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Forced-Air Injection System for Rapid Evaporation of Wastewater

Background

Wastewater from power plants and other industries require evaporation so that residues within the wastewater can be disposed of properly. The typically methods for evaporation are natural evaporation and spray injections. Natural evaporation is slow and highly dependent on ambient temperature and humidity. Thus, natural evaporation may be too slow for power plant applications. Though spray injection methods can boost efficiency by increasing the surface area for evaporation, the residues contained in the sprays can spread by ambient wind. This has led to environmental concerns and regulations which necessitate a new evaporative approach.

Invention Description

Research at Arizona State University has resulted in a new method for evaporating wastewater that involves injection of air into the water through a submerged injection head. The forced-air injection system consists of compressor, injection manifold, and injector heads. A horizontally oriented injection manifold divides the air flow uniformly, while the injector head design minimizes blockage and maximizes flow rates. The resulting system achieves evaporation at very low cost and without risk of spreading wastewater residue.

Potential Applications

- Industrial wastewater treatment

Benefits and Advantages

- Zero residue spreading
- Low cost
- Evaporates water faster than spray techniques
- Use of compression heating increases evaporation rate with low power consumption

Faculty Profile of Professor Tae-Woo Lee