

**NATURAL RESOURCES CONSERVATION SERVICE  
OPERATION AND MAINTENANCE**

**LIVESTOCK PIPELINE  
CODE 516**

An operation and maintenance plan shall be developed and established by NRCS and the producer to maintain the pipeline operation, flow capacity and associated vegetative cover. Items to consider are:

1. Protect pipeline from damage by farm equipment, vehicles, and livestock.
2. Check for leaks and improper operation. Repair any damage as soon as possible after being noted.
3. Repair any eroded areas that are hazardous to the pipeline. Reestablish vegetative cover immediately where erosion has removed vegetation.
4. Mark pipeline locations in areas where they can be damaged by other activities.
5. Record on a map the location of pipeline and its approximate depth.
6. Check to ensure needed volume of water is being supplied at the designed pressure.

**OPERATION and MAINTENANCE CHECKLIST**

- [ ] The system is designed for a maximum of \_\_\_\_\_ (number) of \_\_\_\_\_ (livestock). If the number of livestock is increased, additional water supplies may be needed during peak use periods.
- [ ] Fill pipeline slowly to avoid pressure surges on valves and other appurtenances. Establish a filling procedure that limits the water velocity to 1 foot per second in a closed pipeline or a procedure that has open outlets to expel air before pressurizing the system. Close all valves and hydrants slowly to prevent water hammer in the pipeline.
- [ ] Annually inspect all pressure tanks, pressure gauges, pressure regulating valves, pressure relief valves, air / vacuum vents for proper operation within design pressure limits and ensure they are properly adjusted.
- [ ] Annually inspect the entire length of the pipeline for any signs of leakage, damage to above ground facilities, erosion or pipeline trench settlement. Repair or add backfill as necessary. This is important for the first three years after installation to provide reliable long term service.
- [ ] Prior to freezing weather, winterize or disconnect above ground pipeline(s) and open all valves to allow water to expand or drain the above ground section.

Additional Details: \_\_\_\_\_

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**NATURAL RESOURCES CONSERVATION SERVICE  
MATERIAL SPECIFICATION**

**LIVESTOCK PIPELINE**

(feet)  
CODE 516

**ALL PIPE:**

The ASTM or AWWA designation shall be stamped on the pipe or made available by the supplier with a copy to NRCS.

Pipe will be rated a minimum of 72% of the working pressure of the system as shown on plans (the system pressure is based on pressure tank settings and pressure increases due to elevation).

To ensure adequate wall thickness and strength, pipe with a minimum pressure rating of 150 pounds per square inch shall be used when burying the pipe.

**ABOVE GROUND PLASTIC PIPE:**

All plastic pipe intended for use above ground will contain a minimum of 2% carbon black to prevent sun degradation.

**TABLE 1**

**PLASTIC PIPE MATERIALS SUITABLE FOR PIPELINE INSTALLATIONS**

This applies to pipelines that have an inside diameter of less than 4 inches. Plastic pressure pipe and fittings shall be suitable for potable water and approved for underground use. Common ASTM specifications are listed below. Other pipe and fittings may be approved by NRCS engineer prior to installation.

D1785 Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, 120  
 D2104 Polyethylene (PE) Plastic Pipe, Schedule 40  
 D2241 Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)  
 D2239 Polyethylene (PE) Plastic Pipe (SDR-PR)  
 D3035 Polyethylene (PE) Plastic Pipe (SDR\_PR) Based on controlled Outside Diameter (OD)  
 D2447 Polyethylene (PE) Plastic Pipe Schedule 40 and 80, Based on Outside Diameter (OD)  
 D2737 Polyethylene (PE) Plastic Tubing (ID)

or **AWWA Specifications:**

C901 Polyethylene (PE) Pressure Pipe and Tubing 1/2 through 3 inch for Water Service

**Pressure pipe fittings shall conform to the requirements of the appropriate ASTM Specification:**

- D2466 Polyvinyl Chloride (PVC) Plastic Pipe Fitting, Schedule 40
- D2467 Socket-Type Polyvinyl Chloride (PVC) Plastic Pipe fitting, Schedule 80
- D2464 Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fitting, Schedule 80
- D2609 Plastic Insert Fitting for Polyethylene (PE) Plastic Pipe
- D3261 Butt Hat Fusion Polyethylene Plastic Fitting, for Polyethylene Plastic Pipe and Tubing
- D2672 Bell-End Polyvinyl Chloride (PVC) Pipe
- D2683 Socket-Type Polyethylene Fitting for Outside Diameter-Controlled Polyethylene Pipe and Tubing
- D3139 Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

**Solvents-welded pipe joints conform to the appropriate ASTM Specifications:**

- D2564 Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings

Rubber gaskets for pipe joints shall conform to the requirements of ASTM Specifications F477, Elastomeric Seals (Gaskets) for joining plastic pipe.

**Pressure pipe fittings, valves and appurtenances:**

All fittings, valves and pipeline appurtenances shall have, at a minimum, the same pressure rating as the pipe.

**NATURAL RESOURCES CONSERVATION SERVICE  
MISSOURI CONSTRUCTION SPECIFICATION**

**LIVESTOCK PIPELINE  
(Buried Pipeline)**

**General**

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

If the livestock pipeline is connected up to a domestic well, backflow control is recommended. When a water source for a livestock pipeline is a public well or utility, an approved method for eliminating backflow shall be installed. Devices and recommendations for eliminating backflow can be obtained through the water supplier or the Missouri Department of Natural Resources.

Certain practices that occur in drainage ways of the U.S. may require a permit from the Corps of Engineers. If the pipeline crosses a stream it is recommended the Corps be contacted to determine if a permit is needed. The local NRCS field office can assist in determining which Corps office to contact.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, 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.

**Underground Utilities**

Missouri law requires that the Missouri One Call System (MOCS) be notified before excavation activities are performed in order to have the underground utilities marked. It is the responsibility of the excavation company / person to make the notification. A toll free number, 800-344-7483, (800-DIG-RITE) or MOCS web site [www.mo1call.com](http://www.mo1call.com) is used to make the notification.

If public utilities are known to be in the area, for safety purposes, NRCS must receive a copy of the information given to Missouri One Call System including the serial number assigned by the Missouri One Call System, Inc. prior to beginning work.

**Placement**

Placement of the pipeline shall be as shown on the plans or as staked. The pipe should be free of dirt and other materials before assembling and the pipe shall be carefully placed to prevent damage. Flexible plastic pipe shall be placed in a "snake-like" position to provide expansion and contraction with temperature change.

Other parts of the water system shall be installed and connected to the pipeline as specified.

Pipelines shall be placed so that they are protected against hazards imposed by traffic, farm operations, freezing temperatures, or soil cracking. Unless otherwise specified, plastic pipe shall be buried at least 24 inches for ordinary field traffic. When crossing under a road, pipeline shall be buried deeper or otherwise protected from collapsing by placing it in a steel or concrete conduit.

Other means of protection must be provided if the depth required for protection is impractical because of shallow soils over rock or for other reasons. Abrupt changes in grade must be avoided to prevent damage to the pipe.

The pipeline shall be buried below frost line or otherwise protected from freezing such as providing valves, properly located, so that the pipe can be drained during periods of freezing weather.

Flexible plastic pipelines may be placed by plow-in equipment if soils are suitable and rocks and boulders will not damage the pipe material.

All PVC pipe connections designed to be glued will use PVC solvent cement suitable for use with potable water. Allow glue to cure according to manufacturer's guidelines prior to moving pipe and pressure testing. Gluing shall not be done at temperatures below freezing or above 110 degrees F.

**Testing**

Pipelines shall be pressure tested by the following method:

1. After the placement of the pipe and initial backfill (to hold pipeline in place) and before final 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 shall be repeated before final backfilling.

**Backfilling**

All backfilling shall be completed before the line is placed in service. The initial backfill shall be of selected material that is free from rocks or other sharp-edged material that can damage the pipe. Initial backfill is to be performed prior to pressure testing of the pipeline. 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.

Mound soil over pipe to allow for settlement. Provisions shall be provided for stabilizing disturbed areas and controlling erosion, as necessary.

**Vegetation**

Refer to JS-AGRON 25 or equivalent for seeding and mulching requirements..

**Additional Details:**

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