



EPA Region 8 Drinking Water Unit Tech Tips

Sanitary Protection of Drinking Water Storage Tanks: Drains

EPA Region 8 requires drinking water storage tank drains to have an air gap & be accessible for inspection.

All key drinking water storage tank components, including the drain, need to be protected against conditions that would jeopardize sanitary water conditions.

A drain removes water & sediment from the tank, allowing it to be cleaned & inspected. It is thus an integral component of the tank, located at the tank's low point by design to easily wash out accumulated sediment during tank cleaning.

The drain valve should be closed at all other times. However, it can eventually leak due to constant pressure from the height of water in the tank, creating a moisture-rich environment that can attract rodents, snakes, insects, and the pathogens they carry.

For that reason, drainpipes should never be combined with overflow piping. To maintain sanitary conditions, the water system should be designed to allow the tank to be cleaned while maintaining pressure in distribution.

Drains & Storage Tank Sanitation

Bacteria are the 2nd smallest living organism on the planet (behind viruses), & under ideal conditions their numbers can double every 20 minutes! This means that a single bacterium could produce ~300 billion (3×10^{11}) bacteria in 24 hours! Bacteria grow end-to-end in a pipe, & since they are so tiny & prolific, a leaking drain gate valve is no barrier to them.

Any water leaking out of the drain valve is the most nutrient-rich water in the tank, because the drain valve is at the bottom of the tank where sediment builds up. Bacteria grow in the sediment pore spaces & turn it into a microbial muck.

Bacteria can produce 10 million copies of itself in 12 hours and can turn ordinary sand into this! The sediment becomes a nutrient-rich media able to support opportunistic pathogens.

A shovel standing on its own in the muck



Allowing access to any rodent into a drainpipe is an invitation to nest at the gate valve & bring in any pathogens they may harbor. This is pure & simple – unsanitary.



If this flapper valve were open just slightly, the mice who left these droppings could enter freely right up to the gate valve.



Drain Significant Deficiencies

The Tank Drain cannot be directly connected to a sanitary sewer or storm drain.

An air gap prevents a cross connection between the sewer or storm drain & the drainpipe.



Drains directly connected to a sanitary sewer or storm drain will trigger a Significant Deficiency in most circumstances. There must be an air gap of at least 3 pipe diameters above its entrance.

The Tank Drain must be accessible.

The overgrowth around this drain needs to be cleared to allow it to be easily observed & inspected.

Not having access to inspect the drain will trigger a Significant Deficiency.



Best Practices for Drain Screen Size & Discharge Design



Install the #24-mesh screen between 2 flanges.

EPA recommends installing a #24-mesh screen on the drainpipe to keep pathogens brought in by insects, rodents, snakes, and birds from entering. Even though the drain is valved off, it can develop tiny leaks, which is enough to allow bacterial overgrowth or pathogen entry. The screen can be removed for cleaning events.

EPA recommends raising the drain 12-24 inches above an inlet structure, splash plate, or engineered riprap to minimize animal access and prevent pooled water from entering the drain. The outfall area should be kept free of debris that can negate the benefits of this air gap.

Water accumulated to this mark

