

The Effect of Emitters on Hydraulic Losses in Laterals Pipes

Dr. Amin Suliman *

Dr. Amjad Shaker **

Abstract

In this research, a new analytical and experimental method has been followed, to determine the hydraulic losses due to emitters. The difference losses between pipe without emitters and pipe with closed emitters were measured for different flow velocity. Nine types of local and import emitters have been used, utilizing three types of poly ethylene pipes, their nominal diameters are 16,18 and 22mm. In this research the emitters characteristic curves were plotted and showed that the emitters could be classified in three types regulating discharge, regulating discharge and self washing and ordinary emitters.

By analyzing the measured data, the relationship between hydraulic losses and velocity has been founded. Using these relationships the hydraulic losses due to different emitters and pipes were determined. The values of hydraulic losses of emitters showed that they differ from emitter to another and from pipe to another, despite of all on-line emitters classified as standard ones. The equivalent length for different emitters and different pipes was between 10 to 40cm. The rate of hydraulic losses due to emitters to total hydraulic losses is large enough to be considered in drip irrigation system design, it varies from 21% to 50% depending on emitter and pipe diameter.

Keywords: emitter, hydraulic losses, drip irrigation, emitters characteristic curves, lateral drip irrigation, subunit.

For the paper in Arabic see pages (99-111)

* Professor in water resources management and engineering department-civil engineering faculty- Al-baath University.

** Assistant professor in water resources management and engineering department-civil engineering faculty- Al-baath University.