



Cistern Maintenance – Cleaning and Shock Chlorination

Water stored within cisterns should be clean and potable for consumption. However, accidental contamination during water hauling, damage to the cistern, surface water contamination, and/or loss of chlorine residual can lead to microbial re-growth, and debris/sediment/sludge accumulation over time. Therefore cisterns should be cleaned and disinfected (shock chlorinated) regularly to maintain water quality.

All potable water cisterns shall be cleaned and shock chlorinated

- (a) before commissioning;
- (b) once annually, or on a frequency to sustain water quality;
- (c) whenever contamination has occurred or is suspected to have occurred (e.g., flooding, contaminated water filling, visible debris, or after undergoing maintenance or repairs).

Confined Space:

Cisterns are considered confined spaces and regulated as such. Entrance into a cistern shall be made only by properly trained individuals and in accordance with applicable codes, regulations, and standards. Cleaning (steps a-d) requires entrance into a cistern. **Shock chlorination ONLY (steps e – j) does not require entrance into the cistern.**

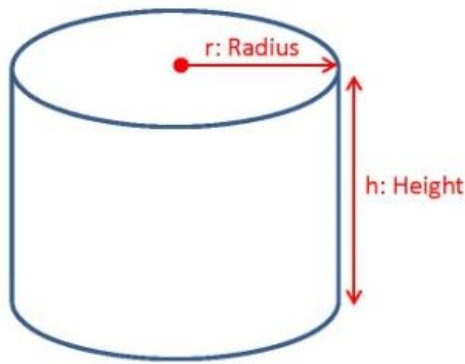
Note: *Confined spaces pose severe dangers to human and animal life. No matter how clean a cistern appears, these dangers still exist and cannot be detected by human sight or smell.*

Procedure:

Cleaning and shock chlorination shall be conducted according to the following instructions:

- (a) Pump all water from the cistern via an outside tap or by a portable pump.
- (b) Inspect the cistern (walls, floor, ceiling, collar, lid, seals) for damage. Repair as necessary.
- (c) Wash the cistern with a pressure washer or a stiff brush to clean debris and sediment from all surfaces.
- (d) Pump out the sludge and debris. A wet-dry vacuum may be used.
- (e) While refilling the cistern with potable water, add chlorine to obtain a free chlorine concentration of 50 mg/L (see Figure 1 for cistern volume calculations, and Table 1 for amount of bleach to add). The cistern should be refilled to the normal operating level or slightly higher.
- (f) Water treatment devices should be bypassed, and gas or power to the hot water tank shut off. Open one tap at a time inside the house, closing each after detecting a chlorine odour.
- (g) Leave the mixed chlorinated water in the cistern for a contact time of at least 6 hours to a maximum of overnight.
- (h) After the 6 hour contact time period, measure chlorine levels of the shock-chlorinated water to ensure a free chlorine residual remains. If free chlorine residual concentration is less than 10 mg/L, repeat steps (e) to (g).
- (i) Dispose the water used for shock chlorination in a safe manner by opening an outside tap. Divert water away from the septic system, sensitive plants, and away from water bodies.
- (j) Flush and refill the cistern with potable water. Open taps within the house for approximately 5 minutes to remove chlorinated water from the pipes. Test the free chlorine in the water to verify proper flushing. Ensure free chlorine levels are below 2 mg/L for drinking. Restore gas or power to the hot water tank, and bring any water treatment devices back online.
- (k) Contact the Health Centre to arrange for testing of the water.

Figure 1: Calculating how much water is in the cistern:



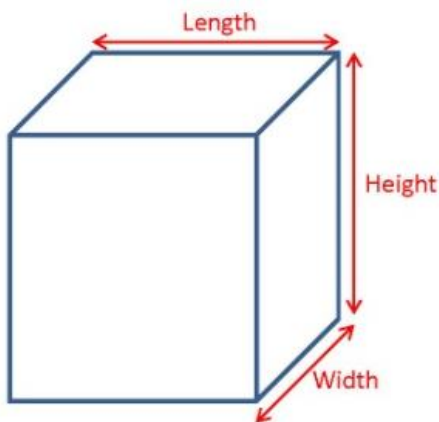
Volume of a Cylindrical Cistern:

$$\pi r^2 h$$

$$\pi = 3.14$$

$$r^2 = \text{radius} \times \text{radius}$$

$$h = \text{height (depth of water)}$$



Volume of a Rectangular Cistern:

$$\text{Length} \times \text{Width} \times \text{Height}$$

Table 1: How much bleach to add to obtain 50 mg/L free chlorine residual:

Size of Cistern in Litres (Gallons)	5.25% Unscented Household Bleach	12% Liquid Bleach
3000 L (800 gal)	3.0 L	1.3 L
3400 L (900 gal)	3.4 L	1.5 L
3800 L (1000 gal)	3.6 L	1.6 L
5700 L (1500gal)	5.4 L	2.4 L
7600 L (2000 gal)	7.2 L	3.2 L
9500 L (2500 gal)	9.0 L	4.0 L
11400 L (3000 gal)	10.85 L	4.75 L

For more information about cistern cleaning and shock chlorination, contact your local Environmental Health Officer.

Environmental Public Health Services
Regional Delivery Sector, Alberta Region
Edmonton Phone: (587) 337-3636
Calgary Phone: (587) 337-7980