

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

**PIPELINE
(ft.)
CODE 516**

DEFINITION

Pipeline installed for conveying water for livestock or for recreation.

SCOPE

This standard applies to pipelines that have an inside diameter of less than 4 in. They are installed for livestock watering or for recreation areas.

PURPOSE

To convey water from a source of supply to points of use.

CONDITIONS WHERE PRACTICE APPLIES

Where conveyance of water in a closed conduit is desirable or necessary to conduct water from one point to another, to conserve the supply, or for reasons of sanitation.

PLANNING CONSIDERATIONS

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff and infiltration. Compare to centralized water facilities that has increased soil compaction because of traffic livestock, vehicles, and humans.
2. Effects on surface and ground water of broken pipelines.

Water Quality

1. The impact of water available at remote sites

as a factor in keeping livestock out of streams and lakes, with the resulting reduction in bank erosion, sediment yield, and the direct deposit of manure in water courses.

2. Effects of bacteria, nutrients, salts and organic matter on surface and ground water because of increased recreation activity caused by the availability of water.
3. Effects of erosion and sediment yield from disturbed areas during construction.

DESIGN CRITERIA

Capacity. For supply livestock water, the installation shall have a capacity to provide at least 12 gal per head per day for cattle and horses, 4 gal for swine, and 1.5 gal for sheep and goats.

For recreation areas, the capacity shall be adequate for all planned uses of the water, such as drinking, fire protection, showers, flush toilets, and irrigation of landscaped areas.

Sanitary protection. If water from the pipeline is likely to be used for human consumption, the requirements of the state health department for materials and installation must be met.

Pipe. Steel pipe shall meet the requirements specified in ASTM-A-120 or in AWWA Specification C-200. If because of local conditions, a coal-tar enamel protective coating is needed for steel pipe, the coating shall meet the requirements of AWWA Specification C-203. Plastic pressure pipe shall be suitable for underground use. The pipe shall conform to the requirements of the following ASTM specifications:

- D 1785 Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120
- D 2104 Polyethylene (PE) Plastic Pipe, Schedule 40
- D 2241 Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)
- D 1527 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80
- D 2282 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR)
- D 2239 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Inside Diameter
- D 3035 Polyethylene (PE) Plastic Pipe (SDR-PR), Based on Controlled Outside Diameter
- D 2447 Polyethylene (PE) Plastic Pipe Schedules 40 and 80, Based on Outside Diameter
- D 2737 Polyethylene (PE) Plastic Tubing
- D 2672 Bell-End Polyvinyl Chloride (PVC) Pipe
- D 2740 Polyvinyl Chloride (PVC) Plastic Tubing

Pressure pipe fitting shall conform to the requirements of the following ASTM specifications:

- D 2466 Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40
- D 2467 Socket-Type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80
- D 2464 Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80
- D 2611 Butt Fusion Polyethylene (PE) Plastic Pipe Fittings, Schedule 80 (for IPS Pipe)
- D 2610 Butt Fusion Polyethylene (PE) Plastic Pipe Fittings, Schedule 40 (for IPS Pipe)
- D 3036 Socket-Type Polyvinyl Chloride (PVC) Plastic Line Couplings
- D 2468 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40
- D 2469 Socket-Type Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 80

- D 2465 Threaded Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Threaded, Schedule 80
- D 2609 Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe
- D 3261 Butt Heat Fusion Polyethylene (PE) Plastic Fittings, for Polyethylene (PE) Plastic Pipe and Tubing
- D 2683 Socket-type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
- D 3139 Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

Solvents for solvent-welded pipe joints shall conform to the following ASTM specifications:

- D 2564 Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings
- D 2235 Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings
- D 2855 Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings
- Rubber gaskets for pipe joints shall conform to the requirements of ASTM Specification F 477, Elastomeric Seals (Gaskets) for joining Plastic Pipe.

Drainage. Valves or unions shall be installed at low points in the pipeline so that the line can be drained as needed.

Vents. For design velocities lower than 8 ft/s, some provision shall be included in the design for removing air. If parts of the line are above the hydraulic gradient, periodic use of an air pump may be required.

Joints. Watertight joints that have a strength equal to that of the pipe shall be used. Couplings must be of material compatible with that of the pipe. If they are made of material susceptible to corrosion, provisions must be made to protect them.

Vegetation. Distributed areas shall be established to vegetation or otherwise stabilized as soon as practicable after construction. Seedbed preparation, seeding, fertilizing, and mulching shall conform to the instructions provided in technical guides.

Visual resources. The visual design of pipelines in areas of high public visibility and those in fragile areas shall be carefully considered.

PLANS AND SPECIFICATIONS

Plans and specifications for installing pipelines shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Construction Specification

PIPELINE

1. SCOPE

Work shall consist of furnishing and installing the pipeline, fittings, and appurtenances as specified on the drawings. The pipeline shall be located as shown on the drawings or as staked in the field.

2. SITE PREPRATION

The pipeline location shall be cleared as needed for trenching and installation of the pipeline. Cleared material shall be disposed of by burning, burying, or other approved method.

3. INSTALLATION

a. Placement

Pipelines shall be placed so that they are protected against hazards imposed by traffic, farm operations, freezing temperatures, or soil cracking. Other means of protection must be provided if the depth required for protection is impracticable because of shallow soils over rock or for other reasons. The minimum cover over the pipeline shall be 30 inches. Low areas may be filled to provide minimum cover. Abrupt

changes in grade must be avoided to prevent rupture of the pipe. Trenches for plastic pipelines are to be free of rocks and other sharp-edged materials, and the pipe shall be carefully placed to prevent damage. Plastic pipelines may be placed by plow-in equipment if soils are suitable and rocks and boulders will not damage the pipe. All fittings and connections shall be installed and sealed in accordance with manufacturer's recommendations.

b. Testing

Pipelines shall be pressure tested by one of the following methods:

- (1) Before backfilling, the pipe should be filled with water and tested at the design working head or at a head of 10 feet, whichever is greater. All leaks must be repaired. The test must be successfully repeated without leaks before backfilling.
- (2) The pipe should be pressure tested at the working pressure for 2 hours. The allowable leakage shall not be greater than 1 gallon per diameter inch per mile. If leakage exceeds this rate, the defect must be repaired until retests show that the leakage is within the allowable limits. However, all visible leaks must be repaired.

c. Backfilling

All backfilling shall be completed before the line is placed in service. For plastic or copper pipe, the initial backfill shall be of selected material that is free of rocks or other sharp-edged material that can damage the pipe. Deformation or displacement of the pipe must not occur during backfilling. Plastic pipelines installed by the plow-in method require surface compaction and shaping in addition to the normal plow-in operations. Installation and backfilling shall be done in a workmanlike manner. Provisions shall be made for stabilizing disturbed areas and controlling erosion, as necessary.

4. VEGETATION

All disturbed areas shall be shaped and graded to blend with the surrounding area. Fertilizers and lime shall be applied as necessary to the disturbed area, incorporated by disking as necessary, and the area seeded in accordance with requirements of Critical Area Planting (342).