

On-site Wastewater Management
Training Course

Passive Dosing Systems

Siphons and Flouts,
Low Pressure Effluent
Distribution Systems

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Siphons

- Transform low or variable flows into regular doses
- Suitable for pressurising manifolds and drainfields
- Have no moving parts
- Require no electricity
- Technology over 100 years old
- Require understanding to ensure appropriate use and operation

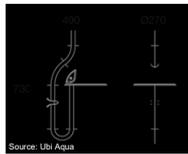
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Various Siphons Available

- Stafford siphon
- Flowking
- ecoteam Surgeflow
- Ubi Aqua by ecoteam
- Orenco

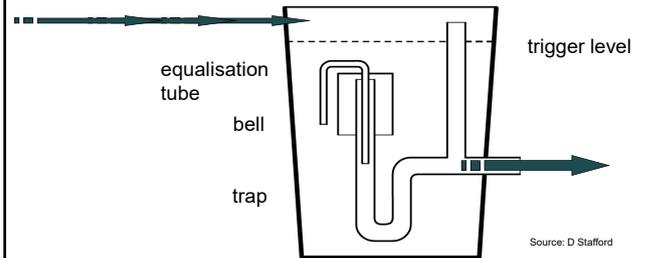


Source: Airis Wastewater Clinic



Source: Ubi Aqua
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Dosing Siphon Anatomy

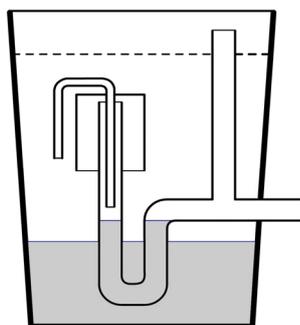


Source: D Stafford

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Siphon Cycle

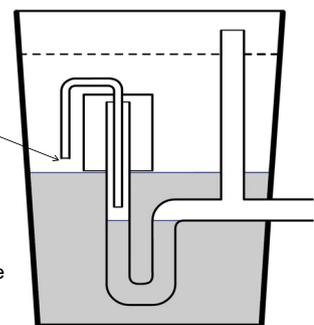
trap primed



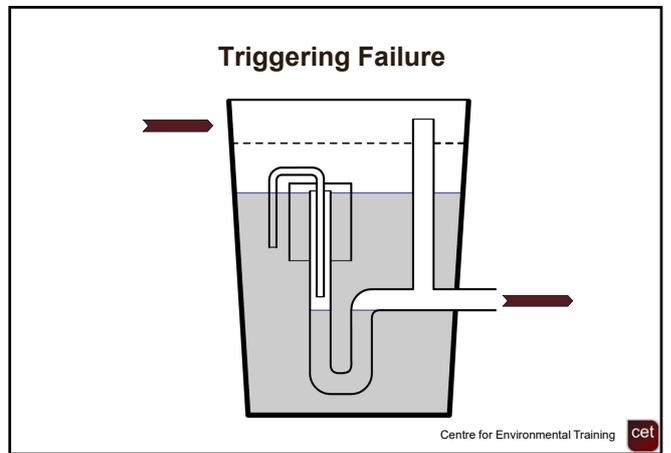
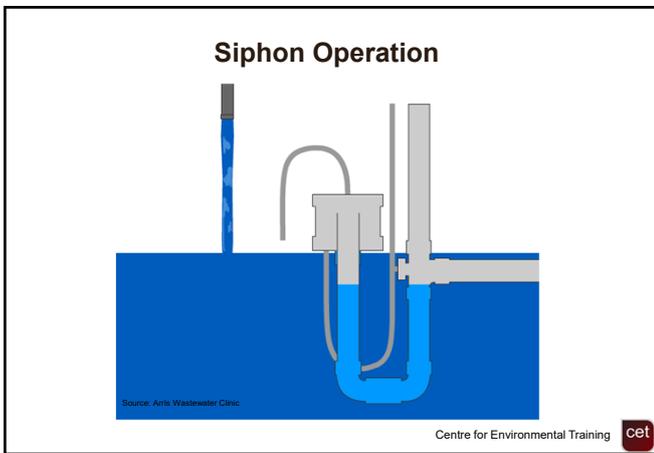
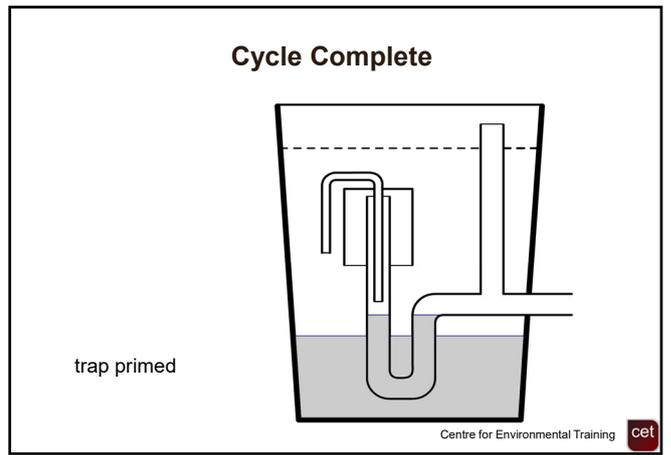
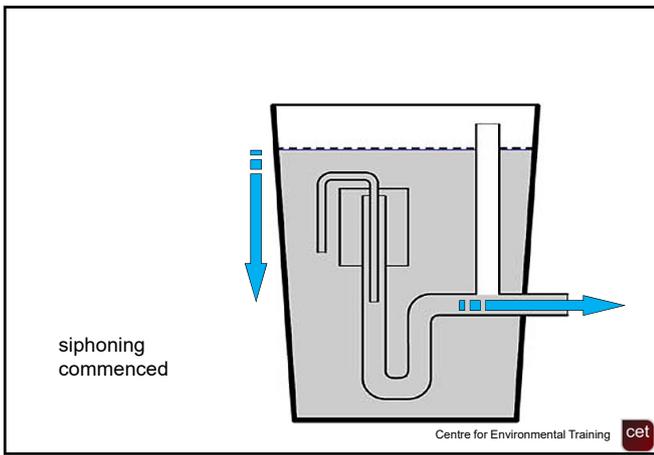
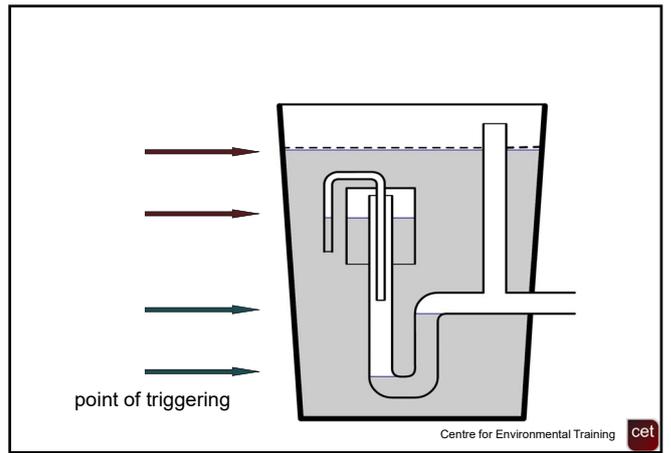
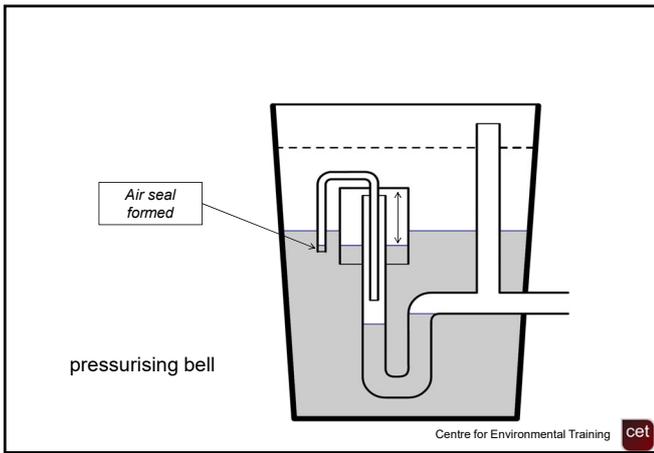
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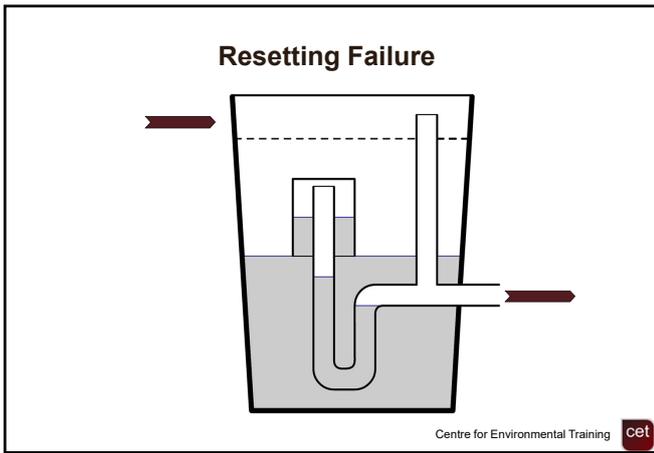
start and end of cycle

Vented to atmosphere



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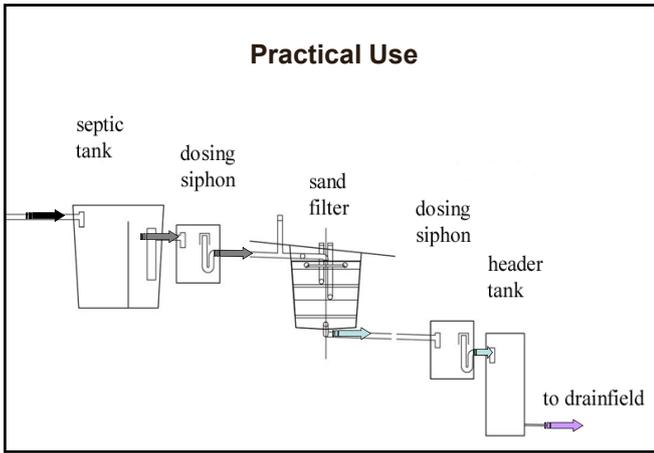




Performance Optimisation

- Outlet filter must be fitted to the septic tank
- Bell:trap volume approximately 3:1
- Bell diameter:trap pipe diameter approximately 3:1
- Deep trap easier to trigger
- Shallow traps need to be driven with high inflow rates
- Balance tube required for reliable resetting
- Calibration of relationship of balance tube ends important

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Applications

- Domestic waste water treatment system, Martinsville, NSW
- One of two dosing siphons in the system

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Applications

- Cheese making waste treatment, Nimbin, NSW
- Doses a drainfield manifold with limited fall

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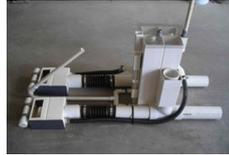
Applications

- Testing squirt height and uniformity, near Nimbin

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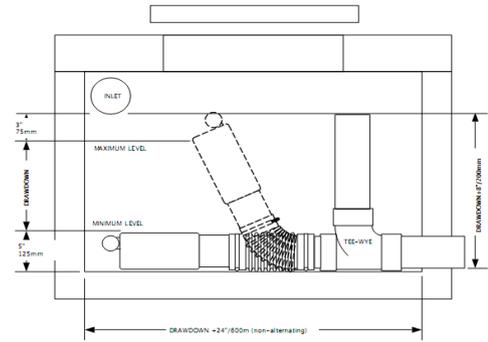
Flout

- Single flout
- Double flout
- Low drawdown possible with larger dose volume



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Flout



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Flout dosing a sand filter



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Flout



Low Pressure Effluent Distribution (LPED) Systems

Definitions (AS/NZS1547:2012)

LPED Irrigation

- Shallow subsurface irrigation of effluent into topsoil through low pressure effluent distribution (LPED) lines

LPED line

- A pressure line perforated with drilled squirt holes and nestled in a distribution line

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LPED Irrigation

- Suitable for both Primary (with outlet filter) and Secondary effluent
- Practical on moderate slopes up to 10-15%
- Not suitable for Cat 1 and Cat 6 soils
- Effluent distributed into shallow trenches 200mm wide by 200mm deep, excavated in good quality topsoil
- Minimum 250mm topsoil depth required for application onto Category 5 soils

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LPED Irrigation

- Require dosed flow by siphon or Flout (low pressure) or pump (pressure) - not gravity fed
- Ensures even distribution along entire LPED trench; avoids spot loading of slotted pipe
- Facilitates hydraulic and nutrient uptake by transpiration and seepage
- Use sequencing valve to alternate loading of lines (pump only)

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LPED Installation

- Minimum 1,000mm spacing between LPED trenches
- Trenches constructed along the contour on sloping ground (max 15% gradient)
- All LPED systems should incorporate capacity for flushing (as per Figure M3)
- LPED systems require appropriate consideration of hydraulic design

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LPED Installation

- Pressure line 25-40mm PVC with 3-6mm drilled holes at appropriate spacing for even distribution along whole length
- Clean water test to observe even squirt height before covering
- Distribution line Ag-pipe or slotted 100mm PVC

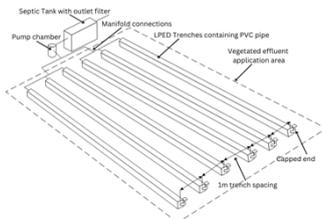
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DIRs for LPED

Soil Category	Soil texture	Structure	Drip and spray irrigation	LPED irrigation
			DIR mm/day	
1	Gravel and sand	--	5	Not advised
2	Sandy loam	All	5	4
3	Loam	All	4	3.5
4	Clay loam	All	3.5	3
5	Light clay	All	3	2.5
6	Medium to heavy clay	--	2	Not advised

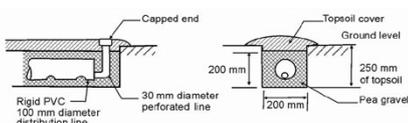
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LPED Irrigation



Typically:

- Multiple hydraulic zones
- Manual flushing
- Mounded surface (capping) to finish to shed rainfall



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References

- The Flout Dosing Device. A device for gravity dosing of effluent or stormwater. <https://rissyplastics.com/flout-systems/about-the-flout.html>
- Arris Wastewater Clinic automatic dosing siphons <https://www.arris.com.au/water/products/automatic-dosing-siphons/>

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