

WORK HEALTH AND SAFETY POLICY: LEGIONELLA

Policy number	WHS1	Version	002 – June 2021
Drafted by	Head Office	Approved by board on	July 2022
Responsible person	General Manager	Review	As required

INTRODUCTION

The NSW Greyhound Breeders, Owners and Trainers Association (NSW GBOTA) considers the Work Health and Safety (WHS) of all persons employed, contractors, suppliers, volunteers, club members and visitors to the club to be of utmost importance. We are committed to making resources available to comply with the relevant Acts and Regulations associated with WHS and to ensure that the club is safe and without risk to health.

The club is committed to the effective management of WHS. It is the aim of the club to eliminate the risk of injury and disease to our workers, contractors, suppliers, volunteers, club members and the public by adopting a planned and systematic approach to the management of work health, safety and welfare, and by providing the resources for its successful implementation and continuous improvement. All reported incidents will be investigated.

The General Manager on behalf of the entity has ultimate responsibility for the implementation and review of the WHS policy and delegation of WHS management responsibilities.

WATER TREATMENT – LEGIONNAIRES

NSW Private Water Supply these give guidance on dosing water tanks with chlorine. **Please do not add chlorine** to the tank(s) until after the samples have been taken.

Chlorine Disinfection

Chlorination involves the addition of chlorine into drinking water to control microorganisms. Chlorination is the most commonly used form of disinfection.

To ensure effective disinfection, add enough chlorine so that after 30 minutes there is at least 0.5 milligrams per litre (mg/L, or parts per million: ppm) present in your water – this remaining chlorine in your water is known as the ‘free chlorine residual’.

Free chlorine residual will naturally decrease over time. You can expect your free chlorine residual after 30 minutes to be less than the chlorine you add. If after 30 minutes the free chlorine residual is below 0.5 mg/L, repeat the addition of chlorine until at least 0.5 mg/L is present after another 30 minutes. Also ensure your free chlorine residual is below 5 mg/L.

Regular monitoring (weekly or more frequently) of free chlorine residual at your taps is recommended to check the effectiveness of disinfection in the water system (see Section 6). Chlorine can be measured with a suitable test kit (for example, a swimming pool chlorine kit).

When adding chlorine to your water system

(typically into the water tank), the amount of chlorine you add will differ depending on the chlorine type you use. This is because the percentage of available chlorine is different for each chlorine type.

the three chlorine types commonly used are:

- Liquid bleach (4% available chlorine)
- Liquid sodium hypochlorite (12.5% available chlorine)
- Granular calcium hypochlorite (65% available chlorine)

Contaminants in your water tank such as dirt and leaves may prevent effective disinfection. Filtration is often necessary to remove these contaminants before adding chlorine. You may need to add more chlorine to achieve a satisfactory free chlorine residual and effective disinfection if you have contaminants in your water.

Chlorine can be added manually or with an automated system to maintain a suitable free chlorine residual. NSW Health recommends that suppliers seek specialist advice when installing an automated chlorine system. Make sure you follow health and safety guidelines when using chlorine and take care to add the correct amount of chlorine to your water system.

For further guidance on chlorination refer to Section 10.5. For guidance on calculating the volume of water in a tank refer to Section 10.4.

Filtration is often necessary to remove suspended particles before chlorination as suspended particles (dirty water) may prevent effective disinfection.

Ultraviolet Disinfection

Another common and effective form of disinfection is ultraviolet (UV) light, which neutralises many kinds of microorganisms.

UV disinfection is less effective in dirty or cloudy water as the light cannot penetrate the water. Filtration is often necessary to remove suspended particles before UV disinfection.

Filtration, chlorination and UV treatment can be automated to allow a high level of disinfection, provided the equipment is adequately maintained.

10.4 Calculating the Size of Your Tank for Chlorination

Tanks come in a variety sizes ranging from 750 L (165 gallons) to over 50 000 L (11 000 gallons). To convert a tank volume in gallons to a volume in litres, simply multiply the number of gallons by 4.5.

To calculate tank water volume

- Full Rectangular Tanks (box tanks, some in ground tanks)
Volume (in litres) = (depth [m] x width [m] x length [m]) multiplied by 1000 (to convert cubic metres to litres)
- Full Cylindrical Tanks
Volume (in litres) = (3.14 x radius [m] x radius [m] x tank depth [m]) multiplied by 1000 (to convert cubic metres to litres)

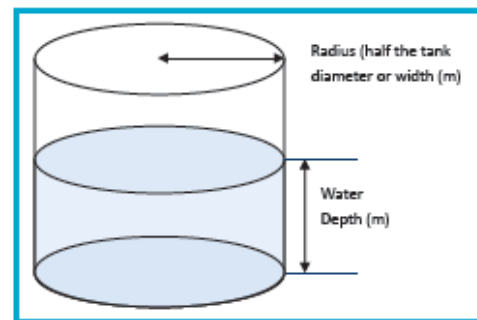
[The radius is the half the diameter or width of the tank]

Example:

$$\begin{aligned}\text{Tank radius} &= 2 \text{ metres} \\ \text{Tank depth} &= 3 \text{ metres} \\ \text{Tank Volume} &= (3.14 \times 2 \text{ m} \times 2 \text{ m} \times 3 \text{ m}) \times 1000 \\ &= (3.14 \times 4 \text{ m}^2 \times 3 \text{ m}) \times 1000 \\ &= (3.14 \times 12 \text{ m}^3) \times 1000 \\ &= 37.68 \text{ m}^3 \times 1000 \\ &= 37\,680 \text{ Litres}\end{aligned}$$

- Part-full Cylindrical Tanks
Volume (in litres) = (3.14 x radius x radius [m] x water depth [m]) multiplied by 1000.
(See diagram below)

Figure 1: Part full cylindrical tank example diagram.



10.5 Adding Chlorine to Your Water Tank for Disinfection

The three chlorine types commonly used are:

- Liquid bleach (4% available chlorine)
- Liquid sodium hypochlorite (12.5% available chlorine)
- Granular calcium hypochlorite (65% available chlorine)

Guidance on using these three chlorine types for disinfection is provided below.

Adding 4% Liquid Bleach to Your Water Tank for Disinfection

Table 1 shows the amount of **4% liquid bleach** to add to your water tank for chlorination, depending on the initial chlorine concentration you are targeting and the volume of water in your water tank.

The table gives three options for the initial chlorine concentration in the tank (1 mg/L, 2 mg/L and 5 mg/L) for a given volume of water in the tank (1,000 L – 10,000 L). Methods for calculating the volume of water in a tank are provided in Section 10.4.

Table 1: Guidance on adding 4% liquid bleach to your water tank

		INITIAL CHLORINE CONCENTRATION			
		1 mg/L	2 mg/L	5 mg/L	
VOLUME OF WATER IN TANK	1000 L	25 mL	50 mL	125 mL	AMOUNT OF 4% LIQUID BLEACH TO ADD
	2000 L	50 mL	100 mL	250 mL	
	3000 L	75 mL	150 mL	375 mL	
	4000 L	100 mL	200 mL	500 mL	
	5000 L	125 mL	250 mL	625 mL	
	6000 L	150 mL	300 mL	750 mL	
	7000 L	175 mL	350 mL	875 mL	
	8000 L	200 mL	400 mL	1000 mL	
	9000 L	225 mL	450 mL	1125 mL	
	10000 L	250 mL	500 mL	1250 mL	

For example: To aim for a chlorine concentration of 5 mg/L in a tank with 1000 litres (L) of water, add 125 millilitres (mL) of 4% liquid bleach.

To ensure effective disinfection, add enough chlorine so that after 30 minutes, there is at least 0.5 milligrams per litre (mg/L, or parts per million, ppm) present in your water – this remaining chlorine in your water is known as the 'free chlorine residual'. Free chlorine residual will naturally decrease over time. You can expect your free chlorine residual after 30 minutes to be less than the chlorine you add.

If the free chlorine residual is below 0.5 mg/L after 30 minutes, repeat the addition of chlorine until at least 0.5 mg/L is present after another 30 minutes. Be careful not to overdose the chlorine and ensure your free chlorine residual is below 5 mg/L. Chlorine can be measured with a suitable test kit (for example, a swimming pool chlorine kit).

Remove any visible contaminants such as dirt and leaves from your water tank before adding chlorine. You may need to add more chlorine

to achieve a satisfactory free chlorine residual and effective disinfection if you have contaminants in your water.

Make sure you follow instructions and health and safety guidance on the product you purchase. The water in your tank should be well mixed after you add liquid bleach to your water.

Liquid bleach can be purchased from supermarkets or hardware stores. Check the label of the bleach product has at least 4% available chlorine and has no additives such as fragrances.

Contact an environmental health officer from your local council or Public Health Unit for help if you are uncertain about this procedure (see Section 9 for contact details). There is more guidance on water treatment in Section 5.

Adding 12.5% Liquid Sodium Hypochlorite to Your Water Tank for Disinfection

Table 2 shows the amount of **12.5% Liquid Sodium Hypochlorite** to add to your water tank for chlorination, depending on the initial chlorine concentration you are targeting and the volume of water in your water tank.

The table gives three options for the initial chlorine concentration in the tank (1 mg/L, 2 mg/L and 5 mg/L) for a given volume of water in the tank (1,000 L - 10,000 L). Methods for calculating the volume of water in a tank are provided in Section 10.4.

Table 2: Guidance on adding 12.5% Liquid Sodium Hypochlorite to your water tank

		INITIAL CHLORINE CONCENTRATION			
		1 mg/L	2 mg/L	5 mg/L	
VOLUME OF WATER IN TANK	1000 L	8 mL	16 mL	40 mL	AMOUNT OF 12.5% SODIUM HYPOCHLORITE TO ADD
	2000 L	16 mL	32 mL	80 mL	
	5000 L	40 mL	80 mL	200 mL	
	6000 L	48 mL	96 mL	240 mL	
	7500 L	60 mL	120 mL	300 mL	
	10000 L	80 mL	160 mL	400 mL	
	16000 L	128 mL	256 mL	640 mL	
	20000 L	160 mL	320 mL	800 mL	
	30000 L	240 mL	480 mL	1200 mL	

For example: To aim for a chlorine concentration of 5 mg/L in a tank with 1000 litres (L) of water, add approximately 40 millilitres (mL) of 12.5% liquid sodium hypochlorite.

To ensure effective disinfection, add enough chlorine so that after 30 minutes, there is at least 0.5 milligrams per litre (mg/L, or parts per million, ppm) present in your water – this remaining chlorine in your water is known as the 'free chlorine residual'.

Free chlorine residual will naturally decrease over time. You can expect your free chlorine residual after 30 minutes to be less than the chlorine you add.

If the free chlorine residual is below 0.5 mg/L after 30 minutes, repeat the addition of chlorine until at least 0.5 mg/L is present after another 30 minutes. Be careful not to overdose the chlorine and ensure your free chlorine residual is below 5 mg/L. Chlorine can be measured with a suitable test kit (for example, a swimming pool chlorine kit).

Remove any visible contaminants such as dirt and leaves from your water tank before adding chlorine. You may need to add more chlorine to achieve a satisfactory free chlorine residual and effective disinfection if you have contaminants in your water.

Make sure you follow instructions and health and safety guidance on the product you purchase. The water in your tank should be well mixed after you add liquid sodium hypochlorite to your water.

Sodium hypochlorite can be purchased from swimming pool suppliers, hardware stores and some large supermarkets.

Do not use stabilised swimming pool chlorine for disinfection because it contains cyanuric acid (also known as Iso-cyanuric acid) and is not effective in enclosed tanks.

Contact an environmental health officer from your local council or Public Health Unit for help if you are uncertain about this procedure (see Section 9 for contact details). There is more guidance on water treatment in Section 5.

Adding 65% Granular Calcium Hypochlorite to Your Water Tank for Disinfection

Table 3 provides guidance on the amount of **65% Granular Calcium Hypochlorite** to add to your water tank for chlorination, depending on the initial chlorine concentration you are targeting and the volume of water in your water tank.

The table gives three options for the initial chlorine concentration in the tank (1 mg/L, 2 mg/L and 5 mg/L) for a given volume of water in the tank (1,000 L – 10,000 L). Methods for calculating the volume of water in a tank are provided in Section 10.4.

Table 3: Guidance on adding 65% Granular Calcium Hypochlorite to your water tank

		INITIAL CHLORINE CONCENTRATION			
		1 mg/L	2 mg/L	5 mg/L	
VOLUME OF WATER IN TANK	1000 L	2 g	3 g	8 g	AMOUNT OF 65% CALCIUM HYPOCHLORITE TO ADD
	2000 L	3 g	6 g	15 g	
	5000 L	8 g	15 g	38 g	
	6000 L	9 g	18 g	46 g	
	7500 L	12 g	23 g	58 g	
	10000 L	15 g	31 g	77 g	
	16000 L	25 g	49 g	123 g	
	20000 L	31 g	62 g	154 g	
	30000 L	46 g	92 g	231 g	

For example: To aim for a chlorine concentration of 5 mg/L in a tank with 1000 litres (L) of water, add approximately 8 grams (g) of 65% granular calcium hypochlorite.

To ensure effective disinfection, add enough chlorine so that after 30 minutes, there is at least 0.5 milligrams per litre (mg/L, or parts per million, ppm) present in your water – this remaining chlorine in your water is known as the ‘free chlorine residual’.

Free chlorine residual will naturally decrease over time. You can expect your free chlorine residual after 30 minutes to be less than the chlorine you add.

If the free chlorine residual is below 0.5 mg/L after 30 minutes, repeat the addition of chlorine until at least 0.5 mg/L is present after another 30 minutes. Be careful not to overdose the chlorine and ensure your free chlorine residual is below 5 mg/L. Chlorine can be measured with a suitable test kit (for example, a swimming pool chlorine kit).

Remove any visible contaminants such as dirt and leaves from your water tank before adding chlorine. You may need to add more chlorine to

achieve a satisfactory free chlorine residual and effective disinfection if you have contaminants in your water.

Make sure you follow instructions and health and safety guidance on the product you purchase. Granular calcium hypochlorite should be dissolved in a bucket of water before being added to your water tank. The water in your tank should be well mixed after you add the dissolved calcium hypochlorite.

Calcium hypochlorite can be purchased from swimming pool suppliers, hardware stores and some large supermarkets.

Contact an environmental health officer from your local council or Public Health Unit for help if you are uncertain about this procedure (see Section 9 for contact details). There is more guidance on water treatment in Section 5.

Review

This policy will be reviewed by the Operations Manager at least once every two years, in light of legislation and organisational changes.

Resources

<https://www.health.nsw.gov.au/environment/water/Pages/NSW-private-water-supply-guidelines.aspx>

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