



Polyethylene Water Storage Tanks In A Residential Application

Part of a series of documents created by Tim Guishard Enterprises discussing relevant subjects in the groundwater industry.

This document discuss areas of concern for people that either have, or are considering the installation of, a rotationally molded polyethylene water storage tank.



Areas of concern with rotationally molded poly tanks, when used in a residential water storage situation:

1. There are nationally accepted standards for; steel, concrete, wood, and fiberglass tank construction, and better manufactures of these tanks design their products to meet these design standards.
There are no nationally accepted construction standards for rotationally molded poly tanks.
Thus there are many variations in quality among manufacturers of poly tanks and even among a single manufacturers product line.
It is very difficult to tell in the field, if the product shipped is the product that was originally ordered, due to a lack of universally accepted coding practices.
2. Per the AWWA and NFPA Design Standards, all tanks that serve a fire system must be anchored to prevent seismic movement thus a loss of important water during this critical event.
The engineering standards, and anchorage, especially relating to seismic restraint, are questionable for some manufacturers of rotationally molded poly tanks. Most poly tank manufacturers rely on the flexibility of their materials to resist seismic failure, but to not account for the piping that is connected to the tank, or the damage caused by the piping broken during the event. See our document titled: "Emergency Preparedness And Your Water System".
3. Like any water storage tank, subsurface soil conditions can promote tank failure.
Uneven settlement of the soil under any tank can cause a tank to rupture or crack.
Remember: even if the tank is only 5,000 gallons and 5' tall, this is over 43,000 LBS of weight compacting the soil under the tank. The taller the tank, the higher the soil bearing pressure in LBS/SQ/Ft. Most naturally placed soils will settle under these weights. Mechanical soils compaction (Under the supervision of a Registered Soils Engineer) is extremely important to the successful installation of any tank.
4. The rotationally molded poly tanks are not easily repairable in the event of a leak.
After the UV light has started the degradation process, most plastic tanks will split completely open, when impacted by a foreign object (IE: Bullet, rock, etc.). Some poly tanks have failed after a sonic boom from a passing aircraft. Some poly tanks have failed for no apparent reason. Field welding processes on poly tanks have not been proven to meet or exceed the life of the rest of the tank.
5. Poly tanks rarely have failure warnings.
When they do, the leaks are normally on or near the mold seams, or at fittings. More often than not, the tanks just explode, frequently causing major property damage. Steel tanks will always provide a failure warning evidenced by rust.



6. Un-proven life span.
Tanks built to the AWWA and NFPA standards are designed and field proven for 40 years or more life span. Rotational molded poly tanks have not yet proven that they are capable of life spans much more than about 10-20 years, as current plastic chemistries have not been around long enough to know how the UV degrades them.

7. Most of the manufacturers of rotationally molded poly tanks do not offer (as standard equipment) drains, and overflows required by nationally recognized standards.
These components should be installed for safety, and maintenance of the tank. Without an overflow, the tanks can be filled above their design capacity, sometimes damaging the tank when a float switch or valve fails. Without a drain, it makes it harder to clean the tank when maintenance is performed.

8. The inlets and outlets of rotationally molded poly tanks are typically supplied on the same side of the tank, and directly above each other in line with the man-way.
This makes it hard to place a ladder against the tank to access the man-way for maintenance of float valves, switches, or the tank interior. The inlet should be offset to one side of the man-way, this make it easier to pipe as well.
Look back at the picture on the cover of this document and try to figure out where to safely place a ladder to access the filter on the inside of this tank!

9. Most of the manufacturers of rotationally molded poly tanks do not offer (as standard equipment) man-ways the meet the requirements in California Code of Regulations, Title 22 **§64585** (b)
 - (7) Equipped to prevent access by unauthorized persons;
 - (8) Designed to allow authorized access and adequate lighting of reservoir interior for inspections, cleaning or repair;*The standard deck man-ways on rotationally molded poly tanks are typically not equipped to lock. Many are too small for a normal sized person to safely enter and exit the tank. For those of you with waist's larger than 38" just try to get through that 16" round opening! You cannot even get a "standard" ladder through these small openings. Larger deck man-ways must frequently be special ordered, if the tank is designed to even accept the larger man-way. AWWA requires two deck (roof) penetrations to provide sufficient airflow during maintenance. Current designs of Poly tanks cannot accept the two deck penetrations required by AWWA. Side shell man-ways are not even an option for most manufacturers (per the manufacturer's literature available at the time of writing this document). These are required by several standards, to better access the interior of the tank for inspection and cleaning. Some of the standard deck man-ways on rotationally molded tanks are designed with small vents, which do not meet the ventilation requirements in the California Plumbing Code for larger piping systems. Larger vents must be special ordered.*



10. Special “flexible” connections are required on the piping leading into, and out of, rotationally molded poly tanks because these tanks swell when filled with water, which will either break the tank or the piping.
Some poly tank manufacturers will void the tank warranty if these flexible connections are not installed between the tank and piping. Even plastic piping connections made to directly the tank connections will fail without these special flexible connections being installed between the tank and piping. Contractors are frequently not installing these connections, for multiple reasons. See our document titled: “Emergency Preparedness And Your Water System”.
11. Water quality issues of tanks in general.
Biofilm growth (I.E.: algae) is quite common in plastic tanks, especially in un-chlorinated systems. Multiple tank systems require careful design of the piping system to ensure that there is complete turnover of the stored water in all tanks. This is also a problem with extremely large (single) tank installations. Single inlet/outlet piping configurations should be avoided wherever possible. The inlet should be 180 degrees from the outlet (I.E.: Inlet on the front of the tank and outlet on the back). If single inlet/outlet piping cannot be avoided, the use of check valves in the outlet piping can be helpful in redirecting the inlet flow during tank filling.
12. Poly tanks larger than 5000 gallons are not commonly available in Southern California.
Shipping (wide/oversize load) costs are major factor in the cost of tanks over 5,000 gallons.
13. Poly tanks will melt to the water line, if the tank’s surface temperature rises above 250° F.
Clearance to brush, or other combustibles, must be significant if the tanks are to be relied on for fire suppression.
14. Manufacturers warranties; vary from 1 to 5 years for Poly tanks.
No manufacturer is offering a longer factory warranty. Beware: there are vendors that are offering their own warranties, and these are not backed by the factory.
15. Manufacturer’s “Factory Seconds” are being sold as “new product with factory warranty” .
Contact the manufacturer to see if they offer a warranty on these products.
16. NSF certification has been required for drinking water components, for several years now.
Some poly tank manufacturers comply and others cannot supply the necessary documentation. When you order a poly tank for a potable application (water that goes into your home) make sure to ask for the NSF documentation. In many cases this is a simple NSF sticker applied to the tank.

All tanks need maintenance, whether: steel, poly, concrete, wood, or fiberglass. Most people do not perform this maintenance, and then are surprised the tank fails. See our document titled: [Water Storage Tank Installation and Maintenance](#), for more information.