gloss laminate to provide a fully cured inner surface without the need of wax coats, a low coefficient of friction and a natural resistance to the build-up of algae or other contamination on the surface. Wax and wax resin coatings cannot be used to achieve full surface cure on tank shells and endcaps.

2.1.4. Dimensional Requirements (refer to Containment Solutions literature)

- 2.1.4.1. Nominal capacity of the tank shall be ____ gallons / liters.
- 2.1.4.2. Nominal outside diameter of the tank shall be ____ feet.
- 2.1.4.3. Nominal overall length of the tank shall be ____ feet.

2.1.5. Monitoring Capabilities

- 2.1.5.1. Double and triple-wall tanks shall have a monitoring space between the walls to allow for the free flow and containment of leaked product from the primary tank. The monitoring space shall provide equal communication in all directions.
- 2.1.5.2. The following continuous monitoring conditions shall be compatible with the cavity between the inner and outer tanks:
 - Vented to atmosphere
 - Vacuum – 5 psig maximum
 - Positive air pressure (5 psig maximum)
 - External hydrostatic pressure – 7' maximum groundwater head pressure over tank top
- 2.1.5.3. Tanks 6' diameter and larger shall have an integrally mounted annular space reservoir installed on the tank for factory-installed brine and continuous hydrostatic monitoring. The reservoir shall be constructed of fiberglass reinforced plastic materials and be included in the tank warranty.
- 2.1.5.4. The monitoring fitting for the monitoring space shall be a 4" NPT fitting.

- 2.1.5.5. The monitoring system shall be capable of detecting a breach in the inner and outer tank under the following installed conditions:
- When the primary tank is empty.
 - When the primary tank is partially or completely full and the ground water table is below tank bottom.
 - When the primary tank is partially or completely full and the tank is partially or completely submerged in groundwater.
- 2.1.5.6. The leak detection performance of the monitoring system shall be listed as a continuous interstitial monitoring method (liquid filled) by the National Work Group on Leak Detection Evaluations (NWGLDE). The system should be capable of detecting leaks in the primary or secondary tank walls as small as 0.10 gallons per hour within one-month.
- 2.1.5.7. The hydrostatic monitoring system shall be capable of a precision tank test that is listed by the National Work Group on Leak Detection Evaluations (NWGLDE).
- 2.1.5.8. If hydrostatically monitored, any solution used in the monitoring space shall be compatible with the tank and be of a contrasting color to the tank.
- 2.2. Accessories**
- 2.2.1. Flanged Manways**
- 2.2.1.1. The standard manway is 22" I.D. and will be furnished with UL listed gaskets and covers (30" and 36" manways are optional).
- 2.2.1.2. Location – see standard tank drawings.
- 2.2.1.3. Optional manway extensions shall be fiberglass and ____ feet long.
- 2.2.2. Fill Tubes - Fill tubes of appropriate design shall be supplied by contractor.**
- 2.2.3. Hydrostatic Monitor Accessories**
- 2.2.3.1. Brine monitoring fluid shall be a calcium chloride solution.
- 2.2.3.2. Double float reservoir sensor supplied by contractor shall be designed for CSI reservoirs. The components of the sensor shall be compatible with brine and provide two alarm points positioned 10" apart.
- 2.2.4. Secondary Containment Collar**
- 2.2.4.1. UL label shall be affixed to collar.
- 2.2.4.2. The collar shall be fiberglass reinforced plastic, 42" or 48" in diameter and shall be factory-installed in accordance with drawings.
- 2.2.4.3. The collar shall include an internal adhesive channel.
- 2.2.4.4. The collar shall be included in the 30-year tank warranty.
- 2.2.5. Adhesive Kit (Kit AD)**
- 2.2.5.1. UL Listed and alcohol compatible adhesive kit shall provide a watertight seal at the tank sump and containment collar joint to prevent the ingress of water or egress of fuel. The adhesive kit includes resin, catalyst, mixing stick, putty knife, sandpaper, grout bag, and installation instructions.
- 2.2.6. Tank Sumps**
- 2.2.6.1. UL label shall be affixed to tank sump components.
- 2.2.6.2. Tank sumps & collars shall be listed by Underwriters Laboratories for petroleum fuels and all blends of alcohol (same as tank). Collar and sump shall be tested and listed as a complete sump system.
- 2.2.6.3. Tank sump components shall be constructed of fiberglass reinforced plastic. The tank sump shall be 42" or 48" in diameter and must mount to the secondary containment collar. Standard tank sump shall consist of an octagon shaped base (round base is optional), round body extension and enclosure top.
- 2.2.6.4. The octagon base shall be 24" in height and provide 19" high panels for piping entry points. The base must be capable of joining to the collar with an internal adhesive channel.
- 2.2.6.5. A 34" O.D. watertight lid shall be provided at the submersible and fill/vapor end of the tank and provide a watertight seal to the sump enclosure with 12" of water above the lid and remain leak free.
- 2.2.6.6. Refer to tank sump drawings for standard models and configurations.
- 2.2.7. Ladders**
- 2.2.7.1. Ladders shall be supplied by the tank manufacturer (carbon steel, stainless steel, aluminum).
- 2.2.8. Anchor Straps**
- 2.2.8.1. Straps shall be supplied by the tank manufacturer.
- 2.2.8.2. Number and location of straps shall be as specified by manufacturer.
- 2.2.8.3. Each strap shall be capable of withstanding a maximum load of 25,000 lbs.
- 2.2.9. Prefabricated Concrete Deadmen Anchors**
- 2.2.9.1. Design Conditions – Deadmen shall meet the following design criteria:
- Deadman shall be designed to ACI 318
 - Manufactured with 4,000 psig concrete
 - Manufactured in various lengths
 - Provide adjustable anchor points for hold down straps
- 2.2.10. Liquid Sensor Drawstring
- 2.2.10.1. Galvanized steel drawstring shall be factory installed at the monitoring fitting to facilitate field insertion of sensor.
- 2.2.11. Fittings Threaded NPT
- 2.2.11.1. All threaded fittings shall be located on a manway cover or within 12" of the tank top center line. Fittings to be supplied with temporary thread protectors or threaded plugs.
- 2.2.11.2. All standard fittings shall be 4" diameter NPT half couplings.
- 2.2.11.3. Internal piping shall be terminated at least 4" from the tank bottom (6" for 12' diameter tanks).
- 3. EXECUTION**
- 3.1. Installation and Testing**
- 3.1.1. Fiberglass underground tanks must be tested and installed according to the current installation instructions provided with the tank (refer to Containment Solutions Pub. No. INST 6001). Tanks are installed with pea gravel or crushed stone as specified in current installation instructions. Containment Solutions' tanks are intended for storing products listed in the warranty; any other products not listed in the warranty must be approved in advance by Containment Solutions.
- 4. LIMITED WARRANTY**
- 4.1. Limited Warranty**
- 4.1.1. Warranty shall be Containment Solutions limited warranty in effect at time of delivery.

CONTAINMENT SOLUTIONS MANUFACTURES:

Underground and Aboveground Storage Tanks

Urea DEF Storage Tanks

Automotive Oil and Lubricant Storage Tanks

Oil/Water Separators and Interceptors

Flowtite® Water Tanks

Chemical Storage Tanks

Fiberglass Manholes and Wetwells



CONTAINMENT
SOLUTIONS®