Shower dipping

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Irrespective of the apparatus used to dip sheep, it is essential for lice control that all sheep are wet to skin level. Wool that is more open is easier to wet than tight, fine wool. Merino fleeces resist wetting, so it is important that dipping is done thoroughly and in accordance with label directions.

Periodically, check several sheep for wetness, for example, by using a water-soluble marking pencil (e.g. Columbia 'Copperplate' Red Copying 2100) on the skin under, and on the back of the neck (see details on pages 3 and 4).

The dilution rate indicated on product labels must be used and nothing, other than a bacteriostat in some instances, should be mixed with registered products in a dip. Increasing the dip concentration or use of mixtures containing more than one dip product cannot counteract substandard application and should not be considered.

Compared to immersion dipping, shower dipping is much slower and involves more complicated machinery. Far fewer sheep can be correctly treated in a shower dip per day and producers should seriously consider whether it is worth persevering with a shower dip.

Only Buzacott™ shower dips are still commercially available, but some producers may still have old Sunbeam™ showers or rectangular shower dips on their farms. These will not effectively wet sheep and should not be used. Mobile shower dips also often fail to wet sheep adequately.

Procedures and effects during dipping

Charging (the dip)

The addition of product at the dilution rate indicated on the label at the beginning of dipping.

Stripping

The selective uptake of pesticide from the dip solution at a faster rate than the removal of water. As a result, the chemical is removed faster than the dip wash, which gradually decreases in concentration as dipping proceeds.

Constant replenishment

The 'constant' addition of fresh pesticide solution from supply tanks into the dip sump during dipping to maintain a constant volume (and concentration) of dip wash. Advantages of constant replenishment are less fluctuation in dip concentration and no interruption of dipping to replenish or reinforce the dip.

Reinforcement

The regular addition of pesticide, but not water, to the dip. Reinforcement replaces the pesticide removed from the dip wash by stripping.

Topping up (Replenishment)

The addition of water and pesticide to the dip to replace the dip wash taken out by the sheep. If product label directions say so, topping up should occur after reinforcement, every time the dip volume drops to no less than 75% full.

Dipping out

The addition of product only (reinforcement) towards the end of dipping to minimise the amount of used dip wash for disposal. By reinforcing without topping up, dipping out allows the dip volume to drop to 50% full. To determine when to start dipping out, estimate the rate at which wash is being removed from the dip. Calculate how many sheep will take the dip to half its initial volume. Keep the dip at full volume until that number of sheep remain, then begin dipping out. Reinforce when the dip falls to 75% of its initial volume. Continue to dip out until the dip reaches half its initial volume then stop dipping and clean the dip. A dip must not fall below half of the initial level even when dipping out. The dip level should never be low enough to allow the sheep to walk in the dip.

Setting up your shower dip

Few shower dips achieve thorough wetting of the sheep. Pump performance and spray patterns are often inadequate, particularly with older, tractor driven pumps. For optimal operation shower dips need to be thoroughly inspected, repairs made and the dip set up correctly. Check all nozzles, pipes, the foot valve, gate valves, pump and sieves to make sure they are clean and working. The sump capacity must be calculated and the sump calibrated to allow the correct concentration of dip wash to be maintained.

The simplest method of measuring the volume is to fill the tank or sump from a container of known volume. Then mark graduations, e.g. every 200 litres, on the wall of the sump or on a dipstick. If a 200-litre drum is used, then calibrate this first because they are often not actually 200 litres. Alternatively, the capacity can be calculated using the dimensions of the sump. If all measures are in metres then the volume will be in cubic metres. There are 1000 litres in a cubic metre so multiply the result by 1000 to calculate the total volume. With a constant replenishment system, the supply tank should be calibrated and levels for different volumes marked on the tank or on a dipstick prepared for that tank. The diagram below provides some advice on measuring the volumes of a dip sump and supply tank.

The most important factor affecting sheep wetting is the volume of dip wash delivered from the nozzles. This is determined by pump pressure, the diameter of delivery pipes and the spray nozzles. The pump should supply at least 142 kPa, maintaining high flow rate to the nozzles at this pressure. Some producers have modified their shower dips with larger diameter pipes to increase the volume of dip wash delivered. Common causes of low pressure are worn impellors in the pump or low pump speed.

A rough guide to correct pressure is that the bottom spray should reach 30 to 40 cm above the top of the dip when run alone. However, during sheep dipping, the bottom sprays are not very important and could be removed altogether. Overhead nozzles should spray to the side walls at just above sheep head height. If the spray does not reach evenly up the walls of a circular dip then the pivoting point of the spray may be off-centre or the arm may not be horizontal. Check the flow rate and pump pressure. A bucket placed anywhere on the floor of the dip should be filled at a rate of 2 litres per minute. The rotation speed of the top arm should be about 5 revolutions per minute (rpm). High speeds (i.e. above 12 rpm) do not wet sheep thoroughly.

Operating your shower dip

Only sheep that are fit and in good condition should be dipped. Heavily pregnant ewes, weaners or sheep in poor condition are more susceptible to stress and should be dipped early in the day. Different sized sheep should be drafted off and dipped separately to prevent smothering. Young sheep are more susceptible to infections and should be dipped first when the dip wash is cleanest. Sheep heavily infested with grass seeds are more prone to infection. Draft off diseased sheep, such as any with dermo, pink eye or open abscesses. Do not dip any other sheep after these before cleaning out the dip.

Avoid dipping sheep on very hot days or in wet or very windy conditions. The sheep may be chilled severely by winds and will not dry out quickly in wet conditions. Start early in the day and finish early enough to allow the sheep to dry before nightfall. Hot, tired sheep should be rested prior to dipping, as skin absorption of chemical and drinking of dip wash can result in losses due to poisoning. The sheep should be yarded overnight, prior to dipping, with access to water but not feed, to allow them to empty out. This reduces contamination of the dip by sheep faeces.

The race leading to the forcing pens and dip entry should have slatted or concrete floors to reduce organic matter (faeces, dirt etc.) contaminating the dip. Do not pack the sheep too tightly. They must be touching but still have room to move. Sheep tend to crowd at the exit gate, unless this is covered in the same way as the walls of the dip. Covering the gate while the dip is operating is safer for the sheep and improves wetting. The top sprays do most of the wetting. However, the bottom nozzles may help to move the sheep around so they do not stay in one position. Do not run the top and bottom nozzles together because this reduces spray pressure.

Draining pens should be cleaned regularly to reduce the amount of organic matter carried back into the dip. Sheep should not be held in the draining pens, but encouraged to return to their paddock as soon as possible to dry out. This will reduce the risk of mycotic dermatitis and subsequent flystrike.

Management of the dipping process in a calm and organised manner will make the task less demanding on sheep and their handlers. Infection can be managed by ensuring skin is intact with sufficient healing time following shearing, yards are free of sharp projections, dogs are muzzled and sheep are free of grass seed infestations, as any hole in the skin can provide a site for bacterial infection from dip wash.

To wet sheep thoroughly they need to be showered using the top nozzles alone for about 12 minutes. Unless you are prepared to shower for this length of time do not use a shower dip as eradication is unlikely to be achieved. Merino sheep look wet much sooner than they are actually wet to the skin where the lice will be. Nozzles must be clean and checked regularly for blockages during dipping.

When using a shower dip, particular attention should be paid to the following points:

- The dip sump must be pumped out and thoroughly cleaned and disinfected before use.
- All eligible sheep should be dipped after shearing cuts have healed, no earlier than 10 days, preferably before 4 weeks, and not later than 6 weeks after shearing. Dipping off-shears is not recommended due to the high risk of infection in shearing cuts.
- The volume of the dip sump should be carefully calculated. Depending on its volume, it may be better to add water in batches from a container of known volume or to use a water meter.
- A dip stick or the dip sump should be calibrated by marking each 100 litres as it is added to aid in chemical dose rate calculations including when ‘dipping out’.
- When using chemical, the dip should be ‘charged’ at the correct rate according to the label directions. Accurately measure the correct amount of chemical and pre-mix this in a bucket of water. Most dipping chemicals are in a form that does not readily disperse if poured directly into a large volume of water. Pre-mixing will disperse it in a form that will mix more readily in the dip. Pour the pre-mix into the dip sump and mix the dip thoroughly using the recirculating pump before the first sheep are dipped. Do the same after any break of an hour or longer because the mixture may settle on standing.
- The dip concentration and volume must be maintained in line with label directions. ‘Constant replenishment’ or ‘topping up’ according to the label directions may be used. Topping up should be done when the volume drops by no more than 25% of the initial volume. If the product label has directions for ‘reinforcement’, this should be done before replenishment of the dip. Reinforcement provides a means of maintaining dip concentration while reducing the volume of dip for disposal when dipping out. Replenishment should be done according to the

specific instructions on the product label to maintain dip concentration. Example calculations are provided in Appendix A.

- Sheep can be checked to ensure that they are wet to skin level all over by using a water-soluble copying pencil or a scourable dye in the dip wash. To do this put on waterproof trousers and gloves, and catch a few dipped sheep after they have had just sufficient time to drain. Open the fleece in the hard to reach areas such as in the neck folds, back of the neck etc. and apply the pencil to the skin. If the skin is wet, the pencil will leave an obvious coloured mark. However, if the skin is dry, it will not. The pencil tip must be dried in between uses. Sheep with areas of dry skin need to be dipped again and any remaining sheep should be dipped more thoroughly.
- The dip wash should not be allowed to become excessively dirty or infections (e.g. clostridial disease, 'cheesy gland' or mycotic dermatitis ['lumpy wool' or 'dermo']) and wool staining may occur. To avoid these, sheep vaccination programs need to be up to date. Moreover, the dip should be emptied and cleaned when one sheep has been dipped for every 2 litres of the dip's working volume (e.g. for a 10,000 litre dip clean out the dip after 5,000 sheep have been dipped). To minimise the volume of spent dip solution for disposal follow the label directions for 'dipping out'. When dipping out, chemical but no water is added to the dip sump as directed on the label to maintain the concentration in the dip.
- Holding dip solution overnight is not recommended, but if this is necessary a suitable bacteriostat should be added beforehand to help prevent the build-up of bacteria in the dip. If mycotic dermatitis is a problem the addition of a bacteriostat such as zinc sulphate or chlorhexidine as directed on product labels is recommended. A disinfectant can be used when cleaning out the empty dip. The sun is a very good bacteriostat, so allow it to dry the dip after cleaning.

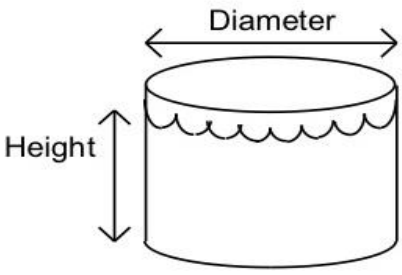
At the end of dipping a large volume of spent dip solution containing chemical remains. Even if the dip will not be used again for several months, at some time it will need to be pumped out. Mobile operations need to pump out before they can move off-site. In preparation for dip disposal a bunded area with growing pasture should be prepared for this purpose. The bund is used to contain the dip wash within an identifiable area where it will soak in and where sunlight and soil bacteria will degrade the pesticide. Stock should not graze this area for at least 3 months unless a shorter or longer interval is indicated on the product label. It is unacceptable to allow spent dip wash enter dams, ponds or any watercourse.

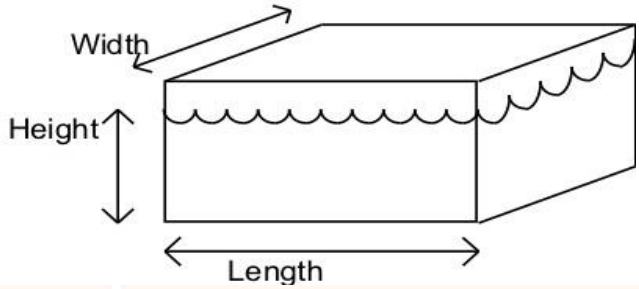
Operator safety

Most dip chemicals are moderately toxic, particularly when concentrated.

- Strictly follow the safety direction on the label.
- Operators should wear overalls, waterproof gloves and boots, a washable hat and any other protective clothing as directed on the product label.
- Waterproof trousers or apron are recommended for those working on the dip.
- Be careful of dip splash as the sheep enter the dip or are dunked.
- Avoid standing in the exit area where sheep will shake and spray dip wash as they leave.
- Wash hands, arms and face with water after contact with pesticides and before eating or drinking.
- Change wet clothing as soon as possible.
- If the chemical is swallowed or contacts the eyes call the Poisons Information Centre (Phone 13 11 26).
- Refer to the LiceBoss Products Tool and the Sheep lice treatments—chemical group characteristics and Use of pesticides for controlling lice—occupational health and safety LiceBoss Notes for information on sheep dip products.

Appendix A: Calculate your sump and tank capacities





Round tanks	Square tanks
Volume = Diameter x Diameter x Height x 785	Volume = Length x Width x Height x 1000
Example:	Example:
Diameter 1.2m	Length 1.9m
Height 1.0m	Width 1.6m
	Height 1.25m
Volume = 1.2 x 1.2 x 1 x 785	Volume = 1.9 x 1.6 x 1.25 x 1000
= 1,130 litres	= 3,800 litres

Calculate the amount of chemical used

(note both millilitres and litres are used here)

Example: Sump volume: 1,130 litres, replenishment tank: 3,800 litres

For a chemical with

- an initial charge of 500 ml per 1000 litres
- reinforcement at 650 ml per 500 litres
- topping up at 250 ml per 500 litres
- constant replenishment at 1000 ml per 1000 litres

Initial charge = dip volume x initial charge rate

= 1130 x 500 ÷ 1000

= 565 ml (0.57 litres) chemical in the sump.

Plus either a) or b):

a) Constant replenishment	b) Periodic topping up
= volume of tank x replenishment rate	= volume of tank x topping up rate
= 3800 x 1000 ÷ 1000	= 3800 x 250 ÷ 500
= 3800 ml (3.8 litres) of chemical in the tank	= 1900 ml (1.9 litres) of chemical in the tank
Maintain the sump level by constant flow from the tank.	When the level in the sump falls 500 litres, reinforce the dip with 650 ml chemical, then top up from the tank.

Appendix B: Preferred shower dip design

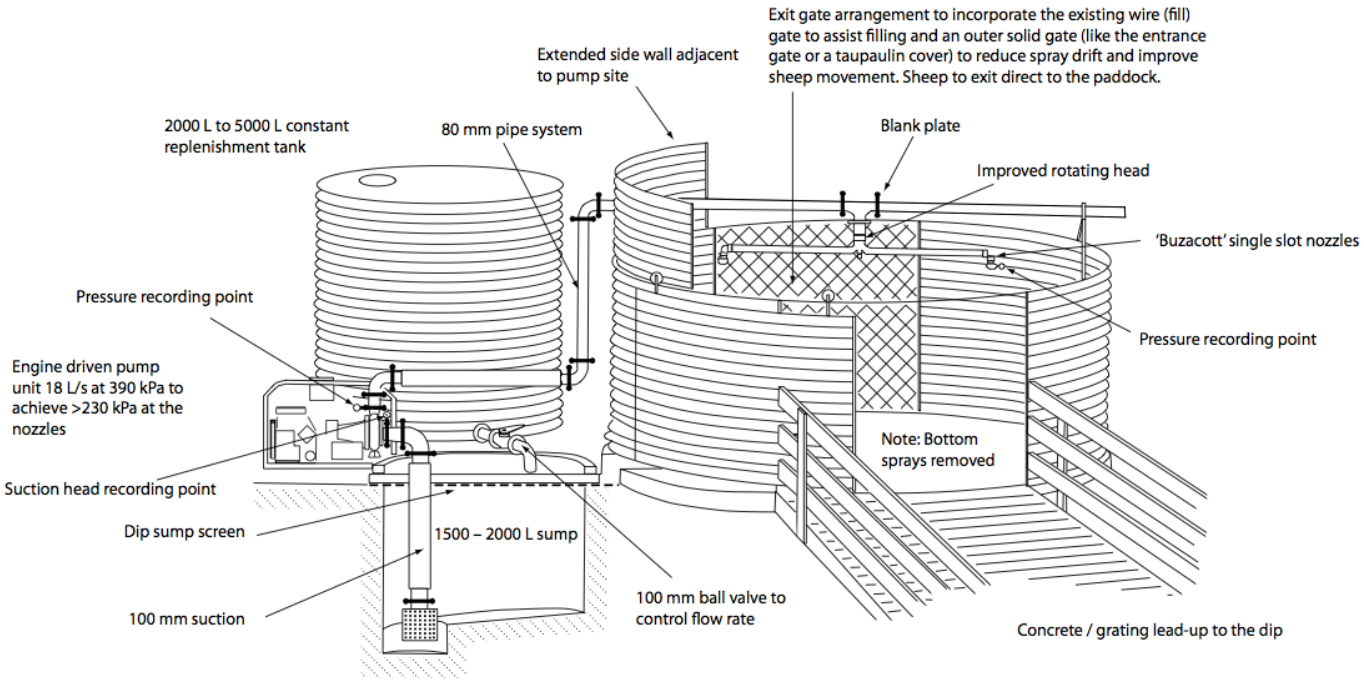


Image: Recommended general arrangement of a shower dip.
Source: Lund and Levot, FLICS (2001) p191-196.

Click here to watch the video.

Shower dipping video
Source: NSW DPI

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