

The FLOUT® dosing device and the CueBox™ sequencer

A DEVICE FOR GRAVITY DOSING OF EFFLUENT OR STORMWATER
AND METHODS TO SEQUENCE ANY NUMBER OF THEM

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WHY DOSE?

The advantages of dosing effluent or stormwater to the disposal area are well known. The flooding action of the dose delivers effluent evenly to the disposal area and the subsequent resting allows oxygen to reach and help digest the biological mat which may form and reduce the disposal area's efficiency. Dosing milkhouse waste to a grass strip disposal manifold allows freeze free, year round operation.

TRADITIONAL DOSING METHODS

Traditional dosing systems may employ bell siphons, pumps, or



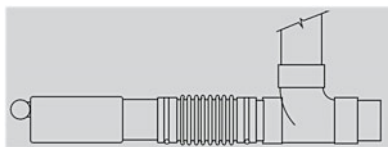
Failed alternating bell siphons to be replaced with Flouts

other devices. The bell siphon is a very old design which will siphon out the contents of a dosing chamber once full and reset once the chamber is empty. It is a simple device with no moving parts but very difficult to use. A bell siphon has a downward projecting trap which extends below the floor of the chamber. This makes for a difficult installation, especially in pre-cast concrete chambers. The additional depth required by the trap may cause problems in high ledgerrock situations. Field installa-

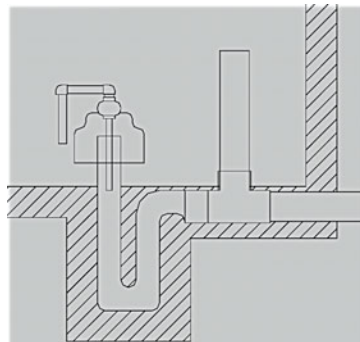
tion using mortar may result in an unveled, malfunctioning bell siphon or a leaking chamber. Bell siphons enjoy the characteristic of automatically alternating when installed in pairs but a third or fourth or more are not possible. Alternating bell siphons will only work when perfectly level. Dips or pockets in the discharge pipe can also disrupt the bell siphon's operation. Bell siphons must be primed, and if one should dry out, operation will not automatically resume. When a bell siphon malfunctions, it is difficult to diagnose, let alone repair. Pumps are the only option when dosing to a higher elevation but are very expensive energy wasters when used on a downhill system. There is also an electric valve system but as with pumps, electricity and expensive controllers are necessary.

Another dosing method employs a dumping bucket but it is very small, providing only a 1.5 gallon dose.

The FLOUT®



A Flout® is totally within the chamber. Installation is simple.



A bell siphon has to extend below the floor of the chamber making installation difficult

Flout is a contraction of the name



A single Flout® dosing device with flexible connector and vent assembly

Floating Outlet®. Rissy Plastics has pioneered the technology since 1992 and the original test installation in Andover, CT is still working perfectly. Thousands of Flout installations are at work in North America, Europe, South Africa, New Zealand, and Pacific Islands.

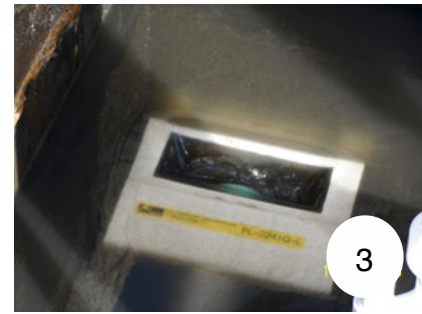
HOW IT WORKS

A chamber of sufficient dimensions to contain the required dose has an upper inlet and a lower outlet,



Flout job number 1 in Andover CT. Since 1992, still dosing after all these years.

usually at floor level. No plumbing extends below the floor. The outlet diameter is usually 3 inches but may be 4 inches, 2 inches, or as small as 1 inch. A box shaped vessel floats on the surface of the liquid in the chamber. There is an opening in the upper side of the vessel and a ballast weight is at-



1. The Flout® is free floating, hinging on the flexible connector as the chamber fills. 2 When the Flout reaches maximum, liquid spills in, sinking it and opening the outlet to flow. 3. As the liquid drains down to the top of the Flout, it empties and begins to float again, closing the outlet

tached. A length of pipe extends far into the vessel, through the side, and attaches to a special flexible connector the same diameter as the pipe. The other end of the connector is connected to the outlet, usually via a tee fitting with a vent extending above the maximum liquid level.

The flexible connector acts as a hinge, allowing the vessel to float ever higher as the chamber fills. When the vessel can float no higher, liquid spills into the vessel, forcing it to sink to the floor, allowing the liquid to flow through the outlet. When the liquid level drops to the top of the vessel, flow stops when the vessel drains and re-floats in the remaining liquid.

One Flout outlet may serve more



This multiple outlet Flout can dose three disposal area sections or combine to achieve a larger flow rate

than one disposal area with the use of distribution boxes. Multiple outlet Flouts provide individual outlets for each section of the disposal area. This arrangement eliminates distribution boxes entirely. Especially useful on side hill systems, multi-outlet units give perfect equal distribution, making serial distribution obsolete. Multiple outlet outlets can be recombined for larger flow rates.

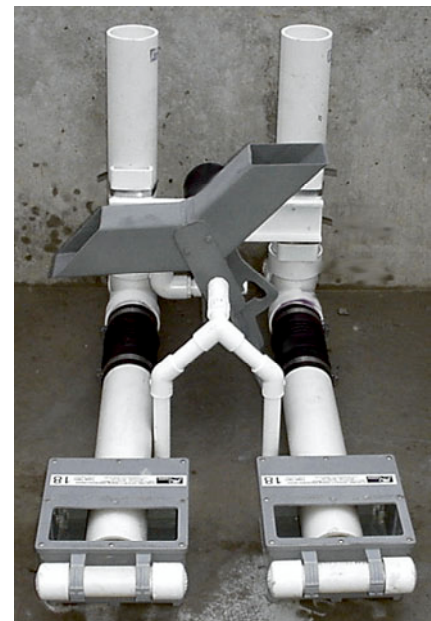
Flout dosing chambers can be cascaded. A multi-outlet unit can divide the flow to more downstream chambers. In pumped systems, a Flout chamber can receive a flow from a low power pump over a long period and discharge rapidly, providing the strength of a high power pump.

Recapped, the Flout is a proven method of dosing effluent or stormwater to the disposal area. It is simple to install, works without power, and in the rare event of a problem, easily diagnosed. It is inexpensive and long-lasting. A Flout never needs to be primed.

The Alternator

One of the first criticisms from the bell siphon camp was that the Flout would not alternate. This is true. If two were installed side by side, the one that sinks first will always sink first. On the other hand, bell siphons will naturally alternate, assuming they are installed perfectly level with each other, which is difficult to do! With help from an additional device, Flouts will indeed alternate. The first alternating system developed employs a see-sawing bucket. It is controlled by a float and cam and changes state upon each fill and emptying of the dosing chamber. The low side of the bucket simply restrains the Flout, causing it to sink before the other. The idle Flout rides the surface of the liquid down and then back up, never handling any liquid. After the bucket flips, the other Flout will sink on the next refill. Many of these are in use and they are still available.

The Alternator has some limits. It needs at least 15 inches of draw-down (DD) and is limited to a maximum drawdown of 30 inches. Larger alternating Flout arrangements are possible using the following method.



The Alternator system. The low side of the bucket will restrain and sink the left Flout first

The CueBox™

The first thing customers asked for once alternating Flouts became available was a way to sequence more than two Flouts. How could this be done without electricity or complicated controls? The answer is the CueBox™. It is named CueBox™ because it 1. Queues the Flouts to sink in order, 2. It's shaped like a box, and 3. It uses a cueball, yes a cueball or any other billiard ball as the main working part.

Sequencing increases the effective capacity of the dosing chamber.

Say a 2000 gallon dose is required by the disposal system. A 500 gal-



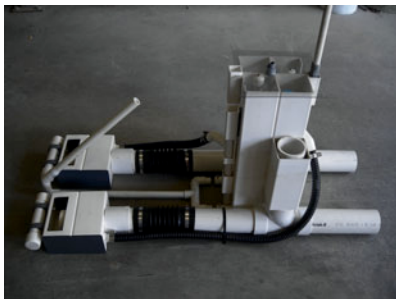
A billiard ball circulates from cell to cell around the CueBox, selecting a Flout at each stop along the way.

lon chamber could dose one quarter of the system at a time for a 2000 gallon effective yield.

Any number of Flout dosers can be controlled. Two, three, four, no limit except for the physical space in the dosing chamber.

A CueBox works by delivering a flow of liquid to the selected Flout via a "trigger hose". The flow will force the selected Flout to sink before all others.

The trigger hose serving each Flout is connected to a pair of "cells" in the CueBox. One is the "lift cell" which will deliver the cue-ball to the "trigger cell" using a "lift



CueBox job number one alternates a pair of 8 inch drawdown Flouts. The angled pipe prevents Flouts from colliding. Note the trigger hoses between each Flout and Trigger Flout. Now working in B.C., Canada

float". As the chamber fills and the lift float rises, the ball will fall through an opening onto the "trigger float", which is shorter and not yet floating. The ball cannot move to the following lift cell because it's lift float is floating also, and blocking the next opening. Normally the trigger float will lift the trigger hose up out of the liquid as the chamber

fills but when there is a ball on it, the trigger float is locked down and



A CueBox™ for sequencing four 28 inch drawdown Flouts.

cannot rise. The liquid will now flow to the connected Flout and sink it. As the chamber drains, the ball will fall onto the next lift float and then be delivered to the next



A high flow rate arrangement with two dual 4 inch outlet Flouts and CueBox sequencer

trigger float as the chamber again refills. The ball will make a complete trip around the cells, ending up where it started. Any untriggered Flout will simply ride the liquid surface down and then back up, never passing any liquid. All of the liquid used to trigger the Flouts and lift the floats is delivered from deep down in the chamber, keeping out surface debris, grease, soap, and hair which could interfere with the function. The cueball path is always above the liquid.

Beyond simply sequencing Flouts, the CueBox can be set up in some interesting and useful ways. One Flout may be connected to more than one trigger cell. This Flout will dose more often than the others

and deliver more doses to a larger disposal area. Larger size and multiple Flouts can be sequenced. Different drawdown Flouts can work together to deliver different sized doses to various sized disposal areas. The CueBox can control Flouts down to 6 inch drawdown. There are various methods to shut down and rest sections of the disposal system as well. The



Two Flouts in this retrofit are set to different drawdowns to better match the disposal fields they each serve. Note the inlet baffle to calm the flow from the pump station which serves the chamber.

Flouts can be anywhere in the chamber. Precise spacing such as that needed by the Alternator is not required.

FLOUT APPLICATION FACTS

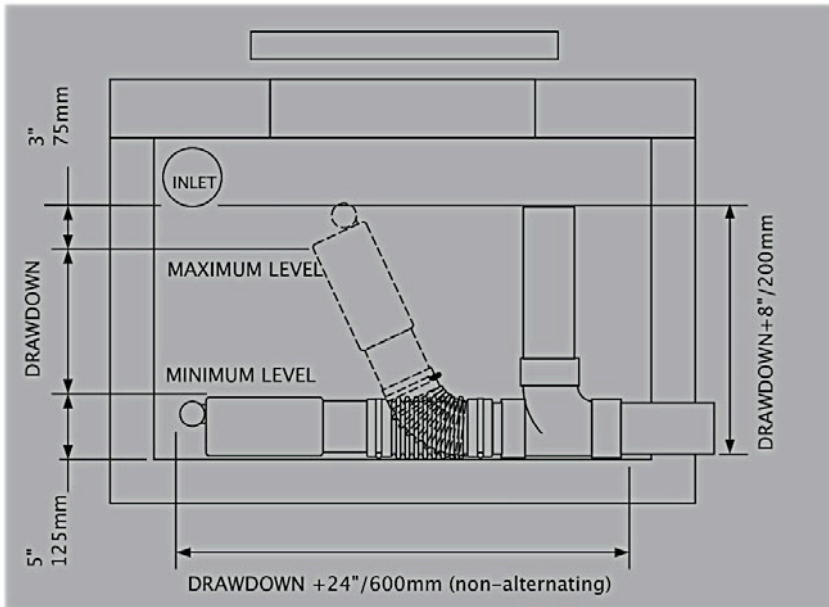
There are a number of simple rules to follow when designing and installing Flout dosing chambers. The rules apply to typical "off-the-shelf" Flouts. Since Flouts are available custom made, designs for specific applications can be implemented. The flexibility is unlimited. If the standard rules will not work, a custom solution may be available.

For all Flout arrangements:

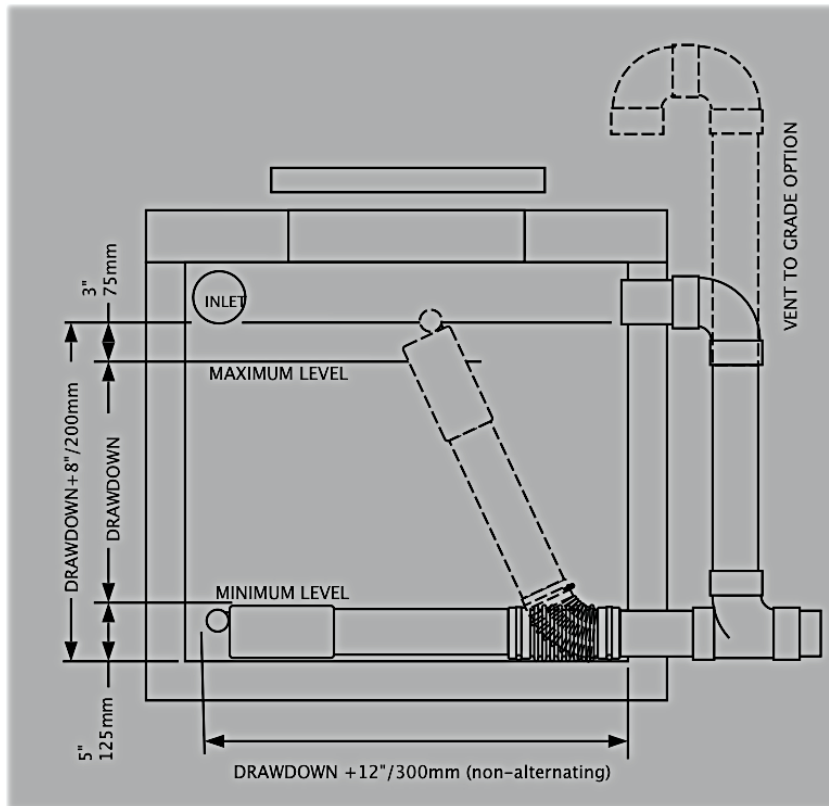
Provide sufficient access directly above each Flout when at maximum liquid level. Do not allow inflow to enter the Flouts. Provide a baffle to direct inflows away from Flouts. Use similar methods to calm rapid inflows to the chamber.

Chamber Size Requirements

The size of the chamber is dependent on the dose volume required and the vertical drop avail-



Typical dimensions for 3" dia. Flout installation with internal vent arrangement



Typical dimensions for 3" dia. Flout installation with external vent arrangement

able. Capacity of chamber in gallons= (in inches) is the inside length x the inside width x draw-down / 231 (cubic inches per gallon) Once determined:

For 3" Flouts

1. Drop from inlet to outlet= draw-down (DD)+ 8 inches.

Eight inches is a result of 5" of liquid remaining at shut off plus 3" from maximum level, up to the inlet. Pre-assembled vents are set for 3" above max. level. The inlet may be lower when available elevation is minimal but avoid flooding the inlet (unless alternate venting is provided) and avoid raising the level of the septic tank. A new, dry Flout will have up to an inch more drawdown on the first cycle of use.

2. Length of chamber = $DD + 24"$ with pre-assembled vent installed INSIDE the chamber, OR $12" + DD$ when a field assembled vent is installed OUTSIDE of the chamber.

3. Width of the chamber is 8" for each Flout + 4". A single Flout requires 12". A double requires 20", a triple, 28" and so on.

4. Headroom: The height from max. liquid level to chamber ceiling= 8"

For larger or smaller size Flout arrangements, multiple, Alternating, and CueBox applications, please contact engineering.

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CueBox™ is a trademark for a dosing control system manufactured by Rissy Plastics, LLC or its licensees. US Patent Pending

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