Slot Injector™

The Superior Jet Aeration System

Aerial view of K_La's ***Slot Injector***™ aeration system in operation at a food processing plant.

K_La Systems

Since 2001 K_La Systems has supplied innovative jet aeration and jet mixing systems for industry, water utilities, and municipalities around the world. In 2006 we introduced the K_La ***Slot Injector***™ aeration system.

We have successfully applied this unique, innovative, high efficiency jet aeration system in over 60 significant industrial projects; which include: food and beverage, pulp and paper, chemical processing, and landfill treatment operations.

K_La Systems has the most experienced team of oxygen transfer professionals in the industry and over the past 30 years we have successfully completed more than 1,300 jet aeration/mixing projects in 32 different countries. Our mission is to continually develop our products by embracing modern treatment technologies, improving manufacturing efficiency, and reducing our system's carbon footprint.

SLOT INJECTOR AERATION TECHNOLOGY

Introduced in 1979 by Bayer AG, the ***Slot Injector*** aerator is similar to a modern jet aerator, but uses a slot-shaped configuration to achieve higher efficiencies. The slot-shaped nozzle and mixing chamber provide a greater shear surface for mass transfer than a circular jet opening of identical area.

The unique shape of the ***Slot Injector*** results in a high percentage of gas dissolution and superior mass transfer rates.

Back-Flush System

Water Environment Research Foundation studies show that fine-pore diffusers have reduced oxygen transfer performance and increased pressure requirements over time due to clogging, and the biggest drop-off is in the first 24 months of operation. It is not uncommon for these types of aeration systems to require frequent cleaning and replacement within the first 5 years of operation. This is not the case with ***Slot Injector™*** systems due to much larger openings and self-cleaning capabilities, which allows for cleaning out the injectors without the need to drain or enter the basin. Back-flushing the ***Slot Injector*** system is conducted essentially with an airlift pump that reverses the flow through the inner injector nozzle resulting in a powerful air-liquid stream that clears trash and debris from the system. ***Slot Injector*** aeration systems are known for long-term, reliable operation.

Complete System Solutions

A typical ***Slot Injector™*** system consists of the ***Slot Injector*** aerators, in-basin piping system, back-flush system, liquid recirculation pumps, and air blowers.

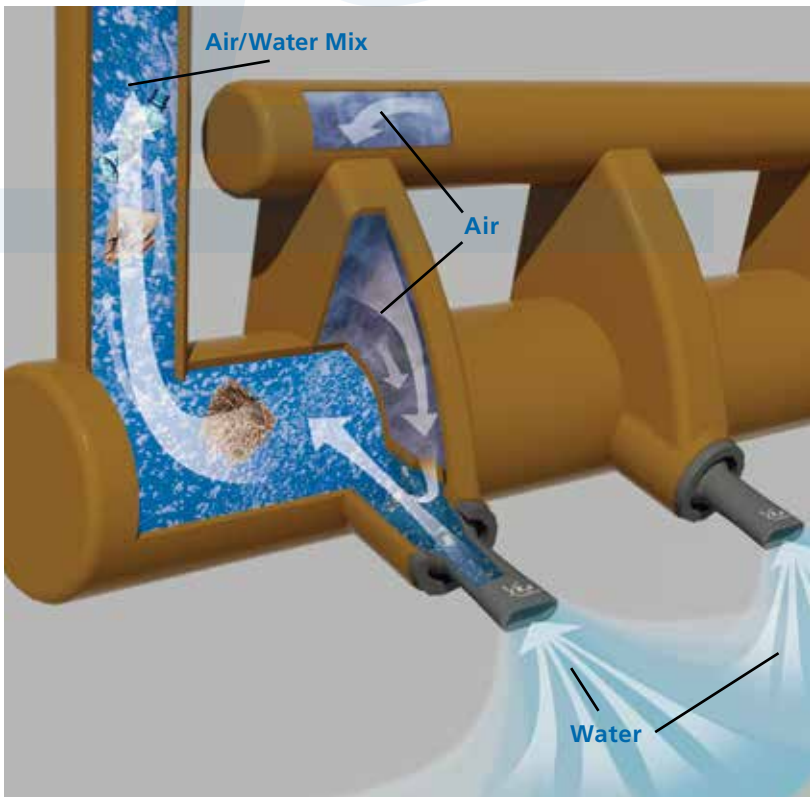
The pumps are either end suction centrifugal, submersible, or self-priming. Low pressure air is delivered by positive displacement blowers, screw compressors, multi-stage centrifugal blowers, or high speed turbo blowers.

Other available components of the ***Slot Injector™*** system included with the out-of-basin air and liquid piping system consists of stainless steel pipe, isolation valves, expansion bellows, supports, and pressure gauges.

Additional scope of supply is available upon request.

RETROFIT OPPORTUNITIES

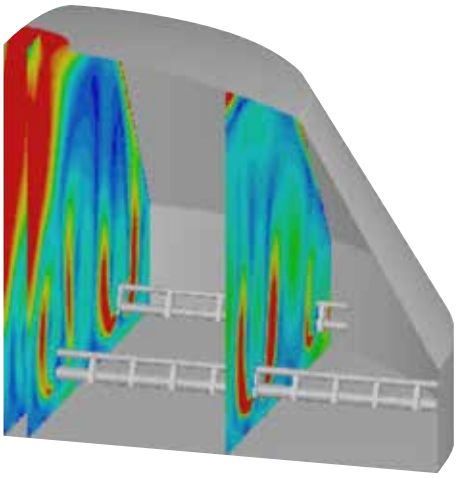
K_La Systems is in a unique position to assist industries in meeting the challenges of production expansion and/or optimizing energy usage in their wastewater treatment facility. Our ***Slot Injector™*** system can easily retrofit all types of diffuser systems, including conventional jet aeration systems, within existing tanks/basins. Higher (15-60%) oxygen transfer rates can be achieved using the existing compressed air delivery components or the same oxygen demand can be met with less air flow. ***Slot Injector*** aeration also provides a more diverse operating range at peak efficiency for seasonal loads without sacrificing process mixing. We encourage you to let K_La Systems take a look at your existing aeration system details and propose an economical retrofit solution using our ***Slot Injector™*** system.



Features and Benefits

The ***Slot Injector™*** system is a superior jet aeration system that is specifically applied to industrial biological treatment processes where fine screening is a standard pretreatment operation in both conventional and advanced air activated sludge applications.

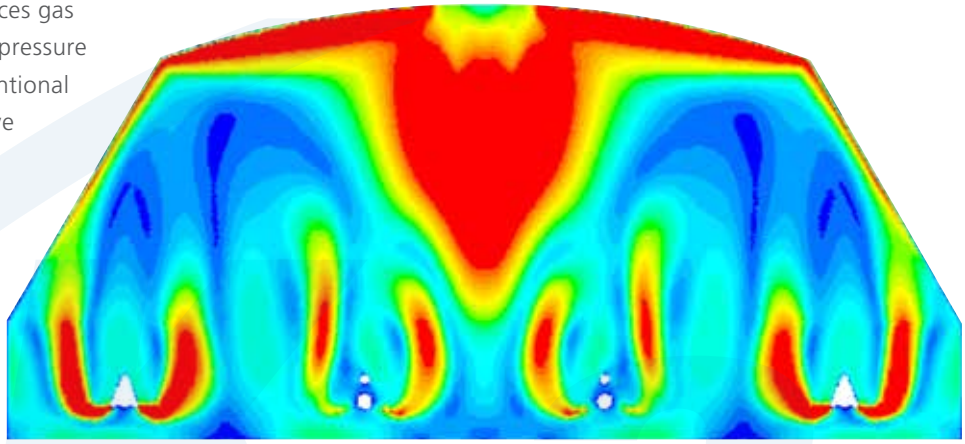
Industries that can benefit from using ***Slot Injector*** technology include: Food and Beverage Processing, Pulp and Paper, Chemical Processing, Pharmaceutical, Refinery, Textile, and Leachate Treatment.



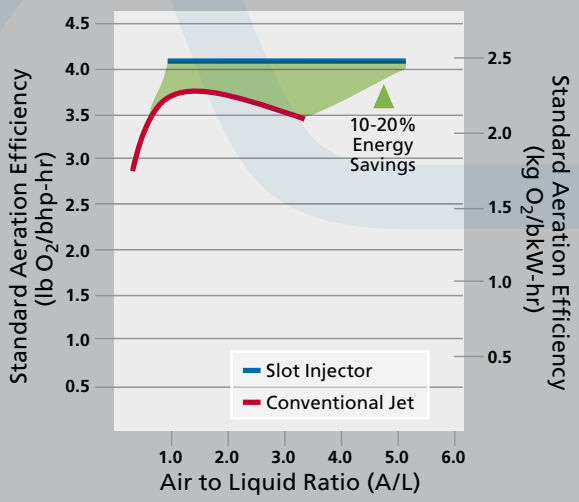
Computational Fluid Dynamic analysis of ***Slot Injector*** system aerator flow patterns in Tower Biology.

CAPITAL AND ENERGY SAVINGS

The propulsion jet of the ***Slot Injector*** aerator creates a zone of extreme negative pressure which enhances gas entrainment. Its mixing chamber incorporates a pressure recovery zone that distinguishes it from a conventional jet aerator. The result is a device that can dissolve large quantities of gas with significantly less motive liquid pumping. Like a conventional jet aerator, the hydrodynamic conditions within the ***Slot Injector*** aerator and the high energy discharge plume produce continuous surface renewal at the gas/liquid interface resulting in higher alpha factors than conventional diffusers.



IMPROVED PERFORMANCE OVER A WIDE OPERATING RANGE



Compared to conventional jet aeration technology, the ***Slot Injector*** system offers some unique benefits:

Capital Savings

- Up to 60% reduction in liquid flow results in smaller and/or fewer pumps, as well as a significant reduction in the size of the liquid piping system both inside and outside the aeration basin.
- The improved gas dissolution results in a 15% reduction in the volume of air required, leading to smaller blowers, motors, and/or piping systems.

Energy Savings

- The higher velocity jet plume allows for raising the ***Slot Injectors*** off the aeration basin floor resulting in energy savings due to lower blower pressure.
- The higher pressure pumping system often results in a 15% improvement in hydraulic efficiency.
- K_La's ***Slot Injector*** design database along with the higher pressure pumping system allows for optimizing aeration efficiency by varying both the air and liquid flow, concurrently meeting all the basic mixing requirements of the process.

Applications

THE *SLOT INJECTOR™* AERATION SYSTEM IS WELL SUITED FOR USE IN ALL TYPES OF CONVENTIONAL AND ADVANCED BIO PROCESSES.

MBR: This aeration plant using the ***Slot Injector*** technology is designed to polish effluent from an anaerobic reactor. The ***Slot Injector*** system was selected due to its ability to maintain high oxygen transfer rates at MLSS concentrations up to 17,000 mg/l.

(photo courtesy of Aquabio, Ltd.)

IFAS (Integrated Fixed-Film Activated Sludge): This aeration plant consists of two bi-directional injector headers and a proprietary pump intake screen for excluding bio-media from the recirculation system.

SBR: This aeration system is shown during commissioning in clean water. The SBR consists of two 1.5 million gallon reactors with an oxygen transfer capacity of 54,000 lbs/d.

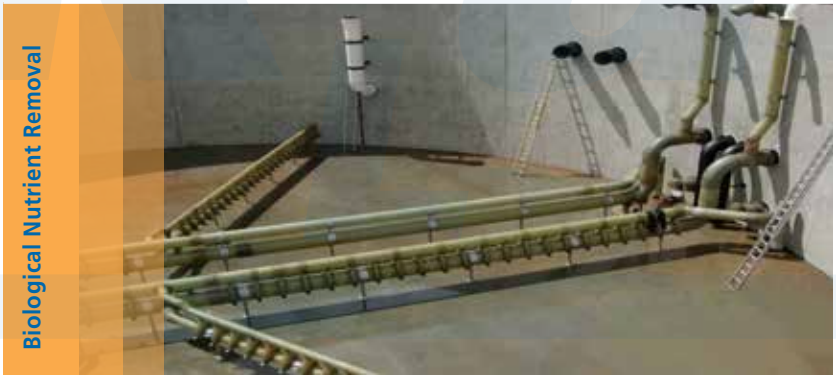
Biological Nutrient Removal: This directional aeration system for a two-stage process consists of two 2.25 million gallon reactors. The system is designed for total nitrogen removal with a total oxygen transfer capacity of 160,000 lbs/d.

Continuous Loop Reactor: ***Slot Injector*** manifolds can be used in oxidation ditches or other directional flow applications to provide both aeration and/or mixing to meet process requirements. K_La has developed a skid-mounted ***Slot Injector*** manifold system for installation into existing basins without the need to take the basin out of service. Either submersible or self-priming pumps can be used.

MBR

IFAS (Integrated Fixed-Film Activated Sludge)

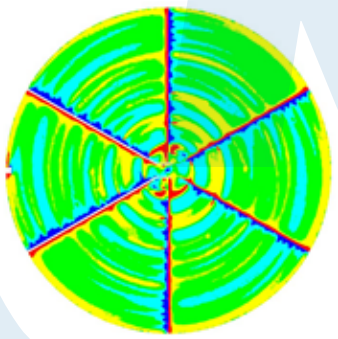
SBR



Biological Nutrient Removal

Continuous Loop Reactor

The K_La Difference: Technology, Experience, Knowledge, and Service



Ask your design/build team, consulting engineer, or turnkey treatment plant provider to use K_La Systems ***Slot Injectors™*** on your next project.

K_La

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