

## ***Cleaning storage tanks***

Your tank can be cleaned by removing all the water and then using clean water to sluice it and scrub it out. If the tank has an anti-corrosion coating, clean it carefully. The sediment should be removed, and the tank cleaned, regularly. The frequency will depend on whether leaf guards, first flush diverters and automatic desludgers are installed. Cleaning should be done at least annually but will certainly be needed if the water becomes coloured or turbid or develops tastes and odours.

**WARNING:** The inside of a tank can be a dangerous confined space and should only be entered if absolutely necessary, and only if you are certain it is safe. If you have to enter the tank, first read Worksafe's fact sheet about working in a confined space available at <https://www.worksafe.govt.nz/topic-and-industry/planning-entry-and-working-safely-in-a-confined-space/>.

A long-handled clean broom can be used to push all the sludge on the bottom of your tank out through the scour valve. Alternatively, a device like a swimming pool vacuum cleaner could be used.

Refill your tank with disinfected water. If you are refilling with tankered water ensure that you use a registered water carrier (<https://www.drinkingwater.esr.cri.nz/carriers/carriermap.asp>).

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You will find that for normal disinfection purposes, a dose of 5 mg/L of chlorine is usually sufficient.

You can use plain household bleach for this job; do not use flavoured, scented or coloured brands.

In new containers, the bleach consists mainly of sodium hypochlorite at a concentration of about 3–5 percent active chlorine. Opened or old containers will be significantly weaker than this, they should not be used.

The smell and taste of chlorine can be reduced by storing water in the fridge for around 24 hours prior to drinking. People sensitive to the taste of chlorine may like to use an in-home filter or boil then chill water prior to drinking.

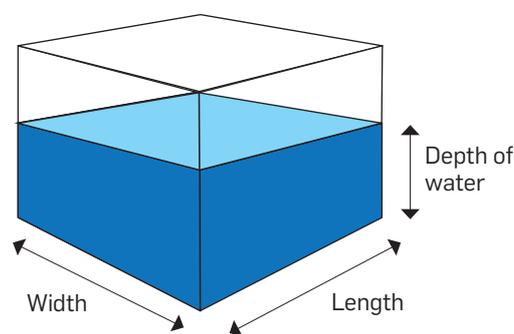
A tank is always disinfected on a water volume basis. The volume may have been provided by the manufacturer or it can be calculated as follows.

### **Calculating your tank volume:**

#### **Square Tank**

The water volume in litres is equal to **length x width x depth of water x 1000**. All measurements of tank dimensions should be made in metres.

For example, a cubic tank measuring **1 m x 1 m x 1 m** would have a volume of **1 x 1 x 1 x 1000 = 1000 litres**.



#### **Circular Tank**

Measure the radius (measure from the edge to the middle of the tank, or measure all the way across and divide by 2) and the depth of water. The tank volume in litres is equal to depth of water in tank (metres) x tank radius (metres) x tank radius x 3140. For example, a tank 2m diameter (from edge to edge) would have a radius of 1 m (from edge to middle). If it were 1 m deep it would have a volume of **1 x 1 x 1 x 3140 = 3140 litres**.

### **How to treat water stored in a tank**

To work out how much chlorine to add to your tank for disinfection, first you need to calculate the amount of water in your tank.

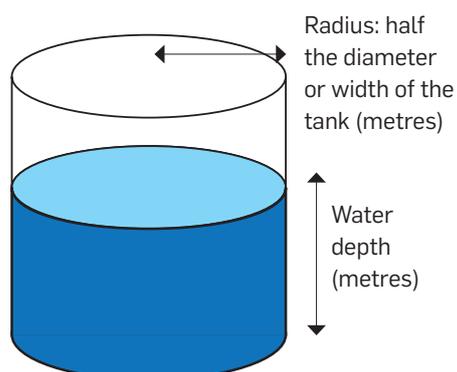
#### **Rectangular/square tanks**

Volume (litres) = depth of water in tank (metres) X tank width (metres) X tank length (metres) X 1000

#### **Cylindrical tanks**

Volume (litres) = depth of water in tank (metres) X tank radius (metres) X tank radius (metres) X 3140

#### **Determining the amount of chlorine to add**



Firstly, the turbidity (cloudiness) of the water should be below a measure of 1 (nephelometric) turbidity unit and secondly, the pH of the water should range from 6.5–8.5. You can arrange a water-testing laboratory to check the turbidity of your water supply and test the pH yourself with a swimming pool kit. If the pH level is out of range chlorine disinfection is less effective and you will need to consult with a water treatment professional. When the turbidity and pH is satisfactory, an initial dose of chlorine less than 5 mg/L may be sufficient to achieve the desired 0.5 mg/L after 30 minutes.

Chlorine is available in a number of different forms. As a general guide, you will need to add:

125 millilitres (mL) of liquid bleach (4% available chlorine) for every 1000 litres (L) of water in your tank

**OR**

40 millilitres (mL) of liquid sodium hypochlorite (12.5% available chlorine) for every 1000 litres (L) of water in your tank

**OR**

8 grams (g) of granular calcium hypochlorite (65% available chlorine) for every 1000 litres of water in your tank.

*The Disinfection Tables, Appendix II and Appendix III (pages 34–37), can be used to calculate the amount of bleach or pool chlorine.*

Note that some manufacturers now sell household bleach as a 5 percent solution. The volumes in Appendix II are based on a 3 percent solution. If you are confident the solution is fresh, you can multiply the volume stated in Appendix II by 0.6 (i.e., roughly between half and two-thirds). However, household bleach has a fairly poor shelf life so using the volumes in Appendix II would still be effective – the slightly larger dose will have no health effects.

An accurate measure, such as a graduated measuring container, should be used to measure the bleach. Most plastic bottles today display their capacity.

After you have dosed your tank and mixed it well, the dosed water should be run through all your household lines so that the newly-disinfected water comes through the taps. Chlorine takes time to work, the water will not be fully disinfected until thirty minutes or so after treatment. If water has been contaminated (e.g. during an emergency) the chlorinated water should be left for 24 hours before use.

#### **Point-of-use device checks and replacement**

When you select a point-of-use device, think about how long it will operate before parts need replacing, and how much these parts will cost.

Equipment manufacturers and reputable suppliers should be able to indicate how long the equipment will last with your water supply.

Filter cartridges need to be replaced periodically, including activated carbon types, reverse osmosis and ultrafiltration membranes, ion exchange resins and also the tubes/lamps used in ultraviolet light apparatus.

These items will need regular checking and should be replaced as recommended by the manufacturer.

Where a replacement item is expensive such as a reverse osmosis membrane, water quality tests should indicate whether the equipment requires replacement.

# APPENDIX 2: Disinfection using sodium hypochlorite (*plain household bleach*)

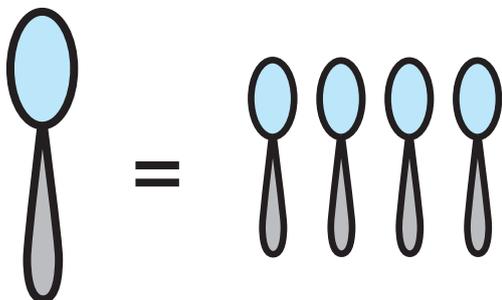
Table 9: Disinfecting with Sodium Hypochlorite (3% solution)

TANK VOLUME LITRES	BLEACH (mLs) REQUIRED TO ACHIEVE CHLORINE DOSE OF:			
	1 mg/L	2 mg/L	5 mg/L	10 mg/L
50	2	3	8	12
100	4	7	17	33
150	5	10	25	50
200	7	13	33	67
250	9	17	42	83
300	10	20	50	100
350	12	23	58	117
400	13	27	67	133
450	15	30	75	150
500	17	33	83	167
600	20	40	100	200
700	23	47	117	233
800	27	53	133	267
900	30	60	150	300
1000	33	67	167	333
2000	67	133	333	667
3000	100	200	500	1000
4000	133	267	667	1333
5000	167	333	833	1667
6000	200	400	1000	2000
7000	233	467	1167	2333
8000	267	533	1333	2667
9000	300	600	1500	3000
10000	333	667	1667	3333
20000	667	1333	3333	6667

**To use the table:**

1. Before disinfection, remove the source of the contamination.
2. Calculate your tank volume in litres (see page 23), and select this on the left-hand column).
3. Select the dose rate required at top of the table:
  - a. 1 mg/L routine disinfection for clean water
  - b. 2 mg/L routine disinfection for reasonably clean water
  - c. 5 mg/L period disinfection for tanks and pipes
  - d. 10 mg/L superchlorination for biologically contaminated tanks.
4. Read the amount of sodium hypochlorite (in millilitres) to be added, where the dose required corresponds to the volume of the tank.
5. Add required millilitres of fresh plain household bleach and mix in thoroughly.
  - a. If you're using imperial measures, 1000 litres equals 220 gallons; 5000 gallons equals 22,730 litres.
6. Allow water to sit for 24 hours before drawing. Boil before drinking until the chlorine level is back to normal.

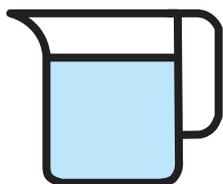
## LIQUID MEASUREMENTS



**1 TBSP** = 20 ml  
= 4 teaspoons

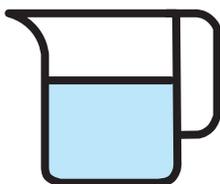


**1 TSP** = 5 ml



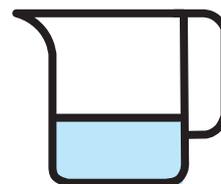
**1**  
cup

**1 Cup** = 250 ml



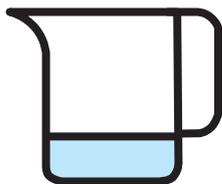
**3/4**  
cup

**3/4 Cup** = 150 ml



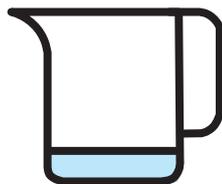
**1/2**  
cup

**1/2 Cup** = 125 ml



**1/3**  
cup

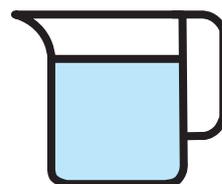
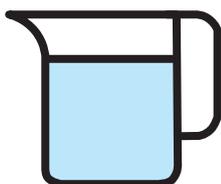
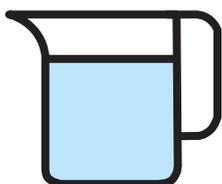
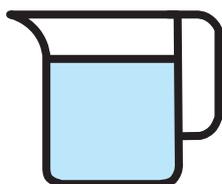
**1/3 Cup** = 80 ml



**1/4**  
cup

**1/4 Cup** = 60 ml

**1 litre** = 4 cups



# APPENDIX 3: Disinfection using calcium hypochlorite

(e.g., HTH or swimming pool chlorine)

Table 10: Disinfecting with Calcium Hypochlorite

TANK VOLUME LITRES	HTH (grams) REQUIRED TO ACHIEVE CHLORINE DOSE OF:			
	1 mg/L	2 mg/L	5 mg/L	10 mg/L
50	0.08	0.15	0.4	0.8
100	0.15	0.3	0.8	1.5
150	0.2	0.5	1.2	2.3
200	0.3	0.6	1.5	3.1
250	0.4	0.8	1.9	3.9
300	0.5	0.9	2.3	4.6
350	0.5	1.1	2.7	5.4
400	0.6	1.2	3.1	6.2
450	0.7	1.4	3.5	6.9
500	0.8	1.5	3.9	7.7
600	0.9	1.9	4.6	9.2
700	1.1	2.2	5.4	10.8
800	1.2	2.5	6	12
900	1.4	2.8	7	14
1000	1.5	3	8	15
2000	3	6	15	30
3000	5	9	23	46
4000	6	12	30	60
5000	8	15	40	80
6000	9	20	45	90
7000	10	20	50	110
8000	12	25	60	120
9000	14	30	70	140
10000	15	30	77	155
20000	30	60	154	310

**To use the table:**

1. Before disinfection, remove the source of the contamination.
2. Calculate your tank volume in litres (see page 23).
3. Select the dose rate required at top of the table:
  - a. 1 mg/L routine disinfection for clean water
  - b. 2 mg/L routine disinfection for reasonably clean water
  - c. 5 mg/L period disinfection for tanks and pipes
  - d. 10 mg/L superchlorination for biologically contaminated tanks.
4. Read the amount of sodium hypochlorite (in millilitres) to be added, where the dose required corresponds to the volume of the tank.
  - a. If you're using imperial measures, 1000 litres equals 220 gallons; 5000 gallons equals 22,730 litres.
5. Add weighed amount to a bucket of clean water and allow to dissolve for six hours.
6. Pour off the liquid from the top of the bucket.
7. Bury the sludge from the bottom of the bucket.
8. Read the grams of calcium hypochlorite (HTH is a common trade name) to be added where the dose required corresponds to the volume of the tank.
9. Allow water to sit for 24 hours before drawing. Boil before drinking until the chlorine level is back to normal.

**CAUTION:**

Calcium hypochlorite is a highly reactive, explosive and poisonous chemical. It should be stored by itself in a secure, dark, dry area and on no account must it be allowed to come into contact with organic liquids such as petrol, diesel, lubricating oils, hydraulic fluids or naked flames. Ensure the chemical you are using is calcium hypochlorite at 65 percent available chlorine, with no other additives.