

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION
IRRIGATION SYSTEM, MICROIRRIGATION**

(Acre)
CODE 441

1. DEFINITIONS

Coefficient of Uniformity (CU). CU is an expression of application uniformity when all areas represented by each observation are equal. CU can be approximated from DU (defined below) with the following expression:

$$CU = 0.63 DU + 37$$

Distribution Uniformity (DU). DU is the ratio of the average of the lowest one-fourth of measurements of irrigation water infiltrated (applied) to the average depth of all irrigation water infiltrated, expressed as a percentage.

Emitter. An emitter is an applicator designed to dissipate energy and discharge a small uniform flow of water.

Lateral. In Microirrigation, laterals are the pipes on which emitters are installed. They receive water from the manifolds and usually range from ½ inch (12 mm) to 1 inch (25 mm) in diameter. The wall thickness for laterals generally varies from 4 to 20 mils for drip tape and 30 to 50 mils for tubing.

Main line. The mainline transfers water from the source to the manifolds.

Manifold. A manifold (sometimes called submain) is the portion of the pipe network between the main line and the laterals. Manifolds generally have separate control valves, either manual or automated, and may include pressure regulators.

Sprayer. Small applicator such as a spitter, micro sprayer, or miniature sprinkler designed to dissipate pressure and discharge a small uniform spray of water over an area of several up to 100 or more square feet.

Subsurface Drip Irrigation (SDI). Variation of traditional drip irrigation where the tubing and

emitters are buried beneath the soil surface rather than laid on the ground or suspended from wires.

2. SCOPE

The work will consist of furnishing and installing materials, as required, to provide for a complete Microirrigation system for the tract of land as shown on the drawings. A water-measuring device is required for the system.

3. SOURCE OF WATER

The source of water shall be as shown on the construction drawings and as previously determined by the landowner. Water rights for the use of the water are the responsibility of the landowner. The source shall provide the full capacity of water of sufficient quality as may be needed for the system being installed. Filtration requirements vary mainly dependent upon the quality of the water source and the requirements of the emitters used.

4. MATERIALS

Main Line and Manifold pipe. This pipe shall meet all the quality requirements of the applicable New Mexico Construction Specifications for irrigation pipelines (430).

Lateral Pipe. This pipe shall meet all the quality requirements as follows:

Plastic lateral pipe shall comply with the requirements of the latest revision of one of the following standards:

- For Acrylonitrile-Butadiene-Styrene (ABS) ASTM D2282, 1527.
- For Polyethylene (PE) ASTM D2239, 2104, 2247, 2737, 3035
- For Polyvinyl Chloride (PVC) ASTM D2241, 1785, 2672, 2740

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- Polyethylene (PE) or Polybutylene (PB) Drip Tubing

Markings on plastic pipe meeting any of the above ASTM standards shall include the following:

- The nominal pipe size; e.g., two inches.
- The type of plastic pipe material in accordance with the designation as shown above; e.g., PE2305.
- The pressure rating in psi for water at 23⁰ C. (73. 4⁰ F).
- The standard designation with which the pipe complies.
- The manufacturer's name (or trademark) and code, spaced not more than 5.0 feet apart.

PE or PB tubing designated as "Drip Tubing" shall bear the manufacturer's name (or trademark) and the designation "Drip Irrigation Tubing", or similar, stamped on the pipe.

The materials shall be fabricated in accordance with the manufacturer's instructions.

5. DESIGN

Microirrigation systems shall be designed according to the criteria in the Practice Standard. The job sheet/drawings may contain additional details required for an acceptable installation.

6. PIPE PLACEMENT

Trenches. Trenches for plastic pipelines shall be free of rocks and other sharp-edged materials, and the pipe shall be carefully placed to prevent damage. Plastic pipe may be placed by plow-in equipment if soils are suitable.

Main Line and Manifold pipe. The pipe placement shall meet all installation requirements of the applicable New Mexico Construction Specifications for irrigation pipelines (430).

Lateral Lines. The following methods of lateral pipe (1" diameter or less) placement are approved in New Mexico.

- If the lateral pipe is a designated drip irrigation tubing, guaranteed by the manufacturer, in writing, for at least 5 years in above ground placement, the lateral pipe may be placed on the ground surface or suspended from trellises for the irrigation of windbreaks, vineyards, and

orchards. Provisions for draining the lateral lines during freezing weather must be provided.

- Lateral pipe used in subsurface installations meeting the above mentioned quality specifications for ABS, PE, or PVC, or designated drip tubing meeting or not meeting the 5 year guarantee mentioned above, shall be buried to the depth recommended by the manufacturer. The burial depth must consider soil type, tubing and emitter spacing, emitter output, crop to be grown, potential for root pinching or intrusion, and time of irrigation.

All pipe shall be placed so that it is protected against hazards imposed by traffic, animals, farm operations, freezing temperatures, wildfire, wind, or soil cracking.

7. TESTING

All main lines shall be filled with water, flushed, and tested for leaks at the design head. All leaks shall be repaired and the test repeated.

Main lines and manifolds placed in open excavated trenches shall be tested for leaks before backfill is placed, and repaired if needed, except that backfill may be placed between the joints, if needed, to prevent movement of the pipe during testing.

During the initial startup the manifold and lateral lines shall be flushed, to remove any sediment or foreign material, prior to closing the ends of the laterals.

8. BACKFILLING

All backfilling shall be completed before the system is placed in service. For plastic pipelines, the initial backfill shall be of selected material, free from rocks or other sharp-edged material that would damage the pipe. Deformation or displacement of the pipe must not be allowed to occur during backfilling.

9. RELATED COMPONENTS

All appurtenant components including emitters, sprayers, bubblers, air/vacuum relief valves, control valves, filters, injectors, pressure regulators, etc shall conform to the type and location shown on the plan.

As with all pipelines, adequate air and vacuum relief must be installed. This is particularly critical in SDI systems to prevent soil ingestion into the emitters during shut down.

10. GENERAL

Variation. All variations in construction from the approved design shall be authorized in a written change order properly dated and signed by the client (decision maker) and responsible NRCS employee authorizing the variation.

Measurement. The completed length shall be the actual distance measured by chaining, measuring wheel, or other methods as approved by the Resource Area Engineer. Bills of materials are not to be accepted as measured distance.

Certification and Guarantee. The installing contractor shall certify that the system installation complies with the requirements of this specification and shall furnish a written guarantee designed to protect the owner against defective workmanship and materials on the entire system for a period of not less than one year.

Basis of Acceptance. The basis of acceptance shall be the ability of the properly installed system, based upon design documentation, to deliver the required amount of water with a DU of at least 80%.

11. OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained irrigation system is an asset to the farm. This irrigation system was designed and installed to apply irrigation water to meet the needs of the crops without causing excessive erosion or runoff. The expected useful life span of the installation should be at least 10 years. The life of this system can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require periodic maintenance and may also require operational items to maintain satisfactory performance. The following are some recommendations to help develop a good operation and maintenance program:

- Only operate system when needed to furnish water for plant growth, the soil may also be

used to store moisture within the rooting depth of the plant.

- Operate the system according to the parameters for the area.
- Check to make sure that all connections are watertight and all valves are working properly.
- Make sure that the filter system is working. Even if it is automatic it needs constant monitoring. Make adjustments if needed.
- Periodically examine emitters for proper operation and replace non-functioning emitters.
- Monitor the crop noting areas of moisture stress and repair or adjust system operation.
- Maintain all pumps, agitators, piping, valves and other electrical and mechanical equipment in good condition following the manufacturers' recommendations.
- Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.
- Immediately repair any vandalism, vehicular or livestock damage.

12. MEASUREMENT

The amount of the Microirrigation system completed as specified will be determined by measuring the area to the nearest 0.1-acre.