

## NATURAL RESOURCES CONSERVATION SERVICE 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 recreation.

#### 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, provide adequate capacity for the seasonal high daily water requirements for the number and species of animals to be supplied. For supplying livestock water, provide the following minimum capacity:

- 20 gallons per head per day for beef cattle and horses,
- 25 gallons per head per day for dairy cattle, and
- 2 gallons per head per day for sheep and goats
- Consult with local extension service for required capacity for other type livestock

For recreation areas, provide adequate water capacity for all planned uses. Typical examples are drinking water, fire protection, showers, flush toilets, and irrigation of

landscaped areas.

Provide additional water capacity for wildlife when applicable.

**Sanitary protection.** If water from the pipeline is to be used for human consumption, follow all applicable state and local regulations.

**Pipe.** Design all pipe to 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, design the system to meet the following provisions:

- Design working pressure equal to or less than 72% of the pressure rating for the pipe
- Maximum velocity of 5 ft/sec when the pipe is flowing at design capacity.

If either of these limits is exceeded, give special consideration to flow conditions and take measures to adequately protect the pipeline against surge.

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

Use plastic pipe which conforms 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

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

**NRCS, GEORGIA**  
**August 2008**

**Diameter**

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

Use plastic pressure pipe fittings which 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

Use solvents for solvent-welded plastic pipe joints which 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

Use rubber gaskets for pipe joints which conform to the requirements of ASTM F477, Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

**Drainage.** Install valves or unions at low points in the pipeline so that the line can be drained as needed. Install check valves as needed to protect groundwater quality or maintain a full pipeline. Install back flow prevention measures as required by the Official Code of Georgia annotated, Chapter 40-23-1 when pumping from well(s). Backflow prevention measures include:

- A functional check valve located on a level horizontal plane in the irrigation supply line between the pump and the well.
- A low pressure drain, a minimum of ¾ inch in diameter, located at the bottom of the horizontal pipe section between the check valve and pump
- A vacuum relief located in the top of the same pipe section as the low pressure drain.

**Vents.** Provide for entry and removal of air along the pipeline, as needed, to prevent air locking or pipe collapse. As a minimum, install vents at all pipe summits. If parts of the line are above the hydraulic gradient, periodic use of an air pump may be required. Make provisions for pressure relief, air relief and vacuum relief as needed to protect the pipeline.

**Joints.** Use watertight joints that have a strength equal to that of the pipe. Use couplings made of material compatible with that of the pipe. If they are made of material susceptible to corrosion, make provisions to protect them.

**Protection.** When steel pipe is used, provide interior protective coatings in accordance with NRCS Conservation Practice Standard 430FF, Steel Pipe. If a coal-tar enamel protective coating is needed for corrosion protection, use coatings which meet the requirements of AWWA Specification C-203.

When steel pipe is installed above ground use galvanized pipe or protect the pipe with a suitable protective paint coating, including a primer coat and two or more final coats.

When plastic pipe is installed above ground use pipe which is resistant to ultraviolet light throughout the intended life of the pipe.

Protect all pipes from hazards presented by traffic, farm operations, freezing temperatures, fire, thermal expansion and contraction. Take reasonable measures to protect the pipe from potential vandalism. Provide a minimum depth of cover of 2 feet over the pipe.

**Vegetation.** Vegetate or otherwise stabilize disturbed areas as soon as practical after construction. Complete seedbed preparation, seeding, fertilizing, and mulching in conformance with NRCS Conservation Practice Standard 342, Critical Area Planting.

**Visual resources.** Carefully consider the visual design of pipelines and appurtenances in areas of high public.

### CONSIDERATIONS

Consider pressure test pipelines by one of the following methods:

- Before backfilling, fill the pipe with water and test at the design working head or at a minimum head of 10 ft., whichever is greater. Repair all leaks and repeat the test before backfilling.
- Pressure test at the working pressure for 2 hours. Maximum allowable leakage is 1 gallon per diameter inch per mile. If leakage during the test exceeds this rate, repair all defects and retest until the leakage is within the allowable limit. Repair all visible leaks before backfilling the pipe.

### PLANS AND SPECIFICATIONS

Prepare plans and specifications for installing pipelines in keeping with this standard and that 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, include the information necessary to construct these additional practices on the plans.

Use guidance in The Engineering Field Handbook, Chapter 5, in the development of plans.

### OPERATION AND MAINTENANCE

Provide an O&M plan specific to the type of installed pipeline to the landowner. Include, as a minimum, 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; and
- Draining and/or providing for cold weather operation of the system.

Refer to GA-Pipeline-516-O&M for plan details.

### REFERENCES

Engineering Field Handbook  
Georgia Irrigation Guide, Appendix C  
Official Code of Georgia Annotated Chapter 40-23-1  
Federal Regulations PB-87-1