

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD AND SPECIFICATION**

IRRIGATION SYSTEM, SPRINKLER

(number and acre)

CODE 442

DEFINITION

A planned irrigation system in which all necessary facilities are installed for efficiently applying water for irrigation by means of perforated pipes or nozzles operated under pressure.

reasonable water losses during application periods.

Systems for special-purpose irrigation shall have the capacity to apply a stated amount of water to the design area in a specified net operating period.

PURPOSE

Efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or a reduction in water quality.

Design application rate. The design rate of application shall be within a range established by the minimum practical discharge rate under local climatic conditions and the maximum rate consistent with the inlet rate of the soil. If two or more sets of conditions are in the design area, the lowest maximum application rate for areas of significant size shall apply.

CONDITIONS WHERE PRACTICE APPLIES

Sprinkler irrigation plans shall be based on an evaluation of the site and the expected operating conditions. The soils and topography shall be suitable for irrigation of the proposed crops.

Distribution patterns and spacing. A combination of sprinkler spacing, nozzle sizes, and operating pressure that most nearly provide the design application rate and distribution shall be selected. Prevailing wind velocities and other unfavorable operating conditions also must be considered.

Enough good-quality water shall be available for practical irrigation of the crops to be grown.

If available from the manufacturers, uniformity coefficient data shall be used in selecting sprinkler spacing, nozzle sizes, and operating pressure. The uniformity coefficient shall be not less than 85 percent.

The sprinkler method of water application is suited to most crops except rice, to most irrigatable lands, and to most climatic conditions where irrigated agriculture is feasible.

In the absence of such data, sprinkler performance tables provided by the manufacturers shall be used in selecting nozzle sizes, operating pressure, and wetted diameter for the required sprinkler discharge. The maximum spacing shall comply with the following criteria.

DESIGN CRITERIA

Depth of application. The net depth of application shall be based on the available moisture capacity of the soil in the root zone depth of the crop irrigated. The gross depth shall be determined by using field application efficiencies consistent with the conservation use of water resources.

1. For low-, intermediate-, and moderate-pressure sprinklers, the spacing along lateral lines (Sl) shall not exceed 50 percent of the wetted diameter, as given in the manufacturer's performance tables, when the sprinkler is operating under optimum pressure. The spacing of laterals along the main line (Sm) shall not exceed 65 percent of this wetted diameter. If winds that can affect the

Capacity. In regularly irrigated areas, sprinkler irrigation systems shall have a design peak capacity adequate to meet the moisture demands of each and all crops to be irrigated in the design area. In computing capacity requirements, allowance must be made for

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distribution pattern are likely, spacing (S_m) shall be reduced to 60 percent for average velocities of 5 miles per hour, to 50 percent for average velocities of 10 miles per hour, and to 30 percent for average velocities greater than 10 miles per hour.

2. For high-pressure sprinklers and for the giant hydraulic type, the maximum (diagonal) distance between two sprinklers on adjacent lateral lines shall not exceed two-thirds of the wetted diameter under favorable operating conditions. If winds that can affect the distribution pattern are likely, the diagonal spacing shall be reduced to 50 percent of the wetted diameter for average velocities of 5 mi/h and to 30 percent for average velocities greater than 10 miles per hour.

3. For perforated pipelines, the spacing recommendations of the manufacturer for the design application rate, number and size of perforations, and operating pressure shall be followed.

Lateral lines. Lateral lines shall be so designed that the total pressure variation at the sprinkler heads, due both to friction head and static head, does not exceed 20 percent of the design operating pressure of the sprinklers.

Except for undertake operation, riser pipes used in lateral lines shall be long enough to prevent interference with the distribution pattern when the tallest crop is irrigated. Riser lengths shall not be less than shown below:

<i>Sprinkler discharge gallons per minute</i>	<i>Riser length inches</i>
Less than 10	6
10 - 25	9
25 - 50	12
50 - 120	18
More than 120	36

Main lines. The design of main lines, submains, and supply lines shall insure that the quantities of water required are conveyed to all lateral lines at the maximum required pressure. If the pressure required for sprinkler system operation is provided by pumping, main line pipe sizes shall insure that there is an economical balance between the capitalized cost of the pipe and annual pumping costs.

Pump and power unit. The pump capacity and the power unit shall be adequate to operate the sprinkler system efficiently when maximum capacity is being pumped against maximum total dynamic head.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing irrigation sprinkler systems shall in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

All irrigation systems must be adequately maintained to perform as planned and designed. Provisions for maintenance access must be provided.