

SECTION 13200

PRECAST CONCRETE SLUDGE STORAGE TANK

PART 1 GENERAL

1.1 Summary

A. Biosolids Storage Tank

1.2 System Description

- A. Precast concrete storage tank with precast concrete roof, beams, columns, posts, and walls; cast-in-place reinforced concrete floor and foundations; access hatches, pressure relief valves, decant chambers, wall castings and waterproofing, separate compartments as specified herein , and as needed for a complete and workable installation.

1.3 SHOP DRAWINGS

- A. Include the following with shop drawing submittal:
1. Overall tank layout with dimensions for column, beam and post layout, footing sizes, pipe penetrations and hatch locations.
 2. Concrete mix design.
 3. Joint sealing and pipe passage details.
 4. Setting instructions.
 5. Details for pipe penetrations, sealing joints and other pertinent data.

1.4 DESIGN REQUIREMENTS

- A. Top panels:
1. Concentrated load of one 10,000 pound axle load plus 30 pounds per square foot snow load.
- B. Wall panels:
1. 120 pounds per cubic foot, granular fill with 2 feet surcharge using a coefficient of earth pressure at rest equal to 0.50.
- C. Design Code: ACI 318-99.
- D. Hydrostatic Load:
1. Internal pressure resulting from any combination of full or empty compartments.

E. Final design and dimensions of bottom slab is the responsibility of the tank manufacturer.

F. Wind load : 90 mph wind speed

G. Appurtenance support loads.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. HTI, Inc., Suttons Bay, MI 231-995-7630

2.2 CAST-IN-PLACE CONCRETE-FLOOR AND FOOTINGS

A. Follow Section 03300.

1. Floor of tank(s) and footings shall be monolithic for each pumpout area and shall be of sufficient size and strength to withstand pressures exerted when the tank is full of sludge. Floor shall be a minimum of 7 in. thick poured in place concrete and shall contain #5 Grade 60 reinforcing steel at 18" on center each way. Footings shall be designed to withstand the forces exerted when the tank is full of sludge and in accordance with the soil bearing pressures as outlined by the geotechnical engineers report. Concrete cover of placed reinforcing shall be in accordance with ACI 318-99 Building Code. Floors in each pumpout area shall be sloped the vertical distance as shown on the plans from the outside wall to the top of the precast concrete sump.

B. Provide keyway in floor for outside wall panel and interior crosswall panels, keyway shall be minimum of four (4) inches deep and sufficient width to set panel and allow for non-shrink grout to be placed on both sides.

C. Provide reinforced cast-in-place floor and foundations designed to transfer loads directly to subbase.

2.3 PRECAST CONCRETE

A. Minimum Compressive Strength at 28 Days:

1. Top Panels: 5,000 psi.
2. Wall Panels: 6,000 psi.

B. Fine Aggregate: 2NS.

- C. Course Aggregate: Peastone.
- D. Cement - ASTM C150, Type III.
- E. Range of Slump: 1 to 2 inches(with water).
- F. Air Entrainment: 5 to 8 percent.
- G. Superplasticizers: As required for proper consolidation.
- H. Reinforcing Steel: ASTM 615, Grade 60.
- I. Slab Bolsters or Chairs: Plastic protected
- J. Solid Slabs: No voids permitted.
- K. Roof and Wall Panels: Provide solid precast concrete panels with tongue and groove joints.
 - 1. All precast panels shall be a maximum width of four (4') feet, except for panels with hatch openings;
 - 2. Tongue and groove on each panel shall be male and female, tongue and groove shall be minimum of 1.5" wide and a minimum of 3/4" deep.
- L. Beams, columns and posts: provide solid rectangular sections.

2.4 ACCESSORIES

- A. Access Opening Cover Over Pump-Out Area: US Foundry APD 4872, aluminum, door hinges on 72 inch side, 6" high concrete curb around openings;
 - 1. Stiffened as required to support 150 psf with embedded aluminum frame.
- B. Other Access Hatches: Aluminum; U.S. Foundry Model APS150, 2424;
- C. Pressure Relief valves:
 - 1. 4", no. per tank compartment determined by tank manufacturer;
 - 2. Troy Valve, Model A22550RS;
- D. Wall Castings as indicated on Drawings: Ductile iron or steel.
- E. Decant chamber valve box: One per valve, shall be Trumbull Item No. 367-4620.
- F. Carbon Canisters (optional):
 - 1. One per tank compartment.
 - 2. Shall be Calgon 28" High Flow VentSorb Molded Design, unit shall hold a minimum of 200 lbs. of activated carbon.

2.5 DECANT CHAMBER

- A. Size: As shown on drawings
- B. No. valves per chamber : 4
- C. Vertical spacing of valves: 26"
- D. Wall sleeves: 4" FL x PE (cast in precast panel);
- E. Overflow in decant chamber is 6" x 12".
- F. Chamber is multiple compartment as shown on plans.
- G. Decant Valves: DeZurik Plug Valve, Model 0400, Fig. 110, F, 6, RS26.
- H. Provide valves with required length of extension stem and 2 inch square operating nut.

2.6 INTERIOR JOINT COATING

- A. Polyurethane Membrane: CIM 1000 Trowel Grade;
 - 1. Apply on all interior vertical joints.
 - 2. Apply over non-shrink grout on interior horizontal joints where precast panel sits in cast-in-place floor.
 - 3. Membrane shall be a minimum of 60 mil thickness and extend three (3) inches on each side of joint.

2.7 EXTERIOR ROOF JOINTS

- A. Product: Tremco Dymeric THC-900 self leveling expansion joint sealant.
- B. Color: Limestone
 - 1. Rake joint 2" deep after applying grout and fill.

2.8 INTERIOR COATING

- A. Type: Spray applied hot bitumastic.
 - 1. Apply interior coating to interior walls, inside of roof, columns, posts, and beams.
 - 2. Coating not necessary in decant facility.
- B. Characteristics:

| | | |
|---------------------------|------------|---------------|
| Viscosity at 25 degrees C | ASTM D2170 | 1221cst |
| Viscosity at 50 degree C | ASTM D2170 | 163 cst |
| Flashpoint, TOC | ASTM D1310 | 105 degrees F |
| Distillation IBP | ASTM D402 | 360 degrees F |
| Softening point | ASTMD36 | 131 degrees F |

2.9 AGGREGATE UNDER BOTTOM SLAB

- A. Minimum of 9" of well drained granular material.

2.10 QUALITY CONTROL

- A. Inspection: Provide engineer schedule of precast concrete placement and allow Engineer to examine forms and steel placement prior to casting.
- B. Concrete Testing:
 - 1. Provide Owner with five (5) sets of three compression tests for precast concrete components.
 - 2. Provide Owner with three sets of compression tests for floors and footings.
 - 3. Testing by independent testing laboratory. Test shall include standard test for slump, air, temperate, etc., and shall be included in total price for furnishing precast components.
- C. Finish on Precast
 - 1. Manufacturer's standard conforming to PCI.
- D. Installer Qualifications: An experienced installer who has completed at least ten (10) precast structural concrete units similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
 - 1. Assumes responsibility for engineering precast structural concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
 - 2. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of precast structural concrete that are similar to those indicated for this Project in material, design and extent.

PART 3 EXECUTION

3.1 EXCAVATING

- A. Follow Division 2 Site Work.
- B. Provide minimum of 9 inches of free draining fill under bottom slab.

3.2 BACKFILLING

- A. Manufacturer's representative must be on site and inspect backfilling operations.
- B. Do not backfill until all interior joints are grouted and sealed and interior coating has been applied.
- C. Minimum of three (3) feet of a well drained granular material must be placed next to the tank walls around entire perimeter of tank.
- D. Backfill shall be placed in maximum of two (2) foot lifts and compacted with hand operated compaction equipment.
- E. No large self-propelled vibratory compaction equipment shall be allowed next to the tank.

3.3 SHIPPING AND STOCKPILING OF PRECAST

- A. Transportation method shall prevent cracking, chipping or damage to panels.
 - 1. Damaged panels shall be repaired; if in the opinion of the engineer, the repairs are justifiable and possible, prior to use. If panels cannot be repaired, they shall be rejected and cannot be used.
- B. Wood blocking for panels shall be strategically placed to prevent damage to panels.
 - 1. Maximum height of stockpile shall be ten (10) panels.

3.4 ERECTION

- A. Comply with manufacturer's instructions.
- B. Set panels in footing with non-shrink cement grout inside and outside of tank. Apply joint coating over grout on interior of tank after grout cures.

C. Fill any void in vertical wall joints with SPECO W10 WATER STOPPER CEMENT. Apply joint coating over grout on interior of tank after grout cures.

3.5 WARRANTY

A. Free from defective material and workmanship for one (1) year.

B. Tank shall not leak materials stored in the tank to the outside of tank (roof hatches not considered to be leakproof) or allow water to leak into the tank from the outside.

C. Contractor shall pay all labor and material costs associated with repair.

3.6 LEAKAGE TESTING - Test structure after backfilling operations are complete.

A. Test each cell of tank independently.

B. Clean with water all interior surfaces of tank, and drain. Owner will provide water for initial filling.

C. Completely fill tank with water and allow to stand for a period of not less than 24 hours.

D. Measure drop in liquid level after 24 hours.

E. No allowable drop in water level for a 24 hour period shall occur in each of the compartments tested.

F. If leakage exceeds maximum allowable, refill and retest tank.

G. Repair all leaks.

H. Contractor will pay for all water used for retesting.

END OF SECTION