Patent Search

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Abstract:

Abstract In recent research, CFD technology employed to investigate the hydraulic performance of a split-flow channel design having an inlet and outlets (two) for dri emitters. First, the split-flow emitter was associated with the generally used emitter containing one inlet and outlet. Then, three-channel layouts were analyzed to det pressure-flow relationship curve, including non-return, single, bilateral sided re-entry layouts, and different channel parameters. It was found that when adopting a n channel layout for split-flow emitters without reducing their hydraulic performance, the length of single-side channels should be half that of those in one-in, one-out resulting in a 15% reduction in channel width. The hydraulic efficiency of the split-flow emitter can be improved compared to the other emitters. In these cases, the ch dimension can be reduced (length), or the channel width increased, resulting in improved anti-clogging efficiency of the emitter.

Complete Specification

Description:Mathematical Model Analysis of a Channel Size With Respect to CFD and Design through Hydraulic Emitter

Field and Background of the Invention

Drip irrigation has become popular due to its effectiveness and economic benefits in water-saving agriculture. Emitters are essential to the system as they allow pre water to slowly and uniformly drop into the soil. The high expense of effectiveness amongst pressure non- emitters has led to widespread use of hydraulic- emitters However, the traditional experimental process involved in designing these emitters has been found to be costly and time-consuming as it requires several modificat cycles for both the emitter structure and mold. Moreover, due to the intricate nature of emitters, traditional experimental methods are ineffective in providing micr characteristic information on the water flow behaviour in labyrinth channels. The importance of two critical factors for drip irrigation emitters: hydraulic performan anti-clogging properties. While these parameters are studied independently, their optimization can significantly benefit the efficiency of the emitter. In addition, the construction of the channel could directly impact the hydraulic efficiency of the emitter. Researchers found that a fractal flow path design led to a more complex int water flow and ensured full turbulent flow, which resulted in improved hydraulic performance. Another design, a 2-way-flow emitter, swayed the water movement r and demonstrated good energy dissipation effects. A hydraulic emitter's efficiency may be affected if the channel construction is modified, as this may alter the qua and strength of vortex in the channel. Similarly, a hydraulic emitter was shown to be significantly affected by the cross-sectional area of H2O and the curvature of th flow inside the structure.

The importance of modelling and simulation in understanding fluid dynamics behaviour in an emitter. A numerical simulation approach is adopted for analyzing an

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