

QUICK TEST FOR IRRIGATOR APPLICATION DEPTH

Irrigating effluent at the correct application depth will save you money on fertiliser and reduce runoff to watercourses and leaching to groundwater. **We encourage you to carry out the following quick test on your irrigator. This will help you identify major irrigator issues which you can address before your compliance visit.**

Before starting your irrigator test:

- Set the irrigator on its fastest speed
- Ensure the drag hose is set up correctly (see diagram on back page) and the irrigator is located at least 20m from any waterways, roads, boundary fences or any public buildings or houses.
- Check that the nozzles aren't split, worn and are still elastic. The nozzles should ideally be replaced every season that the rubber-wear is replaced in the sheds.

STEP 1

Place the straight sided containers (e.g. ice cream containers) in front of your irrigator, far enough away so that spray does not quite reach them when the irrigator is first turned on. Place the containers across the entire width of the irrigator spread, so that all of the spray is caught, and around 1-2 metres apart (about 10 – 20 containers).



STEP 2

Leave the irrigator on until it has completely passed over the containers. Once the irrigator has completely passed over the containers and the spray no longer touches the containers, measure the content by placing a ruler into the effluent and recording the depth in Table 1 of this sheet.



STEP 3

From here we can now calculate the upper quartile (UQ) average of the application depth. To calculate the UQ average, select a quarter of the containers with the most effluent in them. Fill in Table 2 and continue with the worked example on the reverse of this sheet.



STEP 4

It is now important to see where your UQ average sits within the “traffic light system” (see below). If the UQ average sits within the red section, or is greater than the maximum depth allowed by your resource consent, your irrigator requires urgent attention and is likely to be non-compliant with your conditions. If your irrigator is in the yellow or red area, please refer to the checklist on the reverse of this sheet for some suggested improvements.

Irrigator running well	Improvements recommended	Urgent improvement required
<12	12→23	>23
Irrigator running well	Improvements recommended	Urgent improvement required
<9	9→12	> 12

} Low Risk Soils

} High Risk Soils

NB: See explanation sheet for soil risk types

UQ AVERAGE CALCULATOR

Alternately, once you have completed the irrigation test, there is an Effluent Depth Testing Calculator on the Dairy NZ website which can be used for calculating effluent depth and rate:
<http://www.dairynz.co.nz/environment/effluent/managing-and-operating-effluent-systems/>.

1.

Data collection

Container	Depth (mm)	Rating
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

Note: A rating of 1 corresponds to the container containing the most effluent. (In this table a rating of 22 would correspond to the container containing the least amount of effluent)

2.

Calculate upper quartile (UQ) average

Enter the depth of the quarter* of containers containing the most effluent (the 25% with the highest rating)
 *If the quarter is not a whole number, round up.
 e.g. If you used a total of 20 containers, choose the 5 with the greatest depth recorded.

Container	Rating	Depth (mm)
	1	
	2	
	3	
	4	
	5	

UQ total = _____

UQ average = $\frac{\text{UQ total}}{\text{No. of containers in UQ}}$

UQ average = _____

UQ average =

Consented maximum depth _____ mm
 (If specified in your resource consent)
 Note: UQ average should be less than this figure

1.

EXAMPLE

2.

Data collection

Container	Depth (mm)	Rating
1	5	19
2	7	18
3	15	14
4	17	13
5	20	7
6	23	6
7	25	5
8	18	11
9	17	12
10	15	15
11	19	9
12	20	8
13	27	4
14	30	3
15	32	2
16	37	1
17	18	10
18	15	16
19	7	17
20	3	20

Calculate upper quartile (UQ) average

Container	Rating	Depth (mm)
16	1	37
15	2	32
14	3	30
13	4	27
7	5	25

UQ total = 151

UQ average = $\frac{\text{UQ total}}{\text{No. of containers in UQ}}$

UQ average = $\frac{151}{5}$

= 30.2 mm

This quick guide is intended only to help identify if your irrigator may be applying effluent too heavily. It is not an exact method of assessing irrigator performance. Phone the Dairy Team at Horizons on 0508 800 800 if you have any questions regarding your calculations.

EXPLANATION SHEET

Is my soil high or low risk?

High Risk Soils are those with any of the following:

- Contain artificial drainage (mole and pipe),
- Have impeded drainage, are imperfectly drained or have a low infiltration rate,
- Are on sloping land of more than 7 degrees,
- Have a high water table.

Low Risk Soils are:

- Well drained with a slope of less than 7 degrees, and
- Contain a stony or sandy layer within the top 30mm.

If you are unsure if your soils are high or low risk you may wish to contact one of the following rural advisors who will be able to help you:

- Jess Hughes (Horizons) – 0508 800 800
- Logan Bowler (Dairy NZ) – 06 350 5498

Or alternatively:

DairyNZ has recently brought out a 'Pocket guide to determine soil risk for farm dairy effluent application' – this can be downloaded at www.dairynz.co.nz/effluent or phone 0800 4 324 7969.

Why do we use the Upper Quartile Average?

We use the Upper Quartile Average rather than the overall average or maximum application depth for the following reasons:

- Travelling irrigators often show a 'donut' pattern of application depth on the ground. This means that the outsides of the irrigator run will often have high application depths, while the inside of the run will have much lower depths.
- By calculating the UQ average depth, we are aiming to lower the application depth on the outer edges of the run (see diagram on right), so that nutrients are not over applied in this area

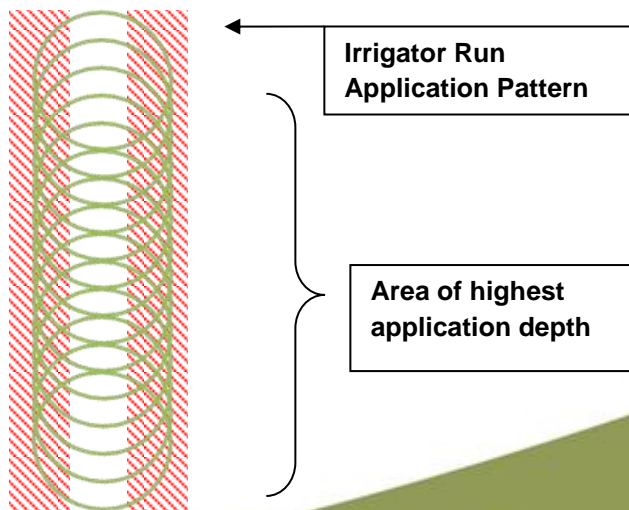
What does the traffic light mean?

If your application depth is within the **red section** of the 'traffic light' then a proportion of your effluent irrigated is likely to have ponding, run off or leach through to ground water, having no benefit to your system and causing potential non compliance with your resource consent. **Your irrigator requires urgent improvements.**

The figure in the **green section** is the depth that can be applied while avoiding leaching through the soil profile. The aim is to keep all nutrients within the root zone for use by plants. If your application depth is in the green you may wish to calculate the uniformity of the spread of effluent to ensure this depth can be applied evenly over the entire application area, thus gaining maximum benefit from effluent application. Please contact Horizons or an irrigation professional for advice regarding this.

If your application depth is within the **yellow section** then leaching is likely to occur, especially if soils are wet.

Refer to the checklist on the reverse of this explanation sheet for some suggestions that may improve irrigator performance. If you are unable to achieve the 'green' application depth please contact one of the rural advisors previously stated or call one of the Dairy Team on 0508 800 800.



IRRIGATOR PERFORMANCE CHECKLIST

HAVE YOU??



Set the irrigator to its fastest speed	
Checked for leaks in the hose or connections and repair	
Greased all moving parts of the irrigator	
Checked nozzles are not cracked, cut, or perished. We recommend you replace the nozzles every year. Check with the manufacturer for correct nozzle size	
Ensured the drag hose is laid out in an 'S' shape with the effluent line looped no more than 3m from the irrigator (as in image) to reduce drag on the system	
Set arms at the end of the booms to manufacturers specifications (not pointing too high or low)	
Checked bearings on irrigator are not worn - have irrigator serviced if necessary	
Ensured the irrigator tyres are pumped up to reduce friction	
Checked hose length, excess hose reduces pressure to the irrigator - only use as much hose as needed for that run	
Ensured the irrigator is not running up hill	
Checked that the pump is big enough to effectively operate the irrigator - consider servicing or upgrading the pump. You may need to use a pressure gauge fitted close to the irrigator to help identify issues with pressure	

