

WEMCO-HIDROSTAL

Screw Centrifugal Pumps

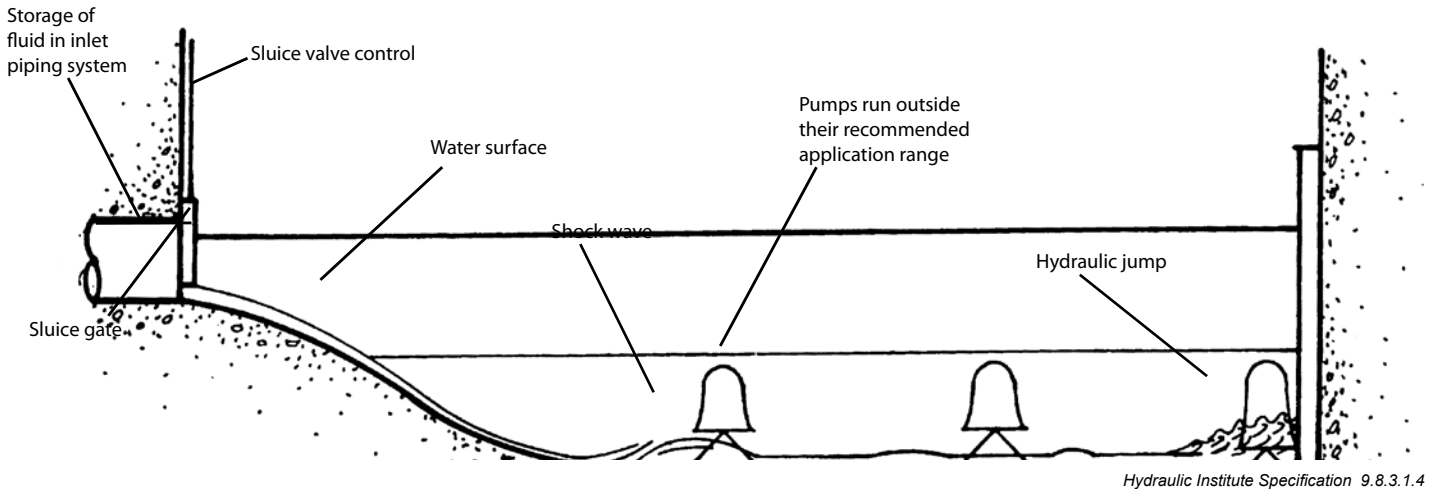
Enhanced Trench-Style Wet-Well

Self-Cleaning Using Prerotation

Excellent
Power & Industrial
Solutions



Trench-Style Self-Cleaning Wet-Well Works, But is Complicated



Trench-Type with Ogee Ramp

The trench-type wet-well described by the Hydraulic Institute (9.8.3.1.4) is designed so that it can be made self-cleaning. To do so, periodically a sluice gate (or other type of valve) is closed on the influent flow to the station, so that a build-up of fluid can occur in the inlet piping to provide a source of liquid for the self-cleaning cycle. To initiate the cleaning cycle, the gate is opened so the fluid flows down an “ogee ramp”, producing a “hydraulic jump” at the toe of the ramp, which in turn produces enough turbulence to suspend any material in the wet-well. In most installations, all but the furthest pump in the trench is shut off, which allows this “jump”, and a following moderate current, to transverse the length of the trench. In doing so, it flows by the suction intakes of the shut-off pump(s), and sluices/scours any material in the wet-well to the last pump, which is running. This pump picks up and discharges all of the accumulated material.

This is effective, but it isn't easy, and may require additional capital expense:

1. It requires a sluice gate or other valve on the inlet piping above the ramp that can throttle the inflow to the station to provide a fluid source for the self-cleaning cycle. In addition to the capital cost of the gate/valve, it will usually require a valve operator, adding even more expense.
2. Depending on the method selected to dewater the trench to initiate the cleaning cycle, one or all of the pumps may break suction (lose prime) and vibrate significantly, sometimes even violently. Most pump manufacturers don't recommend this type of operation, and if the pumps were to be run too long under

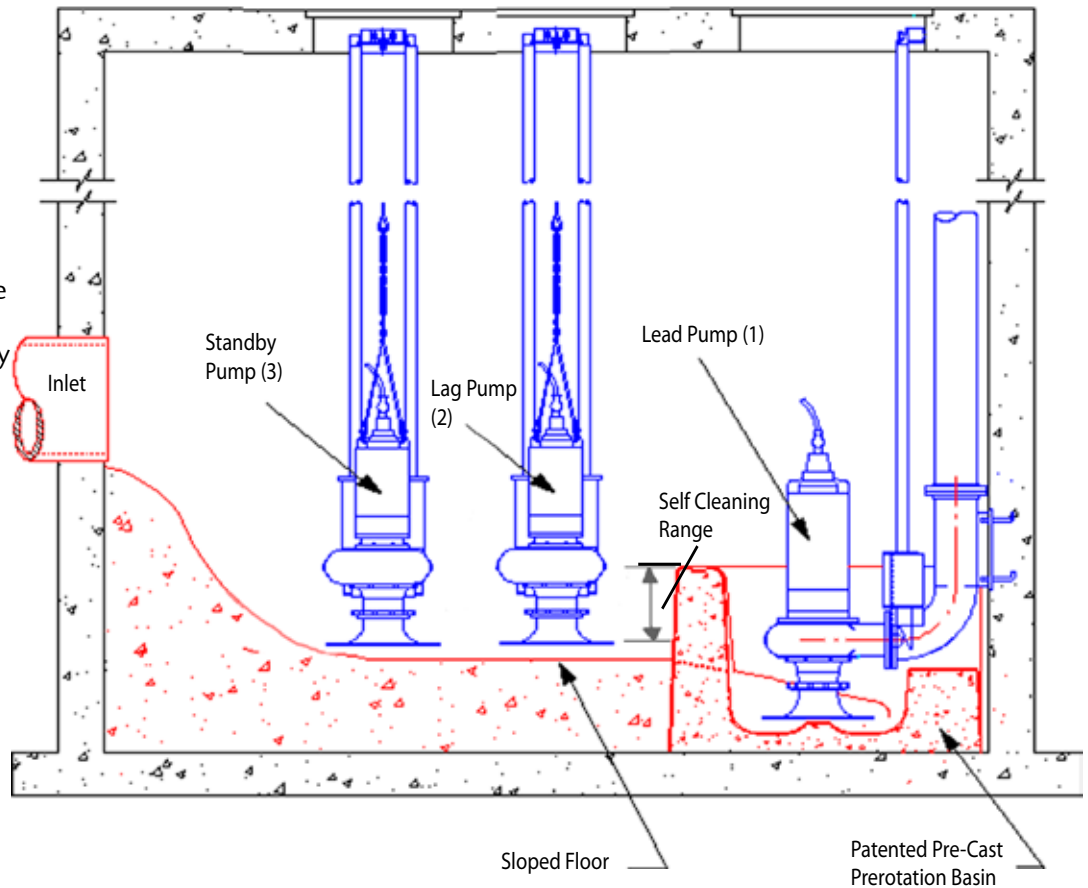
these conditions, warranty and maintenance issues would occur.

3. Every installation is unique, and with the normal variables that exist in every installation, a great deal of trial and error is required to fine tune the cleaning cycle. If this is done manually, a trained operator who understands the complexity of the installation has to run the “self-cleaning” cycle every time by adjusting the gate/valve and pumps. Depending on how often this is done, especially evaluated in light of today's staffing and operating environment, this option can be very expensive in both dollar cost and lost opportunity of the trained operator.
4. The system can be automated, but at considerable capital cost for the electronics, programming and program maintenance. This can be a challenge, because after the system has been fine tuned, all of that knowledge then has to be programmed successfully – a time consuming (expensive), and at times, frustrating experience.

Trench-Style Enhanced With Prerotation

This enhanced design uses the trench and ogee ramp, but completely eliminates the need to store fluid in the inlet system. It avoids the cost of the sluice gate/valve, any automation or electronics, and the trained operator to run it through its “self-cleaning” cycle. Instead, the Prerotation system automatically cleans the wet-well, at least daily, without any costly equipment or operator attention.

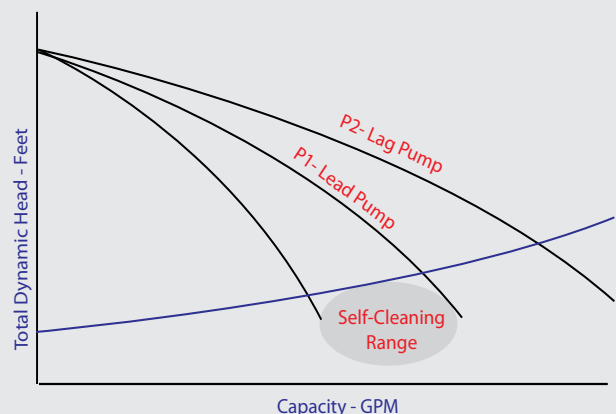
In this system, the last pump is replaced by a “prerotation basin” and Hidrostal screw centrifugal pump. This system both automatically cleans the wet-well every time there is a low flow cycle, and matches the flow of the sump when in its Prerotation cycle.



Advantages over trench-style design:

1. Automatically and continuously cleans the wetwell of both floating and settled solids during every low flow cycle – not limited to a brief, special cleaning cycle.
2. Eliminates the need for any man power/operator attention or activity.
3. Does not require that the main pumps be run outside of their recommended operating range. No excessive vibration or noise.
4. The Prerotation system does the cleaning with far more flexibility in the design geometry of the transition inlet and ogee – reducing construction costs and siting problems.
5. Automatically matches discharge flows to variable sump inflows – can eliminate the cost/complexity of a variable speed drive.
6. The single channel, Hidrostal screw centrifugal “clog-free” pump is unsurpassed in solids handling.

In summary, the enhanced trench wet-well with the Prerotation system is the best method of keeping your pumping wet-well clean --Automatically, Reliably, Simply and Economically!

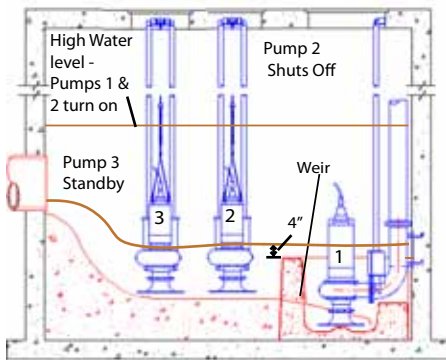


Flow-Matching & Self-Cleaning Range

Sequence of Operations



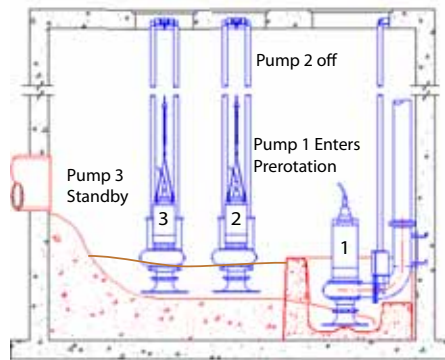
High Wet-Well



Sequence 1

1. Inlet flow decreases.
2. Pump Number 2 will shut off approximately 4 inches above basin weir.
3. Pump Number 1 operates at full flow.

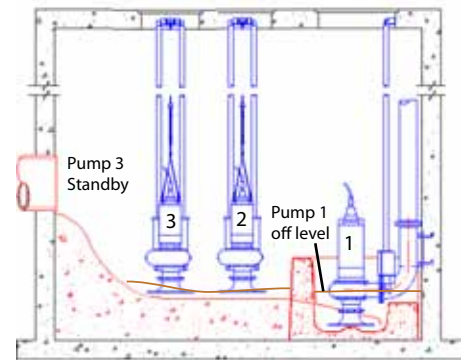
Start/Recleaning Cycle



Sequence 2

1. Wet-well level is pumped down by Pump Number 1.
2. At a level equal to weir height, prerotation starts, system starts to flow match.
3. At the flow matching point, floating and settled material is entrained and folded into the suction due to the Prerotation and is pumped out of the wet-well.

End of Cleaning Cycle



Sequence 3

1. Pump Number 1 will flow match down to its shut off level.
2. During pump-down, the wet-well is automatically cleaned.
3. Pump shuts down without losing prime.
4. Cycle can restart at high or intermediate water level depending on control strategy.

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