

Operating pressures also vary widely, ranging from only 10 pounds per square inch (psi) to over 100 psi. Larger nozzles usually require larger operating pressures to provide sufficient energy for proper water distribution.

Rotating nozzle sprinklers have much larger diameters of coverage than fixed nozzle sprinklers. As a result, they are most commonly used in large field systems where it is desirable to uniformly distribute water over large areas with as few sprinklers as possible. Spray nozzles are used in applications where the diameters of coverage are not as critical, such as small plot areas and in self-propelled irrigation systems (center pivots and linear move systems) where the irrigation system travels over the area to be irrigated.

Many types of sprinkler irrigation systems are in use, ranging from small, portable manually-operated systems to large permanent, automatically-operated systems. Sprinkler systems are classified in the following sections of this circular, and typical applications of each class are discussed.

Multiple sprinkler systems

Multiple sprinkler systems use many small sprinklers with overlapping patterns. The amount of overlap is critical to achieve high uniformity of water application. Sprinklers are typically overlapped 50% to 60% of their diameters of coverage under low wind (less than 5 mph) conditions. Greater overlaps (and thus closer spacings) are required for higher wind speed conditions.

In multiple sprinkler systems, sprinklers are mounted on a lateral pipe or network of lateral pipes which carry water to the sprinklers. Water is supplied to the laterals from manifold (header) or main pipelines, depending on the system design. Multiple sprinkler systems are classified as portable, semi-permanent, or permanent based on whether the sprinklers and pipelines are moved from location-to-location between irrigation sets or whether the components are permanently buried in the field.

Portable sprinkler systems

Portable sprinkler systems are systems in which the sprinklers are mounted on movable lateral pipe sections which are transported from one location to another between irrigations (Fig. 3). The lateral pipes and sprinklers are set up on the soil surface

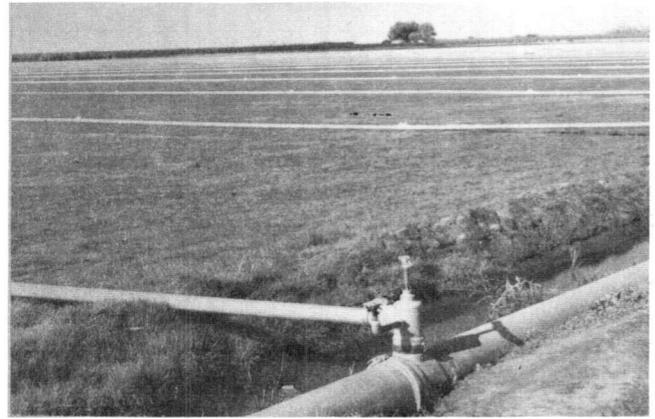


Figure 3. Portable sprinkler irrigation system with impact sprinklers installed on aluminum lateral pipelines.

and remain in place while irrigation occurs, then they are moved to a new location (zone, or set) and the process is repeated. These systems are typically designed with sufficient capacity to irrigate all zones in time to be returned to the first zone before plant water stress occurs. There are three types of portable sprinkler systems based on the method used to move the lateral pipes and sprinklers between irrigations: hand-moved, tractor-moved, and self-moved.

Hand-moved systems

Portable, hand-moved sprinkler systems are manually-moved from zone to zone. They consist of sprinklers mounted on portable aluminum lateral pipes, usually using short risers. Aluminum pipe is used because it is strong, light-weight, resistant to degradation by sunlight, and easily transported and connected with quick-connect couplings. Short risers are typically used because the laterals are not firmly anchored, and tall risers tend to lean or fall.

Laterals may be connected to portable aluminum manifold and mainline pipes, which may also be moved between sets. Buried PVC mainlines and manifolds are sometimes installed, and lateral connections are made through permanent hydrant valves which bring the water to the surface. These systems are sometimes called semi-permanent because the mainlines are permanently installed and only the laterals are portable.

Portable hand-moved sprinkler systems are widely used in Florida because they (1) have a low initial cost, (2) are flexible, easily adapted to vari-