SPECIAL SPECIFICATION

5202

Pipe Casing

1. General.

A. Work Included. Furnish labor, materials, equipment and incidentals necessary to install pipe casings by boring, or open cut as specified. This section sets forth the requirements for utility lines crossing roadways or railroads using open cut.

B. Quality Assurance.

1. Design Criteria.

a. Casing Insulators. Casing insulators shall be designed by the Manufacturer to adequately support and electrically isolate the carrier pipe within the casing pipe under all conditions. Number and location of spacing insulators shall be determined by the Manufacturer to protect carrier pipe from damages. One insulator shall be placed within 2 ft. of ends of casing.

2. Installer’s Qualifications. Installation shall be by a competent, experienced contractor or sub-contractor. The installation contractor shall have a satisfactory experience record of at least 3 years engaged in similar work of equal scope.

3. Performance Requirements. Lateral or vertical variation in the final position of the pipe casing from the line and grade established by the Engineer shall be permitted only to the extent of 1 in. in 10 ft., provided that such variation shall be regular and only in the direction that will not detrimentally affect the function of the carrier pipe.

C. Submittals. Provide shop drawings of casing insulators including sketches of insulators with material components and dimensions and proposed locations of insulators.

D. Standards.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
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<tbody>
<tr>
<td>AWWA C-206</td>
<td>“Field Welding of Steel Water Pipe”</td>
</tr>
<tr>
<td>AWWA C-210</td>
<td>“Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines”</td>
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<tr>
<td>AASHTO M-190</td>
<td>“Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches”</td>
</tr>
<tr>
<td>ASTM A-123</td>
<td>“Zinc (Hot Dipped Galvanized) Coatings on Iron and”</td>
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</table>
Steel Products”  
ASTM A-135 “Electric - Resistance - Welded Steel Pipe”  
ASTM A-139 “Electric - Fusion (Arc) - Welded Steel Pipe” (NPS4 and Over)  
ASTM A-153 “Zinc Coating (Hot Dip) on Iron and Steel Hardware”  
ASTM A-307 “Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength”  
ASTM A-449 “Quenched and Tempered Steel Bolts and Studs”  
ASTM A-568/A568M “Steel, Carbon, and High Strength, Low Alloy, Hot-Rolled and Cold-Rolled for Commercial Quality”  
ASTM C-76 “Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe”  
ASTM D-4254 “Test Methods for Minimum Index Density of Soils and Calculation of Relative Density”

E. **Delivery and Storage.** [Not Used]

F. **Job Conditions; Permits and Easement Requirements.**

1. Where the work is in the public right-of-way or railroad company right-of-way, the Owner will secure the appropriate permits or easements. The Contractor shall observe regulations and instructions of the right-of-way Owner as to the methods of performing the work and take precautions for the safety of the property and the public. Negotiations and coordination with the right-of-way Owner shall be carried on by the Contractor, not less than 5 days prior to the time of his intentions to begin work on the right-of-way.

2. Comply with the requirements of the permit and/or easement. The work within the Texas Department of Transportation (TXDOT) shall comply with TXDOT specifications. If required by the Right-of-Way Owner, obtain Protective Liability Insurance in the amount required by the particular company or other insurance as is specified in the permit at no additional cost to the Owner. Acquire a permit, agreement, or work order from the right-of-way Owner as is required.

3. Construction along roads and railroads shall be performed in such manner that the excavated material be kept off the roads and railroads at all times, as well as, all operating equipment. Construction shall not interfere with the operations of the roads and railroads.

4. Barricades, warning signs, and flagmen, when necessary and specified, shall be provided by the Contractor.

5. No blasting shall be allowed. Existing pipelines are to be protected. The Contractor shall verify location and elevation of any pipe lines and telephone cable before proceeding with the construction and plan his construction so as to avoid damage to the existing pipe lines or telephone cables. Verification of location of existing utilities shall be the complete responsibility of the Contractor.
G. Options.

1. **Casing Material.** Unless specified otherwise, the Contractor may use steel pipe, or reinforced concrete pipe, where bore is specified. Unless specified otherwise, the Contractor may use steel pipe or reinforced concrete pipe where open cut casing is specified. The material specification for casing pipe are the minimum acceptable. The Contractor shall be fully responsible to insure the materials used are of sufficient strength for the installation method chosen and the soil conditions encountered.

2. **Bore Methods.** Unless specified otherwise, the Contractor may use boring, or jacking, for the installation method of casing material. Tunnel liner plate shall not be used where bore or jack methods are used. The Contractor shall be fully responsible to insure the methods used are adequate for the protection of workers, pipe, property, and the public. Provide a finished product as required.

H. Guarantees. [Not used]

2. Products.

A. Materials.

1. **Steel Pipe.** Steel casing pipe shall have a minimum yield strength of 35,000 psi. Casing shall meet ASTM A-36, ASTM A-568, ASTM A-135, ASTM A-139, or approved equal. Pipe shall be coated and lined in accordance with AWWA C-210 or approved equal. Pipe joints shall be welded in accordance with AWWA C-206. After pipe is welded, coating and lining shall be repaired. Unless specified otherwise, the minimum wall thickness of steel casing pipe shall be as follows:

<table>
<thead>
<tr>
<th>Casing Diameter</th>
<th>Wall Thickness</th>
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<tbody>
<tr>
<td>4” - 24”</td>
<td>0.25”</td>
</tr>
<tr>
<td>25” - 42”</td>
<td>0.375”</td>
</tr>
<tr>
<td>43” - 60”</td>
<td>0.50”</td>
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2. **Reinforced Concrete Pipe.** Pipe casing shall conform to ASTM C-76 and shall be of the size, class and length specified. Pipe shall be a minimum of Class IV for 42 in. and smaller diameters and a minimum of Class V for diameter larger than 42 in.

B. Mixes.

1. **Cement Mortar.** Shall consist of 1 part cement to 2 parts clean sand with sufficient water to make a thick workable mix.

2. **Pressure Grout Mix.** Comprised of 1 cu. ft. of cement and 3.5 cu. ft. of clean fine sand with sufficient water added to provide a free flowing thick slurry. If desired to maintain solids in the mixture in suspension, one cu. ft. of commercial grade bentonite may be added to each 12 to 15 cu. ft. of the slurry.

C. Fabrication. [Not Used]
D. Manufactured Products.

1. **Casing Insulators.** Use casing insulators for any type of carrier pipe. Insulators shall consist of pre-manufactured steel bands with plastic lining and plastic runners. Insulators shall fit snug over the carrier pipe and position the carrier pipe approximately in the center of the casing pipe, to provide adequate clearance between the carrier pipe bell and the casing pipe. Fasteners for insulators shall be stainless steel or cadmium-plated. Insulators shall be as manufactured by Cascade Waterworks Manufacturing Company or Pipeline Seal and Insulators, Incorporated or Perry Equipment Corporation.

2. **Mortar Bands.** Concrete cylinder pipe and mortar coated steel pipe may have thickened outside mortar bands in lieu of casing insulators. Mortar bands shall be properly position the pipe within the casing.

3. **Execution.**

   A. **Preparation.** [Not Used]

   B. **General Construction Procedures.**

      1. **Excavation and Backfill of Access Pits.**

         a. Do not allow excavation over the limits of the bore as specified. Trench walls of access pits adjacent to the bore face shall be truly vertical. Shore the trench walls as necessary to protect workmen, the public, structures, roadways, and other improvements.

         b. Excavations within the right-of-way and not under surfacing shall be backfilled and consolidated by tamping in 6 in. horizontal layers to 95% of maximum density as measured by ASTM D-698. Surplus material shall be removed from the right-of-way and the excavation finished to original grades. Backfill pits immediately after the installation of the carrier pipe is completed. If carrier pipe is not installed immediately after casing pipe installation, the Right-of-Way Owner may require the access pits be temporally backfilled until installation of carrier pipe.

         c. Where seeding or sodding is disturbed by excavation or backfilling operations, such areas shall be replaced by seeding or sodding as specified in the North Central Texas Council of Governments Standard Specifications for Public Works Construction, Third Edition, Division 6, Underground Conduit Construction.

      2. **Installing Carrier Pipe In Casings.**

         a. Pipe to be installed within the casing shall meet the requirements for this type of pipe as specified. Where indicated, place, align, and anchor guide rails and/or casing insulators inside the casing. If guide rails are used, place cement mortar on both sides of the rails.
b. Pull or skid pipe into place inside the casing. Lubricants such as flax soap or drilling mud may be used to ease pipe installation. Do not use petroleum products, oil or grease for this purpose. If guide rails are used, install pipe and hold down jacks after installation of carrier pipe.

c. After installation of the carrier pipe, mortar inside and outside of the joints as applicable.

d. After carrier pipe installation is complete, seal or plug the ends of the casing.

3. **Free Air System.** If required by OSHA standards, free-air systems shall be installed and maintained.

4. **Installation of Pressure Grout Mix.**

   a. Install pressure grout mix in the void space between the outside of the casing pipe and the excavation. For bore or jacks with casing pipe, install pressure grout mix immediately upon completion of setting casing pipe.

   b. Grout fittings shall be fabricated into casing pipe at a maximum spacing of 6 ft. Remove and plug grout fittings after pressure grouting.

   c. Install pressure grout from the low end for all crossings where grout fittings are not used. Seal the low end and pressure grout until grout is extruded from the opposite end.

C. **Crossings Installed By Borings.**

   1. Perform the boring from the low or downstream end unless specified otherwise. Bore the holes mechanically and use a pilot hole. By this method, an approximate 2 in. pilot hole shall be bored the entire length of the crossing and shall be checked for line and grade. This pilot hole shall serve as the centerline of the larger diameter hole to be bored. Place excavated material near the top of the working pit and dispose of material as required. The use of water or other fluids in connection with the boring operation will be permitted only to the extent to lubricate cuttings. Jetting shall not be permitted.

   2. In unconsolidated soil formations, a gel-forming colloidal drilling fluid consisting of at least 10% of high grade carefully processed bentonite may be used to consolidate cuttings of the bit, seal the walls of the hole, and furnish lubrication for subsequent removal of cuttings and installation of the pipe immediately thereafter.

   3. In locations where the soil formation is other than consolidated rock, insert the casing pipe simultaneously with the boring operation. This requirement applies to all bored holes of 18 in. or greater in diameter. For smaller diameter bored holes, it is desirable that the casing be installed as the boring progresses, but because of differences in soil formations, the time for inserting the casing shall be the Contractor’s responsibility. In the event that caving sand or water bearing materials are encountered, insert the casing pipe simultaneously with the boring operation regardless of the diameter of the bored hole. In all cases, the security and integrity of the roadway is the primary concern. The Contractor shall be held fully
responsible for the continued integrity of the structure of the roadway being crossed, whether or not a casing pipe is inserted simultaneously with the boring operation.

D. Crossing with Casing Installed by Open Cut. This article covers the requirements for the construction of crossings where pipe casing is required for installation by the open cut method. Excavation, backfill, and embedment of casing pipe shall be as specified in the North Central Texas Council of Governments Standard Specifications for Public Works Construction, Third Edition, Division 6, Underground Conduit Construction. All other requirements shall be as specified herein.

E. Field Quality Control. [Not Used]

F. Clean and Adjust. [Not Used]

G. Schedules. [Not Used]

4. Measurement. This Item will be measured by the foot.

5. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Pipe Casing” of the type and size specified. This price is full compensation for furnishing, hauling and laying of casing, replacement of topsoil; replacing landscaping to a condition as good or better than existed prior to construction; protecting or replacing existing structures, sidewalks or utilities; relocation of existing utilities; disposal of surplus materials; cleaning up and maintenance; surveying and replacement of monuments; dust control; removal of mud from roadways; and any incidental work and materials not otherwise provided for in these Specifications, all in strict accordance with the Contract Drawings and Project Specifications.