

# PRECAST POST-TENSIONED CONCRETE STRUCTURES



# RECTANGULAR TANKS



## TYPICAL INSTALLATION

- Precast concrete elements are manufactured at a Precast/ Prestressed Concrete Institute (PCI) certified facility.
- Precast concrete elements are set on a poured-in-place slab within a receiving keyway. Alignment is checked with laser equipment.
- Temporary props are attached to the inner face of the tank and secured to the base. Top-of-wall brackets placed at the panel joints insure panel alignment.
- Tendons are threaded into the ducts and partial tension is applied to all tendons.
- Walkways are set into place and partial tension is applied.
- Joint grout is pumped into the joint cavities.
- Final tensioning is applied to all tendons.
- Base to wall elastomeric sealants are applied.
- Structures are checked to insure for water-tightness.

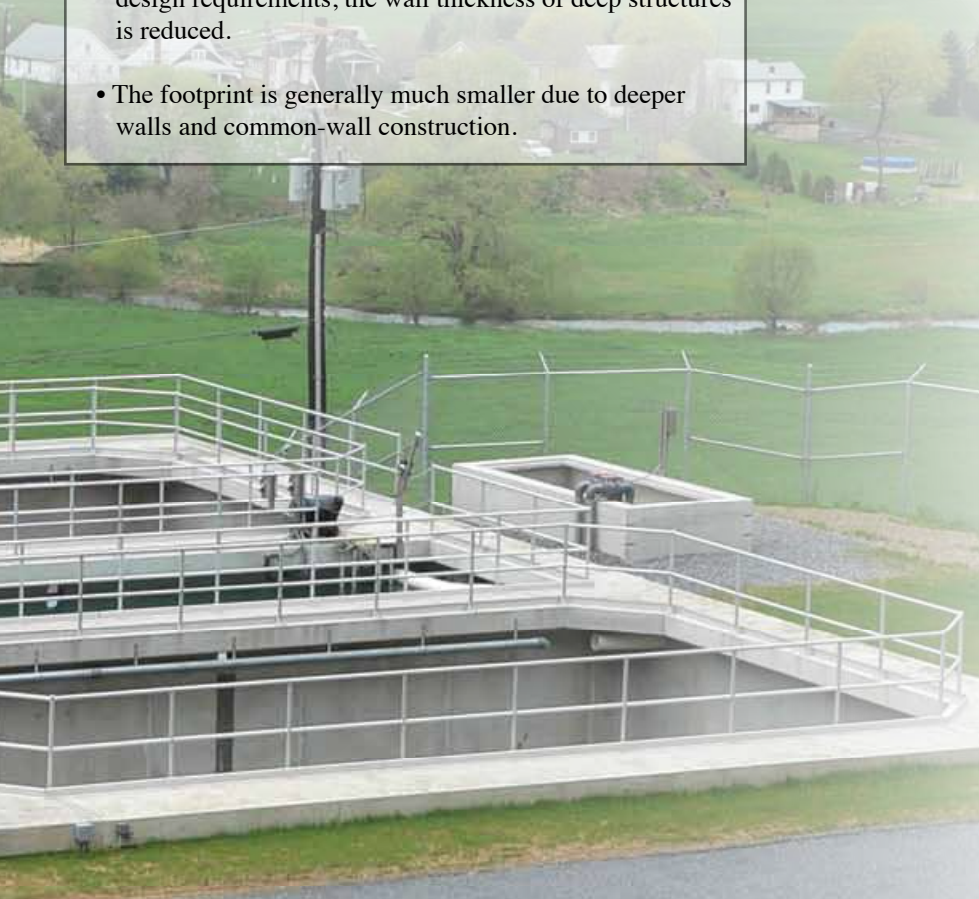


## TANK APPLICATIONS

- Precast post-tensioned concrete rectangular structures manufactured by Dutchland, Inc. are produced for a variety of wastewater treatment process systems, including Sequencing Batch Reactor's, Extended Aeration, Oxidation Ditches, and Membrane Bio-Reactor's. Typical water purposes include Potable Water Tanks, Fire Protection Tanks and more.
- Dutchland, Inc. produces design/build extended aeration wastewater treatment plants, utilizing high quality equipment and complete process designs. *Additional information is available for extended aeration plants designed and manufactured by Dutchland, Inc.*

## STRUCTURAL SUPERIORITY

- Exterior and interior walls are typically designed for full water load on one side and empty on the other side, unless otherwise specified. Tanks are designed in conformance with ACI 318 and ACI 350.
- Precast post-tensioned tanks can be constructed above ground (with the base slab below frost), completely buried, or partially out-of-grade. Tanks can also be designed to withstand differential backfill.
- Post-tensioned walkways provide a structural upper fixed beam. Without the need for conventional cantilever design requirements, the wall thickness of deep structures is reduced.
- The footprint is generally much smaller due to deeper walls and common-wall construction.



## DURABILITY

- All wall panels are solid (not built in added layers).
- All walls are cast horizontally in steel forms, providing an extraordinarily dense and impermeable member. Spalling and surface defects which is typically associated with cast-in-place concrete is virtually eliminated.
- Maintenance associated with steel tamage (dewatering, sandblasting, repainting) is not required.
- Exterior coatings are not required. Penetrating stains or decorative coatings are available upon request.





## 1. CAST-IN-PLACE POST-TENSIONED BASE SLAB (optional)

**Post-tensioned base slabs are cast on-site. Post-tensioned base slabs are in compression, eliminating cracking.**

- Reinforcement is placed within the base form.
- Post-tensioning tendons are placed within the form work.
- Keyway forms are placed and checked for elevation and distance from center of the tank.
- Concrete is placed in a continuous monolithic pour and steel trowel finished.
- The forms are removed and the base is covered or sprinkled with water to achieve proper curing.
- Initial post-tensioning is applied after approximately 20 hours by Post-Tensioning Institute (PTI) certified personnel.
- Final post-tensioning is applied, upon concrete achieving 75% of design strength.
- Tendon tails are removed and the anchor pockets are cleaned, primed and filled with grout.



## 2. TANK WALL PANEL INSTALLATION

**Conforming to the AWWA D-115 standard, all production and installation procedures insure a high quality tank system.**

- Bearing pads and shims are placed in the keyways.
- Wall panels are lifted by a crane and set into place. Alignment is checked with laser equipment.
- Temporary props are attached to the inner face of the wall panels and secured to the base.
- Tendon duct extensions are placed and sealed between the wall panels.
- Tendons are threaded into the ducts.
- Vertical joints are formed. Grout is pumped into the joint cavity and consolidated.
- Circumferential post-tensioning is administered by PTI certified personnel.
- Expanding grout is pumped into the tendon ducts, to permanently encase the tendons and create a bond to the tank walls (bonded tendon tank option).
- An elastomeric sealant is used to seal the base to wall connection.
- The tank is held in constant compression by the encased post-tensioned cables.

\* Tanks are available in bonded tendon and non-bonded tendon designs.



### 3. ROOF AND SUPPORT SYSTEM INSTALLATION

Multiple tank cover designs are available, including precast concrete sloped roof systems, precast concrete domes, and aluminum geodesic domes.

- Precast concrete sections are lifted into place.
- Post-tensioning tendons are inserted into the tendon ducts.
- Circumferential post-tensioning is administered by PTI certified personnel.
- Excess tendon is removed, capped, and sealed off.
- Polyurethane elastomeric sealant and/or Closed Cell Foam Gasket are applied at the roof joints to insure water-tightness.



### 4. THE FINISHED PRODUCT

The finished product consists of a precast post-tensioned concrete tank designed for longevity with virtually no maintenance.

A no hassle ten-year structural warranty covers the base, wall, and roof systems of all post-tensioned tank structures manufactured and installed by Dutchland, Inc.

- All wall panels are solid (not built in added layers).
- All walls are cast horizontally in steel forms, providing an extraordinarily dense and impermeable high strength concrete exterior. The potential for spalling, typically associated with shot-crete or cast-in-place concrete, is virtually eliminated.
- Tanks manufactured by Dutchland, Inc. *do not* require a steel diaphragm, or exterior coatings for water-tightness.
- No repainting or shot-crete maintenance is required.
- Exterior coatings are not required. Penetrating stain or decorative coatings are available upon request.
- The result is a no compromise, cost competitive tank manufactured and constructed in accordance with AWWA D-115 standard.



## 1. CONSTRUCTION

- Elliptical tanks are constructed with methods similar to precast post-tensioned rectangular and circular tanks.
- Elliptical tanks include base, walls and walkways.





**2. BENEFITS**

- Rounded tank ends are easier to fabricate by utilizing precast rather than cast-in-place concrete.
- Less time is generally required in construction for precast concrete than cast-in-place concrete.
- Various configurations are available to meet the requirements of specific equipment suppliers, including but not limited to; Kruger, Siemens and Eimco.
- Dutchland, Inc. typically works directly with the equipment manufacturer during the design / submittal phase to ensure compatibility, resulting in better coordination.



**DUTCHLAND, INC. FACILITY**



**PRECAST MANUFACTURING FACILITY**

**CUSTOM-DESIGNED  
WASTEWATER TREATMENT PLANTS**

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Dutchland, Inc. also specializes in designing and building extended aeration wastewater treatment plants. BNR (Biological Nutrient Removal) for nitrogen and phosphorus designs incorporate MLE concepts. Tertiary treatment for low BOD/TSS is optional.

**Additional information is available upon request for Custom-Designed Wastewater Treatment Plants.**

## **ABOUT DUTCHLAND, INC.**

- Dutchland, Inc. is a PCI certified precast concrete manufacturing facility with ACI certified Quality Control personnel and PTI certified installation personnel.
- Precast concrete is manufactured in Lancaster County Pennsylvania and delivered to the job site.
- Dutchland, Inc. specializes in many types of precast post-tensioned concrete structures, including circular, rectangular, and elliptical structures.
- Dutchland, Inc. surveys all customers. 100% of customers surveyed indicated they would contract with Dutchland, Inc. again.

## **REASONS TO CHOOSE PRECAST POST-TENSIONED TANKS (PPT's)**

1. PPT's utilize superior construction methods, and have a 10-year non pro-rated warranty.
2. PPT's are easily designed for a variety of uses, including water storage, wastewater treatment, storm overflow, effluent storage, and many other purposes.
3. PPT's are virtually maintenance free for decades and are designed to stay in continuous service, eliminating costly maintenance and down time.
4. PPT's can be constructed above ground (with the base slab below frost), completely buried, or partially out-of-grade.
5. Minimal site space is required for PPT construction, resulting in less site work. In some cases, PPT's can be constructed against existing structures or buildings.
6. Wall panels and other PPT key elements are manufactured in a climate controlled production facility rather than on site.
7. Less time is typically required to construct PPT's compared to conventional cast-in-place.
8. Additional information is available about post-tensioning upon request or at our web site: [www.dutchlandinc.com](http://www.dutchlandinc.com)

