

Fluid mechanics analysis of liquid stream going through the wire-screen mesh in the U-tube

강종원, 김정애, 김은영, 정창문, 장호남*
한국과학기술원
(hnchang@kaist.ac.kr*)

Wire-screen mesh is normally used for the removal of particles from the liquid stream. The configurations of wire-mesh such as diameter and shape factor of wire affect the stream of fluid going through the screen. In this study, we made the fluid flow in the U-tube and completed a filtering apparatus equipped with wire-screen mesh. To determine the accuracy of our experiment, we performed a theoretical approach to the relation between wire mesh and fluid stream with computational fluid dynamics (CFD). Fluent is used for simulation. Head loss presented when the stream passes through the wire-mesh is represented by Rose equation (Rose 1945). In this equation, drag coefficient (C_D) has different values depending on the stream types. With other fixed parameters values at a specific mesh, the relationship among velocity, pressure and C_D is formed. At first, pressure drop during water flow was determined. And then, average velocity and maximum velocity of water were calculated. On the basis of these values, we derived a proportional factor between velocity of fluid and head loss. As a result, we could approximate the C_D .