Tideflex® Check Valve for Storm Drainage Backflow Prevention

In the beginning, storm drainage backflow prevention was limited to conventional swinging gate or “flap check” type valves. Operators and maintenance crews learned to live with the fact that swing checks had to be continuously maintained. Many installations required annual re-manufacturing of the seat, gate and hinge areas.

To ensure free movement on sea wall applications, flap checks required frequent cleaning from crustacean growth. Barnacles grow all over everything. As build-up increases, the head pressure to operate the gate soon goes up. The net result leaves more standing water in the pipe before the gate can open and less area for storm surges to runoff. Other problems occur from frequent wave pounding. Hinge bores wear elliptical. As hinge assemblies wear down, the gate will work its way down respectively. Thus resulting in seat and gate damage, leakage and sediment build-up in the pipe.

Lodged debris between gate and seat allow additional migration up the pipe to compound failure of flap check valves. Sticks, cans, tennis shoes and other trash can be found within storm systems. All random large debris contributes to the failure of flap check valves by wedging the gate open.

Many municipalities have designated crews to service these valves. Grinding of the seat and gate areas, rebuilding hinge assemblies, and cleaning out built up sediment within the pipe are all common operations included when intermittent or complete overhauls are performed. Projects of this sort cost municipalities man-hours and leave the outfall unprotected for the duration of the overhaul.

On the other hand, many municipalities either don’t have the money or manpower to maintain their outfall system. Some prefer to gamble against future 20 to 100 year storms and will deal with the problem when a major catastrophic event forces action. There are countless flap check valves which were installed and forgotten. Many have the hardware still attached to the headworks and are non-functional. Many are unknowingly broken or lost and are waiting for a flood event to be noticed.

There are countless inherent problems which go along with any storm drainage swing or flap type check valve. All the more reason for municipalities to take a good look at how much above the purchase price installing swing/flap check technology costs them. Replacement or the intangible costs of maintenance is where more than has to be spent. Fortunately there is a better way…TIDEFLEX!

Tideflex Technologies designed, tested and manufactures the Tideflex® Check Valve. Truly a “Backflow prevention device” in every meaning of the phrase, the Tideflex® Check Valve performs in the ZERO maintenance spectrum! Tideflex Technologies’ all rubber muscle was built to eliminate any potential of failure or need for maintenance. Since rubber products have a memory for its vulcanized curved duckbill shape, the Tideflex® Check Valve requires no mechanical parts, no hinges, pins, gates or seals. No mechanical parts means no mechanical maintenance. None! This is very important! The contributing factors of failure from seat/gate misalignment due to hinge wear is reduced to ZERO! No need for exotic metals (i.e: 316SS, Monel, Hastelloy). All that is needed is a thimble or short section of pipe for mounting. Flanged models are available.
Additional Tideflex® Check Valve benefits are:

- Unaffected by marine growth,
- Closes on entrapped solids,
- Unaffected by sediment buildup or debris,
- Requires VERY LOW head pressures to operate,
- Yields low head loss through the valve,
- Manufactured to specific installation hydraulics.

Let’s address each of these benefits:

- **Unaffected by marine growth.**
  By nature, given enough flexing action, solids will flake from any surface. This flexing action is amplified through the Tideflex® Check Valve’s principle of function. With each surge of storm runoff comes the flexing action inhibiting crustacean growth on the valve surface. This point has been proven by hundreds of marine installations.

- **Closes on entrapped solids comparison.** Let’s take a look at conventional swing or flap checks. Every flap check WILL get some kind of debris lodged between the gate and the seat. It is only a matter of time, and WHEN is the unknown question. Somehow Murphy’s Law manages to hold true, and failure comes up at the worst possible time. The resultant scenario produces a FIXED leak path for backflow to migrate. This FIXED path remains constant no matter how high the river level or tide elevation rises. The effect can allow additional sediment build-up within the pipe. Also, less storm water is able to escape from further up stream. The more sediment or back water build-up within the pipe, the less area available for storm runoff. With the gate lodged open, the door is also wide open for major back flooding if a storm should roll into town! Sounds like complete failure. Either low water with high pipe velocities or maintenance can correct this scenario. Usually when maintenance is performed, some flooding called attention to the problem.

  The Tideflex® Check Valve will eliminate potential backflow. Due to the nature of the valve, the Tideflex® Check Valve will collapse around any debris and seal off the backflow. For example, in tidal areas the duckbill lips will collapse tighter and tighter as the tide height increases. The pressure forcing the lips together puts a squeeze effect on any solids build-up. The valve will form around the obstruction until enough runoff flexes the lips open and flushes the material out. Every installation encounters solids. By installing the Tideflex® Check Valve, the element of backflow potential is reduced to the ABSOLUTE minimum!

- **Unaffected by solids or sediment buildup.** There are countless flap check valves that have been installed and are buried in silt accumulation. On storm drainage lines that have very low gradient, suspended solids tend to drop put and build-up in the pipe and outfall structure. The Tideflex® Check Valve performs without complications even when buried in beach sand. The City of Pacifica, CA, has their Tideflex® Check Valve buried during every tide change. When storm runoff comes down the pipe the Tideflex® Check Valve causes the sand to flush out just like a garden hose stuffed into the ground flushes out an escape path. For lack of a better term, the Tideflex® Check Valve bores or flushed out even when buried. This is proven by the Pacifica installation.
• **Requires VERY LOW head pressures to operate.** One of the best features that the Tideflex® Check Valve has to offer is the low head pressure required to open the valve. As little as one inch of water column differential is all that is needed to start draining through the curved bill. A conventional flap or swing check can’t even touch this mark!

• **Yields low head loss through the valve.** When pumping costs are critical, the Series 35 performs with less head loss characteristics similar to a venturi. The smooth concentric flow path creates an ideal flow pattern to minimize head loss. Therefore, pumping energy costs are reduced to the very minimum where Tideflex® Check Valves are installed.

• **Manufactured to specific installation hydraulics.** Every installation requires specific hydraulic performance conditions. The Tideflex® Check Valve is designed to be manufactured for the installation’s specific needs. By varying the number of reinforcement plies and Durometer of rubber, the Tideflex® Check Valve is matched to each application. All Tideflex® Check Valves incorporate a safety factor 2.5 times the maximum application back pressure call for in the application. For every Tideflex® Check Valve to be manufactured, pipe O.D., I.D., maximum expected back pressure, minimum cracking pressure, and flow rate must be provided. Drawings for customer approval are standard procedure before releasing the order to production. Tideflex Technologies will design, build and hydraulically test the valve before shipping.

All of these safeguards, plus documented proof that the Tideflex® Check Valve performs, has made the Tideflex® Check Valve the only alternative for municipal storm drainage backflow prevention. There are literally thousands of installations throughout the world, and the list of customers keeps growing. Tideflex Technologies encourages potential customers to contact users of these unique check valves. In every case, there has not been a dissatisfied customer since the first Tideflex® Check Valve in 1984!