

**NATURAL RESOURCES CONSERVATION SERVICE**  
**Wyoming**  
**CONSTRUCTION SPECIFICATIONS**  
**FOR**  
**IRRIGATION PIPELINE**  
**CORRUGATED METAL PIPE**

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(Owner/Operator)

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(Project/Title)

**GENERAL**

Pipelines shall be installed in accordance with a design and plan approved by the responsible technician. Details of construction shown in the design and plan but not included here shall be considered as a part of this specification. Construction activities shall be in accordance with applicable OSHA regulations.

**PIPE INSTALLATION**

Pipe shall be the diameter, length, gage or thickness, material type and coated as specified on the drawings.

The pipe shall be handled in a manner so as to prevent damage to the pipe and abrasion to the coating. Individual joints of pipe shall be inspected and any damaged pipe shall be removed and replaced. The pipe shall not be dragged or rolled on the ground.

Pipe shall be laid to the lines and grades as shown on the drawings.

**UNDERGROUND PIPELINES**

Trench. Trench width at any point below the top of the pipe should be only wide enough to permit the pipe to be easily placed and joined and to allow the initial backfill material to be uniformly placed under the haunches and sides of the pipe. The maximum trench width shall be 36 inches greater than the diameter of the pipe. The minimum trench width shall be not less than the pipe diameter plus 12 inches, unless the trench is precision excavated with a semicircular bottom that closely fits the pipe and the width does not exceed the outside diameter of the pipe by more than 10 percent.

Trench banks that are more than 5 feet high shall be shored or sloped.

Where rock, hardpan, cobbles or other hard material which might prevent the pipe from being uniformly supported is encountered in the bottom of the trench, the trench shall be undercut a minimum of four inches below final grade. The over cut area of the trench will then be filled with sand or fine-grained soil.

Bedding. The pipe shall be firmly and uniformly bedded throughout its entire length. Bedding material shall be placed and spread in uniform layers and in such a manner as to fill the trench so there are no unfilled spaces below the pipe. For pipe with bell joints, holes shall be dug in the bedding at the bells to permit the body of the pipe to be in contact with the bedding along its entire length. Blocking or mounding shall not be used to bring the pipe up to final grade.

Hand, mechanical or water packing are optional methods for placing and compacting pipe backfill.

Initial Backfill. The initial backfill material shall be either (1) angular 1 to ¼ inch size crush stone with a maximum of 10 percent cohesive fines or (2) sand and gravels (Soil types GW, GP, SW, and SP) with a maximum particle size of 1 inch containing a maximum of 12 percent of noncohesive fines. Sands shall have a maximum of 45 percent passing the # 40 sieve. The on site trench excavated materials may be used if they meet the above requirements. The initial backfill materials shall be placed in a manner as not to displace, deform or damage the pipe.

When backfilling is done by hand or mechanical means the initial fill shall be compacted firmly around and under the pipe to achieve a soil density equal or greater than the density of the undisturbed side walls of the trench. The thickness of individual lifts prior to compaction shall not exceed 6 inches.

When water packing is used, the pipe shall be filled with water. The initial backfill, before wetting, shall be of sufficient depth to ensure complete coverage of the pipe with backfill after consolidation has taken place. Water packing shall be accomplished by adding water to diked reaches of the trench in such quantity as to thoroughly saturate the initial backfill. After the backfill is saturated, the fill shall be consolidated by rodding or with a vibrator. The wetted fill shall be allowed to dry until firm before completing the final backfill. The pipeline shall remain full of water until after the final backfill is made.

Final Backfill. The final backfill material shall be free of rocks, frozen clods or other debris larger than 1 inch in diameter within 6 inches of the pipe and 6 inches in particle size for the remaining portion of the final backfill unless otherwise specified on the drawings. The material shall be placed and spread in approximately uniform layers so there are no unfilled spaces in the backfill. Final backfill may be mounded over the top of the trench above ground level, but in no case shall the final backfill be lower than the natural ground along the top of the trench.

All special backfilling requirements of the pipe manufacturer shall be followed.

Cover. The minimum depth for backfill over the top of the pipe shall be as shown on the drawings.

At low places on the ground surface or at locations where it is shallow to rock, extra fill may be placed over the pipeline to provide the minimum depth of cover. In such cases, the top width of the fill shall be no less than 10 feet and the side slopes no steeper than 6 horizontal to 1 vertical.

Vertical alignment of pipe shall be uniform and such as to maintain the cover requirements unless otherwise noted on the drawings.

Thrust Blocks. Thrust blocks shall be formed against a solid trench wall. They shall be of the minimum size and materials as specified on the drawings.

## **ABOVE GROUND PIPELINES**

Concrete, timber or other specified pipe supports and anchor and thrust blocks shall be constructed at the locations and to the dimensions shown on the drawings. The pipe shall be a minimum of 8 inches off of the ground along the entire length of the pipeline. Supports shall be set on a firm, stable base. Timber supports shall be treated with a wood preservative meeting the requirements of ASTM D 1760.

## **ON-GROUND PIPELINES**

The ground shall be shaped to provide continuous support along the bottom 1/4 to 1/3 of the pipe circumference. Where rock, hardpan or other materials which might damage the pipe are encountered, the ground surface will be lowered a minimum of 4 inches and the backfilled with sand or fine-grained soil.

Anchor and thrust blocks shall be constructed at the locations, to the size and of the materials as specified on the drawings.

## **JOINTS AND CONNECTIONS**

All joints and connections shall be constructed to withstand the design working pressure for the pipeline without leakage and shall leave the inside of the pipeline free of any obstruction which could reduce the pipe capacity below design requirements.

All fittings, such as couplers, reducers, bends and tees shall be made of material that is recommended for use with the type of pipe specified and shall be installed in accordance with the recommendations of the

pipe manufacturer. All fittings, field welds and bare pipe shall be covered with a coating equal in quality to that specified for the pipe.

A dielectric coupler (insulator) shall be installed between pipes with different coatings, different materials and different ages.

### **CATHODIC PROTECTION**

When cathodic protection is specified on the drawings the pipe shall be protected with sacrificial galvanic anodes.

### **MATERIALS**

Pipe shall equal or exceed the requirements listed in one of the following standards:

ASTM A 760 Pipe, Corrugated Steel, Zinc Coated

Federal Specification WW-P-402C Pipe, Corrugated (Aluminum Alloy Amend. 1)

Federal Specification WW-P-405B Pipe, Corrugated Iron or Steel, Zinc Coated (Amend. 1)

AASHTO M 36 Zinc Coated (Galvanized) Corrugated Iron or Steel Culverts and Underdrains

AASHTO M 196 Corrugated Aluminum Alloy Culverts and Underdrains (Amend. AASHTO 196)

AASHTO M 245 Precoated, Galvanized Steel Culverts and Underdrains

AASHTO M 257 Steel Sheet, Aluminum Coated (Aluminum Type II) by the Hot Dip Process for Sewer & Drainage Pipe

Pipe bands or couplers shall meet the requirements of the applicable pipe specification, except that no flange (channel), smooth slab or dimple band shall be used.

Gaskets shall meet the requirements of ASTM C 443.

### **VALVES AND APPURTENANCES**

Pipeline valves and appurtenances shall be of the size, type, material and pressure rating as shown on the drawings.

### **TESTING**

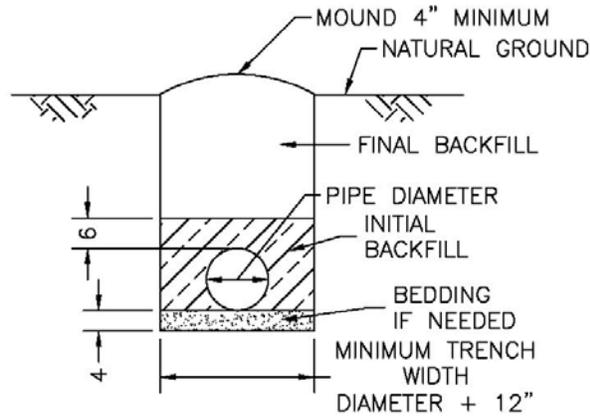
When water is available at the time the pipe is installed the system shall be given an operational test. This test shall consist of filling the pipe with water, taking care to bleed of any air in the pipe. All of the system components shall operate without difficulty. Leakage or defects caused by poor materials or workmanship shall be replaced or repaired. When water is not available to complete a test, the installer shall provide a guarantee stating they will return and fix leaks that are found when the pipe is initially filled with water.

### **GUARANTEE**

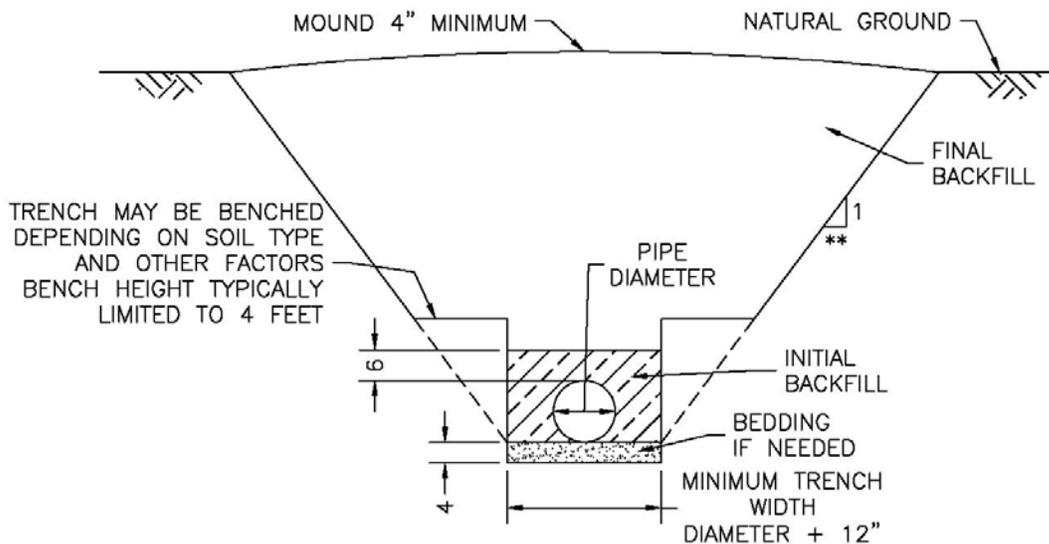
The installing Contractor shall certify that the installation conforms to the requirements of this specification and furnish a written guarantee protecting the landowner against defective materials and workmanship for a period of less not than 1 year. The guarantee will identify manufacturer of pipe and pipe markings.



**FIGURE 1**  
**TRENCH WIDTH AND BACKFILL REQUIREMENTS**



**TYPICAL TRENCH DETAIL**  
**5 FEET DEPTH, MAXIMUM**



**ALTERNATIVE TRENCH DETAIL**  
**DEPTH GREATER THAN 5 FEET**

\*\* Slope typically varies from  $\frac{3}{4}$  to  $1\frac{1}{2}$ :1 or greater based upon material classification and other factors such as wetness, vibration, surcharge, etc. Refer to OSHA 1926 Subpart P for details.