

NATURAL RESOURCES CONSERVATION SERVICE
MISSOURI CONSTRUCTION SPECIFICATION
FOR
IRRIGATION PIPELINE
(Ft)
CODE 430

GENERAL

Construction operations shall be carried out in a manner and sequence that erosion and air and water pollution are minimized and within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grade, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used. Excavator shall assure that all state laws concerning buried utilities have been met.

All trees, stumps, roots, brush, weeds, and other objectionable materials shall be removed from designated work area.

MATERIALS

General Specifications. The material used in manufacturing irrigation pipe shall meet the requirements of an established long-term hydrostatic design stress rating. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign matter, or other defects. The pipe shall be as uniform in color, opacity, density, and other physical properties as is commercially practicable.

Markings. Markings on the pipe shall be according to the ASTM of the pipe used.

Fittings and couplers. All fittings and couplers shall equal or exceed the same pressure rating of the pipe with which they are used. They shall be made of material that is recommended for use with the pipe.

Rubber gasket joints. Rubber gasket joints shall conform to the following:

1. Push-on type--A joint in which an elastomeric ring gasket is compressed in the annular space between a belled end or socket end of pipe.
2. Mechanical joint--A joint in which a seal or gasket is compressed by application of pressure through a mechanical device. The pipe spigot shall have a wall thickness sufficient to withstand, without deformation or collapse, the compressive force exerted when the fitting is tightened.
3. Dimensions of the gasket, coupling (bell) and spigot end shall be according to the manufacturer's standard design dimensions and tolerances. Such dimensions shall be gauged at sufficiently frequent intervals to insure dimensional control and satisfactory joint assembly.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resource Conservation Service or download the standard from the electronic Field Office Technical Guide for Missouri.

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4. Lubricant, if required, shall be suitable for lubricating the parts of the joints in the assembly as recommended by the gasket manufacturer. The lubricant shall have no deteriorating effects on the gasket and pipe materials.
5. The gasket shall be the sole element depended upon to make the joint flexible and watertight. The gasket shall be a continuous elastomeric ring.
6. The joint design may provide for the axial deflection of a pipe joint by permitting one side of the outside perimeter of the joint to open wider than the compressed position without reducing its watertightness. If greater deflections than provided joint design are required, suitable fittings must be provided.

INSTALLATION

Minimum depth of cover. Pipe shall be installed at depths according to the plans. Planned depths shall be sufficient to provide protection from hazards imposed by traffic crossing, farming operations, freezing temperatures, or soil cracking.

In areas where the pipe will not be susceptible to freezing and vehicular or cultivation hazards and the soils do not crack appreciably when dry, the minimum depth of cover may be reduced as indicated on the plans or in the additional details section at the end of this specification.

At low places on the ground surface, extra fill may be placed over the pipeline to provide the minimum depth of cover. The top width of the fill shall be no less than 10 ft and the side slopes no steeper than 6 horizontal to 1 vertical. The fill material shall be placed and compacted before the trench is excavated. When extra protection is needed at vehicular crossings, encasement pipe or other approved methods may be used.

Trench construction. Provisions shall be made to insure safe working conditions if unstable soil, trench depth, or other conditions can be hazardous to personnel working in the trench.

The trench at any point below the top of the pipe shall be only wide enough to permit the pipe to be easily placed and joined and to allow the initial backfill material to be uniformly placed under the haunches and along the sides of the pipe. Installation using "plow-in methods" or precision excavation that has a semi-circular bottom that closely fits the pipe, the width shall not exceed the outside diameter of the pipe by more than 10 percent.

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

If there are rocks, boulders, or any other material that might damage the pipe, the trench bottom shall be undercut a minimum of 4 in. below final grade and filled with bedding material consisting of sand or compacted fine-grained soils. NRCS shall be notified if rocks, boulders, or other material that might damage the pipe is uncovered during trenching operations.

Placement. Flexible conduits complete with fittings and other related appurtenances shall be installed to the lines and grades shown on the drawings. The pipe shall be installed so that there is no reversal of grade between the joints unless otherwise shown on the drawings.

The pipe shall not be dropped or dumped on the bedding or into the pipe trench. The ground surface near the pipe trench shall be free of loose rocks and stones greater than 1 inch in diameter. This ensures that rock will not be displaced and impact the pipe.

Care shall be taken to prevent permanent distortion and damage when handling the pipe during unusually warm or cold weather. The pipe shall be allowed to come within a few degrees of the temperature after it is completely covered before placing the backfill, other than that needed for shading, or before connecting the pipe to other facilities.

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.

For pipe with belled ends, bell holes shall be excavated in the bedding material, as needed, to allow for unobstructed assembly of the joint and to permit the body of the pipe to be in contact with the bedding material throughout its length.

Joints and connections. All joints and connections shall be capable of withstanding the design maximum working pressure for the pipeline without leakage and shall leave the inside of the line free of any obstruction that can reduce its capacity below design requirements.

All fittings, such as couplings, reducers, bends, tees, and crosses, shall be installed according to the recommendations of the pipe manufacturer.

Fittings and appurtenances made of steel or other metals susceptible to corrosion shall be adequately protected by wrapping them with plastic tape or applying a coating having high corrosion-preventative qualities. If plastic tape is used, all surfaces shall be thoroughly cleaned and then coated with a primer compatible with the tape before wrapping them.

Thrust blocks. Thrust blocks must be formed against solid unexcavated earth undamaged by mechanical equipment. They shall be constructed of concrete, and the space between the pipe and the trench wall shall be filled to the height of the outside diameter of the pipe or as specified by the manufacturer.

Initial backfill. The initial backfill is critical to the performance of flexible conduits (especially plastic and thermoplastic pipe). Unless otherwise specified, initial backfill to 6 inches above the top of the conduit is required. The acceptable methods are: (1) Earth Bedding or (2) Sand, Gravel, or Crushed Rock Bedding.

- (1) Earth Bedding The pipe shall be firmly and uniformly placed on compacted earthfill bedding or an in-place earth material bedding of ample bearing strength to support the pipe without noticeable settlement. The earth material on which the pipe is placed shall be of uniform density to prevent differential settlement. Unless otherwise specified, a groove that closely conforms to the outside surface of the pipe shall be formed in the bedding. The depth of the groove shall be equal to or greater than 0.3 times the pipe diameter.

Earth bedding shall be compacted to a density not less than adjacent undisturbed material. Earthfill material used for compacted earth bedding shall be free of rocks or stones greater than 1 inch in diameter and earth clods greater than 2 inches in diameter. The pipe shall be loaded sufficiently during the compaction of bedding under the haunches and around the sides of the pipe to prevent displacement from its final approved placement.

- (2) Sand, Gravel, or Crushed Rock Bedding When sand, gravel, or crushed rock bedding is specified, the pipe shall be firmly and uniformly placed on the bedding material. Material for bedding shall not exceed 1 inch in diameter. The coarse-grained bedding material shall be carefully placed and compacted to a depth equal to or greater than 0.3 times the diameter of the pipe above the bottom of the pipe. The pipe shall be loaded sufficiently during backfilling

and compaction around the sides to prevent displacement of the pipe from its final approved placement.

Final backfill. Final backfill material shall be free of large rocks, frozen clogs, and other debris greater than 3 in. in diameter. The material shall be placed and spread in approximately uniform layers so that there will be no unfilled spaces in the backfill and the 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. Rolling equipment shall not be used or consolidate the final backfill.

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

Testing. The pipeline shall be thoroughly and completely tested at the design pressure for pressure strength and leakage. It is recommended to partly backfill the line before testing to hold the pipeline in place. Backfilling shall be according to the specifications under "Initial Backfill."

The line shall be slowly filled with water. Adequate provision shall be made for air release during filling operations, taking care to bleed all entrapped air. The pressure shall be slowly built up to the maximum design working pressure of the system. While this pressure is maintained, all exposed pipe, fittings, valves, hydrants, joints, appurtenances, and covered parts of the line shall be examined for leaks. Any leaks shall be repaired and the system retested.

It shall be demonstrated by testing that the pipeline will function properly at design capacity. At or below design capacity there shall be no objectionable flow conditions. Objectionable flow conditions shall include water hammer, continuing unsteady delivery of water, damage to the pipeline, or detrimental discharge from control valves, vents, or standpipes.

Basis of acceptance. The acceptability of the pipeline shall be determined by inspections to check compliance with all the provisions of this standard, including the design of the line, the pipe and pipe markings, the appurtenances, and the minimum installation requirements.

Additional Details

Pipe Material to be Used: _____

Pipe Burial Depth: _____

Additional Construction Notes: _____

