



Dutchland

I N C O R P O R A T E D

160 Rt. 41 • PO Box 549
Gap, PA 17527-0549

Phone 717.442.8282
Fax 717.442.9330

www.dutchlandinc.com

Frequently Asked Questions

What is the difference between conventionally reinforced concrete and post-tensioned concrete?

Conventionally reinforced concrete has only “passive” rebar embedded in the pour. With post-tensioned concrete, along with the conventional rebar, tendons are embedded and elongated resulting in improved resistance to forces due to this “active” reinforcement.

What is the difference between pre-tensioning and post-tensioning?

Pre-tensioning and post-tensioning are both forms of prestressing.

Pre-tensioned tendons are stressed by a jack within a form without any concrete. Concrete is then poured, allowed to set and bond, before the ends are cut and the precast member is instantly put into compression.

Post-tensioned tendons are stressed by a hydraulic jack after the concrete has already cured. In precast wall panels, post-tensioning tendons are threaded through horizontal ducts that have been cast into the panels and span the entire length of the tank. The ducts are in-filled with grout and the tendons are stressed with a post-tension/stressing jack.

How does precast concrete differ from other in situ (in place) concrete?

Precast concrete is different because it is made in a plant by highly experienced personnel who apply stringent quality-control measures. In the plant environment, precasters are able to achieve consistency in temperature, moisture, and lower water-to-cement ratios that are not possible in cast-in-place concrete. Dutchland precast concrete easily attains strengths of 5000 psi to 7000 psi or more, with densities that minimize permeability. Cast-in-place concrete is typically only 4000 psi design strength. Also, casting precast elements in horizontal forms results in unprecedented concrete quality over cast-in-place.

What type of cement is used in Dutchland tanks?

All precast elements are constructed with Type I/II portland cement which provides superior strength and sulfate resistance.

Does Dutchland use fly ash in their mix design?

Dutchland uses up to a maximum of 25% fly ash as a cement substitute. The addition of fly ash increases the density of the concrete even further, decreases the water-to-cement ratio, improves the workability, and increases the concrete's resistance to hydrogen sulfide gas associated with wastewater.

What codes and/or standards are Dutchland tanks designed to?

Dutchland tanks are designed in accordance with ACI 318, ACI 350, and Post-tensioning Institute Standards. All circular tanks are designed to AWWA D115.

What is the maximum diameter that a circular tank can be designed to?

There is no maximum diameter that a circular tank can be designed to. To date, the largest circular tanks constructed by Dutchland are between 200' – 300' in diameter.

What is the maximum height that a Dutchland tank can be designed to?

The maximum height of a rectangular tank is approximately 40 feet and the maximum height of a circular tank is 55 feet.

Can a building be erected directly against the tank or on top of the tank?

Yes, a building can be designed with a common wall of a tank or on top of the tank.

Are aesthetic options available?

There are numerous aesthetic options available with precast concrete components. Concrete may be stained at the precast plant or in the field. Textures can also be created with form liners to mimic a wide variety of other masonry alternatives, including brick and stone. Precast concrete provides many options for duplicating existing architectural styles with surrounding buildings.

How can precast post-tensioned tanks be expanded in the future?

Precast post-tensioned tanks can be expanded in the future by utilizing couplers to connect existing tendons to new basins. Dowel bar couplers or epoxy anchors enable base slab expansion.

Can precast post-tensioned tanks be modified at a later date?

Yes, modifying post-tensioned structures to adapt to changes in tank function is very feasible and does not compromise the structural integrity of the tank if done properly. Post-tensioned concrete structural designs are extremely flexible. Tendons are typically spaced with sufficient distance to allow penetrations of standard sizes to be added later. Usually smaller penetrations can be core drilled through the walls without affecting the

post-tensioning tendon at all. Additional tendons can be installed to accommodate larger penetrations or openings.

Can Dutchland tanks be insulated?

Yes, insulation can be cast within a “sandwich” panel or can be added externally.

Can the base slab be post-tensioned?

Yes, base slabs may be post-tensioned to provide enhanced crack control.

How are the precast panels put in place?

The precast panels are craned directly from the delivery trucks into a keyway cast into the base slab.

How do the precast panels stay upright?

Temporary props are used to keep the panels secure during construction. The props are removed after the tank has been post-tensioned.

What is the sequence of events after the panels have been set?

After the panels have been set in place, the wall joints are grouted and sealed, the tendons are stressed, and the base-to-wall joint is grouted and sealed.

How much force is applied to each tendon?

The post-tensioning tendons are stressed to 45 kips (approximately 45,000 lbs. of force).

How are the tendons locked in place?

The tendon is locked off at post-tensioning anchors that have been cast in the end precast panel or buttress panel.

How is the wall connected to the base?

For heavy modular unit structures, such as precast post-tensioned tanks, anchorage to the foundation is not required except when the seismic design requires.

How is the walkway secured to the wall?

The walkway is connected to the wall system via grouted dowel bars that go through a cavity in the walkway into a cavity in the wall.

How are Dutchland tanks made watertight?

All tank walls include a minimum of 125 psi residual compression across all wall joints. In addition, grout is installed and sealant is applied to all wall joints and all base-to-wall joints.

Does Dutchland use any type of water stop in the connection between the wall and base?

The typical wall-to-base configuration uses grout between the joints and sealant over the joint. However, a water stop may be used in certain tank designs.

Does Dutchland coat the interior of the tank?

Coatings are not required for watertightness.

How does Dutchland check their tanks for watertightness?

After a tank is structurally complete, the tank is filled with water and checked for damp or wet areas.

Is precast concrete a green building material?

Precast concrete contributes to green building practices in significant ways. Because precast concrete is factory-made, there is very little waste created in the plant and on-site construction waste and debris is significantly reduced. In addition, Dutchland precast concrete accommodates recycled content by incorporating fly ash into the concrete mix design.

What is the largest tank constructed by Dutchland?

18 million gallons

Why is PCI certification important?

PCI's Plant Certification Program ensures that a plant has developed and documented an in-depth, in-house quality system based on time-tested, national industry standards. To become PCI-certified, Dutchland had to demonstrate their experience and training in manufacturing precast concrete, their quality systems and procedures in place, and their commitment to quality throughout the organization.