

## ITEM 915

### AUGERING PIPE AND CASING

- 915.1 General
- Installing water main or casing by methods of augering or jacking and boring.
- 915.2 Reserved
- 915.3 Definitions
- Auger Method: Installation of steel casing by excavating soil at advancing end of casing and transporting spoil through casing by otherwise uncased auger, while advancing casing by jacking at same rate as auger excavation progresses.
- Slurry Auger Method: Installation of casing or pipe by first drilling small diameter pilot hole from pit to pit, followed by removing excess soil and installing pipe or conduit by pull-back or jacking method.
- 915.4 Reference Standards
- ASTM D 638 – Standard Test Method for Tensile Properties of Plastics.
- ASTM D 648 – Standard Test Method for Deflection Temperature of Plastics under Flexural Load in the Edgewise Position.
- ASTM D 695 – Standard Test Method for Compressive Properties of Rigid Plastics.
- ASTM D 790 – Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- 915.5 Submittals
- Submit product data for casing insulators, spacing of insulators for specific pipe and location on project.
- Prior to installation of pits obtain Engineers approval for pit locations, size, depth, and areas for storage, material, and spoil handling. Acceptance by Engineer does not relieve Contractor from responsibility to obtain specified results.
- Show actual pit location dimensioned on as-built drawings so that they can be identified in field.
- 915.6 Reserved
- 915.7 Materials
- Piping and Fittings: As required by Specification or Drawings.
- Casings: Where shown on Drawings.

Casing Spacers: Use casing spacer width 8 inches for pipe sizes 4 to 12 inches; 12 inches for pipe sizes 14 inches or larger. Wood skids or concrete “donuts” are not acceptable.

For welded steel pipe 12” and smaller, use Pipeline Seal & Insulator Model PE, or approved equal.

For other pipe materials, use Pipeline Seal & Insulator Model C8G-2 or approved equal for pipe sizes up to 12 inches.

For all pipe sizes above 12 inches, use Pipeline Seal & Insulator Model C12G-2 or approved equal.

Obtain approval for equal product in writing from Engineer prior to bid.

915.8 Limits on Auger Length Without Casing

Do not exceed 100 feet for length of auger hole without receiving pit.

Do not exceed 75 feet for length of auger hole for PVC pipe 12 inches and less in diameter without receiving pit.

Do not exceed 40 feet for length of auger hole for PVC pipe 14 inches to 24 inches in diameter without receiving pit.

915.9 Preparation

Utility Relocation: Relocate utility lines clear of pit and zone of potential significant settlement or other ground disturbance.

Install casings as required by Drawings, in accordance with this Item.

Install temporary solid plug at open end of water line to prevent contamination.

915.10 Traffic Control

Conform to applicable provisions of Item 919 – Construction Traffic Control.

During construction operations, furnish, and maintain barricades and lights to safeguard traffic and pedestrians, until such time as backfill has been completed and removed from site. Provide additional barricades and lights as directed by City Engineer.

915.11 Pits

Construct pits on segments of line and within right-of-way. Locate auger pits where there is minimum interference with traffic or access to property. Avoid locating pits close to storm drainage channels, ditches, storm water lines, culverts or near potentially contaminated areas.

Pit Size: Size pits to provide adequate room to meet operations requirements for auger construction as well as structures indicated on Drawings. Provide minimum 6-inch space between pipe and walls of auger pit. Maximum

allowable width of pit shall be 5-feet. Width of pit surface shall not be less than at bottom. Maximum allowable length of pit shall be no more than 5-feet longer than one full section of pipe and shall not exceed 25-feet.

Backfill in 6-inch layers. Each layer to be thoroughly tamped by mechanical means to 90% of the density of surrounding soil.

Provide and properly maintain safety protection against traffic, and accidental or unauthorized entry. Provisions to include concrete traffic barriers or other suitable barrier around periphery of pit as appropriate. Fully cover and secure pits where no construction activity is in progress.

Install sheeting, lining, shoring, and bracing required for protection of workmen and public in accordance with Item 429 – Trench Safety System.

Provide groundwater control and drainage from pits while work is in progress and until pit is properly backfilled.

#### 915.12 Augering (Boring)

Auger from approved pit locations. Excavate for pits and install shoring as outlined above under Paragraph 11 – Pits. Auger mechanically with use of pilot hole entire length of crossing and check for line and grade. Diameter of auger hole not to exceed pipe bell diameter plus 2-inches. Place excavated material outside working pit and dispose of as specified. Use water or other fluids in connections with boring operation only to lubricate cuttings; jetting is not permitted.

In unconsolidated soil formations, gel-forming colloidal drilling fluid may be used. Fluid is to consist of at least 10 percent of high-grade processed bentonite and shall consolidate cuttings of bit, seal walls of hole, and shall furnish lubrication for subsequent removal of cuttings and installation of pipe.

Depending on character of soil encountered during augering operation, conduct operations without interruption, insofar as practical, to prevent hole from collapsing or pipe from seizing up in hole before installation is complete.

Allowable variations from line and grade shall be specified under Paragraph 15 – Jacking.

Remove and replace pipe damaged in augering operations.

#### 915.13 Augering of Casing

Provide jacks, mounted on frame or against backstop, of capacity suitable for forcing excavating auger and casing through soil conditions to be encountered. Operate jacks so that even pressure is applied to casing.

Provide steerable front section of casing to allow vertical grade adjustments. Provide water level or other means to allow monitoring of grade elevation of auger casing.

Bentonite slurry may be used to lubricate casing during installation. Use of water to facilitate removal of spoil and to lubricate exterior casing is permitted; however, water jetting for excavation of soil is not allowed when jacking casing.

Tolerances from lines and grades shown on Drawings for gravity sewer pipe installed in casing are plus or minus 6-inches in horizontal alignment, and plus or minus 1-1/2 inches in elevation.

915.14 Filling Annular Space

For installation of water line, block void space around pipe in augered hole with approximately 12-inches of packed clay or approved equal material to prevent bedding or backfill from entering void around pipe in augered hole when compacted. For pipe diameters 4-inches through 8-inches use minimum 1/2-cubic-foot clay.

915.15 Jacking

Comply with Item 429 – Trench Safety System for all pits, end trenches, and other excavations relating to work required by specifications. Dewater as required to provide safe working conditions.

Wherever end trenches are cut into sides of embankments or beyond it, sheath securely and brace such work to prevent earth caving.

Make up only one joint at a time in pit or trench prior to jacking.

Do not interfere with operations of street, highway, or other facility, nor to weaken or damage embankment or structure.

Use heavy-duty jacks sized for forcing casing through embankment. Use appropriate jacking head, usually of timber, and bracing between jacks and jacking head and jacking frame or backstop. Apply jacking pressure uniformly around ring of casing. Set casing to be jacked on guides, properly braced together, to support section of casing and to direct it in proper line and grade. Place jacking assembly in line with direction and grade of casing. Excavate embankment material just ahead of casing and remove material through casing. Force casing through embankment with jacks into excavated auger hole.

Conform excavation for underside of casing to contour and grade of casing, for at least one third of circumference of casing. Provide clearance of not more than 2-inches for upper half of casing. Taper off upper clearance to zero at point where excavation conforms to contour of casing.

Excavation may extend beyond end of casing depending on character of material, but shall not exceed 2-feet. Decrease advance excavation at direction of Engineer or his representative, when character of material being excavated makes it desirable to keep advance excavation closer to end of casing.

Jack casing from low or downstream end. Lateral or vertical variation in final position of casing from line and grade as shown on Drawings will be permitted only to extent of 1-inch in 10-feet, provided such variation is regular and only in one direction and that final grade of flow line is in direction indicated on Drawings.

Use cutting edge of steel plate around head end of casing extending short distance beyond end of casing from becoming firmly set in embankment.

Once jacking of casing is begun, carry on without interruption, insofar as practicable, to prevent casing from becoming firmly set in embankment.

Remove and replace casing damaged in jacking operations.

Backfill pits or trenches excavated to facilitate jacking operations immediately after completion of jacking of casing.

Grout annular space between casing and excavated hole when loss of embankment occurs or when clearance of 2-inches is exceeded.

#### 915.16 Spacer Installation

There must be no inadvertent metallic contact between casing and carrier pipe. Place spacers to ensure that carrier pipe is adequately supported throughout length, particularly at ends, to offset settling, and possible electrical shorting unless otherwise approved by City. Place end spacer within 6-inches of end of casing pipe, regardless of size of casing and carrier pipe or type of spacer used. Spacing between spacers depends largely on load of bearing capabilities of pipe coating and flexibility of pipe.

Grade bottom of trench adjacent to each end of casing to provide firm, uniform, and continuous support for carrier pipe. When trench requires some backfill to establish final trench bottom grade, place backfill material in 6-inch lifts and compact to density of undistributed soil.

Install casing spacers in accordance with manufacturer's instructions. Take special care to ensure that sub-components are correctly assembled and evenly tightened, and that no damage occurs during tightening of insulators or carrier pipe insertion.

Seal annulus between carrier pipe and casing with casing end seals at each end of casing.

Insulator Spacing:

Spacing shall be as shown on Drawing with maximum distance between spacers to be 10-feet for pipe size 4 to 14 inches and 8 feet for pipe sizes 16 to 30 inches.

For ductile iron pipe or bell-and-spigot pipe, install spacers within one foot on each side of bell or flange and one in center of joint when 18 to 20-foot long joints are used.

If casing or carrier pipe is angled, bent or dented, reduce spacing as directed by Engineer. Provide casing with smooth, continuous interior surface.

915.17 Measurement

Augering or boring and jacking of water pipe will be measured as specified under Item 915.

Augering or boring and jacking of casing will be measured by the linear foot along the center line of the casing placed according to the plans and specifications.

915.18 Payment

No separate payment will be made for the augering or boring and jacking of the water line pipe under this specification, but shall be paid according to Item 906 – Furnishing and Installing Water Line Pipes, Paragraph 906. 9.

Payment for augering or boring and jacking of casing will be paid for at the unit price per linear foot as shown in the proposal and according to the plans and specifications. Casing insulators, casing spacers, and casing end seals will not be paid for directly and shall be included in price bid for casing.

END OF ITEM 915