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Bulletin PP-901

UNDERGROUND INSTALLATION

WARNING: To prevent injury to persons and property damage, safe handling and construction practices must be observed at all times. The installer must observe all applicable local, state, and federal safety codes and any safety requirements specified by the owner or the project engineer.

Buried installations generally involve trench excavation, placing pipe in the trench, placing embedment backfill around the pipe, then placing backfill to the required finished grade. Pipe application, service requirements and size, soil conditions, backfill soil quality, burial depth and joining requirements will all affect the installation.

The care taken by the installer during installation will dramatically affect system performance. A high quality installation in accordance with recommendations and engineered plans and specifications can ensure performance as designed, while a low quality installation can cause substandard performance.

At a minimum, non-pressure and gravity flow DriscoPlex® polyethylene piping systems should be installed in accordance with ASTM D 2321, *Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications*, and pressure systems should be installed in accordance with ASTM D 2774, *Standard Practice for Underground Installation of Thermoplastic Pressure Piping.* System plans and specifications may include additional requirements. The installer should be familiar with this information before installing Performance Pipe DriscoPlex® piping products.

PIPE EMBEDMENT TERMINOLOGY

The backfill materials surrounding a buried pipe are explained below. See Figure 24.

Foundation – A foundation is required only when the native trench bottom does not provide a firm working platform, or the necessary uniform and stable support for the installed pipe. If a foundation is installed, bedding is required above the foundation.

Initial Backfill – This is the critical zone of embedment surrounding the pipe from the foundation to at least 6" over the pipe. The pipe's ability to support loads and resist deflection is determined by the quality of the embedment material and the quality of its placement. Within this zone are bedding, haunching, primary and secondary zones.

Bedding – In addition to bringing the trench bottom to required pipe bottom grade, the bedding levels out any irregularities, and ensures uniform support along the pipe length. Bedding is required when a foundation is installed, but a foundation may not be required to install bedding.

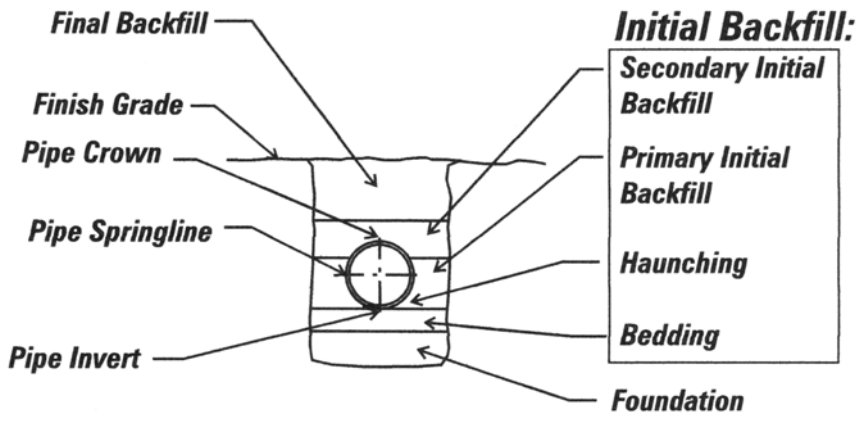
Haunching – The embedment under the pipe haunches supports the pipe and distributes the load. The quality of the haunching backfill and its placement are the most important factors in limiting flexible pipe deformation.

Primary Initial Backfill - This embedment zone provides primary support against lateral pipe deformation. It extends from pipe bottom grade to at least 3/4 of the pipe diameter height, or to at least 6" over the pipe crown if the pipe is installed where the pipe will be continuously below normal groundwater levels.

Secondary Initial Backfill - Embedment material in this zone distributes overhead loads, and isolates the pipe from any adverse effects from placing final backfill material. Where the ground water level may rise over the pipe, the secondary initial backfill should be a continuation of the primary initial backfill.

***Final Backfill* –** Final backfill is not an embedment material, however, it should be free of large rocks, frozen clods, lumps, construction debris, stones, stumps, and any other material with a dimension greater than 8".

Figure 24 Embedment Terminologies



Trenching

In stable ground, minimum trench width, B_d, will vary by the pipe diameter as illustrated in Figure 25 and Table 25. The trench must be wide enough to place and compact backfill soils in the haunch areas below the pipe springline. To minimize the load on the pipe, the maximum trench width should not exceed the minimum trench width by more than 18" plus the thickness of any sheeting, shoring or shielding, unless approved by the engineer. For trenches containing multiple pipes, the distance between parallel pipes should be the

When the pipe is laid in a rock cut or stony soil, the trench should be excavated at least 6" below pipe bottom grade, and brought back to grade with compacted bedding. Remove ledge rock, boulders, and large stones to avoid point contacts, and to provide a uniform bed for the pipe.

PLACING PIPE IN THE TRENCH

OD controlled pipe up to about 8" diameter and weighing roughly 6 lbs per foot or less can usually be placed in the trench manually. Heavier, larger diameter OD controlled pipe will require appropriate handling equipment to lift, move, and lower the pipe into the trench. **Pipe must not be dumped, dropped, pushed, or rolled into the trench. Appropriate safety precautions must be observed whenever persons are in or near the trench.** Requirements for handling and lifting equipment are discussed earlier in this handbook.

Controlling Shear and Bending Loads

DriscoPlex® pipes that enter or exit a casing or a structure wall such as a building wall, vault, or manhole, must be protected against shear and bending loads that can develop from settlement and embedment consolidation. This also applies to socket and sidewall fusions.

A compacted foundation and compacted bedding should be installed below the pipe where it exits the casing or structure as illustrated in Figure 29. At a casing entry or exit, the pipe should be wrapped with an elastomeric sheet material; then the annulus between the pipe and the casing should be sealed either mechanically or with a cement grout. The seal prevents backfill migration into the annulus.

Where OD controlled pipe is flanged at a wall such as a building or vault wall, a structural support as illustrated in Figure 30 is recommended to prevent shear and bending loads. Within the clamp, the pipe is protected against chafing by wrapping it with an elastomeric sheet.