CST™

Anaerobic Digesters

Storage Tank & Cover Solutions

AQUASTORE® TecTank™

BIOENERGY STORAGE SOLUTIONS

Bolted Tank Technology for All Anaerobic Digester Applications

CST Industries, Inc., has been designing and manufacturing digester reactor tanks and covers for more than 36 years and has hundreds of satisfied customers around the world. CST™ has a complete line of tanks, steel roofs, aluminum domes, and flexible membrane covers for biogas plants.

Our worldwide resources provide personalized service to meet our customers' needs including design and engineering, construction, customer service, and support. CST and our Authorized Dealers work closely with customers to construct best-of-class, ultra-low-maintenance biogas plant structures that provide longevity and a rapid customer return on investment.

Advantages of CST's Bolted Tank Technology

- All tank parts are factory coated for maximum protection and are easily transported to the job site
- Bolted tanks can be erected in 1/3 of the time required to build a field-welded or concrete tank on-site
- Tanks can be assembled in even the most remote sites, without large staging areas, and in every season of the year
- Bolted tank construction is very conservation-friendly with little disturbance to the surrounding environment
- CST bolted tanks are factory coated, so there is no in-field painting required which can expose the environment to harmful silica from sandblasting or paint overspray
- Tanks are assembled at ground level using a unique jacking system that progressively elevates the structure to install the panels without the need for expensive cranes or staged scaffolding

Choose Between Floor Options

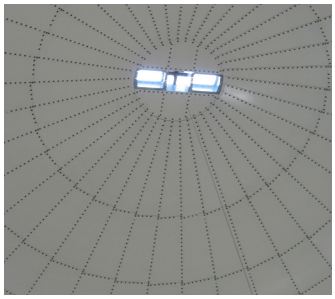
CST understands the complexity that can exist when providing floor designs for digester tanks. That is why we offer options for our customers depending on their digester need. The customer can select from Coated Steel (Vitrium™ glass-fused-to-steel or Trico Bond EP® epoxy coating), or reinforced concrete. Concrete digester floors can vary from flat up to a 45-degree conical shape. Utilizing our worldwide regional offices and Authorized Dealer network we can work with the customer to provide the most economical floor design and installation that is required for the project.

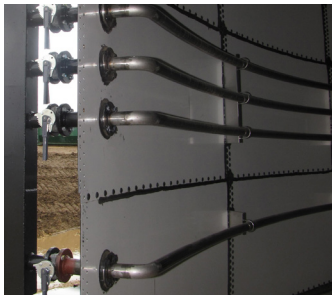
Hybrid Tanks & Other Options

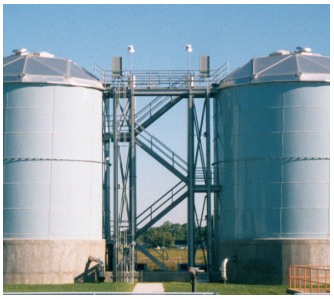
The unique design of CST's bolted tanks easily adapts for hybrid tank designs that utilize the strengths of multiple state-of-the-art coating systems. We can design tanks with different coating systems for the gas and liquid zones of a digester that create a unique storage solution that cannot be accommodated by concrete or field welded designs. CST also offers tanks constructed of stainless steel and uncoated steel when design specifications demand these options.

Accessories (Optional Equipment)

- Baffles
- Caged ladders and platforms
- Crosswlaks
- Insulation
- Nozzles
- Passive Cathodic Protection Systems
- Roff walkways and railings
- Sidewall manway ports
- Spiral stairways





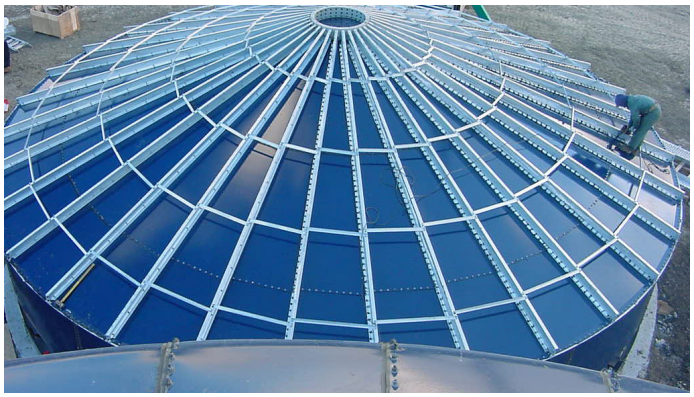


Multiple Tank Cover Options

CST includes the industry's best cover options for digester applications. The gas zone of a digester is the most corrosive area and requires appropriate design. Along with this corrosiveness, there are many other factors (environmental, mixer loads, pressure, vacuums, ancillary equipment loads, etc.) that need to be considered in cover selection. CST can design and engineer the right solution from the multiple cover types in its portfolio.

» Externally Supported Roof

The externally supported roof (ESR) is the most common roof design in the industry with a smooth internal roof surface and no rafters. The design can be used when moderate to high pressure or vacuum design limits are anticipated. It is also preferred when there are heavy load conditions expected from mixers and/or other ancillary equipment is installed in the cover. Roof panels can be designed with Vitrium glass-fused-to-steel coating, OptiBond™ Epoxy Coating System, or stainless steel.



» Geodesic Dome

Geodesic dome designs can be utilized on storage tanks where no, or minimal pressure and vacuum are reqired. The all-aluminum design is lightweight, free-span, and resists corrosion better than many other alloys.

Knuckle Roof

An option for smaller diameter storage tanks (11 to 31 ft diameter tanks), a knuckle roof is best suited for lighter pressure and vacuum applications with no load bearing requirements. The Knuckle roof is available for epoxy coated, glass-fused-to-steel and stainless steel tanks

Dual Membrane- Tank Mounted

Used when the client wants to store and meter the gas at the digester. The dual membrane design expands to allow for more gas storage than an ESR and the internal / external membrane system acts to maintain the required pressure for the operating equipment.

Dual Membrane - Ground Mounted

Gasholders are commonly used in conjunction with other storage vessels to store and regulate gas from the process. The gas can then be regulated and delivered to a power generation process, boiler, or other gas processes.

Roof and Membrane Options and Specifications

ROOF TYPE	MAXIMUM DESIGN PRESSURE	MAXIMUMN DESIGN VACUUM	MAXIMUM DIAMETER	EXTERNAL LOADS	COATINGS/ MATERIAL
External Supported Roof (ESR)	45 mbar 18” WC	5 mbar 2” WC	37.5 (m) 123 (ft)	Accommodate heavy loads (including roof mounted mixers)	Glass, Stainless Steel, Epoxy
Knuckle Roof (KR)	20 mbar 8” WC	5 mbar 2” WC	9.5 (m) 31 (ft)	Limited	Stainless Steel, epoxy, glass
Dual Membrane Tank Mounted (TM)	10 mbar 4” WC	3 mbar 1.2” WC	36.6 (m) 120 (ft)	None	PVC Coated Polyester
Dual Membrane Ground Mounted (GM)	40 mbar 16” WC	3 mbar 1.2” WC	Various	None	PVC Coated Polyester
Geodesic Dome (GD)	5 mbar 2” WC	1 mbar 0.5” WC	304.8 (m) 1000 (ft)	Accommodate standard loads such as walkways, platforms, manways, etc	Aluminum

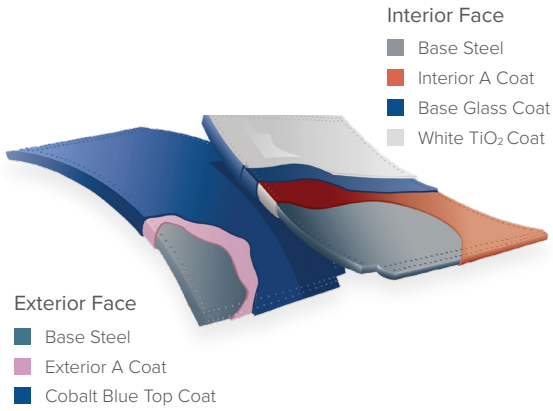
Note: Higher pressure dual membrane (DMF) and higher pressure/vacuum external supported roof (ESR) need to be reviewed as special requests.

Coating Technologies

AQUASTORE®

» Vitrium™ Glass-Fused-To-Steel

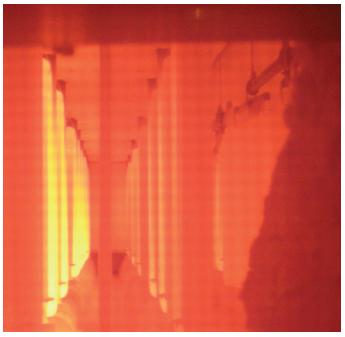
CST provides its customers with the data and information they need to make the right coating technology decision for their application. The only company that designs and manufactures multiple state-of-the-art coating technologies, CST offers customers options in selecting which coating technology is best for each application – unlike companies with only one technology.



Vitrium™ glass-fused-to-steel is the premium coating in the digester tank market. It is a single, strong, integrated glass and steel material fused together at 1,500°F (816°C) in a controlled process furnace. The physical properties of Vitrium are especially suited for digester applications. The hard, inert barrier on both the interior and exterior tank surfaces guards against corrosion. Vitrium internal glass coating is impermeable to liquids and vapors, provides resistance to undercutting caused by corrosion, and offers excellent impact and abrasion resistance.

Vitrium technology combines the outstanding chemical and physical resistant properties of titanium dioxide enhanced (TiO_2) glass with a highly engineered, ultra-fine glass bubble structure for durability and flexibility. Our glass-fused-to-steel coatings range from 6 to 15 mils (152 to 381 microns) on the exterior and 10 to 18 mils (254 to 457 microns) on the interior. Interior sidewalls are tested to be holiday free using the industry-standard low voltage wet sponge testing method. A high voltage dry testing method can be provided upon customer request.

CST tanks made with glass-fused-to-steel outperform other digester tanks, making them the best choice to contain the aggressive liquids found in today's anaerobic digester facilities.



» Glass is fused to steel at 1,500˚F (816˚C) in a state-of-the-art furnace

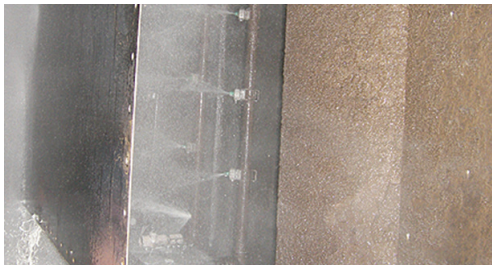
Anaerobic Digester Tank Designs

ITEM	TYPICAL	OPTIONAL
Diameter/Height Ratio	1.0:1.0/1.2	1.0:1.0 through 7.0:1.0
Pressure	5-37 mbar (2”- 15” WC)	Up to 60 mbar (24” WC)
Vacuum	2.5-7.5 mbar (1”- 3” WC)	Up to 20 mbar (8” WC)
Specific Gravity	1.05	Up to 1.8
Temperature	95°-105° F (35°- 40°C)	140° F (60°C) for Glass and 158° F (70°C) for Epoxy
External Supported Roof Slope	15-degrees	10 to 20-degrees
Mixers	Top Mount/Sidewall	Liquid-Gas/Recirculation/Submersible/Paddle
Baffles	Yes	Yes
Ladder, Walkways, Platforms	Standard-Straight	Wrap Around
Concrete Floor	Flat	Conical
Steel Floor	Flat	Glass/Epoxy

» OptiBond™ Epoxy Coating System

TecTank™

Our proprietary Trico Bond EP® epoxy coating provides excellent corrosion resistance and long tank life for the finest epoxy coating available in the liquid tank industry. In the process, parts are degreased and rinsed, hot air dried, and pre-heated at an optimum temperature.



Part surfaces are then blasted with engineered grit material. This creates a rugged 3D surface topography ideally suited for better powder coating adherence, increased durability, and long-term coating performance. Then they are powder coated in a proprietary electrostatic booth with precise environmental controls and cured at a tightly regulated temperature to maximize the cross-link bonding of the epoxy materials.

A uniquely engineered polyurethane topcoat is applied on exterior surfaces. This provides added UV protection and extends the coating life in tough outdoor conditions. A final curing stage through the oven is the last step in the CST process before our stringent quality control inspection – a high voltage defect testing procedure to identify any holidays, inclusions, and thin areas in the coating.

Exterior Color Options

TecTank tanks are available in seven standard exterior colors. Inquire for custom colors.

Tan | Gray | Green | Blue | White | Forest Green | Cobalt Blue

Component Comparison

PANEL TYPE	DIGESTER ZONE	DESCRIPTION
Vitrium Glass-Fused-to-Steel	Liquid Gas	• High Specification 3-coat Glass Coating • High Performance • Low Maintenance • Sidewall, Covers, Floors
Trico Bond EP Epoxy Coating	Liquid Gas	• Proprietary Thermoset Coating • Exceptional Performance • Sidewall, Covers, Floors, Manway, Flanges, Baffles
Trico Bond Severe Duty	Liquid Gas	• Proprietary Thermoset Coating • Temperatures higher than 140°F • Free Proformance is Needed • Longer Maintenance • Sidewall, Covers, Floors, Manway, Flangers, Baffies
Stainless Steel	Liquid Gas	• Grade 316 or 304 • Excellent Resistance Gas Zone • Sidewall, Covers, Manway, Flanges, Baffles
Uncoated Steel	Liquid	• Can be used as sidewall in non-corrosive liquid zones

Worldwide Availability

CST is committed to providing its customers with the highest engineered quality, best service, longest product life and greatest value for every storage and cover solution we supply.

Worldwide Network of Support

Bid and quotation services for CST are available worldwide. Authorized Dealers and factory-trained builders are located on every continent, providing construction and after-installation services.

Authorized Dealer Network

Authorized Dealers offer a complete storage solution for the life of the digester tank from specification to construction to service. No other tank company has the years of experience and history of service that you only get from our dealer network. All design and engineering for CST is done in-house for quality control and process efficiency.

For more information, call +1 844-44-TANKS or visit us online at cstindustries.com

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