

NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA CONSERVATION PRACTICE STANDARD

PIPELINE

(Feet)

CODE 516

DEFINITION

Pipeline having an inside diameter of 8 inches or less.

PURPOSE

To convey water from a source of supply to points of use for livestock, wildlife, or other agricultural purposes.

CONDITIONS WHERE PRACTICE APPLIES

Where it is desirable or necessary to convey water in a closed conduit from one point to another.

CRITERIA

CAPACITY

For livestock water, the installation shall have a capacity to provide seasonal high daily water requirements for the number and species of animals to be supplied. Animal water requirements can be obtained from the NRCS Field Office Technical Guide.

Additional water capacity will be provided for wildlife when applicable.

PIPE

All pipe must withstand the pressure it will be subjected to, including hydraulic transients, internal pressures and external pressures. As a safety factor against surge or water hammer, the working pressure should not exceed 72% of the pressure rating of the pipe and the design flow velocity at system capacity should not exceed 5 ft/sec. If either of these limits is exceeded, special consideration must be given to flow conditions and measures must be taken to adequately protect the pipeline against surge.

Steel pipe shall meet the requirements of AWWA Specification C-200.

Plastic pipe shall conform to the requirements of the following ASTM specifications, as applicable:

D 1527 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80

D 1785 Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

D 2104 Polyethylene (PE) Plastic Pipe, Schedule 40

D 2239 Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

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D 2241 Poly (Vinyl Chloride) (PVC), Pressure-Rated Pipe (SDR)

D 2282 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR)

D 2447 Polyethylene (PE) Plastic Pipe Schedules 40 and 80, Based on Outside Diameter

D 2513 Thermoplastic Gas Pressure Pipe, Tubing and Fittings

D 2737 Polyethylene (PE) Plastic Tubing

D 2672 Joints for IPS PVC Using Solvent Cement

D 3035 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter

AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches through 12 inches

AWWA C901 Polyethylene (PE) Pressure Pipe and Tubing, ½ inch through 3 inches

Plastic pressure pipe fittings shall conform to the following ASTM specifications, as applicable:

D 2464 Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

D 2466 Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40

D 2467 Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

D 2468 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40

D 2609 Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe

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

D 3261 Butt Heat Fusion Polyethylene (PE) Plastic Fittings, for Polyethylene (PE) Plastic Pipe and Tubing

Solvents for solvent-welded plastic pipe joints shall conform to the following ASTM specifications, as applicable:

D 2235 Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings

D 2564 Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings

D 2855 Making Solvent-Cemented Joints with Poly (Vinyl 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. Check valves shall be installed as needed to protect groundwater quality or maintain a full pipeline.

VENTS

Design shall provide for entry and removal of air along the pipeline, as needed, to prevent air locking or pipe collapse. If parts of the line are above the hydraulic gradient, periodic use of an air pump may be required. Provisions shall be made for pressure relief, air relief and vacuum relief as needed to protect the pipeline.

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.

PROTECTION

When steel pipe is used, interior protective coatings shall be provided in accordance with NRCS Virginia Conservation Practice Standard *Steel Pipe (Code 430FF)*. If a coal-tar enamel protective coating is needed for corrosion protection, the coating shall meet the requirements of AWWA Specification C-203.

Steel pipe installed above ground shall be galvanized or shall be protected with a suitable protective paint coating, including a primer coat and two or more final coats.

Plastic pipe installed above ground shall be resistant to ultraviolet light throughout the intended life of the pipe.

All pipes shall be protected from hazards presented by traffic, farm operations, freezing temperatures, fire, and thermal expansion and contraction. Reasonable measures should be taken to protect the pipe from potential vandalism.

VEGETATION

Disturbed areas shall be established with vegetation or otherwise stabilized as soon as practical after construction. Seedbed preparation, seeding, fertilizing, and mulching shall conform to NRCS Virginia Conservation Practice Standard *Critical Area Planting (Code 342)*.

VISUAL RESOURCES

The visual design of pipelines and appurtenances in areas of high public visibility shall be carefully considered.

CONSIDERATIONS

No special considerations have been identified for this practice.

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. If the pipeline is a component of a system that includes additional conservation practices, the information necessary to construct these additional practices will also be conveyed on the plans.

The Engineering Field Handbook, Chapter 5, will guide the development of plans.

INSTALLATION GUIDANCE

1. Pipelines shall be placed so they are protected against hazards imposed by traffic, farm operations, freezing temperatures or soil cracking. Other means of protection must be provided where the depth required for protection cannot practically be achieved.
2. Trenches for plastic pipelines shall be free of rocks and other sharp edged materials.
3. Plastic pipelines shall be placed in a "snake like" position in the trench.
4. Before backfilling, the pipe shall be filled with water and tested at design working head or a minimum head of 10 feet, whichever is greater. All leaks shall be repaired and the test repeated before backfilling begins.
5. All backfilling shall be completed before the line is put into service. For plastic or copper pipe, the initial backfill shall be a minimum of 4 inches of select material, free from rocks or other sharp edged material that could damage the pipe. This initial fill shall be compacted around the pipe to a density of at least equal to the natural density of the trench sidewalls. Deformation or displacement of the pipe must not occur during backfilling.
6. Backfill of plastic pipe shall be done after the pipe reaches the same temperature as the water or soil.

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7. Installation and backfilling shall be done in a workmanlike manner.
8. Provisions for stabilization of disturbed areas and control of erosion shall be installed according to Virginia Conservation Practice Standard, *Critical Area Planting (342)*.
9. Planning and implementation of this practice will be preceded by an environmental evaluation using the "Environmental Evaluation Data Sheet"; Form VA-EE-1, 190-GM, Part 410, Subpart A (Amendment VA 4). All measures required as a result of the environmental evaluation shall be adhered to.

DESIGN DATA

1. Record all design data in an engineering field book, and/or on a plan, or on a design sheet.
2. Estimate the rate of water required.
3. Estimate the rate of water supply.
4. If a pressure system, determine the needed pressure range in psi.
5. Profile along proposed line from source to point of delivery. Profile of outlet pipe.
6. Detail profile/plan by sections, type, ASTM's, length, sizes, and depths of pipe.
7. Basis for pipe sizes selected.
8. Completed Environmental Evaluation.

CHECK DATA

1. Record all check data in an engineering field book, and/or on a plan, or on a design sheet.
2. Document length, depth, size and type of pipe used.
3. A statement as to seeding, sodding, or successful establishment of vegetation.

4. A statement that the pipeline was pressure tested for leaks prior to backfill.

OPERATION AND MAINTENANCE

An Operation and Maintenance plan specific to the type of installed pipeline shall be provided to the landowner. The plan shall include, but not be limited to, the following provisions:

- Opening/closing valves to prevent excessive water hammer
- Filling at the specified rate requirements
- Inspecting and testing valves, pressure regulators, pumps, switches and other appurtenances
- Maintaining erosion protection at outlets
- Checking for debris, minerals, algae and other materials which may restrict system flow
- Draining and/or providing for cold weather operation of the system

REFERENCES

1. Engineering Field Handbook.
2. GM-190, ECOL SCI, Part 410, Compliance with NEPA.
3. Midwest Plan Service, Structures and Environment Handbook: MWPS-1.

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PIPELINE

Approved Practice Narratives

(Feet)

CODE 516

516 D1 Pipeline: A pipeline to supply water for livestock will be installed at the location shown on the plan map.

516 D3 Pipeline: A pipeline to supply water for agricultural use shall be installed at the location shown on the plan map.

516 D2 Pipeline: A pipeline to supply water for wildlife shall be installed at the location shown on the plan map.

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