Parkson VariOx™ Jet Aeration

The VariOx™ jet aeration system is an aeration and mixing device used in numerous water and wastewater treatment applications. Jet aeration combines many of the benefits and efficiencies of both mechanical and diffused air type systems. The jet aerator consists of an inner liquid nozzle and an outer air nozzle. Liquid from the basin is re-circulated through a jet motive pump and discharged through the inner liquid nozzle at a high velocity. Concurrently, air is fed into the outer air nozzle where it is mixed with the motive liquid and discharged as a high energy jet plume.

The cross flow of motive liquid through the air entering the outer nozzle creates a shearing action which generates a medium to fine air bubble. The air bubbles are entrained within the jet plume and discharged in a horizontal plane into the lower portions of the basin.

The jets can be operated with or without air being fed through the outer air nozzle. This provides the functionality of both a mixer and an aeration device. Air rates can also be varied through the outer nozzle which provides the ability to maintain a complete mix condition while adjusting air rates to satisfy process requirements.

The efficiency of the jet system is comparable to fine bubble diffuser systems. The main benefit is that, unlike membrane diffusers, the jets do not lose efficiency over time. Oxygen transfer efficiencies remain constant over the life of the equipment. This is a key advantage when considering both the long term operating cost and the operational sustainability since no scheduled down time for equipment replacement is required.

The motive liquid used to deliver oxygen provides a highly turbulent environment which results in a high alpha value, similar to mechanical type aerators. Alpha values of 0.85 are commonly used for typical municipal wastewater. The jets produce a medium to fine air bubble which is delivered in a high velocity horizontal flow pattern. This flow pattern provides a longer bubble residence time versus standard diffuser designs that create only a vertical path of air bubble travel.

Jet Aeration systems are ideal for:

- BNR / ENR Applications
- Covered Tanks
- Deep Basins
- Sequencing Batch Reactors
- Oxidation Ditches
- Equalization Basins
- Aerobic Digesters

Screening of the raw wastewater is generally provided in most applications. Parkson recommends that screens be sized with openings <1/2" (12 mm). Two methods are available to flush out the jet nozzles – pumped flushout and pneumatic flushout.

Pumped Flushout

The pumped flushout nozzle cleaning system utilizes the jet motive pump in conjunction with a crossover pipe and valve arrangement. The pipe and valve arrangement is configured to allow the flow from the pump to move in a reverse direction compared to the normal mode of operation. Crossover valves are opened which allows the pump to take suction from the jet manifold, creating a reverse flow path of liquid through the nozzle. This high velocity reverse flow will dislodge any potential fouling material within the nozzles. The liquid is discharged back into the basin through the suction bell.

Pneumatic Flushout

The pneumatic flushout system uses air from the blower to create an air lift to move water in a reverse direction through the nozzle assembly. A riser pipe is provided on the liquid line which extends to the top of the basin. The riser is provided with a valve and discharge fitting that directs the flushout liquid back into the basin. With the valve closed, the jet motive pump is turned off so that no liquid is moving through the manifold. The air blower is turned on which moves air into the outer nozzle where it travels into the inner nozzle and begins to accumulate in the liquid piping. The valve on the flushout riser is then opened. The accumulated air in the liquid line moves up the riser, carrying liquid with it. As air continues to be fed into the system, the air moves up the riser pipe and operates as an air lift pump. This continued movement of water up the riser creates a reverse flow through the inner nozzle, dislodging any potential fouling material.

Parkson™
Treating Water Right

50 YEARS 2010

Fort Lauderdale
Chicago
Montreal
Kansas City

1.888.PARKSON
technology@parkson.com
www.parkson.com