ZCL | XERXES®

making a lasting difference®

Fiberglass Storage Tanks

for Water Applications

Fiberglass Water and Wastewater Tanks

One Company. Two Trusted Brands

Xerxes® and ZCL® are widely recognized and well-respected brands that are part of the ZCL Composites Inc. group of companies. For more than three decades, ZCL, a publicly traded company, has manufactured underground and aboveground storage tanks for a wide range of liquid storage applications. Our growth has climbed steadily as fiberglass has increasingly become the preferred material of tank construction.

We fabricate products from manufacturing facilities strategically located throughout North America. Xerxes, with its distinct red product color, is our U.S. brand, while ZCL with a well-established green product, is our Canadian brand. With both brands, customers can be confident that they selected the highest-quality storage tank available that is designed and manufactured by a team of experienced professionals dedicated to providing products that "make a lasting difference."

Experience Matters

Like most market leaders, our decades-deep track record of innovation and product performance separates us from competitors. With more than 200,000 storage tanks installed in North America, we have a significant base of satisfied customers who continue to specify the Xerxes and ZCL brands. Today, we are North America's largest manufacturer of underground storage tanks, and we provide products for many of the world's largest corporations as well as individual property owners needing bulk liquid storage.

The Xerxes and ZCL brands are most widely known for safely storing motor fuels and other petroleum products at thousands of retail, government and commercial fueling facilities throughout North America and the world. In this highly regulated industry, structurally strong, corrosion-resistant, product-tight tanks with a proven tank record are the only option most customers consider. Increasingly, agencies and individuals all over the U.S. and Canada place a greater significance on our water resources, and simultaneously the quality of our water-storage infrastructure.

At Xerxes and ZCL, we have applied years of experience fabricating petroleum tanks to designing tanks and accessories specifically for the extensive water and wastewater industry. We start with the same design fundamentals that go into manufacturing fuel tanks — material that provides long-term corrosion resistance, leak-free design and a robust structure. We then design accessories that address the unique needs of the water industry. The result is a continually evolving range of innovative products.

Wide Range of Models and Options

Best known as North America's largest manufacturer of underground storage tanks, a growing part of our product offering includes a variety of aboveground vessels used to store and process liquids. Aboveground storage tanks, whether horizontal or vertical in design, as well as below-grade wet wells and basins are common types of tanks used in water and wastewater applications. The benefits of using fiberglass as a material of tank construction apply to both aboveground and below-ground tanks.

Underground Tanks

There are many inherit benefits to installing a large water-storage vessel underground. They include optimizing property use and site aesthetics as well as addressing many weather considerations. When selecting a buried tank, a number of unique considerations come into play that differ from aboveground tank placement. Corrosion resistance and structural integrity are the most obvious.

Fiberglass is the ideal material where soil corrosion can shorten the life of tanks made from other materials. Additionally, fiberglass is ideal for burying storage tanks that must handle conditions such as traffic, soil and hydrostatic loads. There is no question that decades-long experience in fabricating storage tanks for underground installation makes us the superior choice.

Aboveground Tanks

For many water and wastewater storage needs, an aboveground tank is best suited to the individual project. Typically aboveground tanks are designed for vertical placement, which provides a smaller installation footprint, or for horizontal placement in sites with height limitations.

For both of these basic designs, we use a variety of fabrication methods, such as filament winding or chop spray, depending on site and customer requirements. While different design parameters apply to aboveground and underground tanks, the corrosion resistance that fiberglass offers in all of these designs is an important feature to project designers and tank owners.

Beyond their basic design, our aboveground tanks are available with a wide range of design enhancements, such as insulation, ladders and seismic-load features.

Wet Wells

Buried vertical vessels are generally referred to as wet wells or basins. While less common than horizontal buried tanks in water and wastewater applications, wet wells are often a critical component in projects where limited space is a factor. In these instances, large capacities with deeper burial can be accomplished.

Wet wells are also routinely designed into projects in conjunction with one or more horizontally installed tanks. This provides a central point of collection with a manifold piping design. Whether the burial is horizontal or vertical, corrosion resistance and a robust structural design are both critical to a long-term tank life.

Why Choose a Fiberglass Tank?

Specifying engineers and facility tank owners have many choices when it comes to materials of construction for water storage tanks. They have an even greater range of choices in manufacturers. Tank selection generally comes down to structural strength, corrosion resistance, watertightness, and ease and cost of installation. A Xerxes or ZCL fiberglass tank, installed above or below grade, is the clear choice when each of these important factors is analyzed.

Here are some design and performance considerations when considering materials other than fiberglass.

Fiberglass vs. Concrete

- **Structural Design** — While concrete is a strong material when used in buried tank designs, the flat tank top design is usually not rated for traffic load conditions without a design upgrade adding to the cost.
- **Installation** — Precast factory-manufactured tanks are generally limited to small capacities. Larger tanks are formed and poured in the field involving many days of site work, often in less than ideal conditions. One piece, factory-manufactured fiberglass tanks don't require field-constructed seams/seals and can be installed in far less time, saving money.
- **Corrosion** — Concrete, and the steel reinforcement that is typically required, can be subject to aggressive corrosive attacks. The solution often requires expensive liners that are likely to require inspection and maintenance.
- **Watertight Design** — Concrete tanks, whether precast or field-constructed, do not offer the watertight design advantages or watertight test capabilities that a fiberglass tank offers. Concrete is vulnerable to cracking and leaking.

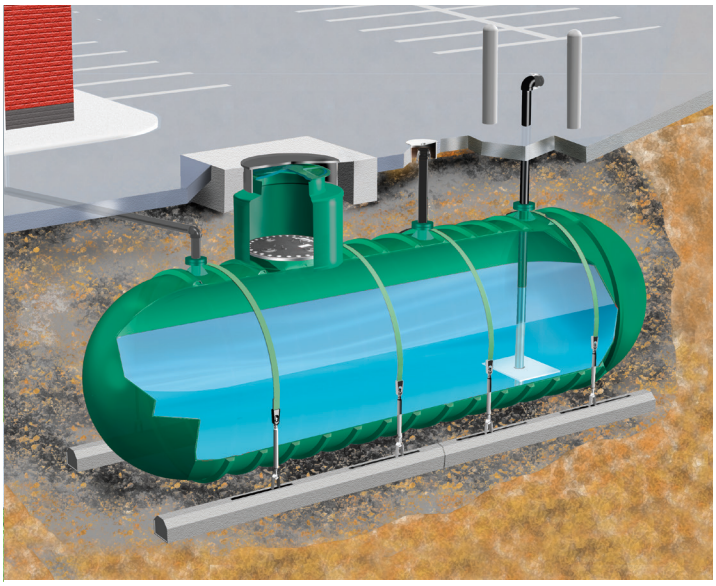
Fiberglass vs. Polyethylene

- **Structural Design** — Similar to fiberglass, polyethylene (poly) tanks use geometry or shape to achieve a desired load rating. Thermoplastic materials have much lower modulus than reinforced thermoset materials such as fiberglass. As a result, poly tanks are generally limited with regard to common burial conditions such as groundwater table, burial depth and traffic loads. Buried fiberglass tanks are designed to withstand a wide range of these and other load conditions.
- **Installation** — Poly tanks are generally not available for underground applications beyond individual tank capacities of 2,000 gallons. Applications that require a tank with a capacity greater than 2,000 gallons typically require installation that manifolds multiple small tanks together when poly tanks are used. The installation method of piping small tanks together to achieve a necessary capacity results in an inferior installation on many levels. Buried piping connections are often the point where leaks occur.

Fiberglass vs. Steel

- **Corrosion** — Metal can't match the rust and corrosion resistance of composites. With buried tanks, both internal and external tank corrosion are big concerns. Coatings and linings are the traditional protective choices with steel, which adds to cost and long-term maintenance. Also, coatings and linings are only as good as their surface preparation and application.
- **Installation** — Underground steel tanks weigh as much as four times more than comparably sized fiberglass tanks, which adds to the installation costs and potentially limits the locations where steel tanks can be used. Much smaller and less expensive lifting equipment can be used for lightweight fiberglass tanks. This expands the range of difficult site conditions where fiberglass tanks can be easily installed.

Fire Protection Applications



Building-industry and fire-safety codes increasingly require that dedicated standby sources of water be available to fire fighters to supplement or replace a primary water source that is either not reliable or accessible. NFPA codes address these situations and provide capacity guidelines for alternative water sources. Insurance requirements are also increasingly driving the need for a dedicated, reliable source of water for fire protection needs.

Within the fire protection industry, system designers and installers are quickly determining that the best solutions for these changing requirements are the use of an underground or aboveground fiberglass storage tank. With their lightweight materials and the wide design flexibility, fiberglass tanks provide storage solutions (inside a facility or buried outside) that are out of sight and protected from freezing conditions.

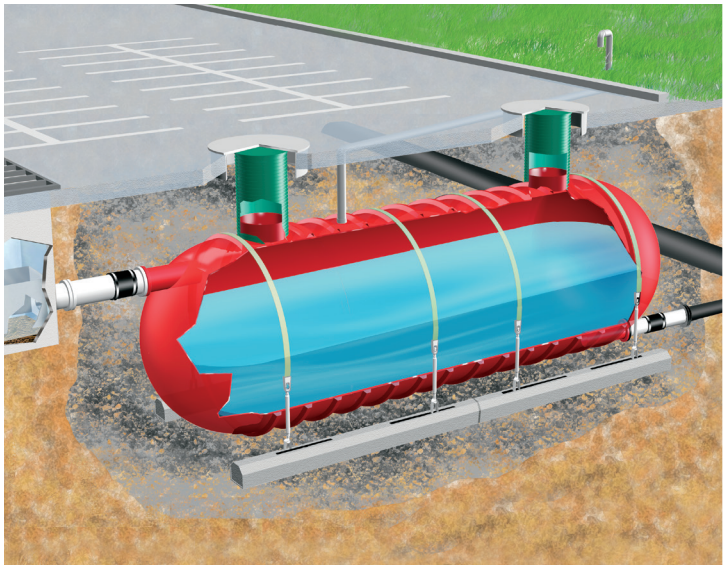
Standby water storage, when used in fire protection applications, is serving a critical function. Nothing less than a reliable, watertight and corrosion-resistant vessel should be used, particularly in the case of buried tanks, where leaks might go unnoticed. Choosing inferior tanks bears risks, which is why our fiberglass tanks are more and more popular for fire protection systems.

Typical Applications:

- **Stand-Alone Applications** — As detailed in NFPA 1142, *Standard for Water Supplies for Suburban and Rural Fire Fighting*, water-storage cisterns are commonly installed in locations where "adequate and reliable water supply systems" do not exist. Examples include residential neighborhoods, churches and commercial buildings beyond the reach of a municipal water supply. A dry hydrant connection to the storage tank allows fire trucks to quickly access a reliable supply of water.

- **Supplemental Applications** — Buildings with sprinkler systems generally rely on a municipal or private well-water supply. In some cases, these are considered inadequate and a secondary water source is required to supply the pressurized sprinkler system. Fiberglass tanks for this use are discussed in NFPA 22, *Standard for Water Tanks for Private Fire Protection*. This standard provides requirements for the design, construction, installation and maintenance of tanks and accessory equipment that supply water for private fire protection systems.

Water Collection Applications



The need for collection and reuse or processing of water is gaining in popularity and necessity every year. Drought conditions highlight the need for water conservation, but market factors such as the cost of water, "green building" concepts and water quality are other examples of the increasing need to conserve water and mange it wisely.

An important step in water conservation practices is to collect and reuse water. Large-capacity fiberglass storage tanks allow for the capture and reuse of water that might otherwise be wasted at many commercial and institutional properties. The U.S. Green Building Council's (USGBC) LEED® rating system for buildings recognizes the importance of water-use reduction and provides LEED points for facility designs that incorporate collection and reuse systems. Fiberglass tanks are frequently specified in these projects.

Fiberglass tanks, both underground and aboveground models, are ideally suited for water collection.

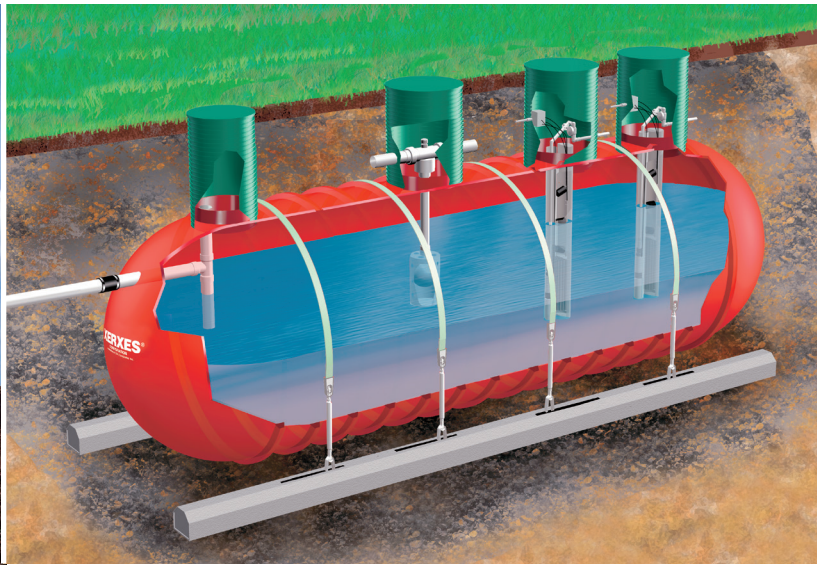
Typical Water Collection Applications

- **Rainwater Harvesting Systems** — Capturing rainwater, practiced for centuries, is rapidly growing in popularity for a variety of reasons. Captured water is often reused for irrigation purposes at large facilities thereby reducing the use of potable water. Many types of collection, filtering and distribution system packages are available in the market today, and many incorporate aboveground and underground fiberglass tanks into their system designs.

- **Greywater Systems** — Greywater systems capture water use and drainage within a building rather than the rainwater that falls on the roof or the property. Drainage from sources such as sinks or showers can be captured, filtered and reused for other non-potable uses, such as toilet flushing. Changing building codes throughout North America recognize the opportunity for maximizing a facility's water-use management and are accepting greywater plumbing designs. Buildings incorporating greywater typically collect it in a fiberglass tank and distribute it through a parallel plumbing system.

- **Stormwater Management** — Regulations governing stormwater quality have been in place for years and are increasing both in terms of numbers and enforcement. Rather than capture and reuse, these applications require "detention or retention" of stormwater runoff for the purpose of improving water quality before it leaves the property. This can be accomplished in different ways, and, in some cases, requires treatment or filtering. Retention ponds are a common solution, but often not the best or safest option. Use of an underground fiberglass tank provides property utilization and safety advantages that site designers have begun to recognize.

Onsite and Municipal Wastewater Applications



A fiberglass underground tank is the ideal product for collecting and processing wastewater because of the highly corrosive conditions inside these tanks. Hydrogen sulfide gas can quickly reduce the useful life of storage tanks made from alternative materials. The non-corrosive nature of a fiberglass tank means that special liners, with their added cost and maintenance, are not required as they are in tanks made of other materials.

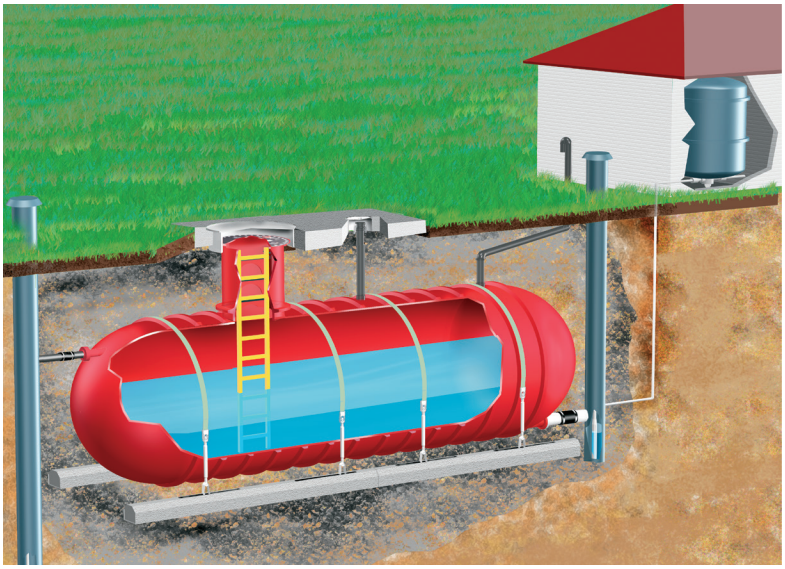
Another important feature of a fiberglass underground tank used in wastewater systems is its round, cylindrical shape. Concrete tanks, with flat bottoms and corners, tend to collect product and are difficult to fully drain or clean. The rounded, smooth bottom of a fiberglass tank minimizes that concern.

Typical Wastewater Applications

- **Onsite Systems** — Otherwise referred to as septic, onsite wastewater systems are growing in popularity as an alternative to traditional sewer-pipe municipal designs. Many different types of technologies are employed in onsite packages, all requiring a range of tank sizes and accessories. While we do not offer a wastewater system package, most of the packaged products available in the market find our tanks to be a perfect component for their design concepts.

- **Municipal Systems** — The most common application for Xerxes tanks in a municipal system is providing excess storage in the case of a stormwater surge (often referred to as combined sewer overflow or CSO). A level of storage or pretreatment is often required at municipal wastewater treatment plants served by combined wastewater and stormwater sewer lines. Regulations are increasingly strict regarding these storm-surge occurrences, where, in the past, the excess wastewater may have been allowed to run untreated into lakes, rivers or oceans. Underground storage capacity, with some level of pretreatment, is an increasingly popular solution to meet this requirement.

Potable Water Applications



Designers and owners of water systems recognize that when the intended use is for potable drinking water, careful consideration is needed when choosing the tank material and manufacturer. Unlike other water storage tanks, such as those used for rainwater or stormwater, potable water tanks have clear health and safety considerations. This is why third-party standards, such as the National Sanitation Foundation (NSF) Standard 61, are relied upon to evaluate the suitability of products and the materials used to manufacture these products.

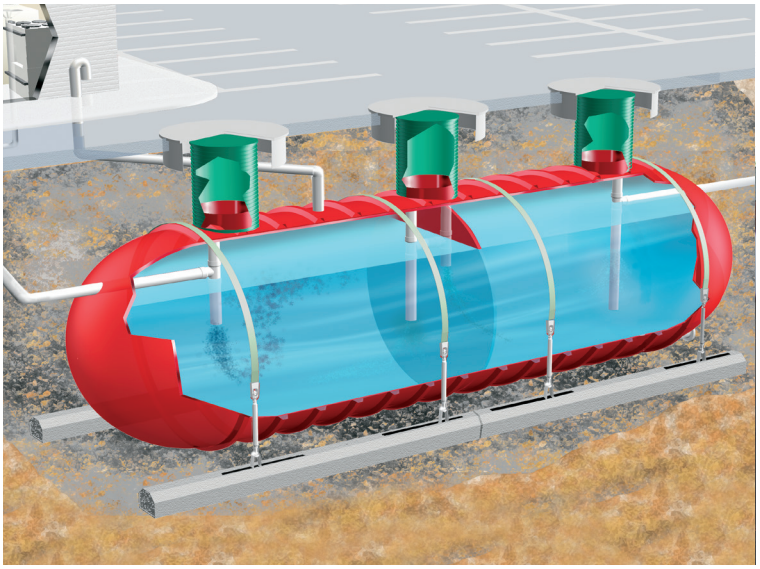
The majority of potable water storage tanks available on the market today refer to the NSF Standard 61 listing. Upon close examination, systems designers learn that the completed storage tank itself is not listed. Rather, the materials used in producing the tank (or, more commonly, the lining of the tank interior) are the listed materials. Material manufacturers, such as resin producers, submit their raw materials to NSF for evaluation. These listed materials are then used by tank manufacturers for the interior surface of a tank without the engineering restrictions or third-party oversight of the materials application that comes with a listed and labeled tank.

The Xerxes/ZCL Difference

While we offer aboveground and underground tanks that use NSF-61 listed resin in their construction, we go a step beyond that by submitting tank samples for lab testing and opening our manufacturing facilities for random, third-party inspections. This much more thorough evaluation and testing of a potable water tank enables us to certify compliance with NSF Standard 61 by applying a unique label to the tank. With very few manufacturers able to provide this certification, it's another clear example of the Xerxes/ZCL difference. When selecting a potable water tank, project designers and owners should require that the completed tank be listed to NSF Standard 61, and that a label verifying the listing is attached to it.

When it comes to storage of potable water, why accept anything short of the highest possible standard?

Grease Interceptor Applications



Underground grease interceptors are commonly used in commercial kitchens to collect fats, oils and grease (FOG) before they enter a wastewater disposal system. Regulations are increasingly mandating their use as an important step in improving municipal waste-water-treatment plant efficiency. These tanks are also important in removing FOG from the waste stream of commercial onsite septic systems. As with the waste stream from septic systems, the FOG collected inside a grease interceptor creates a highly corrosive internal tank environment. Concrete interceptors often have a short life since the corrosion attacks the tank materials, resulting in leaks and structural failure. Some concrete vessels use an internal liner to attempt to extend the tank's useful life, but liners are not a substitute for use of a non-corrosive material such as fiberglass to fabricate the tank. As with septic tanks, another design advantage fiberglass offers is the cylindrical shape, which makes pump-out cleaning easier than in a flat-bottomed concrete tank.

Grease interceptors are often installed under parking lots of fast-food restaurants, truck stops, casinos and similar retail facilities where parking space adjoins the building. The H-20 load-rated design of our tank adds another advantage over alternative tanks. Our fiberglass grease interceptors are available in a wide range of sizes for both underground and aboveground installation, making them the ideal solution for use in these applications.

Consider the following benefits:

- **Non-Corrosive** — Fiberglass tanks are superior to alternative tank materials in the aggressive corrosive environments found in the grease collection tanks.

- **Ease of Installation and Pump Out** — A lightweight fiberglass tank, with its cylindrical geometry, makes the installation and periodic pump-out process easy.

- **Traffic Load Design** — Standard fiberglass tank designs, without expensive upgrades, can be conveniently installed outside a building in a parking area, maximizing property use.

- **Warranty** — Our grease interceptor is backed by a 30-year limited warranty for internal corrosion.

- **IAPMO** — Models listed by the International Association of Plumbing and Mechanical Officials (IAPMO) are also available.

Industrial Wastewater and Chemical Applications

The collection of wastewater from a variety of sources and safe storage of these liquids is a critical design requirement in many types of facilities. Whether it is runoff from a factory wash-down operation, a holding tank for emergency spills, decontamination drain collection or landfill leachate, wastewater storage tanks play a critical role in protecting the environment.

Proper selection of storage-tank materials suitable for wastewater, and the diluted chemicals that might be contained, is essential. Not all tank construction materials are well-suited for these applications. On the other hand, fiberglass is a great solution for a wide variety of these collection and containment needs. We work closely with our material suppliers to analyze each customer's specific collection requirements to determine the compatible tank specifications.

In a market that recognizes the benefits of fiberglass composite materials, our wastewater/chemical tank is often the wisest choice.

Typical Applications:

- **Food Processing Facilities** — Frequent wash down of equipment in this industry is common, requiring collection as part of the drainage system.

- **Aircraft Tarmacs** — These facilities often require collection of the aqueous film-forming foam (AFFF) routinely used at hanger and tarmac facilities.

- **Shower Decontamination** — Hospitals, clinics, laboratories and similar institutional facilities often need emergency decontamination capabilities where wash down requires collection.

- **Landfills** — Collection of leachate runoff (generally very corrosive) is routinely designed into a landfill drainage system.

- **Other** — Diverse waste stream requirements exist at commercial, institutional, educational and military facilities. We have experts who review specific collection-tank requirements to determine whether we have a vessel designed for a particular facility requirement.

Xerxes Tank Data

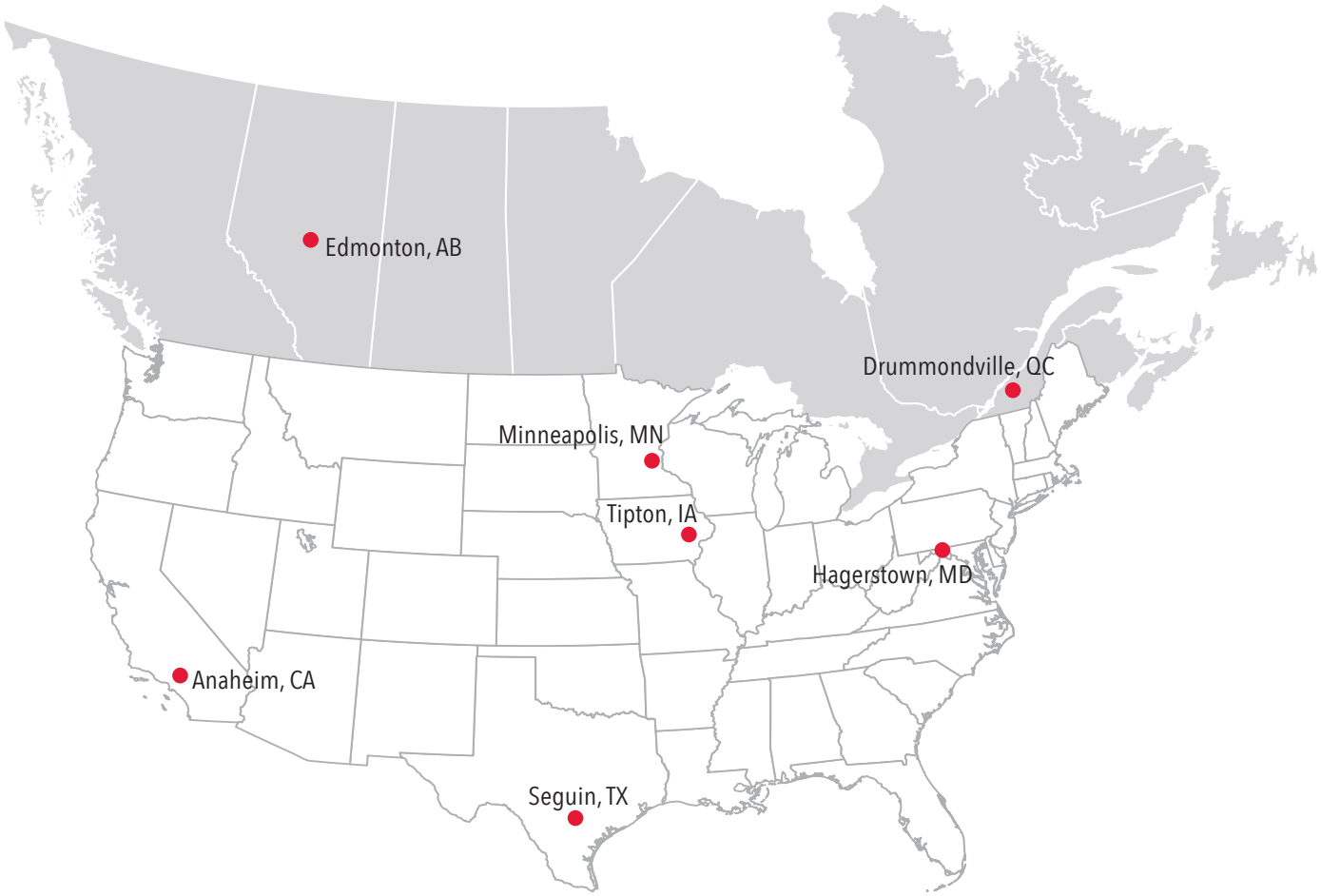
(Listed in U.S. Gallons, Feet/Inches and Pounds)

	Nominal Tank Capacity (gallons)	Single-Wall and Double-Wall Tank Length	Single-Wall Tank Weights (lbs)	Double-Wall Tank Weight (lbs)
4-foot-diameter tanks	600	6′-11 7/8″	600	900
	1,000	11′-3 7/8″	900	1,400
	1,500	16′-0″	1,400	2,100
6-foot-diameter tanks	1,500	10′-7 1/4″	1,000	1,700
	2,000	13′-5 3/4″	1,300	—
	2,500	13′-5 3/4″	—	2,200
	3,000	16′-4 1/4″	1,600	2,600
	4,000	21′11 1/8″	2,200	3,600
	5,000	26′-5″	2,600	4,300
	6,000	30′-8 3/4″	3,000	5,000
8-foot-diameter tanks	3,000	12′-3″	1,400	2,100
	4,000	15′- 1/2″	1,800	2,700
	5,000	17′-8 1/2″	2,200	3,200
	6,000	20′-6 1/2″	2,600	3,700
	7,000	23′-1″	3,000	4,300
	8,000	26′- 1/2″	3,400	4,800
	9,000	28′-9″	3,800	5,400
	10,000	31′-6 1/2″	4,200	5,900
	11,000	34′-4″	4,700	6,400
	12,000	37′- 1/2″	5,100	7,000
	13,000	41′-2″	5,600	7,600
	14,000	43′-11 1/2″	6,000	8,200
	15,000	46′- 9″	6,600	9,100
10-foot-diameter tanks	10,000	21′-5 1/4″	4,500	4,900
	11,000	22′-9 3/4″	4,800	5,200
	12,000	24′- 1/4″	5,100	5,600
	13,000	25′-6 3/4″	5,500	5,900
	14,000	26′-11 1/4″	5,800	6,300
	15,000	29′-5 3/4″	6,600	7,000
	20,000	37′-8 3/4″	8,600	9,000
	22,000	42′- 3/4″	9,700	10,500
	25,000	47′-6 3/4″	11,100	11,800
	30,000	55′-9 3/4″	13,200	14,000
	35,000	64′- 3/4″	15,400	16,500
	40,000	73′-8 1/4″	17,900	19,000
12-foot-diameter tanks	20,000	29′-4″	9,200	14,000
	25,000	35′-7″	10,800	16,600
	30,000	43′-1″	13,100	19,900
	35,000	49′-4″	14,700	22,500
	40,000	54′-4″	16,100	24,600
	48,000	65′-7″	19,300	29,500
	50,000	68′-1″	20,000	30,500

ZCL Tank Data

(Listed in Litres, Millimeters and Kilograms)

	Nominal Tank Capacity (litres)	Single-Wall and Double- Wall Tank Length (millimeters)	Single-Wall Tank Weights (kilograms)	Double-Wall Tank Weights (kilograms)
4-foot-diameter tanks	2,500	2,538	300	400
	3,900	3,395	400	500
	5,000	4,380	500	600
6-foot-diameter tanks	10,000	4,520	500	900
	15,000	6,604	800	1,300
	20,000	8,465	1,000	1,700
	25,000	10,420	1,300	2,200
8-foot-diameter tanks	15,000	3,994	500	900
	20,000	5,137	900	1,200
	25,000	6,090	1,100	1,400
	30,000	7,264	1,300	1,700
	35,000	8,185	1,500	2,000
	40,000	9,392	1,800	2,300
	45,000	10,363	1,900	2,500
	50,000	11,328	2,100	2,700
	60,000	13,500	2,600	3,400
	65,000	14,522	2,900	3,700
10-foot-diameter tanks	50,000	7,449	2,600	2,900
	55,000	8,280	2,900	3,200
	60,000	8,827	3,100	3,300
	65,000	9,576	3,400	3,600
	70,000	10,395	3,600	3,900
	75,000	10,903	3,800	4,100
	80,000	11,582	4,000	4,400
	85,000	12,268	4,200	4,700
	90,000	13,068	4,500	5,000
	100,000	14,345	5,000	5,400
	110,000	15,723	5,400	5,900
	115,000	16,097	5,500	6,100
	135,000	18,745	6,400	7,100
	150,000	21,406	7,300	8,100
12-foot-diameter tanks	80,000	8,941	4,200	6,400
	95,000	10,846	4,900	7,600
	120,000	13,132	6,000	9,100
	135,000	15,037	6,700	10,300
	150,000	16,561	7,400	11,200
	185,000	19,990	8,800	13,400
	190,000	20,752	9,100	13,900



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