

ENVIRONMENTAL ENGINEERING

GREENTANK

Fibreglass Underground Water Tanks



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Fibreglass Tanks for Long-Term Storage of Water

As communities, businesses and industries become increasingly accountable to meet environmental requirements for liquids that require safe, design-proven storage, Greentank is at the forefront with innovative answers. When considering the options in customized systems to store water, facility designers and owners look for a long-term, structurally strong, watertight and cost-effective option. That is exactly what the Greentank fibreglass tank is.

Greentank is long established and well-known as a major tank supplier to the petroleum industry, with hundreds of tanks installed throughout New Zealand. Many of the worlds largest oil companies rely on Greentank to supply environmentally safe underground tanks for the storage of petroleum products at their retail service stations.

Throughout the neighbourhoods and communities of New Zealand, Greentank underground tanks are in place, simultaneously storing products and protecting the environment.

Today Greentank is taking its place in those same neighbourhoods and communities as a major supplier of storage tanks for water — potable water, fire-protection water, irrigation water, grey water, rain-water, stormwater and emergency-supply water — as well as other liquids, such as septage, leachate and chemicals. Each time a Greentank fibreglass underground tank is delivered to a customer, the same performance standard has been met — a vessel for safe underground storage of liquid and careful protection of the environment.

Tanks Designed and Manufactured by a Long-Time Industry Trail-Blazer

Greentank is a trail-blazer in the design and manufacture of high-quality, cost-effective products that help protect the fragile relationship between humans and their environment. Each Greentank water tank represents many years of innovation and proven experience developing and fabricating fibreglass storage tanks for underground storage of liquids.

At Greentank, excellence in service is as highly valued as excellence in product design and manufacturing. Greentank strives to provide customers with prompt, economical delivery and quality service throughout New Zealand. That gives Greentank tanks one more advantage, they are readily available to customers wherever they are.

Features of GREENTANK Water Tanks

- Constructed of rustproof, long-lasting fibreglass
- Manufactured to meet customers functional requirements
- Designed for added strength with integral ribs
- Designed for H-20 load conditions
- Easy to ship and install
- Can be purchased with accessories that allow for both pre-installation and post-installation pressure testing
- Manufactured to applicable requirements of Underwriters Laboratories (UL) 1316
- Manufactured with resin conforming to NSF Standard 61 requirements (potable water tanks)
- NSF listed tanks also available
- Available in sizes from 2,000 litres to sizes in excess of 150,000 litres





Watertight Tanks Featuring the Many Benefits of Fibreglass

A fibreglass water tank, both by virtue of its materials and its design, is inherently the superior choice for safe, long-term storage of water for a wide range of applications. The best storage system for water is structurally strong, corrosion-resistant, watertight, easily installed and cost-effective. All these elements come together in the design and manufacture of a Greentank fibreglass water tank.

Greentank uses only high-quality resin and glass in the manufacture of its fibreglass tanks. Integral ribs in the tanks add strength to the structure. Because the integral ribs and tanks are made of the same materials and are manufactured simultaneously, the result is an extremely robust tank.

Another common material used in tanks today is concrete, in either the form of precast concrete or cast-in-place concrete. Precast tanks are heavy, and therefore can be difficult to ship and to install. When larger capacity tanks (approximately 20,000 litres and greater) are required, precast tanks are generally not available. Therefore, a cast-in-place tank is the only concrete option. Cast-in-place tanks cannot undergo the careful quality-control process that fibreglass tanks manufactured in a factory do. This quality control is key to producing a strong, watertight tank. The installation and proper curing of cast-in-place tanks can be very time-consuming, taking days or weeks, as opposed to the one-day installation typical for a Greentank fibreglass tank.

Since a Greentank fibreglass tank is significantly lighter in weight than comparably sized concrete tanks, a fibreglass tank is much easier to ship

and install. This is especially important tanks are installed in hard-to-access or even for water applications because many of these remote locations, or are at sites with limited excavation space, and the heavy equipment required to install concrete or steel tanks presents a problem.

Lightweight fibreglass tanks are ideally suited to a variety of water tank projects, whether the site is in a rural community, a remote location or the middle of a city. A few typical examples of the many recent Greentank water tank installations are: potable water at Oamaru Hospital, re-cycled coolant water at a Christchurch plastic extrusion factory and a firewater reservoir in the basement of an Auckland office building.

Since water by nature can create a corrosive environment, it is likely that rust can be a major weakness in certain underground water storage systems. Unlike tanks made of other materials, Greentank fibreglass tanks are constructed of materials that are inherently rustproof. In contrast, to guard against corrosion or to provide compatibility with the water being stored, tanks constructed of concrete or steel may require internal and external coatings.

Of the tank options available for water storage, a Greentank fibreglass tank offers the best long-term protection against leakage due to both internal and external corrosion.

Not only is a Greentank tank rustproof, it is also watertight. Easily equipped for on-site pressure testing before and after installation, Greentank water tanks give owners the confidence that the tank is watertight from the time it is installed.

Fibreglass Water Tanks for Potable (Drinking) Water Applications

Each Greentank potable water tank is designed and manufactured to meet a customers specific requirements. A major benefit of ordering a Greentank potable water tank is that it can be manufactured with materials that conform to the requirements of NSF Standard 61 — Drinking Water System Components — Health Effects.

The National Sanitation Foundation (NSF) is a leading international organization that develops standards, and tests and certifies products in the areas of public health safety and environmental protection. Greentank potable water tanks are manufactured with a resin that has been approved as conforming to NSF standards for drinking water system components, demonstrating once again that Greentank is a pioneer in its industry.

The process by which Greentank manufactures potable water tanks with materials conforming with NSF standards offers a significant advantage over steel and concrete tanks. The Greentank fibreglass potable water tank is an integral structure incorporating an interior resin system in accordance with NSF standards with a polyester-resin-glass exterior. This is the most effective combination for a potable water tank.

Steel and concrete storage systems typically use internal linings to meet industry standards for potable water. In order to be effective, these linings require a degree of adhesion that can be difficult to obtain in the manufacturing process and to maintain over the life of the system.



When linings are constructed of materials different from the tank materials, the durability of the end product can be compromised. In short, a Greentank fibreglass potable water tank offers many advantages over these systems.

Another significant advantage of a Greentank potable (drinking) water tank is that because it is lightweight a Greentank tank can be easily installed in the remote locations that are common to potable water system installations, such as campgrounds, resorts, national parks and private homes.



Fibreglass Water Tanks for Fire-Protection Water Applications

Growing concerns about fire safety and increased use of sprinkler systems in building construction have resulted in a new demand for underground tanks for the storage of fire-protection water. Because of this, residential and commercial building designers need to find safe, reliable and cost-effective systems for the storage of fire-protection water in their projects. Often, new regulatory codes and insurance requirements are calling for stand-alone, standby water supplies. Common examples of fire-protection water applications are schools, housing developments, medical centers, resort properties and casinos.

Greentank fibreglass water tanks are becoming an especially popular choice for all types of water applications in rural, suburban and urban facilities. Whether the need is as a sole source of water in rural areas or as a standby water reservoir to supplement a pressurized municipal water system, a Greentank tank provides maintenance-free underground storage of water.

In situations where the existing pressurized water supply is inadequate or when water-pressure levels are not dependable a Greentank standby water reservoir provides an ideal solution to building designers, engineers and architects.

A Greentank underground tank used as a water reservoir has many advantages over an aboveground tank used for the same purpose.

For instance, it does not occupy valuable real estate



that could be used for parking or other needs, and it makes the property aesthetically pleasing. Also, since the tank is buried, it does not require the expensive protection against water freezing that might be necessary with an aboveground tank.

A growing trend is to use a water tank as a dual-purpose tank, such as for potable water and fire-protection water. A Greentank fibreglass tank is ideally suited for such dual-purpose applications.



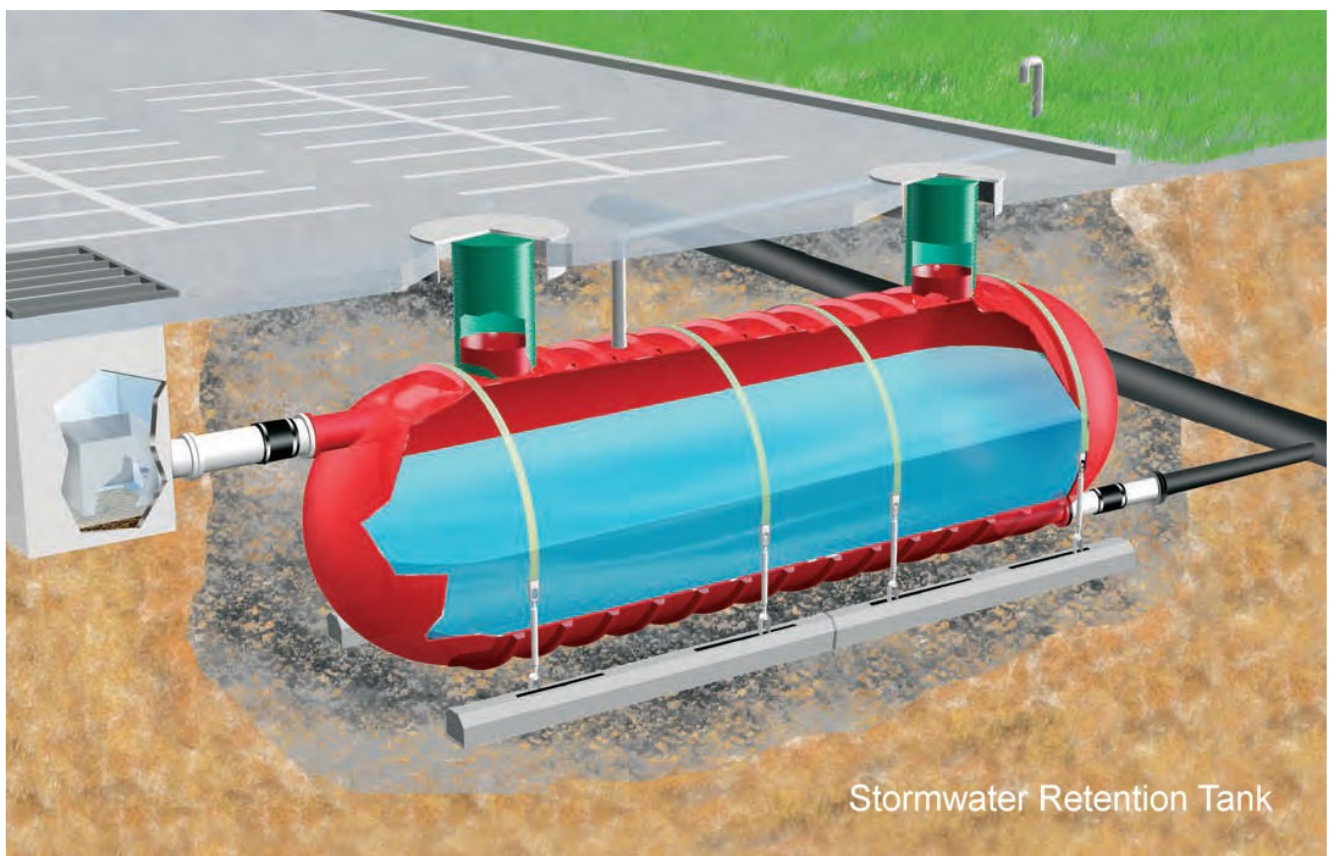
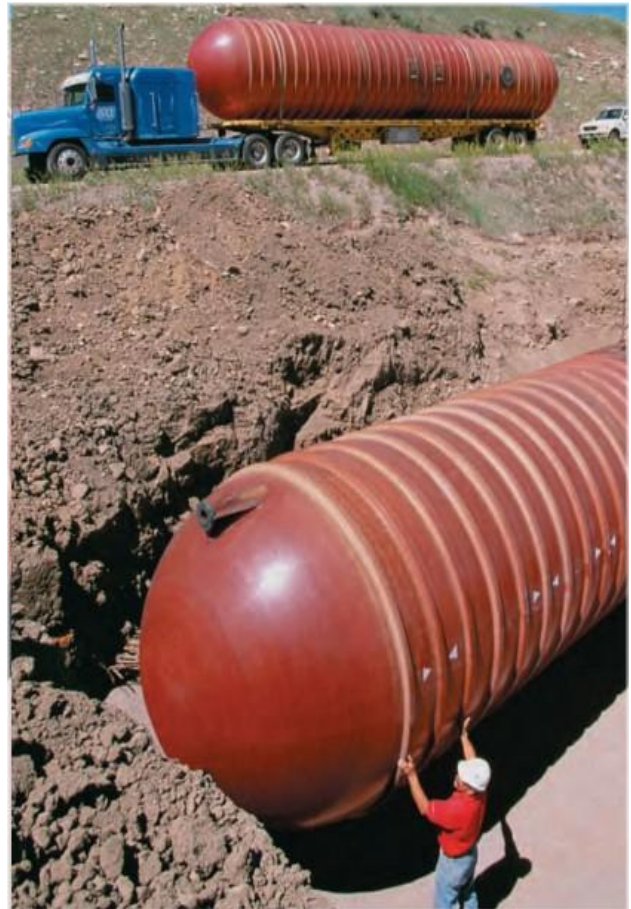
Fibreglass Water Tanks for Storm-Water Retention Applications

Changes in stormwater management are being driven from two directions — environmental concerns and land costs. To address the groundwater contamination or flooding that can occur when stormwater runs directly into sewer systems, new regulations in many communities require a specific retention time before allowing stormwater to run into the drainage system.

Traditionally, a retention pond has been used to meet this requirement. One of the major benefits of using an under-ground water tank for stormwater retention is that it allows developers and property owners to make better use of the property while simultaneously meeting retention-in-time requirements and protecting the environment. With property values high and parking space limited at many commercial sites, this is a significant advantage to property owners. In addition, Greentank tanks are available nationwide and in a variety of sizes.

A Greentank stormwater retention tank has all the usual advantages of an underground fibreglass tank. It is lightweight and, therefore, easy to install. It is watertight and can be purchased to be testable for watertightness. It is corrosion-resistant, thus easy to maintain.

It is H-20 axle-load rated, which means it is ideally suited for use beneath parking lots. When a higher level of stormwater treatment is necessary, a Greentank underground oil/water separator is a superior option. Greentank has a variety of fibreglass products that meet the ever-changing needs of customers for stormwater retention.



Other Common Applications for **GREENTANK** Fibreglass Water Tanks

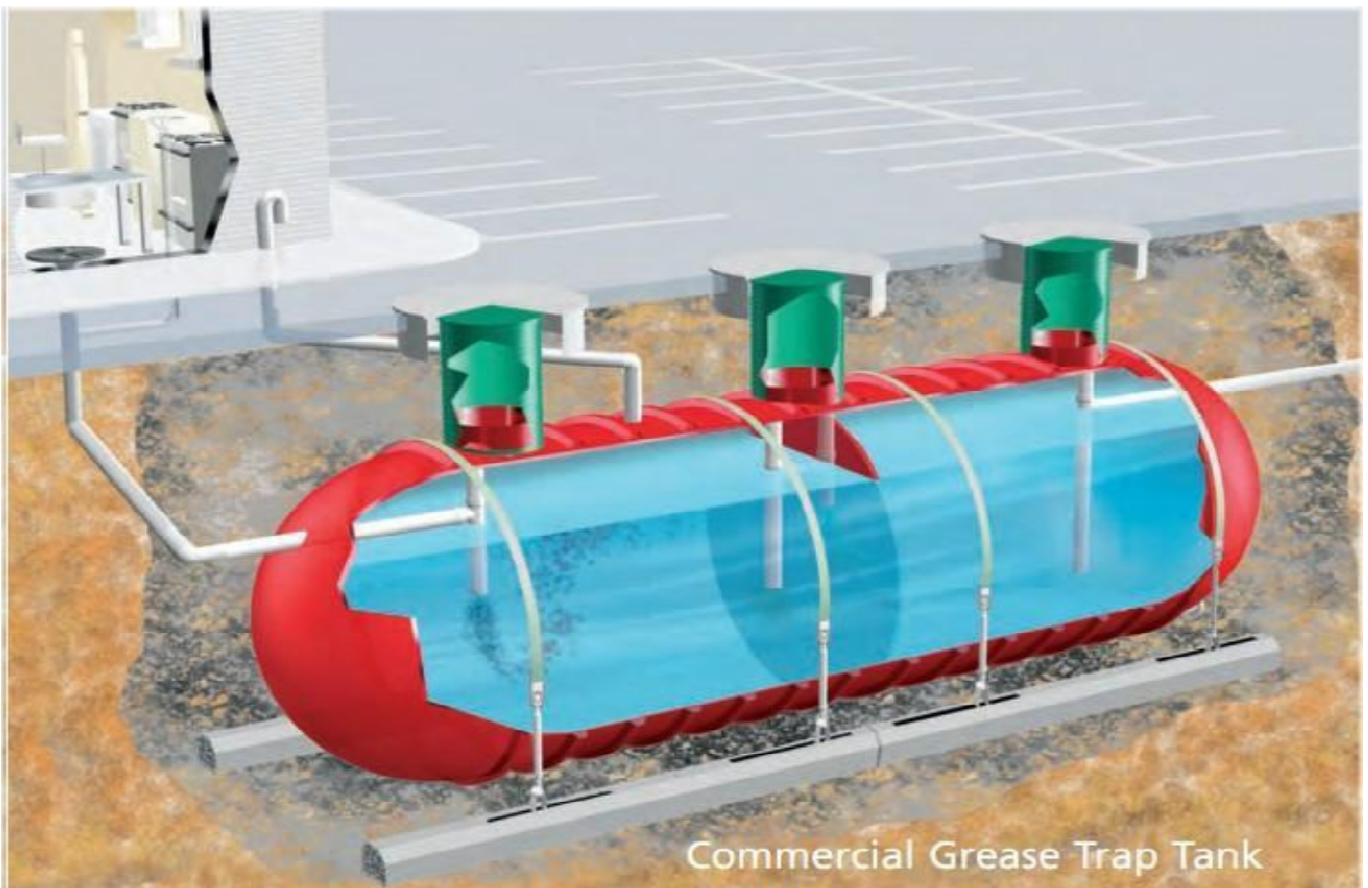
In addition to these uses of a Greentank water tank — for potable water, fire-protection water and stormwater retention — a fibreglass water tank is a superior choice for numerous other water applications. Examples of the flexibility of Greentank water tanks is that they can be designed and manufactured for such diverse applications as field-irrigation water, rainwater collection, livestock and wildlife water supplies, emergency water supplies and grey water (for example, residential dish-washing water, laundry water and bath water). Again, whatever a customers water tank needs, a Greentank water tank can be designed and manufactured to meet that particular application.

In addition to the specific types of water tanks outlined in this brochure, Greentank also manufactures tanks for other water and wastewater applications, oil/water separators with coalescers that can reduce the oil content of stormwater runoff to 10 ppm, grease traps commonly used in commercial kitchen applications and a wide variety of septic tanks that are increasingly popular in on-site wastewater systems. (Contact Greentank to obtain sales literature on these specific products.)

Greentank has a proven record of innovative design and a quality-driven manufacturing process. This results in a Greentank fibreglass tank that is high-quality and competitively priced. A Greentank water tank has the added benefit that it can be removed, recertified and relocated. These features make a Greentank tank a cost-effective option with expanded value for an initial investment.

Typical Water Applications

- National and state parks
- Housing developments
- Schools
- Resorts
- Campgrounds
- Emergency water supplies
- Rural properties
- Rest areas
- Truck stops
- Casinos
- Water recirculation systems
- Large private properties
- Livestock feeding operations
- Residential cisterns
- Car washes



Optional Tank Accessories to Fit a Variety of Water Applications



As the demand for Greentank tanks expands into ever growing types of water applications, the need for specific accessories to complement these tanks expands as well. A goal at Greentank has always been to meet the challenge of a constantly changing market by meeting the functional requirements of system designers and owners. Greentank meets that challenge by developing and manufacturing a wide — and growing — range of water tank accessories such as those listed on this page.



In some cases, Greentank products that are commonly used in the petroleum industry, such as FRP hold-down straps and prefabricated concrete deadmen, have direct application in water tank system designs. In other cases, Greentank has designed products specifically for use as water tank accessories, such as baffles/partition walls, access risers, pump platforms and anti-vortex plates (to name just a few). Together, these products provide solutions for the needs of the water storage industry.



One example of a cost-saving innovation introduced by Greentank is the large-diameter tank bottom sump, which Greentank designed to eliminate the need and expense of a separate lift station when full use of a tanks capacity is necessary. The Greentank bottom sump provides that requirement while at the same time eliminating a potential source of leakage in the piping between a lift station and tank.



Whether a customers particular water storage need is met by the full range of complementary accessories now available, or by a unique solution Greentank develops for a specific customer requirement, Greentank works diligently with customers and the industry to continue to offer solutions to a host of water storage needs.

Optional Water Tank Accessories

- FRP manways (600mm, 762mm and 914mm in diameter)
- FRP manway extensions (variable length)
- FRP or PVC drop/fill tubes
- FRP ladders
- Internal pump platforms
- FRP anti-vortex plates
- Flanged FRP nozzles
- Threaded FRP or steel fittings
- Large-diameter bottom sumps
- Internal baffles/Partition walls
- Hinged and lockable lids
- FRP hold-down straps
- Concrete deadmen