

The uniformity of water application can be evaluated by measuring emitter flow rates at several locations throughout each irrigated zone and calculating  $V_{qs}$  and  $U_s$ . The uniformity should be evaluated for each individual irrigated zone. Then the overall system uniformity is considered to be the lowest zone uniformity measured (See ASAE, 1989a). Although this procedure permits the uniformity to be estimated, it does not allow the evaluator to determine the cause of low uniformities which may be observed.

The flow rates of micro irrigation emitters have different responses to pressure variations. The response of a specific emitter depends on its design and construction. Variations in flow rates between emitters of the same type, which are operated at the same pressure, also occur because of manufacturing variations in the tiny plastic components. Because their orifice diameters are very small, micro irrigation emitters are also subject to partial or complete plugging from particulate matter, chemical precipitates, and organic growths. For these reasons, water application uniformity may be greatly affected by the emitter performance.

The manufacturing coefficient of variation ( $V_m$ ) is defined as the statistical coefficient of variation in emitter discharge rates when new emitters of the same type are operated under identical conditions (same pressure and water temperature). Under these conditions, differences in flow rates observed are assumed to be due to variations in emitter components. Table 2 classifies point source (drip emitters and microsprinklers) and line source (drip tubing) emitters based on manufacturing variation. To achieve highest uniformities of water application, emitters with small manufacturing variations should be installed in micro irrigation systems.

**Table 2. Classifications of manufacturer's coefficient of variation,  $V_m$ , for emitters.**

| Emitter type   | $V_m$ range  | Classification |
|--|--------------|----------------|
| Point source<br>(drip emitters and<br>microsprinklers) | below 0.05   | Excellent      |
|  | 0.05 to 0.07 | Average        |
|  | 0.07 to 0.11 | Marginal       |
|  | 0.11 to 0.15 | Poor           |
|  | above 0.15   | Unacceptable   |
| Line Source<br>(drip tube)                             | below 0.10   | Good           |
|  | 0.10 to 0.20 | Average        |
|  | above 0.20   | Unacceptable   |