

Design and Fabrication of Semi Circular Contraction Critical Flow Flumes for Low Discharges

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ABSTRACT

The concept of circular flume with traditional cutthroat flume is used in the present study to minimize error in the discharge measurement with the traditional cut throat flume. The flume models were tested at College of Agricultural Engineering and developed discharge measurement equations for the flow range of 3-20 lps under free flow and submerged conditions. The results indicated that the semicircular contraction critical flow flumes can be used for discharge measurement in open channels with best accuracy of $\pm 5\%$ with equations developed. A single measurement of Brink depth in the flumes can be used for discharge computation in open channels. The semi circular contraction flumes can be used with $\pm 10\%$ upto 80% submergence conditions. The flumes are portable, easy to fabricate, transport and install in open channels. As the fabrication cost of the flume is less (Rs. 2250.00 to Rs. 3050.00), these flumes can be recommended to the farmers for use in field channels for increasing water application efficiency under canal system.

Key words : Brink depth, Critical depth, Semi circular contracted flume, Submergence condition