

# LIVESTOCK PIPELINE

## (Code 516)

### 1. SCOPE

Work shall consist of furnishing all equipment and materials and performing all operations in connection with construction of the pipeline(s) as shown on the drawings, as specified and as staked in the field.

### 2. MATERIALS

Pipe and fittings shall conform to the requirements shown on the drawings, as specified below and as described in the special provisions.

#### Steel Pipe

Steel pipe shall meet the requirements of either of the following specifications:

ASTM A53/A53M—Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless

AWWA-C 200—Steel Water Pipe 6 inches or Larger

If a protective coating is specified for steel pipe, the coating shall meet the requirements of one of the following specifications:

AWWA-C 203—Coal-Tar Protective Coatings and Linings for Steel Water Pipelines-Enamel and Tape-Hot Applied

AWWA-C 209—Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines

AWWA-C 210—Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines

AWWA-C 214—Tape Coating Systems for the Exterior of Steel Water Pipelines

#### Plastic Pipe

Plastic pressure pipe shall be suitable for underground use. The pipe shall conform to the applicable requirements of the following specifications:

ASTM-D 1785—Polyvinyl Chloride (PVC) Plastic Pipe, Schedule 40, 80, and 120

ASTM-D 2104—Polyethylene (PE) Plastic Pipe, Schedule 40

ASTM-D 2241—Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)

ASTM-D 1527—Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedule 40 and 80

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

ASTM-D 2239—Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Inside Diameter

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

ASTM-D 2447—Polyethylene (PE) Plastic Pipe, Schedule 40 and 80, Based on Outside Diameter

ASTM-D 2737—Polyethylene (PE) Plastic Tubing

## CONSTRUCTION SPECIFICATION

## Livestock Pipeline MT-516-2

ASTM-D 2672—Bell-End Polyvinyl Chloride (PVC) Pipe

Plastic Pipe Fittings, Threaded, Schedule 80

ASTM-D 2740—Polyvinyl Chloride (PVC) Plastic Tubing

ASTM-D2609—Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe

ASTM-D 2662—Polybutylene Water Service Pipe

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

ASTM-D 2666—Polybutylene Water Service Pipe (Copper pipe size)

ASTM-D 2683—Socket-type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing

Pressure pipe fittings shall conform to the requirements of the following applicable specifications:

ASTM-D 2466—Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40

ASTM-D 3139—Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

ASTM-D 2467—Socket-type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80

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

ASTM-D 2464—Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80

ASTM-D 2564—Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings

ASTM-D 2611—Butt Fusion Polyethylene (PE) Plastic Pipe Fittings, Schedule 80 (for IPS Pipe)

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

ASTM-D 2610—Butt fusion Polyethylene (PE) Plastic Pipe Fittings, Schedule 40 (for IPS Pipe)

ASTM-D 2855—Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings

ASTM-D 3036—Socket-type Polyvinyl Chloride (PVC) Plastic Line Couplings

Rubber gaskets for pipe joints shall conform to the requirements of the following specifications:

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

ASTM-F 477—Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM-D 2469—Socket-Type Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 80

ASTM-D 2465—Threaded Acrylonitrile-Butadiene-Styrene (ABS)

**Valves**

All valve types shall be constructed of materials suitable for the environmental exposure and installation. Size, pressure rating and type shall be within the manufacturer's recommended limits and/or as shown on the drawings or specified herein.

Valve risers or manholes shall be as shown on the drawings and shall be constructed in such a manner that they will be resistant to damage or deterioration caused by the elements, leaking water, livestock, vandals, ranch equipment or other hazards.

Air valve types are defined as follows and shall be of the type specified on the drawings:

**Air-Release Valve (1-way valve)**

A continuous acting valve that has a small venting orifice, generally ranging between 1/16 and 3/8 inch in size. This valve releases air from the pipeline once the line is filled and under working pressure.

**Air-and-Vacuum Valve (2-way valve)**

A large venting orifice which exhausts large quantities of air during filling operations and allows air to re-enter the line to prevent vacuum buildup during emptying. It is not continuous acting since air cannot escape once water enters the valve.

**Combination Air-Vacuum-Air Release Valve (3 way valve)**

Combines the functions of air-release and air-and-vacuum valves.

**3. INSTALLATION****General**

The work shall be constructed to the lines and grades shown on the drawings, as specified, or as staked in the field. Installation and backfilling shall be done in a workmanlike manner. Slopes shall be uniform and shall conform to the drawings. Earthfill shall be constructed to not less than design elevations and grades.

**Protection from Hazards**

Pipelines shall be placed so they are protected against hazards imposed by traffic, farm operations, freezing temperatures, soil cracking, or deterioration by exposure to sunlight. Other means of protection shall be provided if the depth required for protection is impractical because of shallow soils over rock or for other reasons.

**Pipe Placed in Trenches**

For trenches deeper than 2 feet, minimum trench width shall be 6 inches or twice the pipe diameter, whichever is greater.

When trenches are excavated in rock or coarse gravelly materials that will damage the pipe or coating, they shall be over-excavated to a minimum of 4 inches and backfilled with 4 inches of sand or other fine soil material before the pipe is placed.

Pipe shall be carefully placed to prevent damage. Sharp bends in the pipe to conform to abrupt changes in grade or alignment shall be made using angle fittings rather than bending the pipe.

Flexible plastic pipe shall be placed in a "snake-like" position in the trench before backfilling. Pipe shall be near the same temperature as the adjacent trench at the time of backfill.

When personnel enter trenches or other excavations, safety requirements of the Occupational Safety and Health Administration (OSHA) Safety and Health Standards, Part 1926, Safety and Health Regulations for Construction, Subpart P, Excavations, shall be followed.

**Plow-in Placed Pipe**

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

Temperature of the pipe during placement and connection with fittings shall be between 40 and 85 degrees F.

Minimum radius of the pipe placing shoe shall be:

- 2 inch pipe – 48 inches
- 1½ inch pipe – 40 inches
- 1¼ inch pipe – 36 inches
- 1 inch pipe – 24 inches

Throat and shoe assembly shall be designed and operated so no scuffing of the pipe occurs.

Under rocky conditions where rocks can damage the pipe, one or more preliminary passes with a ripper shall be completed to eliminate obstructions prior to installing the pipeline.

**Pipe Joints**

All pipe joints shall be made in strict accordance with the pipe manufacturer's instructions. Glue joints in PVC pipe shall be made in accordance with the manufacturer's instructions and ASTM D

2855. Only primer and glue certified for use with the specific pipe material shall be used.

**Testing**

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

- a. Before backfilling, fill the pipe with water and test 1 hour at the design maximum head or at a minimum head of 10 feet, whichever is greater. All leaks shall be repaired, and the test repeated satisfactorily before backfilling.
- b. After backfilling, pressure test at the design maximum pressure for 2 hours. The allowable leakage shall not be greater than 1 gallon per diameter inch per mile. If the test exceeds this rate, the defect(s) must be repaired until tests show that leakage is within the allowable limits. All leaks shall be repaired.

**Backfilling**

All backfilling shall be completed before the line is placed in service.

Initial backfilling in trenches constructed by backhoe or trenching machines shall consist of a 4-inch layer of selected material which is free of rocks with a particle size greater than 1 inch, vegetation, frozen clods, or ice chunks. If adequate selected material cannot be obtained from the excavated material, it shall be imported.

Deformation or displacement of the pipe must not occur during backfilling.

Except at road crossings and other critical areas as shown on the drawings, stock water pipeline backfill need not be compacted. The final fill shall be mounded over the top of trench. Provisions shall be made for filling settled areas along the pipe trench which occur after the original backfill operation is complete.

Plastic pipelines installed by the plow-in method require surface compaction and shaping in addition to the normal plow-in operations.

#### **4. EROSION AND POLLUTION CONTROL**

Provisions shall be made for stabilizing disturbed areas and controlling erosion, as necessary.

At all locations where water will tend to concentrate or enter the pipeline trench, water diversions (water bars) shall be constructed in a manner that will divert concentrated flows away from the trench.

#### **5. MEASUREMENT AND PAYMENT** (Used only if applicable)

For items of work for which specific unit prices are established, payment for each item will be made at the agreed-to unit price for that item. Pipe length will be determined to the nearest foot by measurement of the laid length of pipe along the centerline of the conduit. Other items will be measured to the nearest applicable unit.

Such payment will constitute full compensation for furnishing, transporting and installing materials and for all labor, equipment and tools necessary for completion of the work.

Compensation for any item of work shown on the drawings or described in the special provisions but not listed on the bid schedule will be considered incidental to and included in the pay items listed on the bid schedule.