Specification for Pipe Bursting Water Mains with HDPE Pipe

AEW #160-236

1. GENERAL

The following supplemental water main specifications are intended to address the installation of high-density polyethylene pipe for water main using pipe bursting methods and technology for water mains.

1. Definitions

    1. Pipe Bursting: Method of trenchless construction in which a bursting tool splits/fractures the existing pipe while simultaneously installing a new Polyethylene Pipe of the same size or larger using a Static or Pneumatic Pipe Bursting Technique.

    2. Engineer: Overall project engineer employed or retained by the municipal utility authority or private collection system owner.

    3. Project Owner: Municipal utility authority, sewer district or private owner of the sewer system.

    4. Contractor: Firm engaged in the construction of underground utility lines and with demonstrated competency using pipe bursting methods for the installation of sewer pipelines.

2. Scope

    This specification addresses the installation of water mains by the pipe bursting method, including connecting to existing water mains, connecting existing services or installing house connections. All gate valves, hydrants, and other appurtenances shall be installed using the general provisions and specifications if effect at the municipal authority. The Contractor will furnish all labor, equipment, materials, tools and appurtenances necessary or proper for the performance and completion of the contract. Inspection and payment will be by the method stipulated in the contract.

C. Qualifications

1. The Pipe Bursting Contractor will have actively engaged in the installation of pipe using pipe bursting for a minimum of three (3) years and have installed, as a company, a minimum of 50,000 feet in similar conditions.

2. Field Supervisory Personnel employed by the Pipe Bursting Contractor will have at least (3) three years of documented experience in the performance of the work and tasks as stated in the contract documents.

D. Submittal

The Contractors shall submit the following:

1. Documentation showing that personnel has three (3) years of Pipe Bursting experience with a list of a minimum 50,000 LF installed by the company including 3 water main projects similar or greater in scope and value to the project specified in the contract documents. Information for each supervisor and the company must include, but not be limited to, date of work, location, pipe information (i.e., length, diameter, depth of installation, pipe material, etc.), project owner information, (i.e., name, address, and telephone number, contact person).

2. Drawings and documents:

    a. Shop drawings, catalog data, and manufacturer's technical data showing complete information on material composition, physical properties, and dimensions of new pipe and fittings. Include manufacturer's recommendations for handling, storage, and repair of pipe and fittings damaged.

    b. Certifications of personnel involved in Butt Fusion Welding.

2. MATERIALS

A. HDPE Pipe

1. Polyethylene Plastic Pipe shall be High Density Polyethylene Pipe (HDPE) and meet applicable requirements of ASTM F14.

2. HDPE pipe and fittings will be used in accordance with the material specifications. All additional appurtenances (valves, tees, hydrant, etc.) will meet the material specifications required by the municipal authority.

All pipe installed by pipe bursting will be joined by butt fusion, or electro fusion as detailed in paragraph B (Pipe Joining) of this section.

3. HDPE pipe will be produced from resins meeting the requirements of ASTM D1248, designation PE3408, ASTM D3350 cell classification PE345444C, and will meet the requirements of AWWA C901 and C906. HDPE pipe will meet the minimum stability requirements of ASTM D3350. Pipe will be legibly marked at intervals of no more than five feet with the manufacturer's name, trademark, pipe size, HDPE cell classification, appropriate legend such as SDR 9 or SDR 11, ASTM D3035, AWWA C901 or C906, date of manufacture and point of origin.

4. All pipe shall be made of virgin material. No rework material except that obtained from the manufacturers own production of the same formulation shall be used.

5. The pipe shall be homogeneous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

6. Pipe color shall be solid black with a solid blue stripe unless otherwise specified in these contract documents.

7. HDPE Pipe shall be Ductile Iron Pipe Size (DIPS).

8. Dimension Ratios: The minimum wall thickness of the HDPE pipe shall meet the following;

Minimum DR
DR 9 or DR 11

B. Pipe Joining for Terminal Sections of HDPE Pipe.

1. The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak proof joint. Threaded or solvent-cement joints and connections are not permitted. All equipment and procedures used shall be in strict compliance with the manufacturer’s recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment.

2. Terminal sections may also be joined by Electrofuse Couplings by Central

Plastic Company, Friatec, or approved equal.

3. Terminal sections may also be joined to valves, tees, hydrants, and fittings by butt fusing or electro-fusing a Mechanical Joint (MJ) Adaptor to the end of the HDPE pipe and inserting the MJ Adaptor directly into the valve, tee, hydrant, or fitting.

C. Materials Related to Service Connections

1. Water service connections to the main may be made with Electrofusion Saddles by Central Plastics, Friatec, or approved equal. The connection is to be made in accordance with manufacturer recommendations.

2. Water service connections to the main may also be made with Sidewall Fusion Saddles by Central Plastics, Friatec, or approved equal. The connection is to be made in accordance with manufacturer recommendations.

3. EQUIPMENT

The pipe bursting unit shall be designed and manufactured to force its way through the existing line by fracturing the pipe and compressing the broken pieces into the surrounding soil as the equipment progresses. The bursting unit shall generate sufficient force to burst and compact the existing pipeline. In each case the pipe bursting unit shall pull the polyethylene pipe with it as it moves forward.

4. EXECUTION

A. General

1. Delivery, storage, and handling of the HDPE pipe, valves, tees, hydrants, fittings, and etc. shall be done in accordance with manufacturers recommendation.

2. Excavation of insertion pits shall at locations determined by the Contractor.

B. Preparation

1. Prior to construction, the contractor shall develop and establish a temporary water system to supply water service to the area residents and businesses during pipe bursting operations. It is anticipated that the system will be fed from existing fire hydrants. The temporary system and hydrants shall be disinfected per AWWA standards.

2. Before any excavation is done for any purposes, the Contractor shall contact the appropriate One Call agency for determining field locations of existing utilities.

C. Insertion of the HDPE Pipe

1. The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak proof joint. Threaded or solvent-cement joints and connections are not permitted. All equipment and procedures used shall be in compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by a manufacturer of HDPE pipe and/or fusing equipment.

2. The butt-fused joint shall be in true alignment and shall have uniform rollback beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe. All defective joints shall be cut out and replaced at the expense of the Contractor.

3. Service connections to the HDPE pipe shall be made with materials submitted and approved in accordance with Paragraph 2. Materials.

4. An appropriate relaxation period shall be allowed prior to making service connections and connecting to manholes. The relaxation period shall be appropriate with and dependent upon site conditions, as determined by Contractor.

5. If concrete encasements are encountered, a point repair shall be performed to excavate and break out concrete prior to the bursting operation to allow

the steady and free passage of the pipe bursting head, with approval from the Owner/Engineer. Separate payment for this work will be made and it is not considered incidental to the pipe bursting process.

6. The new HDPE pipe shall be inserted immediately behind the bursting head in accordance with the manufacturer's recommended procedures. The bursting tool shall be specifically designed and manufactured for the type of insertion process being used. It shall be utilized to guide and assist the bursting head during the operation. A pushing machine may be utilized to aid pipe insertion from the rear.

D. Service Reconnections

1. Service connections to the HDPE pipe shall be made with materials submitted and approved in accordance with Paragraph 2. Materials. Services shall be reconnected so as to minimize disruption of service.

2. After the new HDPE pipe has been installed and tested, the Contractor shall be responsible for reconnecting existing services in the manner described in the bid form. All service lines shall be the size indicated in the plans and specifications.

E. Testing And Acceptance

1. After the new HDPE pipe is installed and all services are reconnected, the line shall be cleaned, disinfected, and tested in accordance with AWWA standards.