

discharge rates determine the average irrigation application rate. Many additional factors, including operating pressure, changes in elevation, friction pressure losses, wind, and individual sprinkler characteristics affect the uniformity of water application within an irrigated zone.

The specific objectives of this publication are to present techniques (1) to measure operating pressures, (2) to measure application rates, and (3) to measure the uniformity of water application under field conditions for existing solid set or portable sprinkler irrigation systems. Knowledge of these three factors and changes in their magnitudes over time is important to determine the causes of deficiencies in application rates or uniformities observed. This information is also needed to efficiently and effectively manage sprinkler irrigation systems. Field evaluations should be conducted at least annually to reveal changes which require system maintenance or repair.

## **Measuring Operating Pressures**

Always operate sprinklers within the manufacturer's specified pressure ranges. Sprinkler effectiveness is reduced by operation at either excessively high or low pressures. Pressures that are too high produce fogging and irregular turning. Fogging produces too many small droplets that fall too close to the sprinkler. Pressures that are too low cause improper jet breakup, producing a doughnut-shaped spray pattern. Under either condition, water is not uniformly distributed.

Operating pressures should be within the range specified by the irrigation system designer. Pressure gauges should be permanently installed at the irrigation pump and at entrances to zones. Test gauges periodically to verify that pressures are being measured accurately. This can be done by substituting a test gauge for the field gauges. Replace the field gauges if they are no longer accurate.

Pressures within zones can be measured at the sprinkler nozzles using pitot tube pressure gauges. Position pitot tubes in the discharge stream about 1/8-inch from the nozzle. Adjust the pitot tube by moving it slowly within the stream until the highest constant pressure reading is obtained.

Pressures recorded at critical points within the system, including at the pump discharge, at the entrance to zones, at the distant end of laterals, and at extreme high and low elevations, should be near the pressures specified by the system designer. Extreme deviations from the design pressures should be corrected before proceeding with further system tests.