

Municipal Advisory Board

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MAB Model Specifications for Installation of PE4710 Water Service, Distribution, and Transmission Pipes by Horizontal Directional Drilling

(MAB-11 2024)

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This model specification is intended as a guide for engineers, users, contractors, code officials, and other interested parties for use in the design, construction, and installation of high-density polyethylene (HDPE) pressure water piping systems. The local utility or engineer may need to modify this model specification to adapt the document to local conditions, operations, and practices.

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The MAB serves as an independent, non-commercial adviser to the Municipal & Industrial (M & I) Division of the PPI. Once adopted, MAB will consider revising this specification from time to time, in response to comments and suggestions from users of the model specification. Please send suggestions of improvements to Camille George Rubeiz, PE, F. ASCE, at crubeiz@plasticpipe.org

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MAB-11: MAB Model Specifications for Installation of PE4710 Water Service, Distribution, and Transmission Pipes by Horizontal Directional Drilling

1. GENERAL

1.1 The scope of this model specification is for installation of high-density polyethylene (HDPE) water pipes installed by horizontal directional drilling.

1.2 DESCRIPTION

Large diameter (24 in. or greater) horizontal directional drilling (HDD), sometimes referred to as “maxi-HDD,” is capable of drilling holes of up to 10,000 ft in length, and placing pipes of up to 60-in. diameter, at depths of up to 200 ft. Guidelines for the placement of such pipe are provided in ASTM F1962-22.

Small diameter (12 in. or smaller) horizontal directional drilling (HDD), sometimes referred to as “mini-HDD,” is capable of drilling holes of up to 600 ft in length, and placing pipes of up to 12-in. diameter, at depths of 15 ft. Guidelines for the placement of such pipes are provided in MAB-7.

“Midi-Horizontal Directional Drilling” (midi-HDD) is a category that is intermediate to mini-HDD and maxi-HDD, with regards to equipment capabilities and planning and engineering effort. Guidelines for the use of midi-HDD machines and practices may be obtained from ASTM F1962 or MAB-7, depending upon the particular application and the judgment of the Contractor or Engineer. An appropriate specification for a particular midi-HDD application may be either the maxi-HDD or mini-HDD specification provided herein, or a possible combination of these alternatives, based on discussions between Owner and the Contractor and/or Engineer, as appropriate.

2. CONTRACTOR QUALIFICATIONS

MAXI-HDD

The directional drilling operation, including pipe installation, shall be performed by an HDD Contractor, with experience using the guidelines in ASTM F1962, or equivalent. Such contractors (or their drill rig operator) shall have a minimum of three years field experience and completed a minimum of 30,000 ft of construction in similar type projects, using HDD, including the placement of HDPE pipe in sizes and lengths comparable to the present work project. The experience shall include installations with and without the use of internal water ballast. The Contractor shall be supported by a knowledgeable Engineer (e.g., the Engineer of Record, EOR, as required by the project’s specifications with similar experience, based on similar projects. The EOR shall be capable of determining the minimum required pipe strength, or wall thickness (maximum DR value) for successfully completing the project. See Section 3 (Materials).

The Contractor shall also demonstrate evidence of proper training for its crew, including related courses and field experience for the primary personnel. The crew shall be trained in the proper safety procedures per the HDD equipment manufacturer as well as applicable OSHA rules.

MINI-HDD

The directional drilling operation, including pipe installation, shall be performed by an HDD Contractor, with experience using the guidelines in MAB-7, or equivalent. Such contractors (or their drill rig operator) shall have a minimum of two years field experience and completed a minimum of 20,000 ft of construction in similar type projects, using HDD, including the placement of HDPE pipe in sizes and lengths comparable to the present work project. The Contractor shall be capable of determining the minimum required pipe strength, or wall thickness (maximum DR value) for successfully completing the project. See Section 3 (Materials).

The Contractor shall also demonstrate evidence of proper training for its crew, including related courses and/or field experience for the primary personnel. The crew shall be trained in the proper safety procedures per the HDD equipment manufacturer as well as applicable OSHA rules.

3. HDPE MATERIAL (PE4710)

MAXI-HDD

The pipe shall be consistent with the products as specified in MAB-3 Part 2 or MAB-3 Part 3 when installing large bundles of smaller size pipes. The size(s), including diameter and sizing system (IPS or DIPS), shall be as specified in the work order and project drawings provided by the Owner/EOR.

Although the Owner/EOR will initially specify the proposed dimension ratio (DR) of the product pipe, based on its intended internal operational pressure or other criteria, the Contractor (or EOR) shall confirm the DR value (wall thickness) is able to safely withstand the HDD installation and post-installation, loads. The corresponding DR shall be determined per ASTM F1962 (see also PPI Boreaid®). Internal water ballast may be used, as necessary. The final DR shall be the minimum of the latter value and that initially selected by the Owner/EOR.

The pipe may be fully assembled prior to the beginning of the drilling operation, in the length required to extend throughout the borehole and beyond, as specified by the Owner/EOR, or as consistent with ASTM F1962. Individual pipe segments shall be joined by butt-fusion, as specified in MAB-3, Part 4. The assembled pipe may be hydrostatically tested for leakage before, as well as after (see Section 11), pullback, consistent with ASTM F1962, Section 10.1.1. See MAB-3, Part 6 for pressure testing requirements.

MINI-HDD

The pipe shall be consistent with the products as specified in MAB-3 Part 2 or MAB-3 Part 3. These size(s), including diameter and sizing system (CTS, IPS, or DIPS), shall be as specified in the work order and project drawings provided by the Owner.

Although the Owner will initially specify the proposed dimension ratio (DR) of the product pipe, based on its intended internal operational pressure or other criteria, the Contractor (or Engineer of Record if required by the project's specifications) shall confirm the DR value (wall thickness) is able to safely withstand the HDD installation, and post-installation, loads. The corresponding DR should be determined using MAB-7. The final DR shall be the minimum of the latter value and that initially selected by the Owner.

If provided on a reel, a line tamer may be employed, to improve handling or reduce pull force, as desired, or to reduce ovality, if specified by the Owner. If not provided on a reel, the pipe may be fully assembled prior to the beginning of the drilling operation, in the length required to extend throughout the borehole and beyond, as specified by the Owner, to reduce the possibility of borehole collapse (see MAB-7, Section 9.7.1). Individual pipe segments shall be joined by butt-fusion, as specified in MAB-3, Part 4.

4. SITE INVESTIGATION

MAXI-HDD

For the site and path configuration specified by the Owner/EOR, the Contractor shall review and verify the results of any available relevant site investigations, including both surface and subsurface, as may be provided by the Owner/EOR. The Contractor shall perform supplementary investigations, as necessary, to help ensure a successful HDD operation, including long term reliability of the installed pipeline. If these investigations indicate that the site initially selected by the Owner/EOR is not appropriate for the specified HDD installation, the Contractor shall inform the Owner/EOR, prior to any actual construction activity, and discuss possible alternative sites.

MINI-HDD

For the site and path configuration specified by the Owner, the Contractor shall review and verify the results of any available relevant site investigations, including both surface and subsurface, as may be provided by the Owner. The Contractor shall perform supplementary investigations, as necessary, to help ensure a successful HDD operation, including long term reliability of the installed pipeline. If these investigations indicate that the site initially selected by the Owner is not appropriate for the specified HDD installation, the Contractor shall inform the Owner, prior to any actual construction activity, and discuss possible alternative sites.