manufacturing variation among emitters. It may also be due to other factors which affect emitter flow rates, such as temperature.

Emitter performance variation can be evaluated by measuring emitter flow rates at known pressures. This requires removing the emitters and testing them in a laboratory. Alternatively, both pressures and flow rates can be measured at individual emitters, but then flow rates must be corrected to a common pressure by using the manufacturer's data for that emitter. Neither of these procedures are desirable because of the amount of labor involved for each.

The nomograph in Figure 2 simplifies the procedure for determining the emitter performance variation from the hydraulic and water application uniformities. The emitter performance variation can be estimated in the following three steps:

Step 1. Locate the previously measured hydraulic uniformity coefficient (for pressure, from Figure 1) on the upper bar of the nomograph.

Step 2. Locate the previously measured water application (statistical) uniformity coefficient on the center bar of the nomograph.

Step 3. Draw a straight line from the measured hydraulic uniformity, through the statistical uniformity, and extend it down to the lower bar. Read the emitter performance variation, Vpf, on the lower bar.

As an example, assume that the uniformity of a new micro irrigation system was measured immediately after installation, and that the hydraulic uniformity determined from pressure measurements was 95% (or coefficient of variation due to hydraulics = 0.05). Also, the statistical uniformity of water application from emitter flow rate measurements was 93% (or coefficient of discharge variation = 0.07).

From Figure 2, a straight line drawn through Ush = 95% and Us = 93% intersects the lower bar at an emitter performance variation of 5% (or coefficient of variation due to emitter performance = 0.05). This value would be expected to be approximately the coefficient of manufacturing variation for the emitter because this system is newly installed, and emitter plugging has not yet occurred. For this example, both the hydraulic and water application uniformities are above 90% and would be classified as excellent, indicating that the system was well-designed and properly installed.

As a second example, assume that the same irrigation system was again evaluated after operating for 6 months, and that the hydraulic uniformity was again found to be 95%, but the water application uniformity was now 88%. From Figure 2, a straight line drawn through these two points shows that the emitter performance variation increased to 11%. These results demonstrate that the cause of the lower water application uniformity measured is a change in emit-