A staff guide to operating your effluent irrigation system

Low rate system
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Operating your effluent irrigation system

Understanding how to operate your effluent irrigation system properly is an essential task on farm. This booklet helps take farm staff through the important parts of operating and maintaining a low rate effluent system. The book can be used as a training guide for those who are new to low rate pod systems, or for staff who are new to the farm to introduce them to the farm’s effluent practices and policies.

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Symbols

This symbol means STOP IMMEDIATELY – throughout the book there are examples of problems that will arise on your farm related to effluent. In most cases if you see any of these issues you must STOP IMMEDIATELY and inform your manager or farm owner.

This symbol means WARNING – throughout the book there are examples of problems that will arise on your farm related to effluent. In most cases if you see any of these issues you must fix the immediate problem if you have permission or have been shown what is required to fix the problem. And then inform your manager or farm owner.
Our farm policy for effluent

We must ensure that:

1. No effluent gets into waterways
2. No effluent puddles in any paddocks
3. The effluent system is checked daily (minimum)
4. If there are problems with effluent, talk to the manager/farm owner
5. Effluent irrigation events are checked and recorded against the Effluent Management Plan
6. The Resource Consent / Permitted Activity rules are displayed in the shed
7. The maximum application depth is not exceeded
8. The maximum application rate is not exceeded
9. Effluent is not applied if the soils are too wet

Potential hazards of effluent irrigation

- Hoses and wires in paddocks whilst riding/driving farm vehicles
- Crush warning
- Falling into the effluent pond
- Breaking the crust on the pond releasing gas
- Electricity at the pump
- No heavy lifting
- Unstable pontoons
**Why is effluent important?**

**Well managed and maintained effluent systems:**

- Grow more grass for less cost
- Grow better tasting grass, therefore cows eat more
- Have fewer messy breakdowns
- Have cleaner water for the community
- Ensure regional council rules are met – no fines
- Obtain greater public acceptance.

**What is effluent made up of?**

- Wash down water
- Rain
- Faeces and urine
- Spilt milk
- Detergent
- Soil from feet.

**What nutrients are in effluent?**

- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)
- Sulphur (S).

The value of the nutrients in effluent from 100 cows in an average New Zealand herd is $3000 PA

**What shouldn’t be in effluent?**

- Chemicals
- Rubbish/afterbirth
Before every milking: checklist

1. **Stormwater**
   Is the stormwater or wash water diversion in the correct position?

2. **Stone trap**
   Is the sump/stone trap clear of rubbish/afterbirth?

3. **Storage**
   Is there enough room in the storage pond or tank for another milking? (Refer to pg 7)

4. **Solids separator**
   Is the solids separator or weeping wall set up correctly?

5. **Pump/stirrer**
   Do you need to turn the stirrer or pump on?

6. **Yard**
   Wet the yard before cows come in

7. **Be gentle**
   Reduce noise and be gentle with cows during milking

8. **Turn hoses off**
   Use less water and turn off the hoses

9. **Scrape the yard**
   After milking scrape yard with scraper before you hose down
Before every milking: check effluent storage

Is there enough available storage for this milking?

YES

Milk as normal

NO

Why is the storage full?
- Is the pump broken?
- Is the pipeline blocked?
- Did someone forget to turn it on?

Can you fix problem?

YES

Fix problem and start milking

NO

Notify farm manager/owner

Call the appropriate service person

Tell the service person it is urgent and ask when they can be on site. If necessary call a vacuum tanker to remove effluent.

(Add important contacts and their ph numbers on the space provided on the back page of this booklet)

Reduce all water usage in shed
- Turn water off backing gate
- Do not wash down yard

Start milking and make sure no effluent enters the storage system
Before irrigating: check soil moisture

Check electronic monitoring equipment
Check the soil moisture data logger or use a soil probe to get the soil moisture figure for the paddock being irrigated.

Check website
Some regions / regional councils have up to date information available online providing the soil moisture levels of the area.

Then...
Compare today’s soil moisture figure against the farm’s critical soil moisture figure. The critical soil moisture figure will determine whether you can irrigate and your irrigation timing.

Soil moisture deficit
Maximum application depth
Must be greater than

Check paddocks manually - look and listen. Do not irrigate if:
There is already water puddling on the ground/worms on surface.
You can hear/see water or wet mud under foot when you walk.
It has been raining a lot, snowing or the ground is frozen.
The soil makes a ‘worm’ when rolled, sticks to your thumb when rolled or free water appears when squeezed.
Cow and pasture considerations

- Apply effluent onto short pasture. If possible, graze the area 2-3 days before application
- Avoid grazing pasture within 10 days of spraying effluent, to reduce animal health risks and maximise pasture intake
- Avoid grazing springing or just calved cows on the effluent block – this will help avoid metabolic problems
- Avoid or cover water troughs
- Avoid tiles, swales and low lying areas when soils are wet
- Keep drier and higher areas for spring/autumn application.

Irrigation timing

How often you need to move pods depends on your systems. When conditions are most suitable, irrigate as much of the time as possible. Move pods multiple times a day and get your pond right down.

Once you know the above three numbers use the tables below to work out how long your pods can stay in one place before moving. Use 4 ml application rate if you have not had your system tested and do not know your system’s specific application rate.

**Time between moving pods to apply 15mm depth**

<table>
<thead>
<tr>
<th>Minutes Operating</th>
<th>Your systems average application rate per hour (mm/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 ml</td>
</tr>
<tr>
<td>On</td>
<td></td>
</tr>
<tr>
<td>Off</td>
<td></td>
</tr>
<tr>
<td>Period of time between moves (hrs)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>15.00</td>
</tr>
<tr>
<td>15</td>
<td>22.50</td>
</tr>
<tr>
<td>15</td>
<td>30.00</td>
</tr>
<tr>
<td>15</td>
<td>20.00</td>
</tr>
<tr>
<td>15</td>
<td>20.00</td>
</tr>
<tr>
<td>15</td>
<td>30.00</td>
</tr>
<tr>
<td>15</td>
<td>60.00</td>
</tr>
<tr>
<td>On continuously</td>
<td>7.50</td>
</tr>
</tbody>
</table>

**Time between moving pods to apply 20mm depth**

<table>
<thead>
<tr>
<th>Minutes Operating</th>
<th>Your systems average application rate per hour (mm/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 ml</td>
</tr>
<tr>
<td>On</td>
<td></td>
</tr>
<tr>
<td>Off</td>
<td></td>
</tr>
<tr>
<td>Period of time between moves (hrs)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>20.00</td>
</tr>
<tr>
<td>15</td>
<td>30.00</td>
</tr>
<tr>
<td>15</td>
<td>40.00</td>
</tr>
<tr>
<td>20</td>
<td>20.00</td>
</tr>
<tr>
<td>20</td>
<td>30.00</td>
</tr>
<tr>
<td>30</td>
<td>20.00</td>
</tr>
<tr>
<td>60</td>
<td>20.00</td>
</tr>
<tr>
<td>On continuously</td>
<td>10.00</td>
</tr>
</tbody>
</table>
How to move a pod system

Typical standard pod system setup
Setup will vary on different farms but typically pods are set up with about 3-4 lines with about 6 pods on each line.

Typical large pod system setup
Setup will vary on different farms but typically pods are set up with a single pod line with about 4-6 pods connected to the feed line.

Pod layout in paddock
Divide each paddock into separate zones. Mark on fence posts the correct spacings that can be easily seen when on the bike. This will help line up lines so you get the right spacing and identify each area.

Moving pods
There are two different movement types. Moving pods:
- between paddocks
- within the same paddock.

Moving pods between paddocks
Moving lines between paddocks can be tricky. When going through gates it is very important to have the right angle so lines do not hit or bend around fence post. If lines hit or bend around fence posts this will cause the pipes to weaken and they will split, it will also cause damage to pods /sprinklers.
Moving pods within the same paddock

Split the paddock up into zones and move the lines to a new zone each time. This will mean nutrients are more evenly applied.
Moving standard pods: step by step

1. Soil
Check the soil moisture. Is it too wet to irrigate? Never use pods in the rain.

2. Location suitable for conditions
Check irrigation record sheet, are pods are in the right location. Make sure pods not near waterways, tiles, gullies.

3. Pump - OFF
Turn off pump.

4. Hydrant - OFF
Turn off or disconnect hydrant at paddock.

5. Open Valves
Open all valves at end of each pod line, allow lines to empty before moving. Disconnect tow fittings (if attached) and take tow fitting to other end of pod line.

6. Undo cam
Disconnect all cam locks connecting pod lines to feed line.

7. Close valves
Close all end valves when empty.

8. Cap
Close valve or put on cap on line at the drag end so dirt and stones do not enter pipes while towing.

9. Vehicle direction
Face the tow vehicle the direction the line is to be towed.

10. Connect tow
Attach tow hook to tow vehicle.

11. Drive smoothly
Drive smoothly to new location, use wide U shaped turns not V.
12. Line up
Line up pod line with markers on the fence. If no markers avoid cross over spray approx. 25m

13. Tow hose
Once line is in place unhook and go to next line. Move all lines. Repeat until lines have been moved

14. Connect cam
Connect cam locks and move caps and towing systems to end of each line if at wrong end.

15. Open valves
Open all valves that are connected to the feed line

16. End of line valves
Check all end of line valves and/or caps are closed before turning pump on

17. Turn on
Turn system on

18. Check valves
Check valves all shut again after system is on

19. Check pods
Check each pod is spraying properly. Spray should be fan shape not a solid jet. Look for blocked nozzles and leaks in the line. Have spare nozzles on hand and repair as required.
Moving large pods: within a paddock

When moving large pods within a paddock, use the same step by step method as for standard pods, BUT only drag 2 pods at a time not the whole pod line as it will be too heavy.

Moving large pods between paddocks – step by step

1. Soil
   Check the soil moisture. Is it too wet to irrigate? Never use pods in the rain.

2. Location suitable for conditions
   Check irrigation record sheet, are pods are in the right location. Make sure pods not near waterways, tiles, gullies.

3. Pump - OFF
   Turn off pump

4. Hydrant - OFF
   Turn off hydrant at paddock

5. Open valves
   Open all valves at end of each pod line, allow lines to empty before moving.

6. Undo cams
   Disconnect all cam locks connecting pod lines to feed line

7. Cap
   Put cap on hoses at the drag end so dirt and stones, do not enter pipes while towing

8. Load pods
   Load pods onto to vehicle or trailer

9. Attach hoses
   Attach hoses to vehicle

10. Drive smoothly
    Drive smoothly to new location

11. Line up
    Line up pod line with marker on the fence. If no markers avoid cross over spray approx. 25m
12. **Unload**
Unload pods and hoses

13. **Connect cams**
Remove caps and connect cam locks

14. **Close valves**
Check end of line valve and/or caps are closed before turning pump on

15. **Turn on**
Turn pump and hydrant back on

16. **Check**
Check each pod is spraying properly. Spray should be fan shaped not in on solid jet. Look for blocked nozzles and leaks in the line. Have spare nozzles on hand and repair as required.
Can you see a problem?

The following section illustrates the possible problems that may arise. Make yourself aware of these and the required actions of each problem.

Can I see a problem?

<table>
<thead>
<tr>
<th>Problem</th>
<th>What should I do?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough pressure</td>
<td>STOP irrigating and tell your manager/farm owner</td>
</tr>
<tr>
<td>Spray too thick and not throwing far enough</td>
<td></td>
</tr>
<tr>
<td>Expected throw distances:</td>
<td></td>
</tr>
<tr>
<td>• Small black pods – 12m</td>
<td></td>
</tr>
<tr>
<td>• Small white and purple -14m</td>
<td></td>
</tr>
<tr>
<td>• Big black pods -20m</td>
<td></td>
</tr>
<tr>
<td>Blockage in pod</td>
<td>STOP irrigating and tell your manager/farm owner</td>
</tr>
<tr>
<td>Effluent dribbling out of pod</td>
<td>Clear blocked pod, and check solid separator for problems</td>
</tr>
<tr>
<td>Broken knocker arm/counter balance</td>
<td>STOP irrigating and tell your manager/farm owner. Replace broken parts</td>
</tr>
</tbody>
</table>
### Can I see a problem?

<table>
<thead>
<tr>
<th>Problem</th>
<th>What should I do?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top broken</strong></td>
<td>STOP irrigating and tell your manager / farm owner. Replace broken parts.</td>
</tr>
<tr>
<td>Spray going in two directions, out nozzle and straight up</td>
<td></td>
</tr>
<tr>
<td><strong>Saddle leaking</strong></td>
<td>STOP irrigating and tell your manager / farm owner. Tighten, replace or repair</td>
</tr>
<tr>
<td>Spray will be leaking and puddling around pod</td>
<td></td>
</tr>
<tr>
<td><strong>Pods too close together</strong></td>
<td>Tell your manager / farm owner. Make sure pod lines are lined up correctly with markers. Note: Can be ok if application depth test has been done with this set up but higher risk in challenging conditions</td>
</tr>
<tr>
<td>Spray crossing over</td>
<td>Spray crossover</td>
</tr>
</tbody>
</table>
**In the paddock?**

<table>
<thead>
<tr>
<th><strong>Can I see a problem?</strong></th>
<th><strong>What should I do?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Effluent running into waterways or drains</td>
<td>STOP irrigating and tell your manager/farm owner. Move pod line further away.</td>
</tr>
<tr>
<td>Connection leaking</td>
<td>STOP irrigating and tell your manager/farm owner. Check connection and replace any broken parts.</td>
</tr>
<tr>
<td>Leak in pipe</td>
<td>STOP irrigating and tell your manager/farm owner. Fix the leak</td>
</tr>
</tbody>
</table>

**With ponding in the paddock?**

<table>
<thead>
<tr>
<th><strong>Can I see a problem?</strong></th>
<th><strong>What should I do?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Puddles</td>
<td>STOP irrigating and tell your manager/farm owner. Check your irrigation timing and application rates</td>
</tr>
</tbody>
</table>

Can you see a problem? What should I do?
Can you see a problem?

With the storage pond?

The following section shows the possible problems that may arise with the effluent storage pond. Make yourself aware of these and the required actions of each problem.

Keep the level of effluent in the storage pond as low as possible:

- To have storage space if you have a breakdown, bad weather or if you are too busy to irrigate
- Irrigate whenever the conditions are right, don’t wait until the pond is full
- Check you have enough storage before every milking.

<table>
<thead>
<tr>
<th>Can I see a problem?</th>
<th>What should I do?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet areas or greener areas around the pond may mean that the pond has a leak</td>
<td>Tell your manager/farm owner and show them the wet/greener area</td>
</tr>
<tr>
<td>Grass or solid crust on the top of the pond means too many solids in the pond</td>
<td>Tell your manager/farm owner</td>
</tr>
<tr>
<td>Cracks in pond walls or the sides of the pond falling in</td>
<td>Tell your manager/farm owner and show them where the problem is. Make sure there are no safety issues</td>
</tr>
<tr>
<td>Can I see a problem?</td>
<td>What should I do?</td>
</tr>
<tr>
<td>----------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pond level too high or high level alarm goes off</td>
<td>DO NOT PUT ANY MORE EFFLUENT INTO THE POND. Tell your manager/farm owner or call the appropriate service person</td>
</tr>
<tr>
<td>The pond never fills up. This may indicate that there is a leak</td>
<td>Tell your manager/farm owner</td>
</tr>
<tr>
<td>Pond smells bad</td>
<td>Tell your manager/farm owner&lt;br&gt;Try to keep the pond low, avoid spraying near boundaries or upwind of neighbours</td>
</tr>
</tbody>
</table>
## Troubleshooting

### Problem: Effluent ponding/ puddles or runoff

<table>
<thead>
<tr>
<th>Possible causes</th>
<th>Fixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pods have not been moved</td>
<td>Move pods to new zone</td>
</tr>
<tr>
<td>Soils to wet to irrigate</td>
<td>Stop irrigating and wait until soils conditions are better</td>
</tr>
<tr>
<td>Pods applying on already irrigated land</td>
<td>Mark correct position for lines on fence</td>
</tr>
<tr>
<td>Pods spray crossing over and applying too much effluent in one place</td>
<td>Space pod lines and/or pods further apart so there is no cross over</td>
</tr>
<tr>
<td></td>
<td>Small black pods – 12 m radius</td>
</tr>
<tr>
<td></td>
<td>Small white/purple – 14m radius</td>
</tr>
<tr>
<td></td>
<td>Big black pods – 20m radius</td>
</tr>
<tr>
<td>Leaking pod saddle</td>
<td>Check pod, tighten replace or repair</td>
</tr>
<tr>
<td>Application rate greater than infiltration rate of soil</td>
<td>Apply effluent at the correct rate.</td>
</tr>
</tbody>
</table>

### Problem: Effluent not spraying out of pod properly

<table>
<thead>
<tr>
<th>Possible causes</th>
<th>Fixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough pressure from pump to operate pods properly</td>
<td>Call for pump service. Have you got the right pump for the job?</td>
</tr>
<tr>
<td>Pod or line blocked</td>
<td>Clear out blocked pod and check solid separator for problems</td>
</tr>
<tr>
<td>Pod broken</td>
<td>Check knocker arm, counter balance and nozzle. Replace any broken parts</td>
</tr>
<tr>
<td>Blockage at pump</td>
<td>Remove blockage</td>
</tr>
<tr>
<td></td>
<td>Put grate over sump and put rubbish bucket in shed</td>
</tr>
<tr>
<td></td>
<td>Put in high/low pressure switch to protect pump</td>
</tr>
<tr>
<td>Silting up of mainline</td>
<td>Keep stone trap clean. Flush line with water</td>
</tr>
<tr>
<td>Leak in pipe or bad connection</td>
<td>Check pipes and connection for leaks as these will reduce pressure at the pods</td>
</tr>
</tbody>
</table>
**Problem: Hose /pipe blowout**

<table>
<thead>
<tr>
<th>Possible causes</th>
<th>Fixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor or worn couplings</td>
<td>Replace couplings</td>
</tr>
<tr>
<td>Pipe kinked – can be from bending lines around posts</td>
<td>Replace kinked section of pipe and move lines using wide turns and travel straight where possible</td>
</tr>
<tr>
<td>Couplings installed wrong way around</td>
<td>Put couplings the right way around</td>
</tr>
</tbody>
</table>

**Problem: Artificial drainage tiles run green**

<table>
<thead>
<tr>
<th>Possible causes</th>
<th>Fixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too much effluent applied for the conditions and effluent is draining through the soil profile</td>
<td>Stop irrigating until soil conditions are more suitable</td>
</tr>
</tbody>
</table>

**Problem: Effluent siphoning /draining of mainline when pump is off**

<table>
<thead>
<tr>
<th>Possible causes</th>
<th>Fixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pods downhill from pump</td>
<td>Install an anti-siphon valve and/or anti-drain valve</td>
</tr>
</tbody>
</table>

*Keep spare parts, nozzles, joiners in shed at all times*
**Maintenance – monthly**

**At the shed**

1. **Empty weekly**
   Clean out the effluent sump and stone trap. Place solids on a sealed or contained area.

2. **Level switch**
   Check the level switches are clear and working and are set correctly.

3. **Storage**
   Check level of storage ponds and for any damage.

4. **Solids separator**
   Check solids separator system or weeping wall is working properly and deal with solids if needed. Store solids on sealed or contained area or spread thinly to paddock.
At the pods

1. Nozzles
Make sure nozzles are not cracked or blocked

2. Pod body
Make sure there are no cracks and the tapping saddle is secure

3. Hose in pod
Make sure hose has not twisted in the pods, this stops the pods sitting flat. New hoses may take a while to settle flat, lay out flat for a few days before installing

4. Knocker arms
Check knocker arms are not broken

5. Connections
Clean connections and make sure they are not loose or leaking. Check hose clamps and pipe pushed tight up to fitting

6. Hoses
Check hoses have no cuts, splits or bulges. If hoses have kinked while being moved, replace as they will split. Use joiners to fix splits not tape
At the storage pond

1. Pipes
   Check pipes are running in and out are not blocked

2. Walls
   Check pond walls are stable

3. Leaks
   No signs of leaks

4. Fence
   Check fence is safe and secure

5. Smell
   Does the pond smell bad?
Maintenance – 6 monthly

At the shed

1. Pump
Have a qualified service agent check and service pump as required

2. Pressure
Have a qualified service agent check pump pressure and flow rate to compare against system design

3. Flush
Flush clean water through the delivery lines

At the irrigator

1. Nozzle wear
Check nozzles for wear. Find out what size nozzle is installed and compare to a new nozzle to see how much they have worn

2. Pressure
Check pressure in the paddock, and compare against ideal operating pressure

3. Rate & depth
Measure application rate and depth (see page 30)

4. Hydrants
Check the condition of the hydrants

5. Couplings
Check condition of couplings. Check coupling has not pulled from hose due to towing. Check hose clamps and pipe pushed tight up to fitting

6. Hoses
Check for splits and cuts and bulges.
Sump/stone trap

1. Rubbish
Collect any rubbish out of the sump and/or the stone trap

2. Prepare
If sump/stone trap is wide enough use front end loader, otherwise use a shovel and wheel barrow

3. Scoop
Slowly scoop out the contents taking care not to spill it. Use the low ratio on the tractor to avoid ripping up the entry

Maintenance – annually
At the storage pond

1. Desludge pond (Recommendations do not apply to synthetically lined ponds, call a professional to desludge synthetically lined ponds)
- Remove the crust with excavation machinery – warning: gases may be released when crust is first broken so keep clear and away from pond edge
- Stir the pond to mix the solids before emptying
- Never empty the pond completely
- Be careful to not damage the sides/bottom or the liner of the pond when emptying
- Pond sludge has more nutrient value than normal effluent, so apply to bigger area at lower rate
- Repair any damage to the pond before putting any effluent back in.

2. Grass edges
Control/spray the grass and the weeds around edge of the pond. However be aware that bare ground has a higher chance of eroding pond edges
Maintenance – spreading effluent solids

Spreading direct to pasture

**Muck spreader/slurry tanker**

1. Transfer sludge to a muck spreader or slurry tanker
2. Check effluent nutrient plan for disposal location and application rates
3. Add water to the sludge to make it easier to spread if you are using a slurry tanker
4. Avoid danger zones e.g. waterways, bores, boundaries, creeks etc.

**Tractor**

1. Check the effluent plan for disposal location
2. Spread the load lightly across as large an area as possible. Check your nutrient management plan for application rates
3. Do not dump in one spot.
Stockpiling/composting

1. Check sealed storage area is ready and that the liquid will drain safely into the effluent system or be collected
2. Carefully transport sludge to the storage area
3. Empty sludge onto pile
4. Check that there is no run off
5. Scrape up any fallen / dropped sludge that is not on the sealed area.
Monitoring

Understanding application depth

Application depth is how much volume is going on to your soil – usually referred to as depth (mm) – similar to the rainfall you collect in a rain gauge e.g. 20mm.

<table>
<thead>
<tr>
<th>Soil type</th>
<th>Maximum application depth</th>
<th>Maximum application rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>15mm</td>
<td>32mm/hr</td>
</tr>
<tr>
<td>Loamy sand</td>
<td>18mm</td>
<td>32mm/hr</td>
</tr>
<tr>
<td>Sandy loam</td>
<td>22mm</td>
<td>20mm/hr</td>
</tr>
<tr>
<td>Fine sandy loam</td>
<td>24mm</td>
<td>17mm/hr</td>
</tr>
<tr>
<td>Silt loam</td>
<td>24mm</td>
<td>10mm/hr</td>
</tr>
<tr>
<td>Clay loam</td>
<td>18mm</td>
<td>13mm/hr</td>
</tr>
</tbody>
</table>

Understanding application rate

Application rate is how fast it is going on – usually referred to as (mm/hr) similar to the intensity of rainfall e.g. 10mm in 1 hr.

Maximum application rate and depth for different soil types?

Maximum application rate and depth may be set by regional councils. Ask your manager/farm owner for this farm’s maximum. It is not to be exceeded. If there are no figures from the council then the amount of effluent you can apply at one time, and the speed you can apply it at, is dependent on the soil type. Using the table below and having a discussion with your manager or farm owner, fill in the appropriate areas of the worksheet.
How to test application depth and rate

Collection containers

When testing you can use either rectangle trays with straight sides, rectangle trays with sloped sides or standard round buckets. You will need about 20 of these. You must use a different calculation depending on the type of collection container.

Step 1: Location

Go to the middle pod on the last pod line in the series (furthest away from the pump)

Step 2: Layup containers

Lay out collection containers out in an “L” shape from the middle pod. Containers should be spaced at 1m intervals and cover right to the edge of the spray area of the pod. Put a stone in each container to stop it blowing over if needed.
**Step 3: Turn on**

Turn the system on. Run the pods for 1 hour. Record the start and finish time.

![Image](image1.png)

**Step 4: Measure how much**

**For RECTANGLE TRAYS WITH STRAIGHT SIDES:**

Use a tape measure

1. Remove the stone
2. Measure how deep the effluent is in each container (mm)
3. Write down depth for each container

![Image](image2.png)

**For RECTANGLE TRAYS WITH SLOPING SIDES:**

1. Remove stone
2. Tip effluent into measuring jug record the volume (ml)
3. Write down volume for each container

![Image](image3.png)

**For ROUND BUCKETS WITH SLOPING SIDES:**

1. Remove stone
2. Tip effluent into measuring jug record the volume (ml)
3. Write down volume for each container

![Image](image4.png)
How to calculate application and depth rates

Rectangle trays with STRAIGHT sides

![Diagram of a container with depth measurement](image)
How to calculate application and depth rates

Rectangle trays with SLOPED sides

Note: Maximum application depth = The CONTAINER with the deepest measurement.
How to calculate application and depth rates

Round buckets with SLOPED sides

<table>
<thead>
<tr>
<th>Container 1</th>
<th>Container 2</th>
<th>etc ...</th>
<th>TOTAL (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TOTAL (ml)</th>
<th>NUMBER OF CONTAINERS</th>
<th>AVERAGE VOLUME (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONTAINER WIDTH (mm)</th>
<th>2</th>
<th>CONTAINER RADIUS (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONTAINER RADIUS (mm)</th>
<th>CONTAINER RADIUS (mm)</th>
<th>CONTAINER AREA (mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.14</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AVERAGE VOLUME (ml)</th>
<th>CONTAINER AREA (mm²)</th>
<th>AVERAGE APPLICATION DEPTH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AVERAGE APPLICATION DEPTH (mm)</th>
<th>TIME (hrs)</th>
<th>AVERAGE APPLICATION RATE (mm/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Maximum application depth = The CONTAINER with the deepest measurement.
Emergency

The pond is leaking

Puddles on grass

Burst pipes

Overflowing

Blockage

Emergency Numbers:

- Farm manager/owner
- Regional council
- Effluent systems repairs