

WISCONSIN CONSTRUCTION SPECIFICATION

516. Polyethylene (PE) Pressure Pipe and Tubing for Livestock Pipeline

1. SCOPE

The work shall consist of furnishing and installing Polyethylene (PE) Pressure Pipe and Tubing and the necessary fittings as shown on the drawings.

2. MATERIALS

Polyethylene (PE) Pressure Pipe and Tubing and fittings shall conform to the requirements of the following ASTM and AWWA specifications unless otherwise stated on the drawings.

- a. ASTM D-2239 Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.*
- b. ASTM D-2513 Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings.*
- c. ASTM D-2609 Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe.
- d. ASTM D-2683 Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.*
- e. ASTM D-2737 Polyethylene (PE) Plastic Tubing.*
- f. ASTM D-3035 Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.*
- g. ASTM D-3261 Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.*
- h. ASTM F-876 (PE) Crosslinked Polyethylene (PEX) Tubing (**not for above-ground use**).
- i. ASTM F-2620 Heat Fusion Joining of Polyethylene Pipe and Fittings.
- j. AWWA C-901 Polyethylene (PE) Pressure Pipe and Tubing, ½ In. through 3 In.*
- k. AWWA C-904 Crosslinked Polyethylene (PEX) Pressure Tubing, 1/2 In. Through 3 In. for Water Service (**not for above-ground use**).

*Must contain the code letter "C" in the material cell classification for above-ground use.

The pipe and tubing shall be homogeneous throughout and free from visible cracks, holes, foreign matter, or other defects. The pipe and tubing shall be as uniform in color, opacity, density, and other physical properties as is commercially practicable.

3. JOINTS AND CONNECTIONS

All joints and connections shall be designed and constructed to withstand the pipeline working pressure without leakage and leave the inside of the pipeline free of any obstruction that would reduce capacity.

4. HANDLING AND STORAGE

Pipe and tubing shall be delivered to the job site and handled by means which provide adequate support to the pipe and does not subject it to undue stresses or damage. When handling and placing plastic pipe and tubing, care shall be taken to prevent impact blows, abrasion damage, and gouging or cutting. All special handling requirements of the manufacturer shall be strictly observed. Special

care shall be taken to avoid impact when the pipe and tubing must be handled at temperatures of 40°F or less.

Pipe and tubing shall be stored on a relatively flat surface so that the barrels are evenly supported. Unless the pipe and tubing is specifically coated to withstand exposure to ultraviolet radiation, it shall be covered with an opaque material when stored outdoors for a period of 15 days or longer.

5. INSTALLATION

General

The work shall be constructed to the lines and grades shown on the drawings, as specified, or as staked in the field. Minimum depth of pipeline shall be as shown in the construction details or drawings.

Above Ground Pipe and Tubing

Installation of above ground pipeline including anchoring shall be done as detailed in the construction package and drawings. The pipe shall be laid loosely on the ground surface to create approximately 1% slack to allow for contraction during cold temperatures.

Plow-in Placed Pipe and Tubing

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 and tubing during placement and connection with fittings shall be between 40 and 85 degrees F.

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

To minimize the chances of kinking the pipe and tubing, do not bend the pipe and tubing in a radius less than the manufacturer's recommendations. Recommend bending in the same direction as coiled.

Bends near fittings or valves shall not be closer than 10 pipe diameters.

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

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

Pipe and Tubing Placed in Trenches

The bottom width of the pipeline trench shall be sufficient to provide clearance on both sides of the pipeline at all locations including the joints. For trenches deeper than 2 feet, minimum trench width shall be 6 inches.

The bottom of the pipeline trench shall be free of rocks, clods, and other obstructions. If uniform support cannot be obtained because of rocks, dense or wet soils, or when trenches are excavated in rock or coarse gravelly materials 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 and tubing is placed.

Pipe and tubing shall be carefully placed to prevent damage. Manufacturer's recommendation for joint deflection and pipe and tubing bending radius shall be followed. Bends near fittings or valves shall not be closer than 10 pipe diameters. Sharp bends in the pipe and tubing to conform to abrupt changes in grade or alignment shall be made using angle fittings rather than bending the pipe and tubing. **Pipe and tubing shall be near the same temperature as the adjacent trench at the time of backfill to minimize contraction due to cooling.**

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.

Backfilling

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

Initial backfill for trenches constructed by backhoe or trenching machines shall consist of a 4-inch layer of selected material which is free of rocks or other sharp-edged material, 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 and tubing must not occur during backfilling.

Except at road crossings and other critical areas as shown on the drawings, 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 pipeline trench which occur after the original backfill operation is complete.