

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS
IRRIGATION PIPELINE

1. Scope

The work shall consist of the necessary construction operations and furnishing of materials so that all requirements for proper installation shall be met with the system operating as planned.

2. Location

The location of the pipeline shall be as shown on the construction plans and/or as staked in the field.

3. Materials

Pipe, fittings, and gaskets shall conform to the requirements of the applicable American Society of Testing Materials (ASTM) pipe specifications.

Concrete for thrust blocks shall conform to the requirements as stated in joints and connections.

Earth backfill shall conform to the requirements as stated in the "Backfill" section.

4. Excavation

The trench at any point below the pipe shall be only wide enough to permit the pipe to be easily placed and joined. The width of the trench shall allow the initial backfill material to be uniformly packed around and along the sides of the pipe. The maximum trench width shall be 2.5 feet greater than the diameter of the pipe.

The trench bottom shall be uniform so the pipe lies on the bottom without bridging. Clods, rocks, and uneven spots that can damage the pipe or cause non-uniform support shall be removed.

If the trench is excavated in rocks, boulders, or other material which may damage the pipe, the trench bottom shall be cut a minimum of 4 inches below final grade and filled with bedding material consisting of sand or compacted fine-grained soils.

Excavations greater than 4 feet in depth shall include shoring or sloping in accordance with current Occupational Safety and Health Administration (OSHA) standards.

5. Installation

Pipe shall be installed at a depth sufficiently below the ground surface to provide protection from hazards imposed by traffic crossing, farming operations, freezing temperatures, or soil cracking. The minimum depth of cover shall be as detailed in the plans.

Care shall be taken to prevent permanent distortion and damage when handling the pipe during unusually warm or cold weather. The pipe shall be approximately the same temperature as the soil before backfilling. The pipe shall be uniformly and continuously supported over its entire length on firm, stable material. Blocking or mounding shall not be used to bring the pipe to final grade.

6. Joints and Connections

All joints and connections shall be capable of withstanding the design maximum working pressure for the pipeline without leakage. Pipe joints shall leave the inside of the pipeline free of any obstructions, which can reduce capacity.

All fittings such as couplings, reducers, and bends shall be installed according to the manufacturer's recommendations.

All exposed polyvinyl chloride (PVC) or metal surfaces and all underground metal surfaces shall be adequately treated to prevent deterioration of the material.

Thrust blocks (when required) will be installed at the elbow joints both to resist hydraulic forces and to steady the installation in unstable soils. The thrust blocks must be formed against solid, unexcavated earth, undamaged by mechanical equipment. They shall be constructed of concrete having a compressive strength of at least 2000 pounds per square inch (psi). The concrete mixture shall be 1 part cement and 6 parts sand and gravel. The space between the pipe and the trench wall shall be filled with concrete to the height of the outside diameter of the pipe or as specified by the manufacturer.

7. Testing

Pipelines shall be tested for pressure strength, leakage, and proper functioning. If it is necessary to partially backfill the line before testing to hold the pipeline in place, backfilling shall be such that all joints and connections shall be left uncovered for inspection; only the body of the pipe sections shall be covered. Partial backfills needed to hold the pipe in place during testing shall be placed as specified in the "Backfill" section of this specification.

Testing must demonstrate that the system will function properly at design capacity. At or below design capacity, there shall be no objectionable flow conditions such as water hammer, continuing unsteady delivery of water, damage to the system, or detrimental discharge from control valves.

8. Backfill

All backfilling shall be completed prior to the line being placed in service. The initial backfill material over plastic pipe shall be selected soil or sand, free from rocks or stones larger than 1 inch in diameter and earth clods greater than 2 inches in diameter. At the time of placement, the moisture content of the material shall be such that the required degree of compaction can be obtained with the backfill method to be used. The material shall be placed so the pipe will not be displaced, excessively deformed, or damaged.

If backfilling is done by hand or mechanical means, the initial fill shall be compacted firmly around and above the pipe as required to provide adequate lateral support to the pipe. The backfill shall be placed in layers and compacted around and above the pipe to a depth of ½ foot by hand or mechanical means.

Water packing may be used when possible to consolidate the initial backfill around the pipe. The initial backfill, before wetting, shall be of sufficient depth to ensure complete coverage of the pipe after consolidation occurs. Water packing is accomplished by adding enough water to diked reaches of the trench to thoroughly saturate the initial backfill without excessive pooling. After the backfill is saturated, the pipeline shall remain full until after the final backfill is made. The wetted fill shall be allowed to dry until firm before beginning the final backfill.

Final backfill material for plastic pipe shall be free of large rocks, frozen clods, and other debris greater than 3 inches in diameter. The material shall be placed and spread in uniform lifts so there will be no unfilled spaces in the backfill. The finished backfill will be level with the natural ground or at the design grade required to provide the minimum depth of cover after settlement takes place.

All special backfilling recommendations of the pipe manufacturer shall be met.

9. Markings

Marking on the pipe shall include the following (spaced at intervals of not more than 5 feet):

- a. Nominal pipe size
- b. Type of plastic or other material in accordance with the designation code

- c. For plastic pipe, standard dimension ratio (SDR), dimension ratio (DR), or Schedule 40 or 80 (whichever is applicable) and the pressure rating for pressure applications
For pipe constructed of other materials, use similar notations
- d. ASTM designation with which the pipe complies
- e. Manufacturer's name (or trademark) and code

10. Inspection and Acceptance

The acceptability of the installation shall be determined by inspection to check compliance with all the provisions noted in the plans or these specifications such as pipe grade, pipe markings, installed appurtenances, and the minimum installation requirements.

If requested by the state conservation engineer, the manufacturer shall certify that the material meets the requirements stated in the specification.

All construction shall be performed in a competent manner, and the job site shall have a neat appearance when finished.

11. Measurement

Measurement for the amount of pipeline completed will be determined by measuring the length of the backfilled trench in feet.

12. Construction Details