

DWP INSTALLATION GUIDE

INSTALLATION GUIDE FOR CORRUGATED DUAL-WALL POLYETHYLENE PIPE (DWP)

Scope

This guide provides recommendations for the installation of corrugated dual wall polyethylene pipe used in gravity flow storm sewers and subsurface drainage applications. This guide is for use by designers and specifiers, installation contractors, regulatory agencies, owners, and inspection organizations that are involved in the construction of storm sewers and other gravity-flow drainage applications. This guideline does not eliminate the need for engineering analysis of each job. The recommendations made herein may require modification upon the completion of such analysis.

This installation guide does not address all of the safety problems, if any, associated with its use. It is the user's responsibility to determine the appropriate safety and health practices associated with the use of this product and insure compliance on each job.

Trench Excavation

Excavate trenches to ensure that sides will be stable under ALL working conditions. Slope trench walls or provide supports for the walls in conformance with all local and national standards for safety. The trench should be backfilled as soon as possible, but not later than the end of each workday. Pipe should not be laid or embedded in standing or running water.

Surface water should be prevented from entering the trench and the trench should be dewatered when necessary to maintain stability. Trench bottoms containing rock, soft areas of muck or other material needs to be removed and replaced with a suitable material.

When a trench groove is going to be used, the groove must conform to the outside diameter of the pipe and envelope. The groove shall be circular shaped so that 140 degrees of the pipe will rest in the groove with a maximum clearance of .5 inch around the circumference. If this groove is not achieved, there will be insufficient support and pipe deflection will increase. The use of the groove does not eliminate the requirement for the proper initial and final backfills. The minimum trench width to be used when a trench groove is used will be the outside diameter of the pipe plus 3 inches on each side of the pipe.

When a trench groove is not going to be used and trench walls are stable or supported, provide a width sufficient, but no greater than necessary, to ensure working room to properly and safely place and compact haunching and other embedment materials. The minimum width shall be

DWP INSTALLATION GUIDE

not less than the greater of either the pipe outside diameter plus 16 in. (400 mm) or the pipe outside diameter times 1.25, plus 12 in. (300 mm). If mechanical compaction of the fill material is required, the space between the pipe and the trench wall must be wider than the compaction equipment used in the pipe zone. If there is not enough room for fine material to fill alongside the pipe then a wider trench should be considered or special bedding material provided.

Supports may be used to maintain the trench sidewalls throughout the installation; the supports should be tight enough to prevent washing out of the trench walls from behind the supports. Unless specified by the engineer supports should be left in place as long as support is necessary in that region. When removing trench supports the pipe and the embedment material should not be disturbed, this also holds true for movable trench supports.

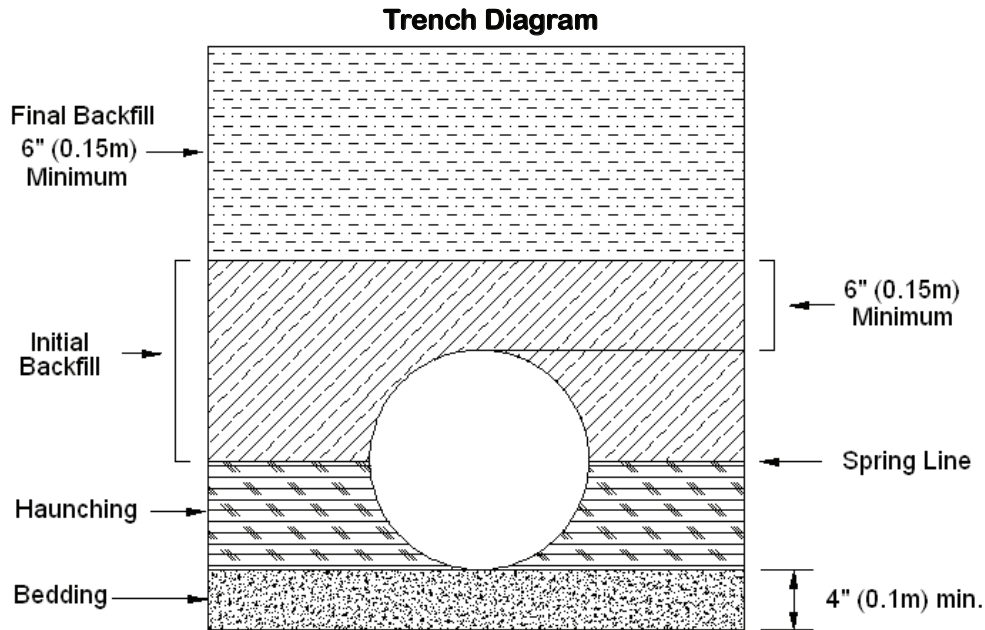
Bedding

A layer of bedding will create a consistent surface free of unstable or unsuitable materials. The trench should be excavated to allow for a minimum of a 4" bedding layer, unless otherwise specified. It may be necessary to excavate additional trench to provide more bedding in situations where unstable or spongy trench bottoms are encountered. The bedding shall be done with Class I non-compacted materials or Class II materials compacted to 85% Proctor Density. Materials and descriptions appropriate for bedding may be found in the table 1 below.

Pipe Joining

Pipe should be placed into the trench and connected together in a manner that will not damage the structural integrity of the pipe or compromise the joint itself. When a gasket is used it should be lubricated with a lubricant prior to joining the pipes together. The spigot end should be inserted manually to insure the proper alignment and a machine may be required to finish pushing the pipes together. The receiving pipe must be sufficiently anchored to handle the force of the pipe fitting into the bell. An installation stub or power ram should be inserted into the bell of the 2nd pipe to push the pipes together. This will reduce the chances of damage by pushing against the pipe with the machine. The spigot end should be pushed into the pipe until the Home Position (painted dot on corrugation) is just on the outside of the bell. Attempting to push Home position into the bell will result in damaging the pipe and the bell. If the joint does not completely connect, take the pipe apart, clean the bell and spigot and attempt it again.

DWP INSTALLATION GUIDE



Backfill: **Haunching**

The haunching is the most important part of the installation process since it provides the primary support for the soil and traffic loadings. Haunching should be placed in maximum 6" layers uniformly on both sides of the pipe. Tamp or ram to achieve the specified compaction. If the material does not require compaction shovel into the area, eliminating voids. Construction of each layer should be repeated up to the spring-line. The haunching may be done with Class I non-compacted materials or Class II materials compacted to 90% proctor density. (See Table 1 for material specifications).

Initial Backfill

Initial backfill extends from the spring-line to a minimum of 6" above the crown of the pipe. This area of the backfill anchors the pipe and ensures that loads are distributed as evenly as possible into the haunching. When compacting it is important to avoid using equipment directly on the pipe itself. Initial backfill may be done with non-compacted Class I materials or class II materials compacted to 90% proctor density.

Final Backfill

The final backfill extends from the initial backfill to the surface. It does not support the pipe, but plays an important role in allowing the load to be distributed over the pipe. Compaction of this area is recommended if live load such as a roadway or equipment movement will be over the pipe trench to prevent pavement settlement. The final backfill can be done with a Class I material and Class II material compacted to the engineer's specifications. The native material excavated as well as classes III or IV backfill materials will need to be reviewed by the engineer before they may be used as a final backfill material.

DWP INSTALLATION GUIDE

Cover Limitations

The minimum cover in trafficked areas is 1 ft. above the crown. Pavement layers may sometimes be included as part of minimum cover. For flexible pavement the paving equipment load and the amount of cover over the pipe must be considered in determining if the pipe can support the resultant load.

Minimum cover calculations for flexible pavement are measured from the top of the pipe to the bottom of the pavement section. Minimum cover calculated for rigid pavement is measured from the top of the pipe to the top of the pavement section.

TABLE 1: Classes of Embedment and Backfill Materials

Soil Group ^{A,B}	Soil Class	American Association of State Highway and Transportation Officials (AASHTO) Soil Groups ^C
Crushed rock, angular ^D : 100% passing 1-1/2in. sieve, $\leq 15\%$ passing #4 sieve, $\leq 25\%$ passing 3/8in. sieve and $\leq 12\%$ passing #200 sieve	Class I	...
Clean, coarse grained soils: SW, SP, GW, GP or any soil beginning with one of these symbols with $\leq 12\%$ passing #200 sieve ^{E,F}	Class II	A1,A3
Coarse grained soils with fines: GM, GC, SM, SC, or any soil beginning with one of these symbols, containing > 12 % passing #200 sieve; Sandy or gravelly fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with >math>\geq 30\%</math> retained on #200 sieve	Class III	A-2-4, A-2-5, A-2-6, or A-4 or A-6 soils with more than 30% retained on #200 sieve
Fine-grained soils: CL, ML, or any soil beginning with one of these symbols, with <math>< 30\%</math> retained on #200 sieve	Class IV	A-2-7, or A-4, or A-6 soils with 30% or less retained on #200 sieve
MH, CH, OL, OH, PT	Class V Not for use as embedment	A5, A7

^A See Classification D2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

^B Limits may be imposed on the soil group to meet project or local requirements if the specified soil remains within the group. For example, some project applications require a Class I material with minimal fines to address specific structural or hydraulic conditions and the specification may read "Use Class I soil with a maximum of 5% passing the #200 sieve."

^C AASHTO M145, Classification of Soils and Soil Aggregate Mixtures.

^D All particle faces shall be fractured.

^E Materials such as broken coral, shells, and recycled concrete, with $\leq 12\%$ passing a No. 200 sieve, are considered to be Class II materials. These materials should only be used when evaluated and approved by the Engineer

^F Uniform fine sands (SP) with more than 50% passing a No. 100 sieve (0.006 in., 0.15 mm) are very sensitive to moisture and should not be used as backfill unless specifically allowed in the contract documents. If use of these materials is allowed, compaction and handling procedures should follow the guidelines for Class III materials.