

RESIDENTIAL FIBERGLASS TANKS

Good materials and the right care extend a pressure tank's service life

Because of their excellent corrosion resistance, fiberglass pressure vessels have found their way into numerous water treatment systems, replacing steel vessels. In the residential category, fiberglass vessels are used in water softeners, filters, iron removers and reverse osmosis (RO) water treatment systems.

Figure 1 is a schematic of a residential water softener. As the water treatment system becomes larger, so does the pressure vessel. While vessels used for residential retention or disinfectant treatment usually are less than 120 gallons, commercial uses of deionization and other water treatment can require vessels with up to 2,000 gallon capacities.

There are different maintenance requirements for these two general categories of fiberglass vessels. Once a fiberglass tank is installed in an in-home water treatment system, little maintenance is required though proper preventive care needs to be taken at the installation stage. Figure 2 shows a typical cabinet model water treatment system where the vessel is part of the brine tank. As a result, it comes into intimate contact with salt and moisture. Proper care must be exercised when

choosing the correct tank for this application. Choose a tank that is constructed to resist the conditions in the salt water. Acidic water and salt can present a threat to the surface of the vessel if the incorrect glass or resin system was used in the manufacture of the vessel.

Materials Make the Difference

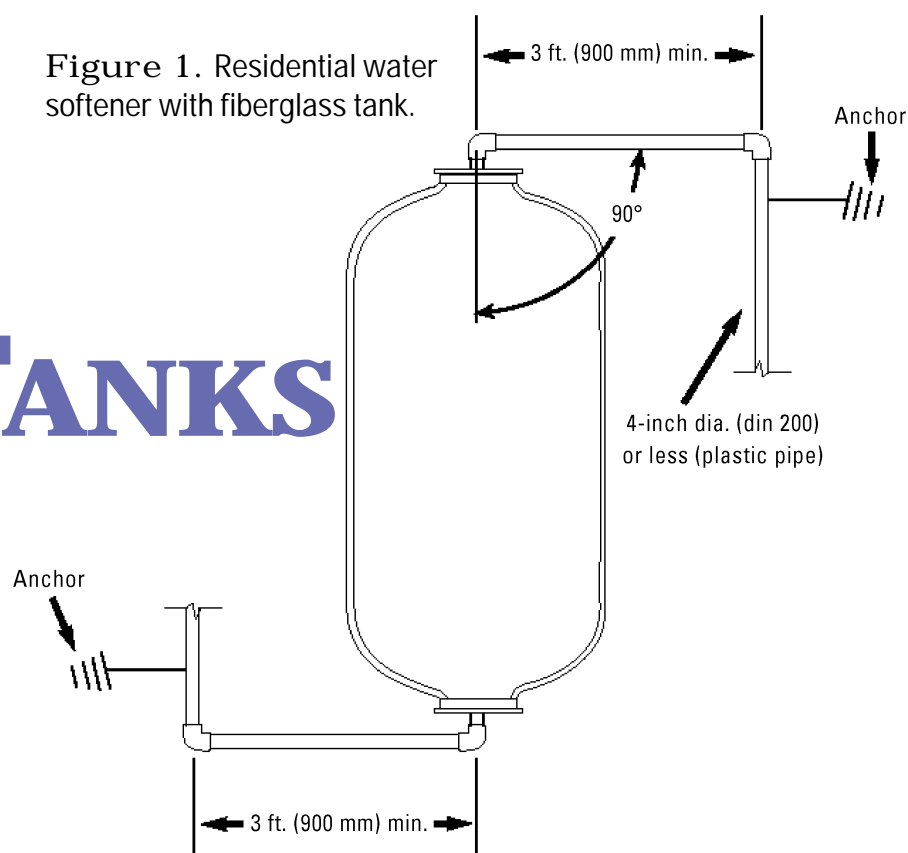
Residential tanks are manufactured with plastic linings and plastic threaded connections. These connections must be treated with care during installation.

Some manufacturers use virgin plastic, which can be cut or cross threaded easily. Other manufacturers use glass reinforced threads, which provide significantly more strength. These threads also must be protected from cuts, nicks and cross threading.

With any size fiberglass tank, the outside surface must be protected from hammer blows, drops off a truck or any other kind of impact damage. The tank should not be rolled on its side or dropped from the bed of a truck.

An impact can be seen as a "white bruise" on the exterior of the tank. If the bruise area is large, showing cracks and abrasions,

Figure 1. Residential water softener with fiberglass tank.



do not install it. The tank is going to be used in a pressure environment, and such a fracture could result in the failure of the vessel.

Vacuum and Temperature Protection

Most dealers are aware that a fiberglass vessel should be protected. Either the label or the manufacturer should be consulted to see what vacuum is allowed. Depending on the strength of the bond between the fiberglass and the plastic liner, some tanks could be extremely vulnerable to vacuum.

However, modern fiberglass vessels are designed for reasonable vacuums in water systems. Reasonable means that the tank is rated to five inches of mercury vacuum. You can best protect the vessel from vacuum by

- Using air breaks in the discharge plumbing,

- Using a mounted vacuum breaker so it can counteract the development of a negative pressure condition inside the vessel, and
- Protecting the vessel from high discharge rates in the drain line.

Consider a tank rated at five inches of mercury maximum vacuum. Each inch of mercury represents about 1.1 feet of water. This means that if the drain line falls six feet in elevation, some type of a vacuum break needs to be installed on the tank or the drain line needs to be broken with an air gap connection.

It is a little known fact that fiberglass actually increases in strength at low temperature. However, if the fiberglass tank is lined with thermoplastic, precautions should be taken, because thermoplastics become brittle at low temperatures.

The manufacturer's minimum temperature specification must be followed to prevent damage. For a polyethylene-lined tank, do not subject the tank to temperatures less than 38° F. For other plastics such as PVDF the low temperature limit is higher. If these precautions are not taken, the plastic may become brittle and crack.

Ultraviolet Light Exposure

While this generally is a concern only in outdoor installations found in warm climates, direct intense sunlight is detrimental to many plastics. It may discolor the tank and create a prickly surface by exposing glass fibers. Also, it may embrittle the plastic tubing and fittings often used to make connections to the water treatment unit. If the tank is located outside, it is recommended to provide shade or UV protection.

Plumbing for Tank Expansion

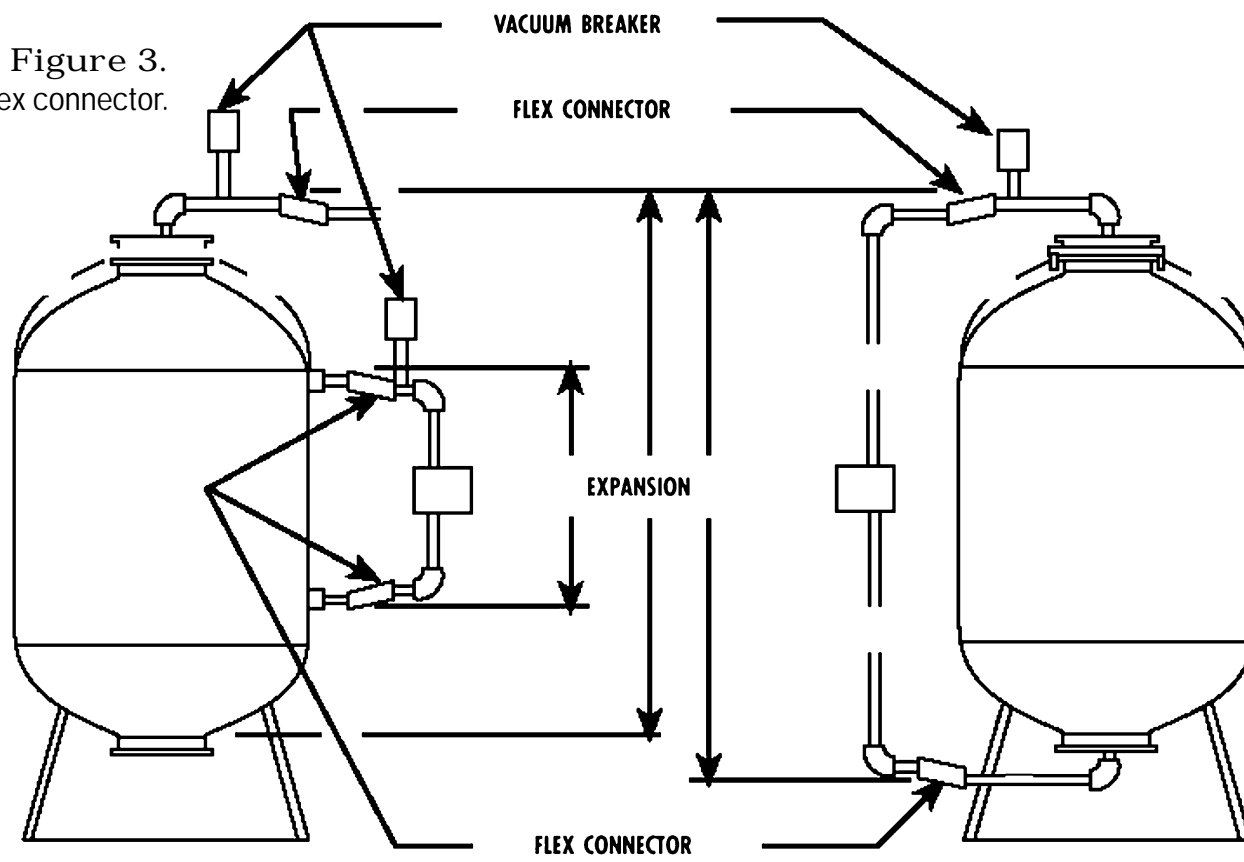
Fiberglass has a low structural modulus, meaning that a pressure vessel will expand



Figure 2. Cabinet Model Water Treatment System



Figure 3.
Flex connector.



somewhat as pressure is applied. This expansion does not mean the tank is weak. It simply is the normal behavior for the material.

There are two ways to plumb a system to allow for expansion—namely, using flex connectors or flexible right-angle plastic pipe. The typical use of flex connectors is shown in Figure 3.

Flexible plastic pipe must be approved by the vessel manufacturer, who may specify different free-run lengths than those shown in the diagram.

Dealers who sell, service and maintain pressure vessels find that the benefits of corrosion protection and weight reduction make fiberglass a great choice. Because most water treatment professionals are familiar

with metal, a fiberglass vessel may take a little getting used to. However, with care and common sense, a fiberglass vessel will provide good service for many years. **WQP**

About the Author
Structural is a fiberglass tank manufacturer in Chardon, Ohio.

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