

Irrigation Water Conveyance

Nonreinforced Concrete Pipeline Specifications

Installation

Minimum depth of cover. The pipeline shall be placed deep enough below the land surface to protect it from the hazards imposed by traffic crossing, farming operations, freezing temperatures, or soil cracking. The minimum depths of cover shall be 18 in. for pipe sizes 12 in. and less in diameter and 24 in. for pipelines greater than 12 in. in diameter.

Exceptions to these depths may be specified for rocky areas or other local conditions. If a shallower covering is specified, there shall be provisions to protect the line from damage by vehicular traffic. Greater depths of cover shall be specified when local conditions indicate a need.

Trench construction. If trenches are excavated in soils containing rock or other hard materials or in soils susceptible to appreciable swelling and shrinking on wetting or drying, or if the trench bottom is unstable, the trenches shall be overexcavated and backfilled with selected materials to sufficient depth to provide a suitable base. If water is in the trench, it shall be drained away or controlled in such a manner as not to damage the joint mortar, and a suitable base shall be maintained.

Openings. Openings into mortar joint and case-in-place concrete pipelines shall be covered to prevent air circulation except when work is actually in progress. Such openings shall be kept closed until the pipeline is completed and is to be filled with water.

Joints and connections. All joints and connections shall be designed and constructed to withstand the design maximum working pressure for the pipeline without leakage and to leave the inside of the line free of any obstruction that may tend to reduce its capacity below design requirements.

Mortar joints shall be protected from drying out. If the soil used in the initial backfill is not thoroughly moist, a suitable membrane shall be used over the mortar. Membranes consisting of one layer of kraft paper or paper cut from cement sacks or membranes conforming to specifications in ASTM-C-171 or C-309 shall be considered suitable.

Thrust blocks. Thrust blocks must be formed against a solid hand-excavated trench wall 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. The block shall have a minimum thickness of 6 in. and the bearing area specified.

Backfill. The backfill material shall be placed so that the pipe will not be displaced or damaged and so that the backfill is level with the natural ground or at the design grade required to provide the minimum depth of cover after settlement.

An initial backfill of soil shall be placed around the mortar joint pipe and over it to a depth of 6 in. for the full width of the trench. The initial backfill shall not lag behind pipe laying by more than seven sections of pipe.

If laying ceases for 2 hr or more, the initial backfill shall be brought up to and cover the last completed joint. Nothing in this section shall prohibit the complete backfilling while mortar bands are still plastic. If complete backfilling is not done at this time, completion shall be delayed at least 20 hr. To prevent damage to mortar joints, the trench shall be backfilled to the minimum specified cover or to 2 ft, whichever is less, before the pipe is filled with water.

Cast-in-place pipelines. Cast-in-place pipe shall be installed, cured, and backfilled according to the requirements set forth in ACI 346-70.

Testing. Concrete pipelines shall be tested for leaks by observing their normal operation any time after 2 weeks of continuous wetting. All visible leaks shall be repaired. Seasonal cold water shall not be used for this test.

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 such as water hammer, continuing unsteady delivery of water, damage to the pipeline, or detrimental discharge from control valves, vents, or stands.

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

Certification and guarantee. If requested by the state conservation engineer, the manufacturer shall certify that the pipe complies with the standards of these SCS specifications.

The installing contractor shall certify that the installation complies with the requirements of this standard. A written guarantee that protects the owner against defective workmanship and materials for not less than 1 yr and that identifies the manufacturer and markings of the pipe used shall be furnished.

Materials

Pipe. Nonreinforced concrete pipe laid with mortar joints shall conform to or exceed the requirements in ASTM-C-118.

If nonreinforced concrete pipe are laid with rubber gasket joints, the rubber gaskets shall conform to or exceed the requirements in ASTM-C-505.

Nonreinforced cast-in-place concrete pipe shall conform to or exceed the requirements of American Concrete Institute Standard 346-70.

Stands. If constructed of concrete pipe having a diameter greater than 24 in, the pipe shall conform to the standards in ASTM-C-76 or C-478.

Cast-in-place stands shall contain steel reinforcing on not more than 1-ft centers to provide steel areas equal to or greater than the least values specified for Class II (1500-D-Ultimate) pipe in ASTM-C-76.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TECHNICAL GUIDE
SECTION IV

NATIONAL
SUPPLEMENT
430-CC-NS-1

Irrigation Water Conveyance Nonreinforced Concrete Pipeline (ft)

Planning considerations for water quantity and quality

Quantity

1. Effects on the water budget, especially on infiltration and evaporation.
2. Effects on downstream flows or aquifers that would affect other water uses or users.
3. Potential use for irrigation water management.
4. Effects of installing a pipeline on vegetation that may have been located next to the original conveyance.

Quality

1. Effects of installing the pipeline (replacing other types of conveyances) on channel erosion or the movement of sediment and soluble and sediment-attached substances carried by water.
2. Effects on the movement of dissolved substances into the soil, and on percolation below the root zone or to ground water recharge.
3. Effects of controlled water delivery on the temperatures of water resources that might cause undesirable effects on aquatic and wildlife communities.
4. Effects on wetlands or water-related wildlife habitats.
5. Effects on the visual quality of water resources.

MONTANA SUPPLEMENT

Irrigation Water Conveyance (MT-430-CC)

Nonreinforced Concrete Pipeline

The following additional standards apply to nonreinforced concrete pipelines.

Established minimum life. 20 years

Design Criteria

Materials.

Pipe: Nonreinforced concrete pipe laid with mortar joints shall conform to or exceed the requirements in ASTM-C-118.

If nonreinforced concrete pipe are laid with rubber gasket joints, the rubber gaskets shall conform to or exceed the requirements in ASTM-C-505.

Nonreinforced cast-in-place concrete pipe shall conform to or exceed the requirements of American Concrete Institute Standard 346-70.

Stands: If constructed of concrete pipe having a diameter greater than 24 inches, the pipe shall conform to the standards in ASTM-C-76, C-478, or C-361.

Cast-in-place, stands shall contain steel reinforcing on not more than 1-foot centers to provide steel areas equal to or greater than the least values specified for Class II (1500-D-Ultimate) pipe in ASTM-C-76.

Plans and specifications. The drawings must specify the diameter, size, wall thickness, strength or class designation, and type of pipe required for the installation.

Montana Construction and Construction Materials Specification MT-430-CC applies to this practice.

Plans and specifications are to be developed for each installation, and approved by the individual having design approval authority for the project.

If other additional specifications or measurement and payment clauses are required, they shall be in keeping with the requirements of Construction and Material Specifications, NEH Section 20. (Consult area engineer).