Pump-Mounted Mixing / Flush Valves

Description:
Pump-mounted mixing / flush valves are a proprietary product accessory designed to provide by-pass flow of the sewage/wastewater with the purpose of creating a mixing / flushing action in the wet-well. The valve is operated by means of an internal oil-pot arrangement designed to close slowly when it is pressurized by the pump discharge flow. The valve is mounted directly onto the exterior surface of the pump volute casing. The thrulet port size is 46 mm (1.8").

Deficiencies and Potential Problems:
1: Proprietary Design - Single Source of Supply
The pump-mounted mixing / flush valve is a proprietary product and is typically not available on the open market from sources other than the pump manufacturer. Therefore, the product is typically very costly, both initially and at a later date when replacement units or replacement parts are required.

2: The valve thrulet port is small, typically 48mm in size. This does not provide adequate room for passage of large solids typically found in raw sewage and wastewater.

Port Thrulet diameter = 46mm

When the valve becomes clogged the pump must be removed from the wet-well for cleaning and servicing. This is time consuming, messy and costly.

3: The mounting of the valve on the volute casing creates an unusual interruption to the normally smooth contoured surface of the casing interior wall. This, combined with the by-pass of discharge flow through the small port area creates unusual flow paths and turbulence at the port locations. This can result in casing damage and premature failure due to wear from abrasion / erosion.

Areas of volute casing subject to premature wear from abrasion / erosion

In areas of high sand / grit contents, the abrasive / erosive action is greatly increased, thereby shortening the casing life even more quickly.
Alternative Mixing / Flush Arrangement

Description:
The following sketch illustrates a superior non-proprietary mixing / flush system design utilizing standard low-cost commercial components:

A. Standard commercially available motor-operated ball valve of a port size to meet customer’s preferences. The valve is powered and controlled by a timed circuit in the pump control panel. Utilizing an adjustable timing device, the valve can be set to open upon operation of the lead pump unit and close after a pre-determined time period according to the customer’s preferences. Unlike the pump-mounted valves, this system provides great flexibility to adjust the time duration of the mixing / flushing action. Location of the motor-operated valves in the dry valve-vault provides easy, safe access for servicing. There is no need to remove the pumps from the wet-well!

B. By-pass piping from the main pump discharge pipes. This can be low cost PVC or other materials to meet customer’s preferences.

C. The by-pass line (mixing / flushing pipe) enters the wet-well adjacent to the main pump discharge pipes. The line is directed to the bottom of the wet-well.

D. Using standard commercial pipe fittings a “nozzle” arrangement is created at one or more locations to meet the customer’s preferences. This method provides great flexibility as to the quantity and locations of the nozzles to meet the unique mixing / flushing requirements of each individual application. Low cost PVC pipe and fittings permits easy re-configuration should the customer’s needs or preferences change.

E. Standard commercial check valves prevent by-pass flush from flowing into discharge pipe of the opposite pump.

Summary:

This alternative system arrangement provides the following key advantages:
- Low cost non-proprietary system components available from numerous sources of supply
- Low cost PVC pipe and fittings provide for highly flexible system design and easy reconfiguration
- Design flexibility regarding size of mixing / flush pipes and nozzles; superior non-clogging design
- Adjustable timing of the mixing / flush sequence
- Location of valves in safe, dry valve-vault area