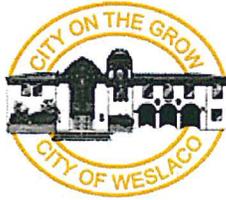


City of Weslaco

"The City on the Grow"



David Suarez, Mayor
John F. Cuellar, Mayor Pro-Tem, District 2
David R. Fox, Commissioner, District 1
Olga M. Noriega, Commissioner, District 3
Gerardo "Jerry" Tafolla, Commissioner, District 4
Lupe V. Rivera, Commissioner, District 5
Fidel Peña, Commissioner, District 6

Leonardo Olivares, City Manager

CITY OF WESLACO Invitation to Bid

The City of Weslaco hereby requests sealed bids for the following:

FIBERGLASS, DOUBLE-WALL, CHEMICAL STORAGE TANKS RFB No.: 2013-14-21

Sealed bids addressed to Homer Rhodes, will be accepted at the Weslaco City Hall Purchasing Office, 255 S. Kansas Avenue, Weslaco, Texas 78596, until **3:00 p.m.** on **September 24, 2014**, at which time they will be opened and read aloud. Please mark envelope, **"SEALED BID"**

FIBERGLASS, DOUBLE-WALL, CHEMICAL STORAGE TANKS RFB No.: 2013-14-21

Potential Bidders/Respondents are advised that the bidding documents can be downloaded from the City of Weslaco web page address: www.weslacotx.gov, and may also be secured at the Weslaco City Hall Purchasing Office, 255 S. Kansas Avenue, Weslaco, Texas 78596, or by calling 956.447.2240. Be advised that if your company is contemplating on bidding this project you must contact the Purchasing Office, so that any changes/additions via addendum form can be forwarded to your company. (Please include your company name, address, e-mail, telephone and fax, and contact person). **No electronic bids will be accepted.**

The City of Weslaco reserves the right to accept or reject any or all bids, to waive any informalities, and to accept the bid to be the best and most advantageous to the City and to hold bids for a period of forty-five (45) days without taking action, for the purpose of reviewing the bids and investigation of bidders' qualifications prior to bid award. Bids submitted past the aforementioned date and time will not be accepted.

City of Weslaco
Homer Rhodes,

A handwritten signature in blue ink that reads "Homer Rhodes". The signature is fluid and cursive, written over the printed name.

Purchasing Office
hrhodes@weslacotx.gov

VENDOR'S NOTICE OF INTENT TO SUBMIT A BID

If you intend to submit a bid for:

FIBERGLASS, DOUBLE-WALL, CHEMICAL STORAGE TANKS RFB No.: 2013-14-21
with the City of Weslaco as outlined in the specifications, please indicate your intention by signing, dating, and returning this form to the address below prior to **September 19, 2014**, so that you may receive any addendums to the specifications should the need arise.

**Homer Rhodes
Buyer II
City of Weslaco
Purchasing Department
255 S. Kansas
Weslaco, Texas 78596
Phone :(956) 447-2240
Fax: (956) 969-8452
hrhodes@weslacotx.gov**

Name: _____ (print)	Signature: _____
Title: _____	Company/Agency: _____
Mailing Address: _____	City/State/Zip: _____
Phone: _____	Fax: _____
Email: _____	

RFP No.: 2013-14-21



"The City on the Grow"

FIBERGLASS, DOUBLE-WALL, CHEMICAL STORAGE TANKS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and install, field test, complete and make ready for service one vertical, double-wall, fiberglass reinforced plastic (FRP) tank for the bulk storage of hydrochloric acid, as specified herein.
- B. Coordinate the location of tank accessories with City prior to shop drawing review to ensure they are adequate for installation.

1.02 RELATED WORK

- A. This tank is being supplied as part of work performed for the City by Others. All connections to tank shall be done by others.

1.03 SUBMITTALS

- A. Submit shop drawings. For shop drawings, submit one electronic copy of each item in pdf format. Shop drawings shall show details of construction and erection as follows:
 - 1. Dimensions of tank
 - 2. Wall thicknesses (shell, head and base).
 - 3. Schedule (orientation and elevations) of fittings, anchor bolts, attachments and joints.
 - 4. Width and thickness of joint overlays.
 - 5. Resin used and complete description of chemical resistance for all materials that will come in contact with chemical stored, including a statement from the resin manufacturer that the materials used are suitable for the intended service.
 - 6. Weight of tanks.
 - 7. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction. Include complete resin system information.
 - 8. Design calculations and inspection records. Design calculations shall be stamped and sealed by a Professional Engineer registered in the State of Texas, and will be for record only. As a minimum, calculations shall demonstrate that each tank will adequately transfer forces from the main vessel to the anchor bolts at the foundation.
 - 9. Statement that design, engineering calculations and fabrication are in accordance with this Section, all applicable ASME standards, including ASME RTP-1 and the building code.
 - 10. The manufacturer shall furnish a copy of their "Certificate of Authorization" (ASME accreditation). Alternately, the manufacturer shall submit confirmation that the Manufacturer's Laminating Process is certified by FRPI.

11. When a sloped bottom is specified, shop drawings submitted for approval shall provide details illustrating how the bottom is constructed. These details shall reflect construction requirements specified. Calculations or literature shall also be submitted demonstrating the core material used to accomplish the slope is suitable for the compressive loads resulting from the tank weight in a fully flooded and otherwise loaded state.
12. Written instructions for handling, storage and installation of tanks. These instructions shall include bolt torque values and detailed instructions for pipe connections.
13. Installation list of tanks with similar applications and comparable size. The list shall include project site location, date of installation and contact person's name and phone number of each reference. The list shall demonstrate the fabricator has a minimum of ten years of experience with the manufacture of fiberglass tanks as specified in this Section.
14. If there is a discrepancy between this specification and the ASME RTP-1 standard, the Engineer shall be notified during the submittal process and the Engineer will provide clarification and direction.
15. Statement that all hydrostatic tests have been performed after installation of fittings
16. Submit an equation and tabulated data that calculates and lists liquid volume as a function of depth. Provide the following information:
 - a. Number of gallons per inch of depth
 - b. Number of gallons per foot of depth
 - c. Total tank gallons
 - d. Usable gallons between the bottom of the tank suction pipe and the bottom of the overflow pipe
 - e. Distance in inches between the bottom of tank suction pipe and bottom of overflow pipe.
17. Proposed payment terms, including percentages at shop drawing approval, completion of shop fabrication, and completion of final assembly.

B. Samples

1. Representative laminate samples of both the cylindrical shell and the heads shall be furnished. These samples shall be from plant production and shall be representative of actual construction, workmanship, appearance and surface hardness of tanks to be furnished. The City may reject any tank which does not meet the standard of the representative samples.

C. Quality Control Submittals

1. Qualifications of manufacturer's quality assurance supervisor.
2. Copy of manufacturer's quality assurance program.
3. Quality Control Inspection Report, prepared by manufacturer's quality assurance supervisor. The report shall include, as minimum:

- a. The names of production personnel who worked on the tank.
 - b. The type and quantity of materials used for the tank construction.
 - c. The visual inspection results for individual components taken before and after assembly.
4. Factory Test Report, prepared by manufacturer's quality assurance supervisor, including certification by signature of results.
 5. Field Inspection and Test Report, prepared manufacturer's shop inspector.
 6. Manufacturer's Certificate of Proper Installation in accordance with manufacturer's written recommendations

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C581—Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass Fiber Reinforced Structures, Intended for Liquid Service
2. ASTM C582 – Standard Specification for Contact-Molded Reinforced Thermosetting Plastics (RTP) for Corrosion-Resistant Equipment.
3. ASTM D638 – Standard Test Method for Tensile Properties of Plastics
4. ASTM D695 – Standard Test Method for Compressive Properties of Rigid Plastics
5. ASTM D883 – Standard Terminology Relating to Plastics.
6. ASTM D2563 - Standard Practice for Classifying Visual Defects in Glass-Reinforced Plastic Laminate Parts.
7. ASTM D2583 – Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
8. ASTM D2584 - Standard Test Method for Ignition Loss of Cured Reinforced Resins.

B. American Society of Mechanical Engineers (ASME)

1. ASME RTP-1 – Standard for Reinforced thermoset Plastic Corrosion Resistant Equipment.

C. Occupational Safety and Health Administration (OSHA)

D. Fiberglass Reinforced Plastics Institute (FRPI)

1. FRPI SP9000 – Standard Practice for Laminating Process Certification
2. FRPI SP9100 – Standard Practice for Laminate Certification

- E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. The tank shall meet the requirements of ASME RTP-1.
- B. Tank manufacturer shall also meet or provide services that meet the following requirements:
 - 1. Manufacturer's Quality Assurance Supervisor. This employee shall have at least ten (10) years of experience in the FRP industry.
- C. The fiberglass tanks shall be manufactured by
 - 1. Augusta Fiberglass, Blackville, South Carolina;
 - 2. Belco Manufacturing Company, Belton, TX;
 - 3. Or approved equal.
- D. FRP tank manufacturer shall not subcontract all or any portion of the FRP tanks specified in this Section.

1.06 SYSTEM DESCRIPTION

- A. The fiberglass tank shall be designed for the following:
 - 1. Hydrochloric Acid Tank
 - a. Number of tanks 1
 - b. Inner Diameter 10'
 - c. Outer Diameter 10'6"
 - d. Straight Shell Height 11'9" (approximate)
 - e. Overall Height 12' (approximate)
 - f. Volume 6,000 gallons
 - g. Chemical 15% hydrochloric acid
 - h. Specific gravity 1.08
 - i. Top Dished
 - j. Bottom Internal sloped bottom to the drain / external flat bottom
 - k. Mounting Onto a flat concrete slab
- B. The fiberglass tanks shall meet the requirements shown in the FRP Chemical Tank Schedules of this section.

1.07 DELIVERY, STORAGE AND HANDLING

- A. The CITY shall require the manufacturer to assume responsibility for packaging to prevent damage to the tanks during normal transit and handling.
- B. Flange faces shall be protected from damage. All openings shall be covered with a minimum 1/2-in thick wooden blind flange secured in place with steel fasteners to prevent entrance of dirt, water and debris.
- C. Tanks shall be mounted on padded cradles, skids or protective framework so constructed as to provide for easy handling for crane, fork truck or similar device and be provided with lifting lugs, cleats, etc., to permit proper handling in accordance with manufacturer's instructions. Nozzles, manholes, or other fittings shall not be used for lifting.
- D. Tanks shipped horizontally shall be supported by cradles supporting 120 degrees of the tank circumference.
- E. Instructions shall be provided for unloading and installation of the tanks.
- F. Any components or other pieces shall not be placed inside the tanks during shipping. Internal cross bracing shall be provided.

1.08 WARRANTY

- A. The manufacturer shall warrant in writing that the equipment furnished is appropriate for the intended service and shall be free of manufacturing and fabrication defects in design, material and workmanship for a period of 12 months from shipment.
- B. The equipment shall be warranted to be free from defects in workmanship, design, or material. If the equipment should fail during the warranty period due to a defective part(s), it shall be replaced and the unit restored to service at no expense to the OWNER.
- C.

PART 2 PRODUCTS

2.01 GENERAL

- A. The use of a manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.
- B. Like items of materials, equipment shall be the end products of one manufacturer in order to provide standardization for appearance, operation, maintenance, spare parts and manufacturer's service.
- C. Anchor bolts or hold-down devices shall be sized and provided by the manufacturer. Unless otherwise specified, anchor bolts or hold down devices shall be constructed of Type 316 stainless steel.
- D. Design of FRP equipment for fabrication under these specifications shall be provided by the manufacturer. The design shall allow for the most severe combinations of conditions in accordance with ASME RTP-1 requirements. Design calculations will become part of each

design package. Where applicable, calculations shall include but are not limited to the following considerations:

1. Internal pressure
2. External pressure
3. Design and upset temperatures
4. Thermal gradient
5. Static head
6. Accessory loads (handrails, mixers, platforms, etc.)
7. Transportation and erection loads
8. Stiffener rings
9. Wind, seismic, and snow loading
10. Flange thickness
11. Secondary bond overlays
12. Unsupported span (pipe)
13. Hold-down flanges, lugs, or ring supports
14. Knuckle radius of bottom
15. Compressive loading
16. Thermal expansion stresses
17. Internal supports
18. Live loads

2.02 LAMINATE MATERIALS

A. Resin:

1. The resin used shall be a commercial grade, corrosion resistant thermoset that has been evaluated in a laminate in accordance with ASTM C-581 and has been determined by previous documented service to be acceptable for the service conditions.
2. The same premium grade resins shall be used throughout the entire wall section of each tank.
 - a. The resins used for the corrosion barrier shall not contain pigments, dyes, colorants, or fillers. Neither thixotropic agents nor antimony trioxide shall be used in the corrosion barrier.

- b. A thixotropic agent that does not interfere with visual inspection of laminate quality, or with the required corrosion resistance of the laminate, may be added to the exterior layer for viscosity control. The manufacturer shall obtain approval from the manufacturer of the resin prior to using a thixotropic agent and to ensure that the addition of the thixotropic agent will not reduce the resistance of the laminate to corrosive chemical environment.
- c. Resin pastes made from the same resin used for the corrosion barrier will be permitted for use in filling crevices before overlay provided the use is within the requirements of ASME RTP-1.
- d. A pigmented exterior gel coat shall be added to the exterior surface for improved weather resistance

B. Reinforcement:

1. Chopped Strand Mat: Chopped strand mat shall be constructed from chopped E-type glass strands bonded together using a resinous binder. The strands shall be treated with a sizing that is chemically compatible with the resin system used.
2. Continuous Roving: Continuous roving shall be E-type glass fiber with a sizing that is chemically compatible with the resin system used.

C. The inner corrosion barrier of the tank for hydrochloric acid service shall be fabricated with a resin rich barrier using the following resin/catalyst system:

1. The resin rich barrier for the tank shall consist of 1 layer of 10 mil C glass on the process side followed by two layers of 10 mil synthetic surfacing veil with resin applied to maintain a ratio of 90 percent resin to 10 percent glass, plus or minus 5 percent. The resin rich barrier shall be a minimum of 30 mil total thickness.
2. The synthetic, non-hydrophilic polyester surfacing veil shall be Nexus as manufactured by Burlington Industries., Style 100-10 Apertured 1.5 oz. Dacron polyester fiber 12-16 mils thick.
3. The resin shall be Vinyl Ester and shall be Derakane 411 or Hetron 922 by Ashland Chemical, Dion VER 9100 by Reichhold Chemical, or F010 by AOC. There shall be no additives in the resins used for the corrosion barrier.
4. The cure system for the corrosion liner shall be MEKP catalyst system. The BPO catalyst shall be applied using a volume control mechanism. DMA shall be added to the resin prior to mixing at the gun tip with pumped BPO. Uncontrolled application of DMA via the process of diluting with styrene is specifically prohibited.

D. All joints shall be overlapped a minimum of 2-in. Overlapped joints shall be staggered to promote structural integrity. In all layers, the veil or glass shall be rolled into the resin with each layer separately rolled out.

E. The inner corrosion barrier shall be followed by not less than two layers of 1-1/2- or 2-oz chopped strand, (E-CR) (E) glass mat, minimum 0.086-in thick for the tank shell and top head and five layers of 1-1/2- or 2-oz chopped strand, (E-CR) (E) glass mat, minimum 0.215-in thick for the tank bottom head. The layers shall have 25 to 30 percent of glass content.

- F. The inner corrosion barrier plus the two mat layers shall have a minimum total thickness of 0.116-in for the tank shell and top head and the five mat layers shall have a minimum total thickness of 0.245-in for the flat bottom head. The entire liner shall be completely cured before the structural layers are applied. This thickness shall not be included in the structural laminate thickness calculations.
- G. The structural layer shall be of additional fiberglass laminates to achieve the desired thickness using Type E-glass, and shall have a glass content of 50 percent. The resin shall be a brominated vinylester such as Derakane 510A by Dow Chemical; Dion VER 9300FR by Reichhold Chemical, or Hetron FR992 by Ashland Chemical. Resin shall have a Class I flame spread rating with the addition of 3 percent antimony trioxide or 7.5 percent antimony pentoxide. The cure system in the structural layer shall be MEKP. Care shall be taken to avoid excessive laminate exotherm.
- H. The structural layer shall consist of alternate layers of resin saturated woven roving and chopped strand mat. The chopped strand mat shall have non-continuous glass strands with a maximum length of 2.0-in. The use of "Fab Mat" or knitted reinforcements will not be permitted in any portion of the tank fabrication.
- I. In addition to the above requirements, the tanks shall have an average glass content of at least 35 percent by weight per ASTM D2584.
- J. The outer tank surface shall consist of a layer of C glass surfacing veil not less than 10 mils thick. The resin shall be as described in Paragraph C above and shall be applied to maintain a ratio of 90 percent resin to 10 percent glass.
- K. Outside finish shall be a parafinized topcoat containing an ultra violet absorber. The absorber used shall not inhibit resin cure. A pigment shall be applied to the exterior gel coat. The outer surface and top coat shall be pigmented a white color..
- L. All exposed edges or ends of fittings, covers, flanges, nozzles, and appurtenances shall be covered with resin finish coat used in the inner corrosion barrier as specified in paragraph 2.02 C above, and containing parafinized wax. In addition, any exposed joints between the tank walls or top and fittings shall be covered with the same corrosion barrier as described in above.
- M. All tanks and FRP accessories shall be post cured at the tank manufacturer's facility. The success of the post-cure process shall be the responsibility of the tank manufacturer. The cure system used shall be in accordance with the resin manufacturer's current recommendations. The procedures outlined below are provided as minimum requirements only.
 - 1. Post curing shall be conducted with dry heat by curing oven or forced hot air such that both the interior and exterior laminate surfaces are exposed to the same hot air temperatures. Placing equipment in sunlight or steam into the equipment and/or around it while under a tarp, placing the equipment under electric salamanders or heat lamps are not acceptable means of post curing will not be permitted.
 - 2. Post curing ovens/structures shall be equipped with time/ temperature recording devices such that the temperatures are logged. A continuous record or chart of curing air temperatures shall be made available for review by the Engineer prior to shipment of the tanks.
 - 3. Manufacturer shall post-cure the equipment at a minimum of 180 degrees F or the operating temperature of the process, whichever is greater. Post-cure temperature shall not exceed the

Heat Distortion Temperature of the resin or, 250 degrees F, whichever is less.

4. The post-cure temperature shall be ramped up to and down from the hold period temperature to avoid thermal shock to the laminates being cured. The post cure period, excluding ramping and holding time shall be a minimum of 4 hours and shall be engineered based upon laminate volume plus laminated thermal properties. The laminate volume calculations shall be made available for review by the Engineer along with the post-curing temperature charts specified above.
5. Posture shall take place prior to hydrostatic test and final inspection.
6. Any cracking that results from the post-cure process shall meet the minimum visual defect levels as specified for the inner surface plus interior and exterior layers of the laminates.
7. The equipment shall be properly supported to minimize dimensional changes, such as warping and shrinking that may result from the process. Dimensional changes are limited to the dimensional tolerances specified.
8. All FRP covers and blinds shall be removed from the tanks during post-cure; however, all loose FRP accessories such as the covers and blinds shall also be post-cured.
9. All shop repairs or rework shall be performed prior to post-cure.

2.03 FIBERGLASS TANKS

- A. The fiberglass tanks shall be designed and constructed in accordance with ASME RTP-1 using Type II laminates. The tanks shall be as shown in the FRP Chemical Tank Schedule at end of this Section and shall be capable of storing the specified chemicals at temperatures up to 125 degree F. The sodium hypochlorite and sodium bisulfite tanks shall be constructed using the hand lay-up process. Chopped hoop construction will not be acceptable.
- B. Tanks shall be vertical type with external sloped bottom with side flanged drain connection and dished top. All dimensions, details and accessories shall be specified herein.
- C. Tanks shall be designed so that no external bracing, ribs, hoops, or support wires are required. Top of tank shall be capable of supporting 250-lb point load on a 4-in by 4-in area with a maximum deflection of ½ percent of the tank diameter at the area the load is applied.
- D. Ultraviolet absorbers shall be added by the manufacturer to the exterior resin layer for improved weathering resistance.
- E. There shall be no vertical joints (in axial direction) in the cylindrical shell. Joint overlays for secondary bonds in the cylindrical shell shall be for Type II laminates.
- F. The entire thickness of the cylindrical shell (inner surface, interior layer, and exterior layer) shall be built up prior to removal of the shell from the mandrel.
- G. The axial strength of the cylindrical shell shall be at least 25 percent of the hoop strength.
- H. Dished top heads shall have a minimum thickness of 5/16-in. Flat bottoms shall have a minimum thickness as required by ASME RTP-1 but not less than 0.50-in, where the corrosion allowance in the flat bottom will also include an additional three layers of 1.5 ounce random strand mat and

this additional corrosion allowance material shall be shown in the laminate sequence provided on the shop drawings submitted for approval.

- I. The knuckle radius of the top and bottom heads shall be in accordance with ASME RTP-1.
- J. Heads shall be laminated integrally with the shell or shall be laminated separately. Heads laminated separately shall be molded with an integral skirt in accordance with ASME RTP-1. The entire head including knuckle radius and skirt shall be fabricated in one piece.
- K. For the sloped bottom tank, the bottom shall be contact molded complete with the corrosion barrier and structural layers. Once the bottom has been completely laminated, it shall be mounted to the tank shell in such a way as to facilitate a ¼-in per foot slope. The attachment and knuckle reinforcement overlays shall then be applied to secure the bottom to the shell following reference standard requirements.
 - 1. A ¼-in per foot sloped closed cell foam or other suitable core material capable of handling compressive loads of the tank shall be filled to capacity and attached to the bottom of the tank. The exterior of the core material shall be perpendicular to the tank shell and provide a flat bearing surface for the tank bottom.
 - 2. The core shall then be overlaid with a ¼-in thick Type II laminate with a laminate sequence in accordance with ASTM C582. This core overlay shall be continuous around the knuckle radius of the tank and terminate no less than 6-in from the edge of the core.
 - 3. Under no circumstances shall the sloped bottom be achieved by installing the sloped core material on the inside of the tank bottom and overlaying it with fiberglass on the inside of the tank.
- L. Tanks shall be completely fabricated in the shop. No field assembly is permitted.

2.04 ACCESSORIES

- A. The fiberglass tank shall be equipped with the following accessories as shown on the following schedule.
 - 1. Lifting lugs of Type 316 stainless steel.
 - 2. A minimum of four, integrally constructed hold-down lugs positioned at 90 degree angles shall be provided for anchoring the tank to the concrete supports. The number, size and location of hold-down lugs shall meet seismic design conditions and accommodate the configuration of the tank equipment pad.
 - 3. Nozzles, connections, and manways shall be provided per the following schedule.
 - 4. Drain pipes leaving tanks must contain a locking Ball Valve to prevent incidental draining of tanks.

HYDROCHLORIC ACID TANK 1 - NOZZLE SCHEDULE AND ACCESSORIES					
North = 0-degrees					
SERVICE	SIZE	INNER TANK		OUTER TANK	
		DEG	ELEV	DEG	ELEV
MANWAY	24"	135	DOME	-	-
FILL	2"	225	DOME	-	-
LEVEL ELEMENT	6"	45	DOME, A MINIMUM OF 18-IN FROM THE WALL	-	-
OUTLET	2"	0	BOTTOM SIDEWALL - 10" ABOVE TANK BOTTOM	0	BOTTOM SIDEWALL - 10" ABOVE TANK BOTTOM
DRAIN	2"	90	BOTTOM SIDEWALL – AT BOTTOM OF TANK	90	BOTTOM SIDEWALL - AT BOTTOM OF TANK
OVERFLOW	4"	100	UPPER SIDEWALL	100	UPPER SIDEWALL
VENT	6"		DOME	-	-
SIGHT LEVEL GAUGE	3"	270	DOME	-	-
LEAK DETECTION	3"	-	-	50	BOTTOM SIDEWALL
OUTER DRAIN	2"	-	-	95	LOWER SIDEWALL

5. The following instrumentation shall be provided:
 - a. Tank Leak Detection Switch
 - 1) Tank leak detection switch shall be provided by the tank manufacturer.
 - b. Sight Level Gauge
 - 1) The sight gauge tube shall be supported to a FRP unistrut, which shall be bolted to the floor through a mounting bracket, or a reverse float type sight gauge, mounted through the dome.
 - 2) Sight tube shall read the level in both feet and volume (in 500-gallon increments for hydrochloric acid tank).
 - c. Ultrasonic Level Element/Transmitter
 - 1) Note that the ultrasonic level element/transmitter mounting nozzle shall be furnished by others.. Tank manufacturer shall coordinate the selected instrumentation with the City.
 - 2) The blind flange for the nozzle shall be the same thickness and shall have the same flatness tolerance as the flange to which it is attached.
 - 3) The blind flange shall have the same corrosion barrier design as the tank and shall be a fume-tight with EPDM full gasket and Type 316 stainless steel bolts.
6. Identification labels noting tank designation per Fiberglass Tank Schedules above (6-in high lettering).
7. Clips to secure internal equipment/instrumentation shall be fiberglass and laminated to tank interior wall. These clips shall be a Type 1 laminated per ASTM C582 and have the same

corrosion barrier design on all surfaces as the tank.

- B. The area on the back of all flanges around each bolt hole and the diameter of the standard washer shall be flat and parallel to the flange face. This area shall be spot faced if necessary to meet this requirement.
- C. All nozzles shall be flanged. Nozzle necks and flange faces shall be manufactured by the hand lay-up process using Type II laminate. Compression molded and resin transfer molded fittings are not permitted. The flange outer diameters and drilling shall be per ANSI 16.5. All flange faces shall be flat and true to plus/minus 1/32-in.
 - 1. Unless otherwise specified, nozzles on top or bottom heads shall have flanged faces perpendicular to the vertical centerline of the tank and nozzles on side walls shall have flange faces perpendicular to radial centerlines. Tolerance on angle of flange face with respect to tank centerline is 1/2 degree.
 - 2. Nozzles shall be flush type installation as defined by ASME RTP-1.
 - 3. Materials shall be suitable for intended chemical use.
 - a. Gaskets shall be EPDM or Viton.
 - b. Fittings shall be PE or PVC.
 - c. Metal components (anchor bolts, etc.) shall be Type 316 stainless steel.
 - 4. All nozzles 4-in in diameter and smaller shall have full plate gussets extending out to the outside diameter of the flange.
 - 5. Each tank shall be furnished with sufficient number of pipe supports molded to the tank exterior wall to restrain overflow pipe and fill pipe. The number of supports shall be as recommended by the tank manufacturer but shall not be less than two.
- D. Each tank shall be furnished with top manhole and cover. The manholes shall be liquid tight for maximum loading condition and suitable for intended chemical use.
 - 1. Manholes shall be made the same as for flanged nozzles of the same diameter. Manholes shall be a minimum of 24-inch diameter. The side manhole cover shall be a minimum of 1.25-inch thick. The top manhole cover shall be a minimum of 0.5-in thick.
 - 2. Cover shall be fume tight, furnished with EPDM or Viton full face gaskets, and Type 316 stainless steel bolts. Boss flange type flush manways shall not be used. Tolerance on flatness shall be the same as for the flanges.
- E. All identification and precautionary labels shall be furnished and permanently installed as recommended by the Manufacturing Chemists Association for each chemical that is to be stored. The label shall contain the following minimum information,
 - 1. Chemical to be stored:
 - a. Chemical Name and Chemical Abstracts Service (CAS) Number.
 - b. Concentration and common name of chemical (if any).

- c. Specific gravity.
 - d. Maximum temperature that tank can handle.
2. Design pressure/vacuum.
 3. Tank capacity in gallons.
 4. Tank manufacturer and date of manufacture.
 5. Tank manufacturer serial number.
 6. Tank designation per Fiberglass Tank Schedule.

2.05 SHOP INSPECTION AND QUALITY CONTROL

- A. The fiberglass tank manufacturer shall have a quality control procedure adequate to ensure that all fabrication complies with the requirements specified herein and ensure that all laminates are at least the equal to the reference samples in laminate quality.
- B. The Manufacturer's Quality Assurance Supervisor shall perform a final inspection of all tanks prior to factory testing. Final inspections shall include check for: resin cure, dimensions, laminate thickness, physical properties, reinforcing content, pressure tests, and visual inspections for laminate imperfections. The visual inspection shall ensure the laminates conform to the following requirements:
 1. The laminates of the corrosion barrier, consisting of the inner barrier and the inner layer, shall conform to Visual Inspection Level 1 criteria described in Table 6-1 of ASME RTP-1.
 2. The laminates of structural layer and exterior shall conform to Visual Inspection Level 2 criteria described in Table 6-1 of ASME RTP-1.
 3. All visual inspections shall be made before an exterior pigmented coating, paint or insulation is applied to the shell or head(s) of a tank.
- C. A Quality Control Inspection Report, approved and signed by the Manufacturer's Quality Assurance Supervisor, shall be prepared for review and approval by Engineer. The report shall include all tank inspection records covering the following information:
 1. Barcol hardness readings in accordance with ASTM D2583.
 2. Thickness measurements.
 3. Measurements showing compliance with dimensions and tolerances in diameters, lengths, squareness of ends, angles of fittings and flanges, and flatness of flanges.
 4. Laminate quality: presence of pits, foreign inclusions, dry spots, air bubbles, pinholes pimples, and delaminating.
- D. Upon completion of fabrication and inspection, the following factory tests shall be performed for each FRP tank:
 1. Acetone sensitivity test for all internal secondary bonds.

2. Glass content by ignition loss on three cutouts per ASTM D2584.
3. Hydrostatic Leak Test – The tank shall be filled to top nozzle and stand for 48 hours for no leakage.
4. A Factory Test Report, approved and signed by the Manufacturer’s Quality Assurance Supervisor, shall be submitted to the Engineer for review and approval. The report shall include, at a minimum, the following items:
 - a. Inspection records.
 - b. Results of hydrostatic testing.
 - c. Test reports of physical properties of standard laminates.
- E. Inspection shall be performed for each tank and the report shall be made for each tank. Inspection records shall be available to the City. Upon request, manufacturer shall send a copy of his/her inspection records to the City for review prior to inspection.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install the fiberglass tank in accordance with the City’s instructions and the manufacturer’s instructions. The manufacturer’s field inspector shall witness the off-loading of the tanks and inspect the foundations prior to tank setting. He or she shall certify that the tanks were properly installed with no defects evident during inspection or field testing.
- B. Tanks shall be installed on five layers of 30 lb roofing felt, or other resilient support as recommended by the manufacturer, on a level, smooth troweled concrete pad. All debris and protrusions shall be removed before installing felt.
- C. Anchor bolts shall be accurately placed using templates furnished by the tank manufacturer, and as specified in Section 05500.
- D. The CITY shall provide all materials, labor, equipment, and incidentals required to facilitate anchoring of liquid level devices
- E. All pipe connections to tanks shall be as shown on the Drawings. All connections to the tanks shall follow the manufacturer’s instructions.
- F. Tanks and support members shall be anchored in their final position according to the manufacturer’s recommendations prior to the field test and any repair work.

3.02 FIELD INSPECTION AND TESTING

- A. The Manufacturer shall provide the services of their shop inspector for field inspection and testing of the tanks supplied.
- B. After installation and inspection, each tank shall be field tested by filling to the overflow with water. The tank and fittings shall hold water without loss, evidence of weeping, or capillary

action for a period of 48 hours prior to acceptance. The City may also inspect each tank for defects, damage and conformance with this Section.

- C. The manufacturer's field inspector shall inspect the completed installation after testing and prepare and sign a Field Inspection and Test Report for review by the City. The report shall document the tank field inspection and testing results. Any observed tank defects shall be photographed and described in the report, including recommendations for repair or replacement.
- D. After testing, the tanks shall be thoroughly cleaned and dried before use.
- E. Should any defects become evident during inspection, testing, as documented in the Field Inspection and Test Report, or within the warranty period, the defective tank or fitting shall be repaired or replaced as approved by the Engineer at no cost to Owner or change in Contract Time.

3.03 CLEANING

- A. All interior surfaces of the vessel shall be cleaned and decontaminated. This includes all loose or removable FRP accessories.
- B. Each surface to be cleaned shall be cleaned with a mild detergent capable of removing grease, oil, or other residue, no abrasive cleaning agents shall be used. This detergent shall then be thoroughly rinsed off with fresh water through a spray mechanism. Care shall be taken in order to not damage the surface being cleaned.
- C. This cleaning procedure shall be performed after installation and field testing is completed and before the vessel is filled with the required chemical.