

# Considerations for ASTM D2321 standard practice for underground installation of thermoplastic pipe vs. cast iron for sewers and other gravity-flow applications.

by Francesca Dunbar and Laura Loziuk

Often, when something is out of sight, it's out of mind. This can be related to things like piping systems behind the walls and floors of a building or buried in the ground, and proper installation practices are required to ensure health and safety. All buildings require buried piping systems for waste or water distribution, and the process can be either simple or complicated depending on the pipe material.

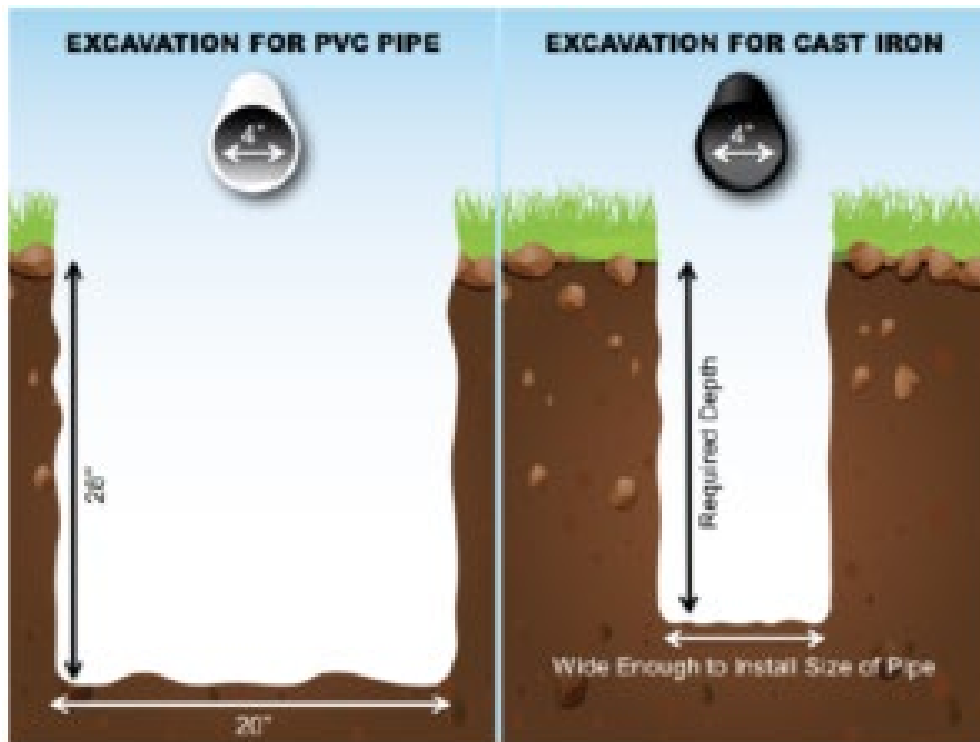


Figure 1. Adequate

trenching is required according to product selection and conditions, according to ASTM D2321.

ASTM D2321: *Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and other Gravity-Flow Applications*, as the title suggests, is the standard used for underground burial of thermoplastics for DWV systems, and the process to comply with the standard's provisions can be confusing. Here is an overview to help demystify the compliance process by product choice.

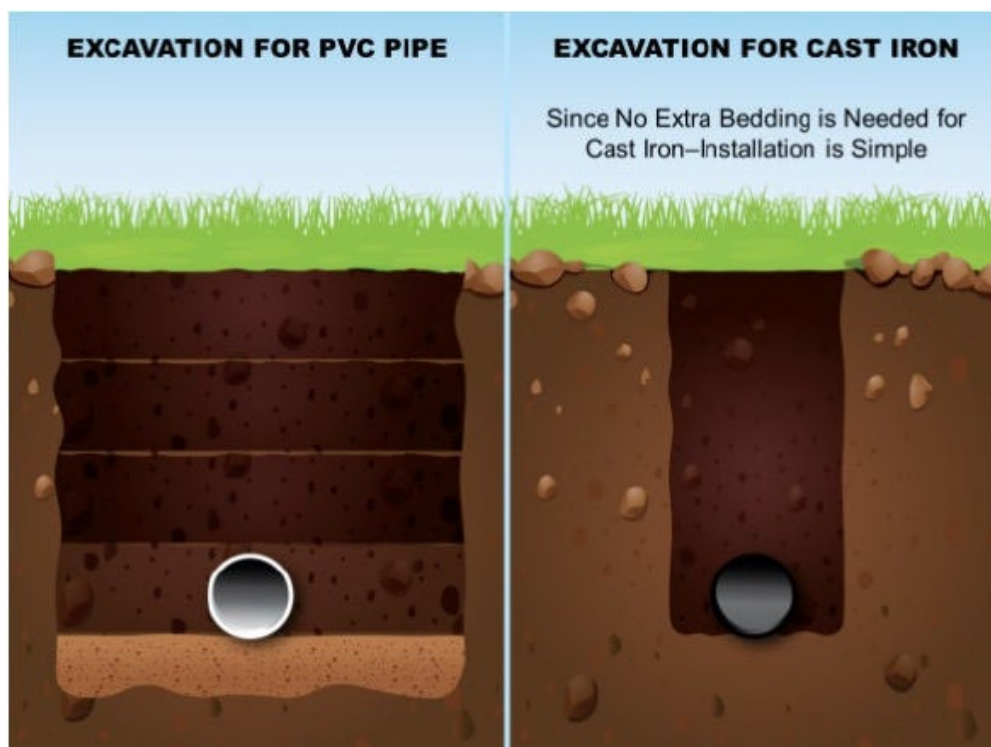
Proper underground installation of piping is one of the most misunderstood applications. Piping that is buried needs to not only support the earth load, but also the live load above, so careful steps are required to ensure performance of the piping system. All underground thermoplastic piping must be installed in accordance with the standard and any regulations, ordinances, and codes in the respective jurisdiction.

Buried piping also will be installed in a variety of subsoils. Therefore, special attention is required for thermoplastic pipe-laying techniques in accordance with the standard. On the

other hand, because of its material characteristics, cast iron soil pipe does not have to comply with a specific standard for use underground; it can simply be installed in a trench wide and deep enough to allow for proper slope and burial (see Figure 1).

With any piping, an initial inspection is required to ensure that the product is free from any damage. When determining trench widths for thermoplastic piping, two options are prescribed by ASTM D2321. Option 1 is to use the pipe outside diameter (OD) plus 16 inches. Option 2 is to use the pipe OD times 1.25 + 12 inches ( $OD \times 1.25 + 12$ ). Note that the trench depth is determined by the intended service and local conditions.

In all cases, thermoplastic pipe should be installed at least below the frost level. Refer to the ASTM D2321 standard for specific instructions.



*Figure 2. Special attention is required at the trench bottom when using thermoplastics as it must be smooth and free of rocks that can impale the soft, thin plastic piping wall. Cast iron is direct burial.*

Special attention is then required for backfilling for thermoplastic piping. Again, ASTM D2321 outlines the backfilling requirements and prescribes the necessary steps to ensure that backfilling provides the necessary support for thermoplastic piping so the load does not deform the pipe and the pipe is supported on all sides. Improperly backfilled and supported thermoplastic piping is prone to failure as the piping is not rigid enough to be self-supporting (see Figure 2).

On the other hand, when excavating for cast iron soil pipe, you only need to meet the required depth and width to accommodate the pipe size and any recesses for hubs if using hub and spigot. Since it is a rigid, heavy-duty product, no additional steps for bedding or

even hand compaction are necessary, making it a simple, more durable choice for an underground installation.

As you can see, proper installation of plastic pipe can increase the initial installed cost of the product when installed according to the ASTM D 2321 standard. Cast iron soil piping, defined as a rigid material that is 10 times stronger than thermoplastic material, allows it to handle the loads with no risk of deflection.

Sometimes the path of least resistance is the right choice. Consider the total installation cost, simplicity, and ease of a direct burial cast iron system the next time you are designing your underground plumbing project.

### About the Authors



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