



SPECIFYING MUNICIPAL WATER TANKS



ABOUT TANK CONNECTION

In 2003, three founding partners started a company focused on storage tank solutions. Today, Tank Connection Affiliate Group leads the tank industry as the largest global supplier of bolted steel tanks for liquid and dry bulk storage applications. The affiliate group maintains five tank manufacturing facilities and over 500 employees dedicated to the design, manufacture and field installation of above ground storage tank systems. All of their storage tank products are manufactured in the U.S., with shipment and installations worldwide.



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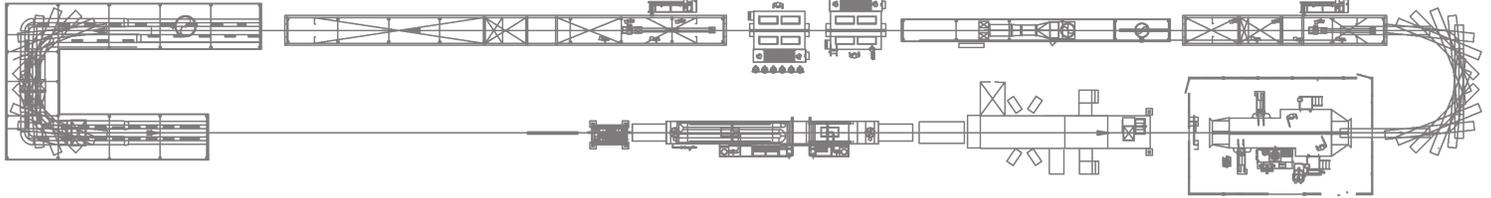
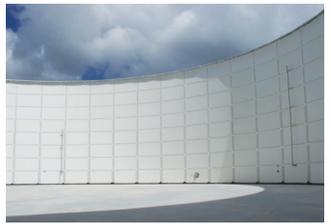
At Tank Connection, we follow a simple formula for success!

Routinely, we are asked what factors contributed to the company's exponential growth over the last decade. From day one we set our charter that defined our mission, vision and core values. To condense our view, we wanted Tank Connection to focus on listening to clients and providing them with factual information on different types of storage containment options. The marketplace is full of suppliers promoting storage tank products that will not fulfill municipal requirements for long-term field performance. Our approach to service clients is based on the development of a broad product line of superior storage tank products, designs and field construction services. Initially, our product line included bolted, shop-welded and field-welded tank construction. As our company developed, we added hybrid tank designs, aluminum geodesic domes, elevated water tank designs, composite pedestals and other types of containment covers. At Tank Connection, we simply focused our efforts on developing high performance, above ground storage tank systems. Needless to say, over the last decade the industry has responded favorably to our straight forward approach.

WHAT PRODUCT ADVANTAGES DOES TANK CONNECTION OFFER IN MUNICIPAL WATER STORAGE?

We offer **all types** of steel tank construction including bolted RTP, shop-weld, field-weld, SIT's (system installed tanks) and hybrid tank construction. Our bolted RTP (rolled, tapered panel) tank design has become the #1 bolted tank design selected worldwide. We also offer a variety of specialty storage products including aluminum geodesic domes, flat covers, and elevated water tank designs.

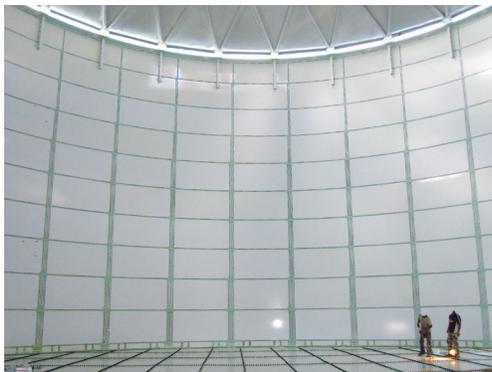
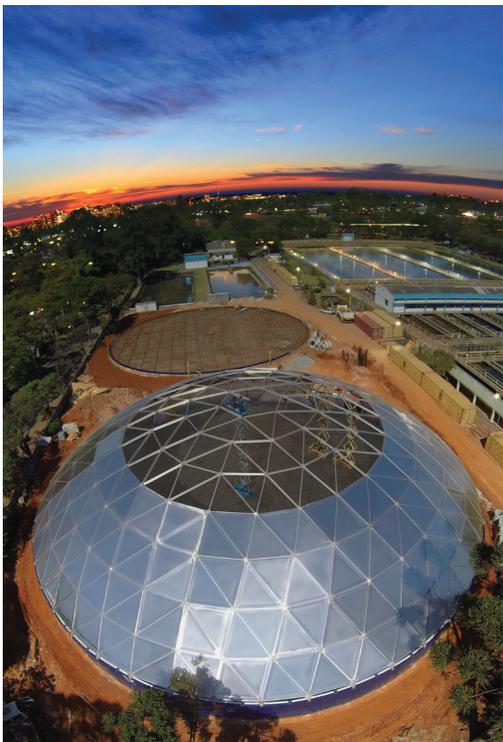
- ▶ TC maintains one of the most extensive engineering departments in the tank industry. We have PE's that set on AWWA D103, AWWA D104, AWWA D106 and AWWA D108 committees. Internally, we maintain an expanded listing of PE stamps throughout the U.S.
- ▶ We are the exclusive provider of a proprietary coating system developed by Akzo Nobel called LIQ Fusion 7000 FBE™. (Akzo Nobel is the largest powder coating supplier worldwide.) This system is a special epoxy powder coating that is designed for water immersion service. To date, this system has received extensive testing and has proven to be unmatched in performance compared to any other coating system for water storage. It is a stronger system than glass/vitreous enamel in potable water applications. Tank Connection is also the only company certified to apply this system on bolted steel tank panels used in liquid immersion service.



- ▶▶ Our coating application technology is the second part of the coating equation. Our state-of-the-art, high-tech coating process line is over twice the length of a football field and includes 14 stations, 21 stages and over 110 application processes, checks and inspections. This line requires an operations team of 13 people to maintain its automated processes.
- ▶▶ As of March 2015, TC installed a second, even larger, state-of-the-art, high-tech powder coating line. The demand for our coating technology in water storage remains unprecedented, so we are expanding once again to fulfill client's needs.
- ▶▶ In municipal water storage, the premier hybrid bolted tank system, selected for potable water storage, utilizes the best component tank features of coated carbon steel, concrete and aluminum construction. Under review for quality, installed cost, life-cycle cost and safe field construction, this storage tank containment system has proven to be unmatched in water storage applications.

THE PREMIER BOLTED WATER TANK FOR MUNICIPAL WATER STORAGE INCLUDES:

- ▶▶ Bolted RTP (rolled, tapered panel) tank sidewall
- ▶▶ LIQ Fusion 7000 FBE™ coating system
- ▶▶ Concrete foundation with base setting ring
- ▶▶ Aluminum geodesic dome cover



IN SPECIFYING A MUNICIPAL WATER STORAGE TANK, WHAT ARE SOME OF THE MAIN FACTORS TO CONSIDER?

- ▶ Always ensure a competitive bid process occurs. NEVER allow a single storage tank product or company to be specified. As an example, some municipal specifiers previously released specifications for a “glass tank only” bid. Since there is only one glass tank manufacturer in the U.S., a competitive bid process to benefit the client has been defeated from the onset. One supplier or one product specified simply equates to a non-competitive bid process.
- ▶ In specifying a water tank design, we advise consultants to specify our bolted RTP tank design and LIQ Fusion 7000 FBE™ coating system, along with a glass coating spec and/or a field-weld tank specification. Review the merits of each product and then make your selection.
- ▶ In water storage service, we advise clients on tank products that can't be refurbished (i.e., blast, coat and repair) in the future, as limited service life products. Typically, these products maintain the highest life cycle costs for municipal water storage applications.
- ▶ Web stiffeners, also known as webbies and/or external stiffeners are commonly used on some bolted tank designs. The sole function of a web stiffener is to prevent shell buckling (flattening of shell) during inclement wind conditions. Although allowed by AWWA D103 specification, Tank Connection has objected to their use for some time. We ask a simple question, do you want a water storage tank reinforced with cheap external stiffeners or do you want a water storage tank that incorporates heavier plate thickness? As an example, a web stiffener for a 100' diameter water tank costs ~\$900. When a municipal client is spending significant capital funds for a new water storage tank system, should they expect to receive a tank designed with an erector's set of external stiffeners? At TC, we subscribe the use of heavier plate thickness with no exterior web stiffeners allowed, the same as welded tank construction. It is our view that bolted steel tanks that utilize thin sidewall designs and web stiffeners should not be considered extended service life products for municipal water storage.
- ▶ If a welded or bolted water tank is larger than 32' diameter, utilize an aluminum dome cover. Aluminum geodesic domes have become a preferred tank cover in the municipal water market. Aluminum domes are commonly requested today for all types of tank construction including field-welded, bolted and concrete tanks. The merits of the product are easily recognized. These covers are extremely strong and represent high quality containment that is virtually corrosion and maintenance free.



SAO PAULO, BRAZIL

These two 140' diameter domes were installed on bolted RTP municipal water tanks.



NAPA, CALIFORNIA

This 68' diameter dome was designed, manufactured, delivered and installed in 35 days (total) on this existing field-welded tank.



ALDRICH, PENNSYLVANIA

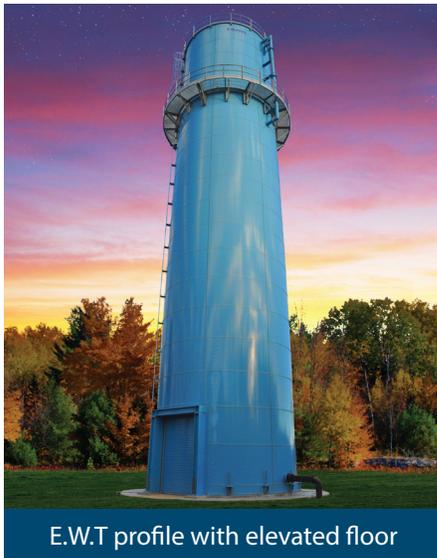
This aluminum dome installed on a low profile concrete tank.

- ▶ Safe field construction at any global location. The days of elevating tank workers in the air are over. Tank Connection as well as other suppliers, maintain a special synchronized jacking process that allows large bolted water tanks to be jacked from grade level. We also station these jacks worldwide, which allow bolted water tanks to be safely built at grade level at any location. The examples shown below are municipal water tanks that were jack built from grade level. Additionally, TC has now developed a “patent pending” elevated water tank (EWT) design that can be jack built from grade level.

The water tanks shown below were all jack built from grade level. The process represents unmatched safety and quality control in the field.



Large diameter low profile



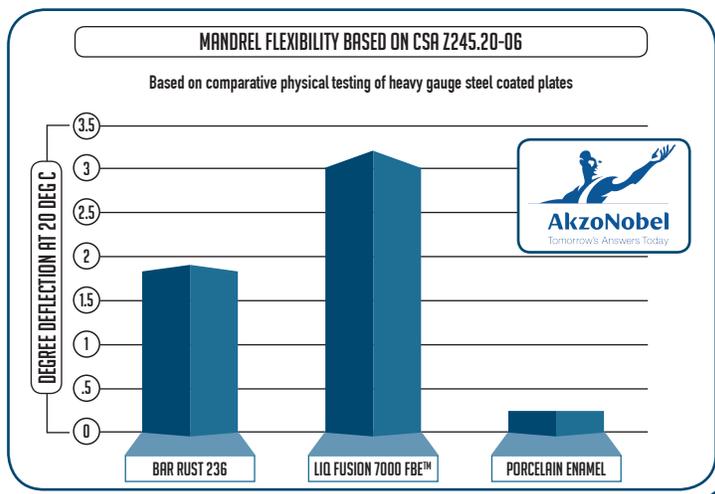
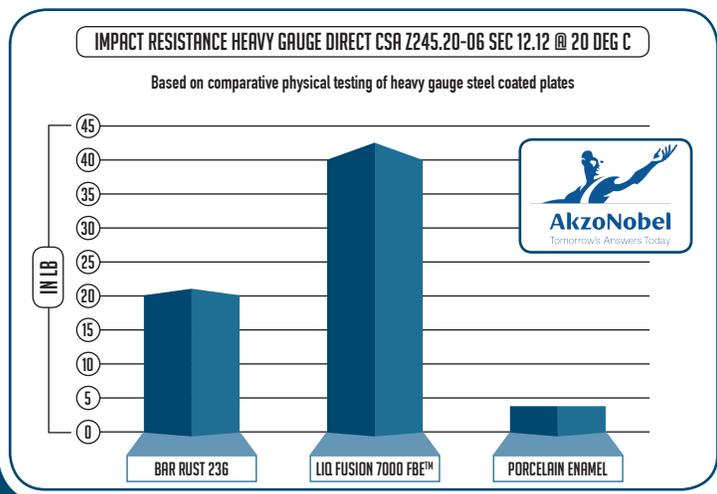
E.W.T profile with elevated floor



Standpipe profile

- ▶ Coatings available for bolted and welded water tanks range from poor to high performance systems. As we have noted, the best factory applied coating system that has undergone extensive testing for potable water storage applications was developed by Akzo Nobel, and is called LIQ Fusion 7000 FBE™. Akzo Nobel has also conducted extensive lab testing on other powder coat systems, liquid coatings and glass/porcelain enamel coatings. In potable water storage, glass coatings can provide good panel protection, but they also come with a list of other problems associated with their formulations, uncoated bolt holes and edges, holidays, etc.

Two areas in particular that are of importance in bolted tank construction include coating flexibility and impact resistance. All steel storage tanks, bolted or welded, expand and contract. Relative to bolted tank construction, under FEA analysis the bolted connection area becomes stressed during expansion. In essence, steel is ductile and the coating system selected also needs to be flexible. As noted in lab testing, mandrel flexibility is excellent for select epoxy powder coating systems, but the opposite occurs for glass/vitreous enamel coatings. Again, steel is ductile under stress, but glass coatings are brittle. The area of concern is in the bolt connection region where the glass coatings can crack. A coating failure in this area can create a corrosion point. In 2014, two glass tanks incurred failure in municipal water service due to corrosion in the bolt connection area.



In summary, municipal water tank systems are available in today's market ranging from low to high performance systems. There are four variables in the selection of high quality water containment systems. This includes the quality of tank design, fabrication, coatings and field construction services. Clients tell us routinely that it is difficult to sort through the barrage of blurred promotion offered by some suppliers. Our response is consistent in advising them to always separate real facts from promotion rhetoric on storage tank products under review. In today's market, factual R&D testing is available on any coating system and tank design. Request the back-up data, review it and then hold vendors accountable in their warranties for the product claims made. The market is well served only when vendors listen to their clients and deliver storage containment products that fulfill or exceed their expectations.

DESIGN » Our bolted RTP (rolled, tapered panel) tank design is unmatched worldwide. It is the strongest, precision tank design that does not utilize cheap web stiffeners.

COATINGS » Our LIQ Fusion 7000 FBE™ coating system and application technology is unmatched in water storage applications. It is a *STRONGER SYSTEM THAN GLASS COATINGS* and other epoxy powder systems. It is provided exclusively by one company, Tank Connection.

PRODUCT QUALITY » Simply unmatched worldwide. Our facilities are ISO 9001 quality system certified. TC operates 5 storage tank manufacturing facilities in the U.S. and supports over 500 employees. Our storage products and services are requested globally because our quality is recognized as "the BEST" in the industry!

INDUSTRY EXPERTS IN STORAGE » We are the leading experts in storage applications with more years of combined industry experience than any other tank company.

FIELD CONSTRUCTION PROCESSES » Unmatched in quality and field safety. EMR: .59



 Request A Quote And "Get Connected" With Real Performance From The Market Leader, Tank Connection!



Tank Connection is an ISO 9001 certified company. TC leads the storage industry in application expertise, storage innovation and solutions, storage tank manufacturing technology, vertical integration of operations and field construction services. When you specify Tank Connection, you have selected the top performance storage systems and field construction services available globally.

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