

Storm drain and culvert pipe installations can be sensitive to the presence of moisture in the bedding, backfill and surrounding soil. Soils placed and compacted in the pipe envelope need to be stable in the presence of water.

Concerns and Precautions:

According to the AASHTO LRFD code Table 12.12.3.5-2, materials that contain certain amounts of sand are not to be used as backfill for flexible pipe unless specific measures are included in the contract documents to account for proper control of moisture content and to monitor compaction of these materials during the installation process. (see note 2 below).

Table 12.12.3.5-2—Equivalent ASTM and AASHTO Soil Classifications

Basic Soil Type (1)	ASTM D2487	AASHTO M 145
Sn (Gravelly sand, SW)	SW, SP (2) GW, GP sands and gravels with 12% or less fines	A1, A3 (2)
Si (Sandy silt, ML)	GM, SM, ML also GC and SC with less than 20% passing a No. 200 sieve	A-2-4, A-2-5, A4
Cl (Silty clay, CL)	CL, MH, GC, SC also GC and SC with more than 20% passing a No. 200 sieve	A-2-6, A-2-7, A5, A6

1. The soil classification listed in parentheses is the type that was tested to develop the constrained soil modulus values in [Table 12.12.3.5-1](#). The correlations to other soil types are approximate.
2. Uniformly graded materials with an average particle size smaller than a No. 40 sieve shall not be used as backfill for thermoplastic culverts unless specifically allowed in the contract documents and special precautions are taken to control moisture content and monitor compaction levels.

Needed Steps:

Given the important information above, the engineering community must design their projects with consideration given to gradient control of the backfill envelope. As the AASHTO Section 12 Plastic Pipe Design procedure warns, uniformly graded material with an average particle size smaller than a No. 40 sieve **“should not be used as backfill for thermoplastic culverts.”** If, however, the design engineer allows the use of such material, that decision **requires extra precautions** during design and installation. The design engineer must take into consideration the actual moisture content and compaction levels of the chosen backfill material **and additionally monitor and measure these factors** during construction. A very large component of the structural capacity of the soil-pipe system is dependent on the design of the backfill envelope for plastic pipe design. That can only be achieved by mandating a high quality installation with a thorough understanding of the project variables, such as moisture sensitivity of the backfill materials. The engineering community will help **reduce their liability** when specifying a plastic pipe system by following the **very important** steps outlined above for **each and every** project.