Water Tank comparisons for drinking water: defining clean and green

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All drinking Water at Milkwood Farm comes from the sky. This means catchment and storage of drinking-quality water is a very big deal for us. And since we've got the opportunity to define the quality of our drinking water here (a luxury so many millions of people do not have), we're determined to get it as healthy as we possibly can. Both for our family, and for this planet of ours.

Which led us to the seemingly mundane but actually quite complex task of selecting water tanks for drinking water. Which kind to go with? Plastic, aquaplate, cement or stainless steel?

Our criteria for selecting our drinking water tanks were thus; excellent water quality, relatively low embodied energy, and affordable. Which made our task of choosing trickier than we first thought.

But decide we did, and we thought we'd share the results of our research here in case they're of use to others. This is not the final word on water tanks, but it's the product of our 6 months of researching, talking and thinking about how to balance our criteria to give our farm the best drinking water system we can possibly devise:

A comparison of water tank materials for drinking water

Plastic tanks of all shapes and sizes. Image by Irrigation Direct.

PLASTIC WATER TANK

Materials: food-grade polyethylene, the same stuff used to make plastic food containers like tupperware etc, and considered the safest form of plastic. Has added UV stabilizers to prevent the plastic breaking down outside, and plastic softeners to make it flexible. BPA softeners may be used (i never could get a clear answer on that from any manufacturer).

Toxicity: At the drinking end, I have problems with this option. Plastic softeners like BPA are not what you want in your child's tummy as the tank materials go through their inevitable off-gassing process. Softened plastics are also heavily associated with endocrine disruptors.

Also, being outside, these tanks break down over time, regardless of the UV stabilizers

Enviro-cred: Plastics are, as I'm sure you know, made from oil – which isn't that great. Their embodied energy during production is pretty high too. A lifetime of 25 years means they don't live forever, and at the end of that time, due to the UV degradation, they're not considered recyclable in Australia. At all. Which again ups their embodied energy. Transport to site is necessary, unless you live next to a plastic tank factory.

Installation: dead easy. All that's required really is a stabilized flat spot. Because plastic tanks have a small amount of flex in them, they're a bit more forgiving than other materials when it comes to installing. These types of tanks come in a wide range of sizes and shapes, which may aid installation.

Price: Plastic tanks are a cheap option, at around the $2,600 mark for a 22,500L tank. Delivery extra.

Our verdict: the toxicity and embodied energy didn't make this option attractive at all, despite it's price tag. Would potentially also melt in a bushfire, causing us to have no water. Not good.

Aquaplate® tank.

CORRUGATED IRON WITH PLASTIC LINING WATER TANK

Materials: The modern version of the classic Aussie corrugated iron tank. Aquaplate® is the most common material used. Aquaplate® is corrugated steel on the outside with a plastic polymer lining on the inside. As far as we know, all corrugated steel tanks (except stainless steel) are now sold with this plastic lining, to prevent rust and to prolong the life of the tank.

Toxicity: The main issue with these tanks to me is the polymer that forms the plastic lining of the tank. Not much info could we find on the polymer plastic lining, except that it doesn't need the UV stabilizers in it because it's not exposed to sunshine. But any way you look at it, it's spray on plastic, directly in contact with your drinking water.

Softened plastic in constant contact with drinking water is not my idea of a healthy time. Again, see links to BPA, endocrine disruptors or do your own research.

Enviro-cred: Not too bad. The steel production has a lot of embodied energy (about 2/3 of a plastic tank), but this can, in theory anyway, be offset by recycling the product at the end of its 25 years warranty. How they get the bonded plastic lining off to re-use the steel, no-one can tell me yet. So that sounds a little theoretical to me.

There's also the possibility that the steel made to use the tank may be recycled already, which would be great, but not a given, so it's hard to count on it. Again, transport to site is needed.

Installation: Fairly easy – you need a good solid flat pad to put it on, but it's pretty much a case of plonking it down and hooking it up to a down pipe. These types of tanks come in a wide range of sizes and shapes, which may aid installation.

Price: Around $2,800 for 22,500L, depending on shape and location. Delivery extra.

Our verdict: better than plastic (at least on the embodied energy front) but too many questions about toxicity of the polymer lining for this to be an option.


A concrete tank on a farm somewhere. Image by Edwards Concrete Tanks

CONCRETE WATER TANK

There are two options for concrete tanks – up to 15,000L tanks can be cast off-site and delivered, or for larger tanks the only option is to make them on-site. As we're talking in the 22,500L range, we only investigated the cast-onsite option.

Materials: Made of concrete with steel reinforcing. All concrete sold in Australia now contains fly ash, which is the scrapings from within the chimney of coal-burning furnaces. It makes concrete stronger. Concrete's other components are sand, gravel, lime and water.

Toxicity: Not bad at all, as far as we can tell. Concrete tanks have historically been considered to produce superior quality drinking water because the great thermal mass of the tank provides a stable water temperature. This means less warm spots, and therefore less algal blooms. It is also often commented that concrete tank water has a nicer taste. This might be because of the various minerals leaching from the cement tank into the water. There are various reports about fly ash toxicity that made us wonder about it's health effects when included in concrete, however.

Enviro-cred: Not so good. High embodied energy (about the same as a plastic tank for the same size). There's also ethical questions about the sourcing of sand, as much sand mining happens in environmentally sensitive areas. Not recyclable, which means no chance of off-setting your guilt about the embodied energy. A well made concrete tank should last a very long time, however, which is a plus.

Installation: More complicated than a simple delivery. Requires a crew to come out, prep site and pour tank. Tank pad must be very well made and stable, or tank may crack. Some logistics to consider with access for concrete truck to tank site, weather, and so on.

Price: comparatively expensive – around $4,000 for a 22,500L tank installed.

Our verdict: better than the options containing plastics, but still some toxicity questions. The non-recycleability also made it hard to get excited about this option.


Unloading a stainless steel tank

STAINLESS STEEL WATER TANK

Exploring this option seemed a bit dumb, initially – surely it would be incredibly expensive and no-one made them anyway?

Materials: Stainless steel, which is iron with added chromium and/or nickel.

Toxicity: Stainless steel is considered to be very safe and preferable for many applications, hence its use in surgical equipment, catering, drink bottles and so on. As far as we could tell, if you don't heat it up or ingest shavings of it, it's pretty much inert.

Enviro-cred: High embodied energy in production, but 100% recyclable. Completely and utterly. Because of its high value, the chances of the stainless steel having had multiple lives previous to its incarnation as a water tank are also high. Should last a lifetime if we don't back a truck into it, which ups its cred further.

Installation: relatively easy, with good solid pad prepared. Like plastic and aquaplate, a simple operation of delivery and placement.

Price: fairly expensive – around $4,000 (delivered) for 22,500L

Our verdict: expensive upfront, but when its all said and done, worth it. Very low toxicity means excellent and safe drinking water, and in 70 years time our grandchildren can use the steel for something else (or cash it in).

Whew. So that's the wash-up. We ended up getting two 22,500L stainless steel tanks, which, when full, will assure our family of plenty of drinking water all year round, even in the 100-year drought.