Congratulations, you have been awarded the contract to construct a water or wastewater treatment facility or to expand your internal wastewater treatment plant.

The tank manufacturing industry has come a long way in incorporating new technologies and features into storage vessels that benefit water and wastewater treatment facilities. You may already be familiar with some of the standard features available on tanks today, such as embedded starter rings for use with concrete floors, wrap-around staircases, reinforced work platforms able to support davit cranes and a variety of supports that will support various piping arrangements across the floor of the tank.

What is new in tank manufacturing are companies that supply special nonstandard features that are specific to a company’s applications—for example, stainless-steel rim angles in lieu of wing girders on an open top tank that will support anaerobic digesters, or diffused air grids across the floor, or accommodations for a certain type of digester. If a tank manufacturer can talk the talk of your industry and suggest adaptations and attachments to accommodate special needs, the company probably will ask the right questions to develop a solution and provide an exceptional tank to complement your system.

Whether a system will accommodate enormous quantities of water or the water treatment facility is small, tanks may provide more than just storage. They may provide solutions for keeping systems running smoothly. Beyond some key elements in tank manufacturing, you will be better prepared to determine what type of tank will work best for your job.

Key Elements

First, tanks that are most commonly used in water processing and treatment today are constructed of concrete, carbon or stainless steel. Carbon and stainless steel tanks come in three common designs: field-welded, factory-welded and field-bolted. Each design and material of construction has its advantages and disadvantages.

Concrete tanks commonly have been used because they accommodate exceptionally large volumes of storage. Because concrete is porous, a leak tolerance up to 0.005% is expected and acceptable; however, small leaks make an impact during freeze-thaw cycles by causing cracks and exposing reinforced walls within where corrosion may reach and take hold.

Field-welded tanks are also used to accommodate exceptionally large storage capacities. They require certified welders on site and longer construction cycles to accommodate weld inspections and interior and exterior coating application in the field. On the flip side, tanks that are welded at the factory may be shipped already coated and ready to install, while restricted to smaller sizes (often 15 ft in diameter) in order to be shipped by truck and railcar.

Somewhat less well known are bolted tanks, which have panels that are coated at the factory and erected in the field with hardware and gaskets. Bolted tanks that incorporate a durable flange panel design perform well in liquid storage and offer low maintenance. Using bolted tanks also may compress the construction cycle because they may be erected easily and put into service.

Considering Individual Needs

The individual job or project will dictate the capacity needed for each storage tank within the system. The end use of the tank will be most important for determining design. Consider available space. Tanks may be designed as tall and slender (stovepipes) or short and wide depending on ground area available. Environmental conditions such as high winds or strong seismic activity should be taken into consideration, as they may require that a tank be of shorter height and wider width. Does your project necessitate that tank construction occur during cold winter months? Be aware that weather and environmental conditions will affect construction and coating of cement and field-welded tanks but have less of an impact on factory-welded or bolted tank construction.

If the facility being built may be expanded in the future, plan for the possibility now. Building a new tank is more expensive than expanding an existing one—think upward. Incorporate expansion into the original design by including a foundation and choosing starter rings that are certified to accommodate additional volume. Also, choose materials of construction that are easily expandable, such as bolted steel panels that are individually coated at the factory. Welded tanks may be expanded but will require recoating of the full interior tank surface to ensure a smooth, consistent coat. Concrete tanks are not readily expandable.
All liquids—potable water, wastewater and chemicals—are aggressive toward tank walls. Two important considerations are the coating used on the interior surface of the tank and the tank’s long-term maintenance requirements; these two issues go hand in hand. The better the quality of the coating found on the interior of the tank, the less the possibility of corrosion and the need to repair or recoat the tank in the future.

The key to tank coatings lies in their application. Coatings applied at the factory will deliver a more consistent and regulated coat and therefore, better corrosion resistance for the long term. Coatings that are thermally cured at the factory are even better, as the coat quality is not subject to environmental conditions or ambient air. Coatings applied in the field are subject to inconsistencies or small missed spots, as well as environmental conditions during the curing process.

During the life cycle of the tank, maintenance will be a key issue. Because corrosion is the principal enemy of the tank, a poor-quality coating or application process will necessitate time-consuming maintenance and recoating, usually in eight to 12 years. If not treated properly, corrosion may cause contamination of the product being stored and damage the integrity of the tank wall, shortening the life of the overall system.

Finding a Vendor Fit

While a variety of tank manufacturers fill the market, not all tank vendors are the same or understand water and wastewater processing equally. The longer a manufacturer has been in business, the more likely it will understand your specific needs and requirements.

Consider choosing a vendor that has received its ISO Quality Certification or is API-certified. By the same token, be cautious of vendors that claim manufacturing to API standards; if they do not hold the industry certification, there is no assurance they manufacture to those standards. Consider requesting job histories or client references to verify experience in an industry. While that may seem like extra work, it will reveal a vendor’s ability to accommodate your needs and showcase previous projects.

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