



WATER AND WASTEWATER STORAGE



SPECIFIERS' GUIDE TO DESIGN AND CONSTRUCTION



Engineered Storage Products Company is "*specifier friendly*." Aquastore® glass-fused-to-steel tanks are found in virtually every segment of the liquid storage market. Common applications include storing potable water, wastewater, process water, fire suppression water and landfill leachate. We have developed answers for your specification needs for these as well as unusual storage applications.

Our engineers provide Aquastore tank designs to a wide range of standards, such as AWWA D103 Standard for Bolted Steel Water Storage Tanks, AISC, Factory Mutual codes and National Fire Protection Association Standard 22. Submittal drawings and design calculations are available for every tank.

Aquastore sectional bolted tanks offer several advantages that have contributed to their success. They are cost-effective. Compare the lifecycle cost of a glass-fused-to-steel tank to a field-welded or concrete tank and the difference is significant. Glass coatings do not require periodic repainting and most graffiti can be removed in a matter of minutes.

Factory coating eliminates the weather delays and variables affecting the quality of field-applied paint. The unique design and bolt assembly of the tank can be pre-engineered to allow for capacity expansion in the future. Engineered Storage Products utilizes a variety of sealants with specific chemical resistant properties suited to the liquids to be stored. Aquastore tanks can be erected in remote locations and can be designed for relocation. Best of all, their performance is dependable, with minimal maintenance cost.

This guide provides basic information for specifying an Aquastore tank. Aquastore storage tanks are available from independent, authorized Aquastore dealers who are available to discuss your design requirements.

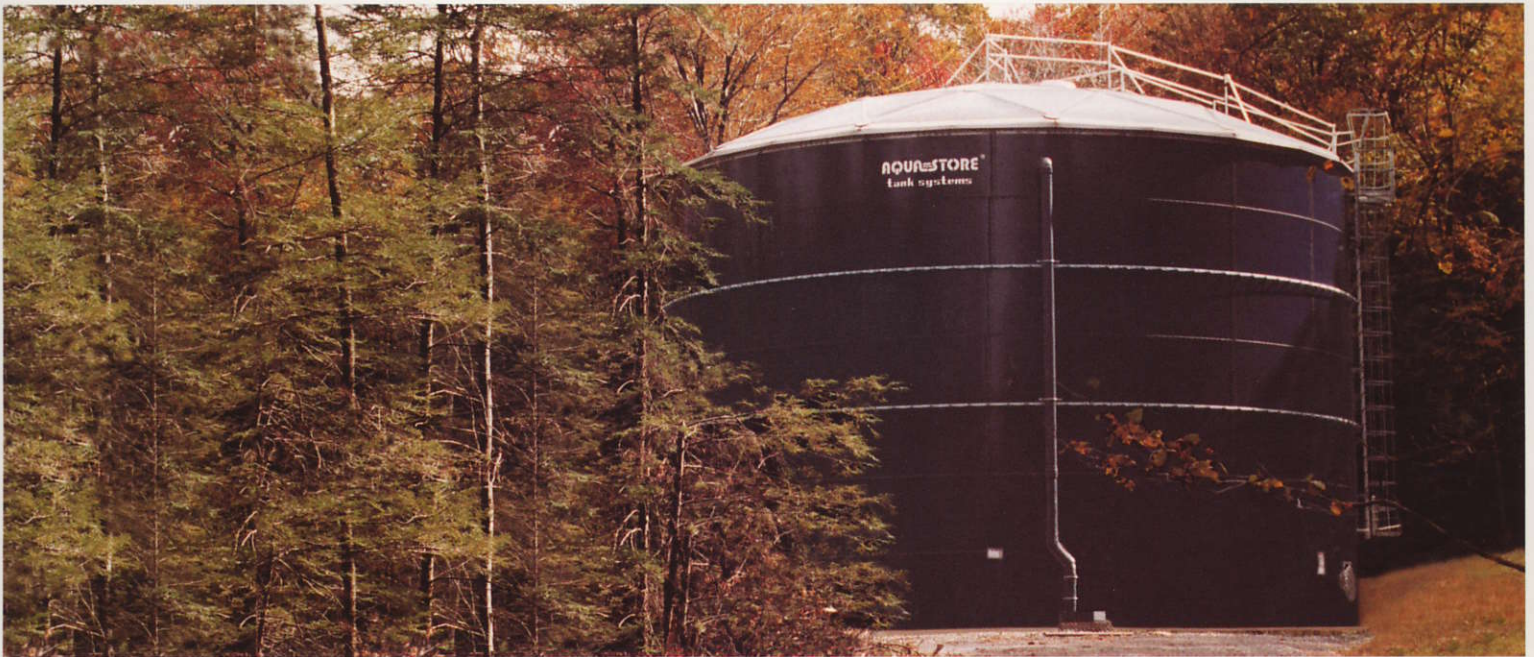
Two Aquastore potable water reservoirs and an Aquastore backwash storage tank are central features of this water treatment plant. This guide contains information for specifying any of the tanks shown.



Suitable for a wide range of wastewater treatment applications, Aquastore tanks are specified as clarifier, digester, landfill leachate, trickling filter and waste treatment tanks.



AQUASTORE. THE NAME TO SPECIFY FOR WATER STORAGE.



The unique modular assembly allows Aquastore tanks to be specified and erected in difficult locations. The glass-fused-to-steel coating provides low maintenance protection.

Finished glass-fused-to-steel sheets are shipped on protective skids, containerized or full box crated.





The glass coating on these two Aquastore storage tanks used in treating process wastewater at a brewery in the Dominican Republic is suited to industrial applications.

Aquastore glass-fused-to-steel coatings were selected for this wastewater treatment plant. The complex includes effluent water storage tanks, equalization tanks, a clarifier and an aeration tank.



Exterior Face

- Base Steel
- Exterior A Coat
- Cobalt Blue Top Coat

Aquastore's glass coatings meet ANSI/NSF Standard 61 requirements for indirect additives, making them suitable for potable water storage.



Cobalt Blue

Global Glass™ Cobalt Blue color, 2 coat system for dry product storage and non-essential or non-aggressive liquid storage. Standard exterior glass coating.



White

Vitrium™ White color, TiO₂ enriched 3 coat system for most liquid storage applications. Municipal and industrial water and wastewater. Factory holiday free.



White

Glass97® White color, TiO₂ enriched, enhanced, 3 coat system for demanding industrial applications. Factory holiday free.

Interior Colors

INTERIOR AND EXTERIOR COATINGS.

- White TiO₂ Coat
 - Base Glass Coat
 - Interior A Coat
 - Base Steel
- Interior Face

The heart of the coating system is a multi-step glass-fused-to-steel process. The fabricated sheets are grit blasted to a uniform, near white surface. The sheets are then inspected and pre-coated. Proprietary formulations of borosilicate, minerals, water and clays are blended into a sprayable slurry.

After inspection, the slurry is fused to the steel sheets at temperatures above 1500°F

to produce the distinctive glossy Aquastore finish. The molten glass reacts with the profiled steel surface to form an inert, inorganic chemical and mechanical bond. All three grades of coatings; Global Glass™, Vitrium™, and Glass97® share general physical properties, while each incorporates slightly different additives to meet specific needs for each of their applications.

Engineered Storage Products' proprietary Edgecoat® process thermal sprays the edges with a protective alloy. Glass is added to double coat the sheet edges with barrier coatings. For some individual circumstances,

multiple applications and firings produce specialized coatings.

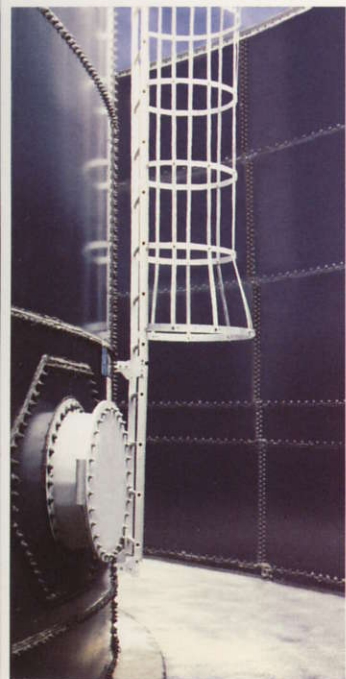
Engineered Storage Products continues to develop innovative glass coatings for specific demands. Our Vitrium glass-fused-to-steel coating was created to meet the needs of potable water storage. Our proprietary TiO₂ glass, utilizes dramatically increasing toughness and durability characteristics while reducing production time. You get better potable water storage for less. Global Glass, Vitrium and Glass97 are ANSI/NSF certified. Your authorized Aquastore dealer will recommend the coating that is best for your specification.

Physical Properties of Aquastore Glass-Fused-to-Steel Coating

Inside Sheet Color	Cobalt Blue, White
Outside Sheet Color	Cobalt Blue, Desert Tan, Forest Green, Sky Blue, White
Thickness	Global 7–13 mils, 180–330 microns, Vitrium 7–15 mils, 180–380 microns, Glass 97 9–18 mils, 230–460 microns
Service Range	140° F @ 3-10 pH-subject to verification, depending on specific products stored & glass selected
Abrasion Resistance	Taber-8 mg loss (CS-17, 100 g, 1000 cycles)
Elasticity	Young's Modulus 12 x 10 ⁶
Permeability	Impermeable to gases and liquids within normal operating temperature ranges
Thermal Conductivity	8 BTU/hr/ft ² /F°/in
Cleanability	Smooth, inert, glossy, anti-stick
Hardness	6.0-7.0 Mohs
Corrosion Resistance ASTM B-117	Excellent, virtually unaffected by most waste waters, brines, sea water, sour crude, spray salt, organic and inorganic chemicals

Note: Specific applications may be limited by sealant, hardware or glass protection characteristics. Consult your Aquastore dealer for suitability for specific applications.

The durability of our coating systems produces low maintenance installations. The glass-fused-to-steel bond minimizes maintenance and eliminates the cost of repainting.



Rigid manufacturing standards and exact processes in ISO 9001 quality system certified facilities result in smooth fit up during assembly. Ladders and accessories ship as a package with the tank.



Finished Aquastore sheets are thoroughly inspected and tested throughout the coating process, not just for appearance, but for proper color, thickness and continuity of the glass coverage.



From metallurgic testing to ongoing research in glass enameling formulations, Engineered Storage Products is constantly striving to improve the quality of Aquastore tanks.



AQUASTORE QUALITY STORAGE PRODUCTS.

Fabrication of reliable, durable products requires knowledge, experience and investment. Engineered Storage Products Company has more than a half century of manufacturing glass-fused-to-steel tanks—longer than anyone in the world. We understand the demands of market applications. Our personnel in sales and customer service have a practical awareness of what is important in the field. These demands have been translated into the most comprehensive quality control procedures in the industry.

Raw steel is first tested for physical properties, such as tensile strength and elongation, and chemically analyzed. After

the steel has been decoiled, cut to length, blasted and treated with an anti-corrosion solution, each wall sheet is stamped with an identification number. This serves as a historical tracking mark for its entire service life. Narrow tolerance allowances hold Aquastore parts to rigid standards that are upheld through all subsequent processes. No other manufacturer can match this piece by piece accountability.

The quality of Aquastore glass coatings is well known. We test the glass coated sheets for precise color, proper bubble structure and a complete absence of holidays. The colorimeter, and electronic conductivity test all yield

objective and quantifiable results that demonstrate our coating specifications have been met.

Engineered Storage Products has an established product development and improvement program that contributes to every other phase of production. When research produces quantifiable results, they are incorporated into the manufacturing process. So our customers receive the best product we are capable of producing up to the moment it is shipped.

Engineered Storage Products Company is ISO 9001 quality system certified. The best indication

of the precision of Engineered Storage Products' manufacturing procedures can be seen in the field. The *fit* of Aquastore glass-fused-to-steel bolted panels is amazingly accurate. Customers who have seen other types of fabrication are surprised at how much faster construction of an Aquastore tank is completed.

From the automated manufacturing processes through the stage-by-stage inspection and even down to careful inspection of the glass. Aquastore quality is the best in the industry.

Precision manufacturing requires accurate tools. This 2500 ton press stamps the sidewall sheets and punches the bolt holes in a single stroke operation.



Hardware and Sealants

The hardware and sealants for the assembly of an Aquastore tank are standard with the order. The specific types, such as chlorine resistant sealants or hardware with protective covers, are made for the individual application.



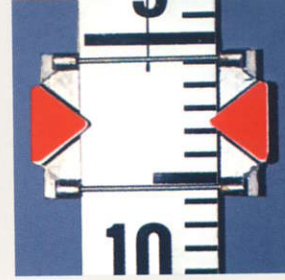
Link Seals

For tanks with floors, the link seal is provided as standard equipment. The link seal fits around the protruding pipe to ensure that the bottom remains watertight.



Stairs & Walkways

Aquastore tank ladders and stairways are constructed of aluminum rails and rungs with hot-dip galvanized cages and step off platforms. Ladders with locking safety cage doors are available.



Level Indicators

Durable and functional, the liquid indicator is a utilitarian option that can be ordered with your Aquastore tank and installed as part of the assembly operation.

STANDARD FEATURES, ACCESSORIES AND OPTIONS.

Despite the complexities of manufacturing and glass coatings, Aquastore tanks are relatively simple to specify. Most projects will define the capacity requirements in the earliest stage. The application and any space limitations will determine the configuration. Once these parameters have been determined, there are only a few decisions left.

The standard features of an Aquastore tank are very basic. They consist of the glass-fused-to-steel sidewall panels, a sidewall manway and the hardware and sealant required to assemble the tank.

Floors and roofs or domes are optional, as are aluminum ladders with cages, ladder door assemblies, level indicators, manway or observation platforms, roof walkways and guard rails, bottom round access doors and the Aquastore cathodic protection system. Your Aquastore Dealer can assist with determining the requirements for your application.

Aquastore's cathodic protection system consists of sacrificial anodes that mitigate corrosion and provide protection to internal submerged surfaces of the tank. ESPC's cathodic protection system is incorporated into the manufacturer's 10-Year Extended

Performance Warranty. The system is simple, robust and requires only minimum inspection and maintenance.

No matter what options you select for your Aquastore tank, the top-down assembly process of the tank requires a system of industrial jacks. Your Aquastore tank will be erected by trained builders. Engineered Storage Products Company holds training sessions for builders, who are sponsored by or who are employees of your authorized Aquastore Dealer insuring a better tank installation.

Ventilators

Aquastore tank ventilators are designed to allow for air exchange during filling and emptying, and are equipped with corrosion-resistant bird and insect screens.

Floors

Glass-coated, bolted steel floors can protect the tank integrity in certain local soil conditions. They can also significantly reduce foundation concrete requirements and simplify installation in remote locations.



Sidewall Manways

Aquastore tank manways, designed in accordance with AWWA D103 Standards, are 24", 30" or 36" in diameter. They are constructed of steel that has been hot-dip galvanized.



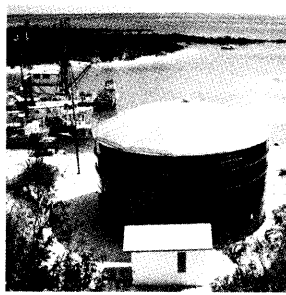
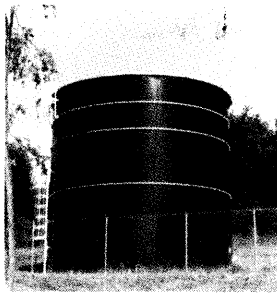
AUTHORIZED AQUASTORE DEALERS AND SALES OUTLETS.

Engineered Storage Products Company delivers Aquastore tanks globally through a network of Authorized Sales Outlets and Aquastore Dealers. These organizations and their representatives are available to discuss your requirements from the inception of the project. Their experience in your region and knowledge of applications can be of valuable assistance during the project development and specification stage. From early planning through construction and commissioning of the tank, your Aquastore Dealer and Authorized Sales Outlet can provide the support services you need. Pricing, sample

foundation layouts, project scheduling, approval drawings and foundation construction are just a few of the areas where dealers can help. They can prepare budget estimates and supply technical information. Authorized Sales Outlets and Aquastore Dealers are trained to provide complete turnkey service. You deal with one source from start to finish, including service after the installation. To locate your Aquastore Dealer, check the map section at www.aquastore.com.



- Firm Quote
- Budget Quote



Date	Quote Due Date	
Inquiry From	Phone	Fax
Email	Job Reference	
Address	Phone	Fax
City	State	Zip

AQUASTORE TANK REQUEST FOR QUOTATION.

PROJECT INFORMATION

Name: _____

Client: _____

Street Address: _____

City _____ State _____ Zip _____

Phone: _____

Fax: _____

E-mail: _____

Date: _____

Temperature Range (°F) (°C) _____

pH Range _____

Specific Gravity _____

Freeboard (inches or millimeters) _____

TANK DATA

Quantity of Tanks _____

Minimum Tank Capacity _____

Tank Diameter _____

Tank Height _____

Job Site _____

Municipal Water Supply

Industrial Wastewater

FLOOR SYSTEM

- Flat Steel Floor
- Concrete Slab Floor

ROOF SYSTEM

- Steel Roof with 25 lbs./sq. ft (100 kg/m²) Live Load
- Steel Roof with ___ lbs./sq. ft (___ kg/m²) Live Load
- Open Top
- Dome with ___ lbs./sq. ft (___ kg/m²) Live Load

TANK DESIGN CODE

- AISC
- AWWA D103
- FM
- NFPA 22
- Other _____ (Specify)

Product Stored: _____

Internal Design Pressure _____ (in. WC) (___ mm WC)

Internal Design Vacuum _____ (in. WC) (___ mm WC)

EQUIPMENT OPTIONS

- Ladder (Aluminum only) with Cage
- Ladder Door Assembly (Anti Climb)
- Level Indicator
- Manway Platform (Tank with Roof)
- Observation Platform (Open Top Tank)
- Roof Manway
- Roof Walkway and Guard Rail
- Gravity Vent (Aluminum only)
- Bottom Round Access Doors
- Cathodic Protection System

INSTRUCTIONS

To complete the Request For Quotation form on the facing page, follow the steps below. Submitting this information will ensure that you will receive a quick and accurate Aquastore tank quotation. Please leave an item blank if you do not know or are uncertain how it should be filled out. We will specify values based on our database for the product stored and the location of the tank(s).

1. Select a Size

Review the capacity chart on the following pages. If there are no height or diameter restrictions, specify the desired capacity and we will select the most economical configuration.

2. Select a Design Specification

AISC is a tank based on American Institute of Steel Construction standards, suitable for all applications. American Water Works Association Standard D103 is a specification for bolted water storage tanks for drinking water supply systems. Factory Mutual (FM) designs are approved for fire protection water storage. National Fire Protection Section 22 is another fire protection water storage standard.

3. Provide Design Requirements

- Product to be stored.
- Internal Design Pressure in Water Column height.
- Internal Design Vacuum in Water Column height.
- Temperature range of the product stored.
- pH of product (neutral water is 7; acids are < 7 and bases are > 7 .)
- Specific gravity of the product stored. (Water is 1.0)

4. Select a Floor System

- A flat steel floor is coated internally and externally with Aquastore glass-fused-to-steel.
- A concrete slab can be utilized as the tank floor. The Aquastore walls are embedded in the slab foundation.

5. Select a Roof System

A steel roof is coated with Aquastore glass-fused-to-steel. The standard roof live load is 25 lbs./sq. ft. (100kg./m²), but a different loading can be specified. Open top tanks will include the wind stiffening commonly used in wastewater treatment and liquid sludge applications.

6. Select the Desired Optional Equipment

- Exterior Aluminum Ladder with cage and grooved, skid resistant rungs meets OSHA regulations.
- Ladder Door Assembly
- Level Indicator- Gauge board type with float
- Roof Manway Platform
- Open Top Observation Platform
- Roof Manway with lockable hasp
- Roof walkway and guard rail for dome and glass coated roof systems
- Gravity vent for most water storage applications
- Bottom round Access Doors to facilitate inspection and maintenance programs.
- Cathodic Protection System—suitable for many applications to further reduce maintenance requirement and extend tank life.



AQUASTORE PROJECT SPECIFICATIONS

SCOPE

The Engineer's selection of factory applied glass-fused-to-steel sectional tank construction for this facility has been predicated upon specific criteria, construction methods and optimum coating for resistance to internal and external tank corrosion. Deviations from the specified design, construction or coating details will not be permitted.

DRAWINGS and SPECIFICATIONS

Construction shall be governed by the Owner's drawings and specifications showing general dimensions and construction details, after written approval by the Engineer of detailed erection drawings prepared by the tank bidder. There shall be no deviation from these drawings and specifications, except upon written order from the Engineer.

Three sets of complete specifications and shop drawings shall be submitted in accordance with the "Drawings and Specifications" section.

A complete set of structural calculations shall be provided for the tank structure.

QUALIFICATIONS of the TANK MANUFACTURER

The bidder shall offer a new tank structure as supplied by Engineered Storage Products Company of DeKalb, Illinois, U.S.A., a manufacturer specializing in the design, fabrication, and erection of factory applied glass-fused-to-steel tanks. The manufacturer shall employ a staff of full time design engineers, own and operate its steel fabrication facilities and glass coat the tank all at one plant location.

Design Criteria (select one)

- American Water Works Association Standard D103 for bolted water storage tanks
- American Institute of Steel Construction
- Factory Mutual (FM) approved designs for fire protection water storage
- National Fire Protection Association Section 22 fire protection water storage
- Other _____

Product Stored: _____

Minimum Capacity: _____

Nominal Tank Diameter: _____

Nominal Tank Sidewall Height: _____

Internal Design Pressure: _____ (in. WC) (mm. WC)

Internal Design Vacuum: _____ (in. WC) (mm. WC)

Temperature Range (°F) (°C): _____

pH Range: _____

Specific Gravity: _____

Freeboard (inches or millimeters): _____

Roof Live Load: _____

Wind Speed: _____

Seismic Zone: _____

Location (job site): _____

MATERIALS

Plates and Sheets

Plates and sheets used in the construction of the tank shell, tank floor (when supplied) and tank roof (when supplied), shall comply with the

minimum standards of the specified code or with AISC, latest edition. Design requirements for mild strength steel shall be ASTM A570 Grade 30, and for high strength steel shall be ASTM A607, Grade 50, both with a maximum allowable tensile stress per design code. The annealing effect created from the glass coated firing process shall be considered in determining ultimate steel strength.

Rolled Structural Shapes

Material shall conform to minimum standards of ASTM A36 or AISI 1010.

Horizontal Wind Stiffeners

Design requirements for intermediate horizontal wind stiffeners shall be of the "web truss" design with extended tail to create multiple layers of stiffener, permitting wind loads to be distributed around the tank. Web truss stiffeners shall be of steel with hot dipped galvanized coating.

Bolt Fasteners

Bolts used in tank lap joints shall be 1/2" - 13 UNC - 2A rolled thread, and shall meet the minimum requirements of AWWA D103, Section 2.2. The finish shall be zinc, mechanically deposited, 2.0 Mils minimum under bolt head, on shank and threads. All lap joint bolts shall be selected such that the threaded portions will not be exposed to the "shear plane" between tank sheets.

Bolt head encapsulation shall consist of high impact, UV stabilized polypropylene copolymer encapsulation of entire bolt head. The bolt head encapsulation shall be certified to meet the ANSI/NSF Standard 61 for indirect additives.

Bolt lengths shall be sized to achieve a neat and uniform appearance. All lap joint bolts shall include a minimum of four (4) splines on the underside of the bolt head at the shank in order to resist rotation during torquing.

Sealants

The lap joint sealant shall be one component, moisture cured, polyurethane compound. The sealant shall be suitable for contact with potable water and shall be certified to meet ANSI/NSF Additives Standard 61 for indirect additives and shall be chlorine resistant up to 50ppm. The sealant shall cure to a rubber-like consistency, have excellent adhesion to the glass coating, low shrinkage and be suitable for interior and exterior use. Neoprene gaskets and tape type sealer shall not be used.

GLASS COATING SPECIFICATION

Surface Preparation

Following the decoiling and shearing process, sheets shall be steel grit-blasted on both sides to the equivalent of SSPC-10. Immediately after blasting, these sheets shall have a water-soluble rust preventative lubrication applied to both sides. This preventative lubricant is applied to the sheets to ensure protection from corrosion during fabrication.

Preparation of Sheet Edges

After initial sheet preparation, all full height vertical wall sheet edges and all rectangular shaped floor sheet edges shall be mechanically beveled to a 45 degree angle and a thermal spray coating of 316 stainless steel shall be applied to the sheet edges to a thickness of .0015"-.005".

The process shall be equal to *EDGECOAT™* by Engineered Storage Products Company. The coating shall be firmly adherent (tensile strength of >1500 psi per ASTM C633).

Cleaning

After fabrication and prior to application of the coating system, all sheets shall be thoroughly cleaned by a caustic wash and hot water rinse process followed immediately by hot air drying. Inspection of the sheets shall be made for traces of foreign matter or rust. Any such sheets shall be re-cleaned or grit-blasted to an acceptable level of quality.

Coating

All sheets shall receive one coat of a glass pre-coat to both sides. Milled glass shall then be applied to the inside of the sheet. This milled glass shall be formulated to produce a finished interior surface with optimum toughness and resistance to conditions normally found in potable water storage tanks. A final cover coat of milled glass shall then be applied to the exterior of the sheet. All glass layers shall be fired at a minimum temperature of 1500°F in strict accordance with the manufacturer's quality process control procedures. Interior dry coating thickness shall be 7 to 18 mils (180 to 460 microns).

Engineered Storage Products Company Coating Grades

COATING	CHARACTERISTICS	APPLICATIONS
Vitrium	3 Coat System TiO ₂ Enriched White Color	Most Liquid Storage
Glass 97	3 Coat System TiO ₂ Enriched White Color	Demanding Liquid Storage
Global Glass	2 Coat System Standard Exterior Glass Cobalt Blue	Dry Product Storage Non-Aggressive Liquid Storage

Factory Inspection

The manufacturer's quality system shall be ISO 9001 certified. Coated sheets shall be inspected for glass coating thickness. Shell sheets and foundation sheets shall be checked for proper curvature. Coated sheets shall be checked for color uniformity by an electronic colorimeter. An electrical leak detection test shall be performed on the inside surface after fabrication of the sheet. Sheets with electrical leakers or pinholes shall be rejected. A part number and steel source number shall be stamped in the upper right corner of every sidewall sheet, prior to glassing.

Packaging

After quality certification, sheets shall be protected from damage prior to packaging for shipment. Heavy paper or plastic foam sheets shall be placed between each panel to eliminate sheet-to-sheet abrasion during

shipment. Individual stacks of panels will be wrapped in heavy duty plastic and steel banded to special wood pallets built to the roll-radius of the tank panels. Shipment will be by truck or, for export shipments, by ocean container.

ERECTION

Field erection of the glass-coated, bolted-steel tank shall be in strict accordance with the procedures and policies outlined in the manufacturer's erection manual and conducted by a certified erection crew. Specialized erection jacks and building equipment developed and manufactured by the tank manufacturer shall be used to erect the tanks.

Prior to a liquid test, all surface areas shall be visually inspected by the Engineer. An electrical leak test shall be performed during erection using a wet sponge nine (9) volt leak detection device. All electrical leak points found on the inside surface shall be repaired in accordance with manufacturer's published touch up procedure. No back fill shall be placed against the tank sidewall without prior written approval and design review of the tank manufacturer. Any backfill shall be placed according to the strict instructions of the tank manufacturer.

Roof

Tanks can include a radially sectioned roof fabricated from glass-coated, bolted steel panels produced by the tank manufacturer, and shall be assembled utilizing the same sealant and bolting techniques as for the sidewall panels, to assure a weather/air tight assembly. The roof shall be clear span and self-supporting. Both live and dead loads shall be carried by the tank walls. The roof shall be of knuckle design, with no rolled angle connection between sidewall and roof panels. The manufacturer shall furnish a roof opening which shall be placed near the outside tank ladder and which shall be provided with a hinged cover and a hasp for locking.

Roofs for tanks greater than 36 ft. diameter shall be constructed of structurally supported flat glass-coated steel sheets or of non-corrugated triangular aluminum panels, firmly sealed and clamped in an interlocking manner to a fully triangulated aluminum space truss system of wide flange extrusions. Alternative roof systems may be specified by the Engineer.

EQUIPMENT and APPURTENANCES

Roof Vent

A properly sized vent assembly in accordance with AWWA D103 shall be furnished and installed above the maximum water level of sufficient capacity so that at maximum design rate of water fill or withdrawal, the resulting interior pressure or vacuum will not exceed 0.5" water column. The vent shall be constructed of aluminum such that the hood can be unbolted and used as a secondary roof access.

Pipe Connections

Where pipe connections pass through tank panels, they shall be field located, saw cut, (acetylene torch cutting or welding is not permitted), and utilize an interior and exterior flange assembly and the tank shell reinforcing shall comply with AWWA D103. A single component urethane sealer shall be applied on any cut panel edges or bolt connections.

Outside Tank Ladder

An outside tank ladder shall be furnished and installed as shown on the contract drawings. Ladders shall be fabricated of aluminum and utilize grooved, skid-resistant rungs. Safety cage and step-off platforms shall be fabricated of galvanized steel. Ladders can be equipped with a hinged lockable entry device.

Access Doors

Access door(s) shall be provided as shown on the contract drawings. The manhole opening shall be a minimum of 24 inches in diameter. The access door (shell manhole) and the tank shell reinforcing shall comply with AWWA D103.

Cathodic Protection

If the option of Cathodic Protection is requested by owner, then the design and specification for such cathodic protection will be the responsibility of the manufacturer. When cathodic protection is specified, electrical continuity between all tank sidewall panels shall be the responsibility of the tank manufacturer.

FIELD TESTING

Hydrostatic

Following completion of erection and cleaning of the tank, the structure shall be tested for liquid tightness by filling tank to its overflow elevation. Any leaks disclosed by this test shall be corrected by the erector in accordance with the manufacturer's recommendations. Water required for testing shall be furnished by the owner at the time of tank erection completion, and at no charge to the tank erector. Disposal of test water shall be the responsibility of the owner. Labor and equipment necessary for tank testing is to be included in the price of the tank erection.

DISINFECTION

If required, the tank structure shall be disinfected by chlorination in accordance with AWWA Standard C652 "Disinfection of Water Facilities" as modified by the tank manufacturer. Disinfection shall not take place until sealant is fully cured as detailed by the manufacturer.

TANK MANUFACTURER'S WARRANTY

The tank manufacturer shall include a warranty for the tank materials and coating. As a minimum this warranty shall provide assurance against defects in material or workmanship. Warranty against the corrosion of the glass-coated surfaces is available with the cathodic protection option.

EXCERPTS FROM:

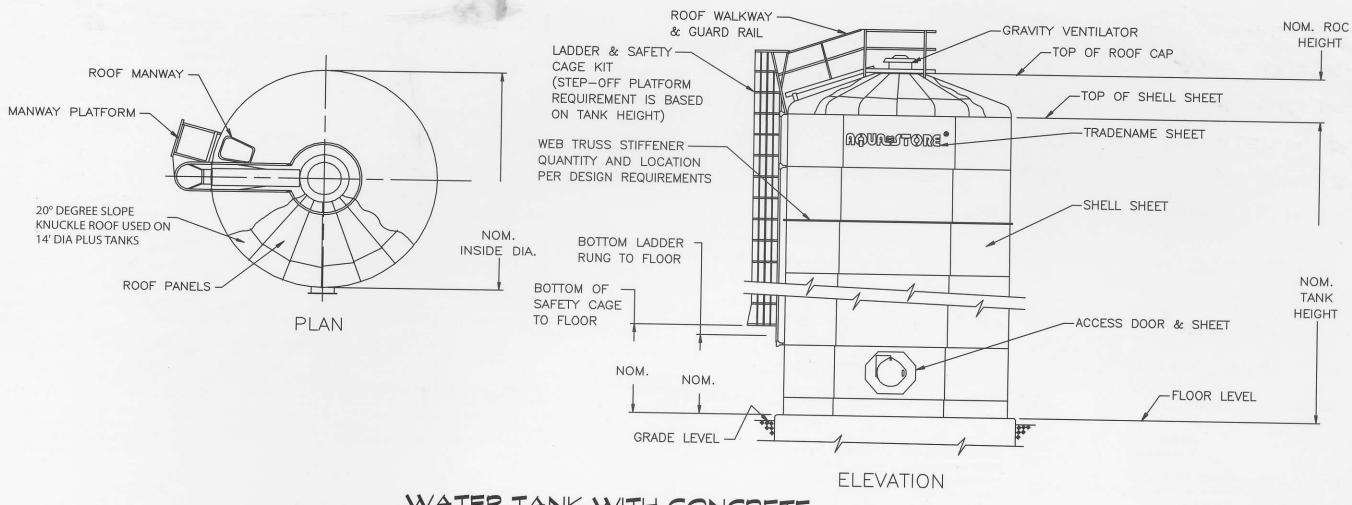
One-Year Warranty

Engineered Storage Products Company warrants that an Aquastore® brand liquid storage tank will be free from defects in workmanship and materials, under normal and proper use, maintenance and operation during the period expiring on the earlier of (i) one year after liquid is first introduced into the tank or (ii) 14 months after shipment from the factory.

10-Year Extended Performance Warranty

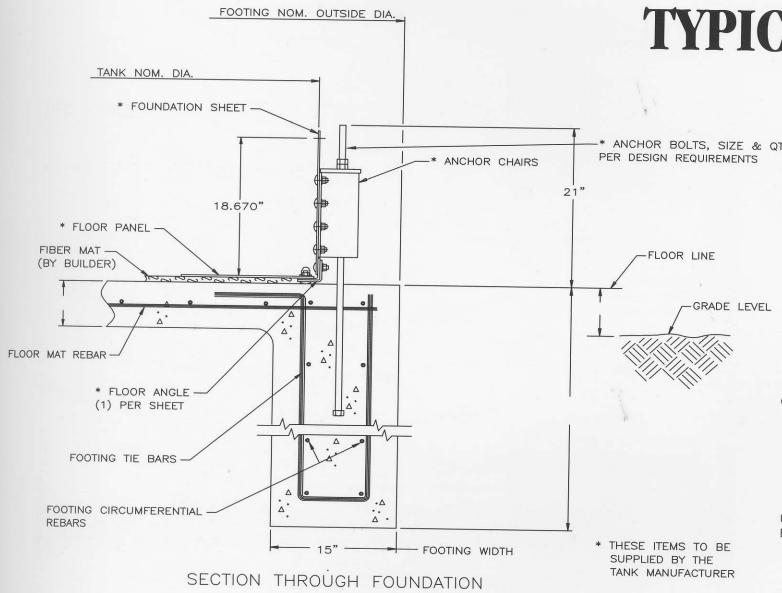
Manufacturer shall further warrant that the glass-coated product zone surfaces (that portion of the tank interior below the normal high elevation of the contained liquid) of a municipal water supply or municipal waste water treatment storage tank will not corrode, under normal and proper use, maintenance and operation, during the period expiring on the earlier of (i) 120 months after liquid is first introduced into the tank or (ii) 122 months after shipment from the factory, if the tank is purchased with an Aquastore brand cathodic protection system.



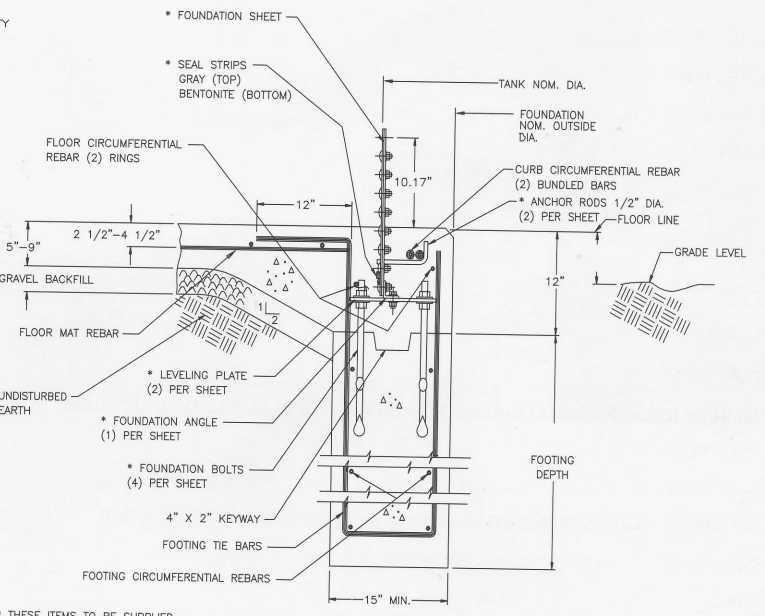


WATER TANK WITH CONCRETE FOUNDATION

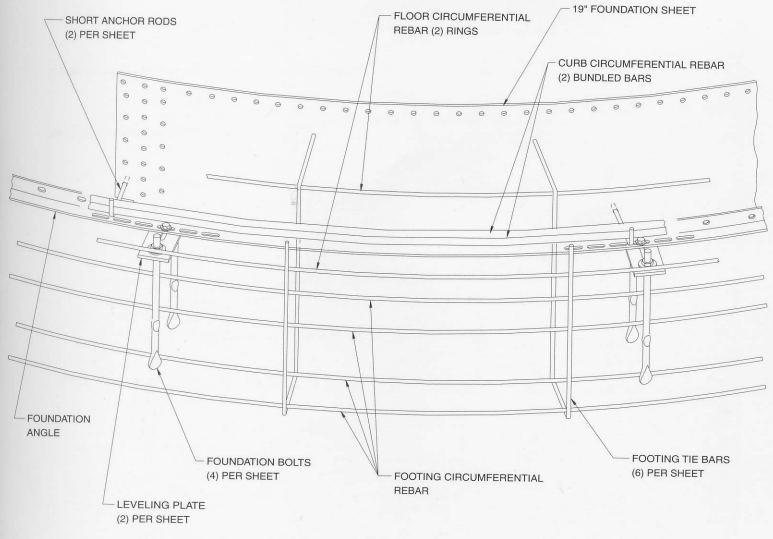
TYPICAL TANK ELEVATION AND PLAN.



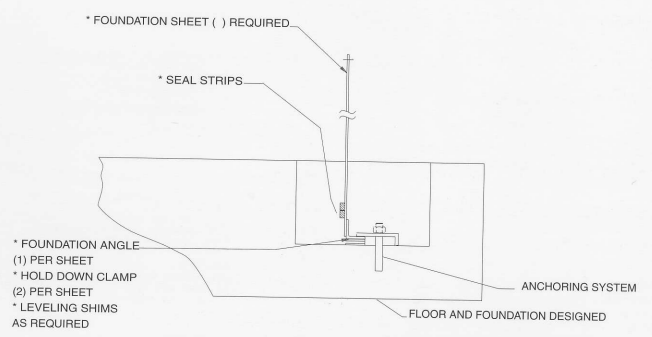
STEEL FLOOR FOUNDATION 11" DIA AND LARGER TYPE.



S.S. FOUNDATION 11" DIA AND LARGER TYPE.

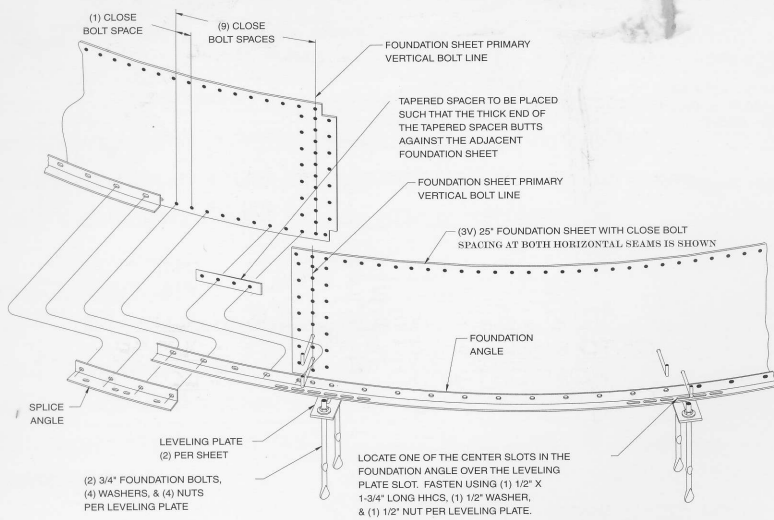


19" FOUNDATION GENERAL REBAR PLACEMENT SHORT STARTER CONCRETE FOUNDATION.

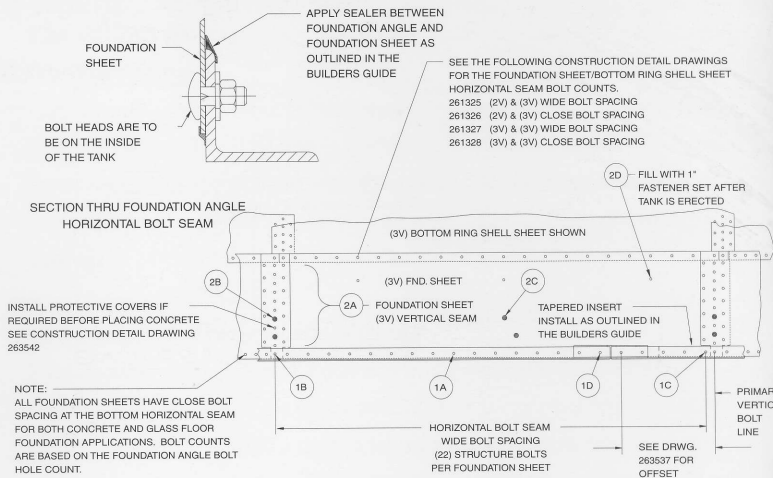


NOTCH FOUNDATION ANCHORING SYSTEM.

FOUNDATION DRAWINGS.

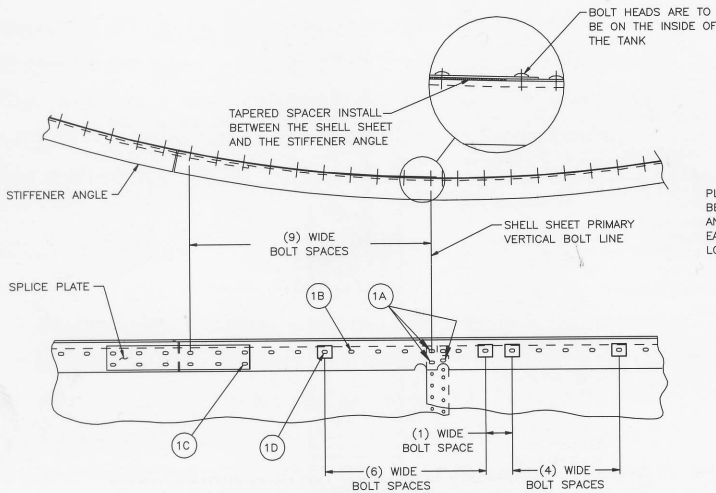


**25' FOUNDATION GENERAL ASSEMBLY
MID STARTER CONCRETE FOUNDATION**

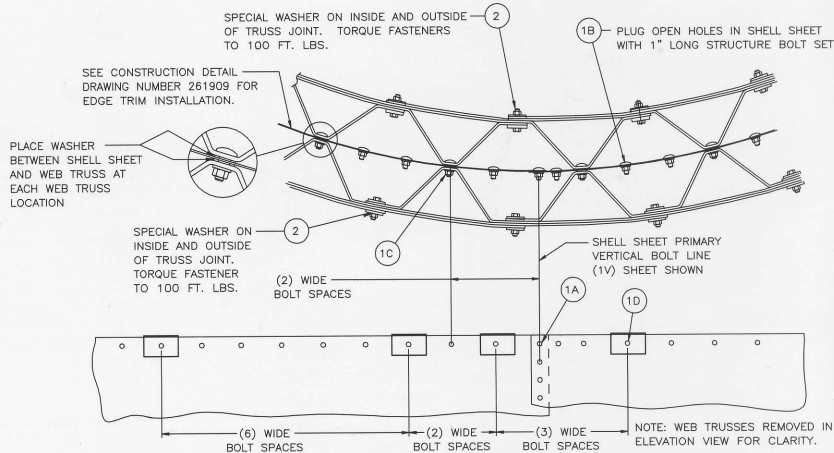


**(3V) 25' FOUNDATION GENERAL ASSEMBLY
MID STARTER CONCRETE FOUNDATION**

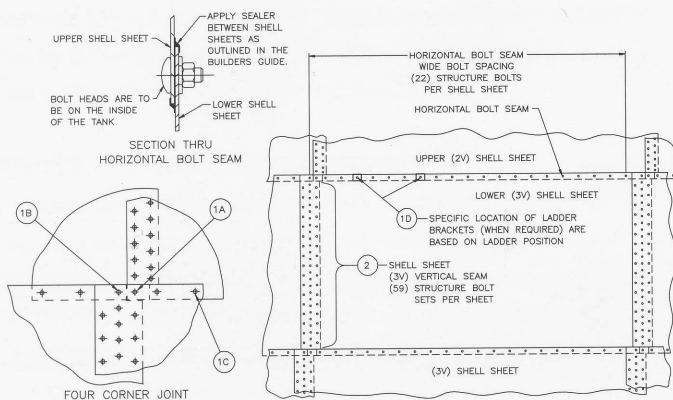
ASSEMBLY DRAWINGS.



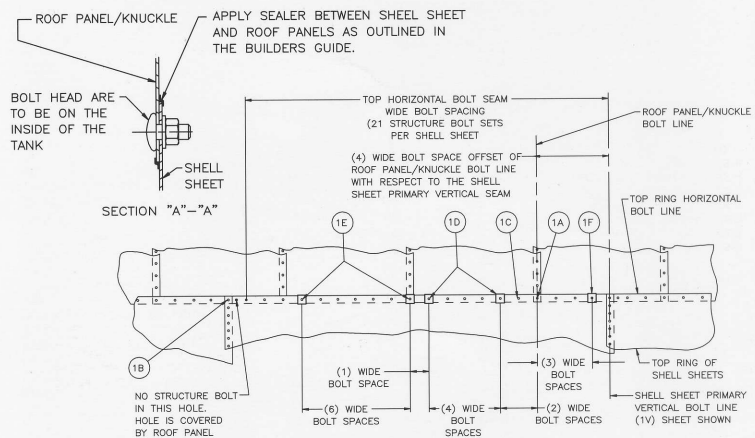
**TOP RING STIFFENER ANGLE
INSTALLATION ONTO
(2V) SHELL SHEET DOMED ROOF**



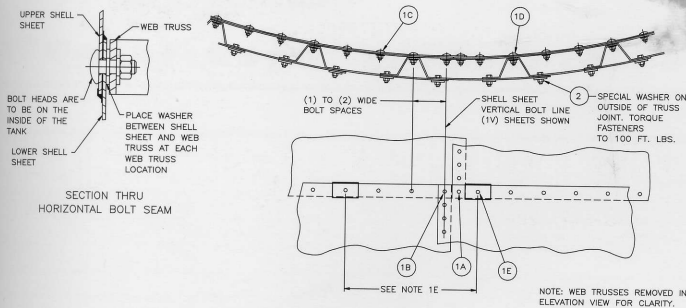
**TOP RING 5-1/2" SHORT WEB TRUSS
INSTALLATION OPEN TANK, WIND LOADING**



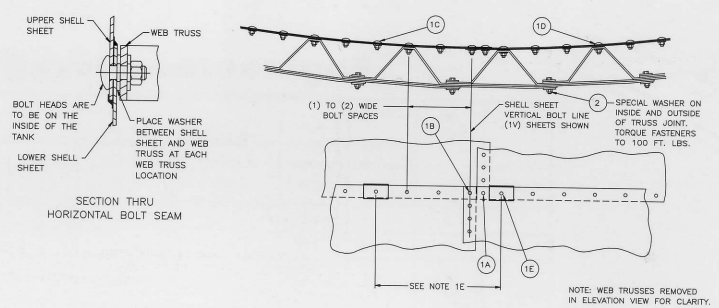
BOLT JOINTS (2V) & (3V) SHELL SHEETS WIDE BOLT SPACING ALL TANK TYPES



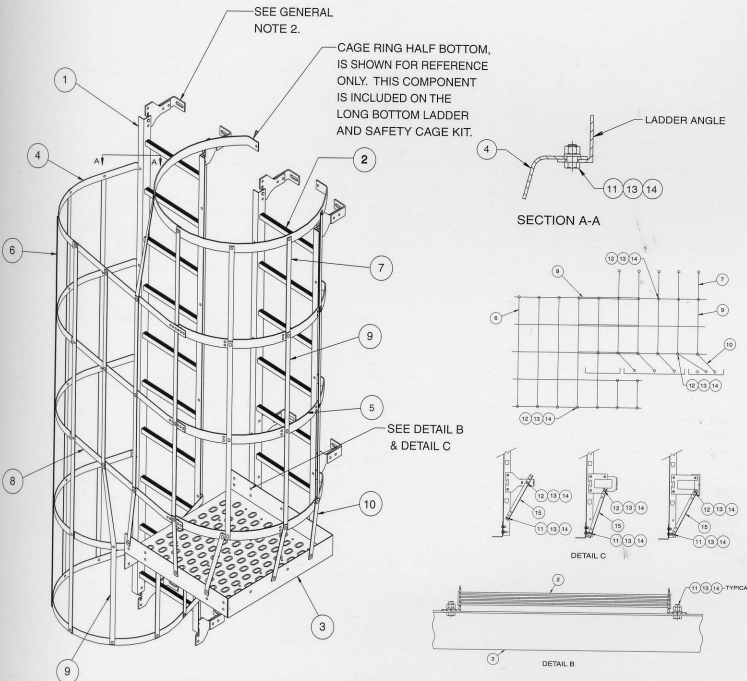
BOLT JOINTS SLOPED ROOF AND SHELL SHEET 20° SLOPED ROOF 14' DIA. PLUS



**3" WEB TRUSS INSTALLATION
ONTO SHELL SHEET WITH WIDE BOLT SPACING
HORIZONTAL BOLT LINE**

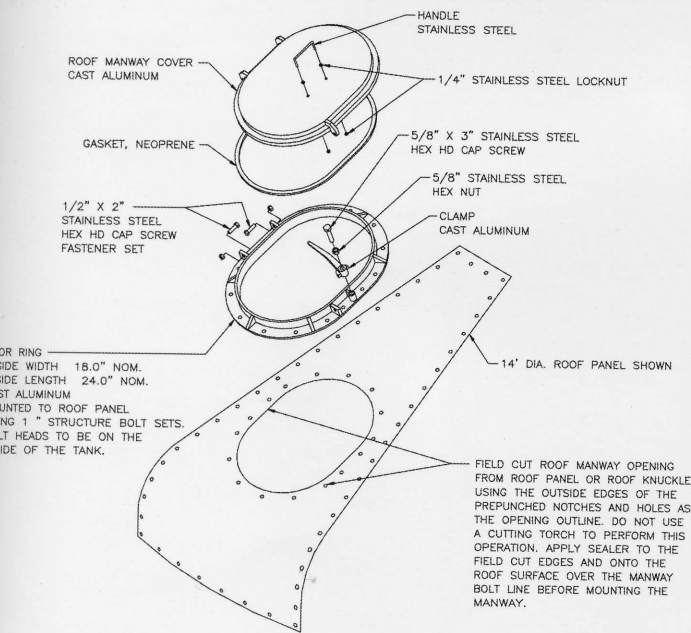


**5-1/2" SHORT WEB TRUSS INSTALLATION
ONTO SHELL SHEET WITH WIDE BOLT SPACING
HORIZONTAL BOLT LINE, WIND LOADING**

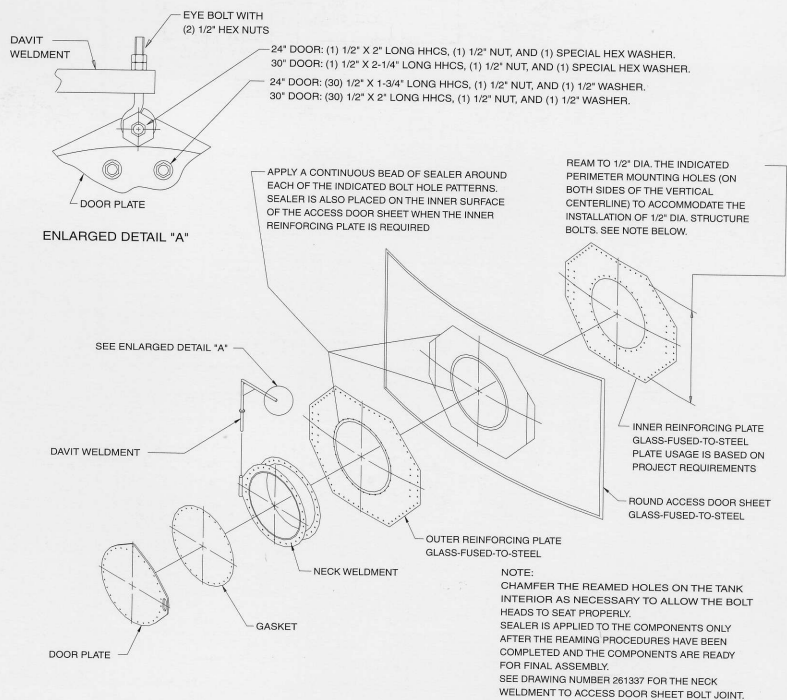


LADDER AND STEP-OFF PLATFORM KIT

ACCESSORIES.



**ROOF MANWAY INSTALLATION
20° SLOPED ROOF 14' DIA. PLUS**

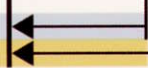


**24" AND 30" ROUND ACCESS DOORS
(W/DAVIT) INSTALLATION GLASS COATED TANKS**

Engineered Storage Products Company **Aquastore™** Tanks

Model Diameter	Sheets	Actual Diameter (feet)	Capacity Per Foot (gallons)	Maximum Water Depth																
				AWWA (feet)	AISC (feet)	6 5.51	10 10.09	15 14.68	19 19.26	24 23.84	28 28.43	33 33.01	38 37.59	42 42.18	47 46.76	51 51.34	56 55.92	61 60.51		
11	4	11.19	736	139.0	139.0	4	7	10	14	17	20	24	27	31	34	-	-	-		
14	5	13.98	1,148	139.0	139.0	6	11	16	22	27	32	37	43	48	53	58	64	69		
17	6	16.78	1,654	139.0	139.0	9	16	24	31	39	47	54	62	69	77	84	92	100		
20	7	19.58	2,252	139.0	139.0	12	22	33	43	53	64	74	84	94	105	115	125	136		
22	8	22.37	2,940	138.6	139.0	16	29	43	56	70	83	97	110	123	137	150	164	177		
25	9	25.17	3,722	123.2	139.0	20	37	54	71	88	105	122	139	156	174	191	208	225		
28	10	27.97	4,596	110.9	131.0	25	46	67	88	109	130	151	172	193	214	235	257	278		
31	11	30.77	5,562	100.8	119.0	30	56	81	107	132	158	183	209	234	260	285	311	336		
34	12	33.56	6,617	92.4	109.1	36	66	97	127	157	188	218	248	279	309	339	370	400		
36	13	36.36	7,767	85.3	100.7	42	78	113	149	185	220	256	291	327	363	398	434	469		
39	14	39.16	9,009	79.2	93.5	49	90	132	173	214	256	297	338	379	421	462	503	545		
42	15	41.96	10,343	73.9	87.3	57	104	151	199	246	294	341	388	436	483	531	578	625		
45	16	44.75	11,765	69.3	81.9	64	118	172	226	280	334	388	442	496	550	604	657	711		
48	17	47.55	13,283	65.2	77.0	73	134	194	255	316	377	438	499	560	621	681	742	803		
50	18	50.35	14,893	61.6	72.8	82	150	218	286	355	423	491	559	628	696	764	832	901		
53	19	53.15	16,596	58.3	68.9	91	167	243	319	395	471	547	623	699	775	852	928	1,004		
56	20	55.95	18,390	55.4	65.5	101	185	269	354	438	522	607	691	775	859	944	1,028	1,112		
59	21	58.74	20,270	52.8	62.4	111	204	297	390	483	576	669	761	854	947	1,040	1,133	1,226		
62	22	61.54	22,249	50.4	59.5	122	224	326	428	530	632	734	836	938	1,040	1,142	1,244	1,324		
64	23	64.34	24,319	48.2	56.9	134	245	356	468	579	691	802	914	1,025	1,137	1,248	1,360	1,384		
67	24	67.13	26,474	46.2	54.6	145	267	388	509	631	752	873	995	1,116	1,237	1,359	1,444			
70	25	69.93	28,729	44.3	52.4	158	289	421	553	684	816	948	1,079	1,211	1,343	1,474	1,504			
73	26	72.73	31,076	42.6	50.4	171	313	456	598	740	883	1,025	1,168	1,310	1,453	1,565				
76	27	75.53	33,514	41.1	48.5	184	338	491	645	799	952	1,106	1,259	1,413	1,567	1,625				
78	28	78.32	36,036	39.6	46.8	198	363	528	694	859	1,024	1,189	1,354	1,519	1,684					
81	29	81.12	38,659	38.2	45.2	213	390	567	744	921	1,098	1,276	1,453	1,630	1,745					
84	30	83.92	41,374	37.0	43.6	228	417	607	796	986	1,176	1,365	1,555	1,744	1,805					
87	31	86.72	44,180	35.8	42.2	243	445	648	850	1,053	1,255	1,458	1,660	1,863						
90	32	89.51	47,069	34.6	40.9	259	475	690	906	1,122	1,337	1,553	1,769	1,926						
92	33	92.31	50,060	33.6	39.7	275	505	734	964	1,193	1,422	1,652	1,881	1,986						
95	34	95.11	53,143	32.6	38.5	292	536	779	1,023	1,267	1,510	1,754	1,997	2,046						
98	35	97.91	56,318	31.7	37.4	310	568	826	1,084	1,342	1,600	1,858	2,106							
101	36	100.70	59,573	30.8	36.4	328	601	874	1,147	1,420	1,693	1,966	2,166							
104	37	103.50	62,932	30.0	35.4	346	635	923	1,212	1,500	1,788	2,077	2,227							
106	38	106.30	66,383	29.2	34.5	365	670	974	1,278	1,582	1,887	2,191	2,287							
109	39	109.10	69,926	28.4	33.6	385	705	1,026	1,346	1,667	1,987	2,308	2,347							
112	40	111.90	73,562	27.7	32.7	405	742	1,079	1,416	1,753	2,091	2,408								
115	41	114.69	77,276	27.0	31.9	425	780	1,134	1,488	1,842	2,196	2,468								
117	42	117.49	81,095	26.4	31.2	446	818	1,190	1,561	1,933	2,305	2,528								
120	43	120.29	85,006	25.8	30.5	468	858	1,247	1,637	2,026	2,416	2,588								
123	44	123.09	89,010	25.2	29.8	490	898	1,306	1,714	2,122	2,530	2,648								
126	45	125.89	93,105	24.6	29.1	513	939	1,366	1,793	2,219	2,646	2,709								
129	46	128.68	97,278	24.1	28.5	536	981	1,427	1,873	2,319	2,765									
131	47	131.48	101,557	23.6	27.9	559	1,025	1,490	1,955	2,421	2,829									
134	48	134.27	105,913	23.1	27.3	583	1,069	1,554	2,039	2,525	2,889									
137	49	137.07	110,376	22.6	26.7	608	1,114	1,619	2,125	2,631	2,949									
140	50	139.87	114,932	22.2	26.2	633	1,160	1,686	2,213	2,740	3,009									
143	51	142.67	119,580	21.7	25.7	659	1,207	1,755	2,303	2,851	3,070									
145	52	145.46	124,302	21.3	25.2	685	1,254	1,824	2,394	2,963	3,130									
148	53	148.26	129,134	20.9	24.7	711	1,303	1,895	2,487	3,078	3,190									
151	54	151.06	134,057	20.5	24.2	738	1,353	1,967	2,581	3,196	3,250									
154	55	153.86	139,073	20.2	23.8	766	1,403	2,041	2,678	3,310										
157	56	156.66	144,181	19.8	23.4	794	1,455	2,116	2,776	3,371										
159	57	159.46	149,381	19.4	23.0	823	1,507	2,192	2,877	3,431										
162	58	162.26	154,673	19.1	22.6	852	1,561	2,270	2,979	3,491										
171	61	170.65	171,082	18.2	21.5	942	1,726	2,510	3,295	3,672										
179	64	179.04	188,318	17.3	20.5	1,037	1,900	2,763	3,627	3,852										
187	67	187.43	206,381	16.5	19.5	1,137	2,083	3,029	3,974	4,033										
193	69	193.03	218,898	16.1	19.0	1,206	2,209	3,212	4,153											
201	72	201.42	238,340	15.4	18.2	1,313	2,405	3,498	4,334											
210	75	209.81	258,609	14.8	17.5	1,425	2,610	3,795	4,514											
218	78	218.20	279,712	14.2	16.8	1,541	2,823	4,105	4,695											
227	81	226.59	301,642	13.7	16.2	1,662	3,044	4,427	4,876											
235	84	234.99	324,399	13.2	15.6	1,787	3,274	4,761	5,056											
243	87	243.38	347,984	12.7	15.1	1,917	3,512	5,107	5,237											

TANK CAPACITY RANGES
 Aquastore AWWA
 Aquastore AISC



Capacity Chart (US Gallons X 1000)

Model Sidewall Height Actual Sidewall Height (feet)	70	75	79	84	89	93	98	102	107	112	116	121	125	130	134	139
6	70.33	74.92	79.50	84.08	88.66	93.25	97.83	102.41	107.00	111.58	116.16	120.75	125.33	129.91	134.49	139.08
5	80	86	91	96	101	107	112	117	122	128	133	138	143	149	154	159
8	116	123	131	139	146	154	161	169	176	184	192	199	207	214	222	229
8	158	168	179	189	199	210	220	230	240	251	261	271	282	292	302	313
9	206	220	233	247	260	274	287	301	314	328	341	354	368	381	395	408
4	261	278	295	312	329	347	364	381	398	415	432	449	466	483	500	517
2	323	344	365	386	407	428	449	470	491	512	533	554	576	597	601	
5	391	416	442	467	493	518	544	569	595	620	646	662				
5	465	495	526	556	586	616	647	677	707	722						
0	546	581	617	653	688	724	759	782								
2	633	674	716	757	798	840	842									
0	727	774	822	869	902											
3	827	881	935	962												
3	934	995	1,023													
9	1,047	1,083														
1	1,143															
4																
6																

1. 100 mph wind speed
2. 25 psf live snow load
3. Seismic zone 0
4. Specific gravity 1.0 @ STP
5. Structure Height Limitations:
Local Soil Conditions & Construction Techniques

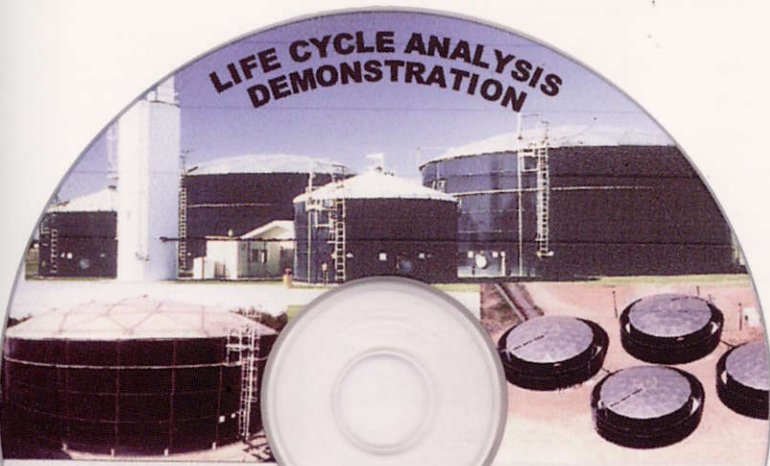
AQUASTORE TANK CAPACITIES.

6. AWWA Designates AWWA D103-97
7. Model Number => Model Diameter & Model Height
Model Number 4228 => 42' diameter & 28' height
8. For steel floor option:
Add 0.678' x Capacity Per Foot (gallons) to capacities listed for tanks
9. No Freeboard Allowance except in the shaded yellow color or where the freeboard is variable

LIFE CYCLE COST

Refer to back page for details of live new life cycle analysis programs

LIFE CYCLE ANALYSIS DEMONSTRATION



1. Place CD in drive, await window "Pack and Go Setup"
2. Hit "OK"
3. Hit "Yes"
4. Window - successful installation - hit "Yes"

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