



ASTM D1785 & D2241 Solvent Welded PVC Pipe Underground Applications

INTRODUCTION

The PVC pipe industry has published consensus standards that represent the most comprehensive documents for installation requirements and best practices. For ASTM D1785 and ASTM D2241 pipe used in underground applications, NAPCO promotes the use of the following standards as the primary sources of installation guidelines:

- ASTM D2774, *Standard Practice for Underground Installation of Thermoplastic Pressure Piping*
- ASTM D2855-15, *Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings*
- ASTM F1668, *Standard Guide for Construction Procedures for Buried Plastic Pipe*
- IAPMO UPC 1, *Uniform Plumbing Code*

For more detailed technical information, refer to the PVC Pipe Association's *Handbook of PVC Pipe Design and Construction*.

When necessary, we have presented additional information specific to our product offering.

The statements contained in this installation guide are those of NAPCO and are not warranties, nor are they intended to be warranties.

RECEIVING, HANDLING, & STORAGE

Follow ASTM F1668, Section 5 and ASTM D2774, Section 10.1 – 10.3.

UV PROTECTION

AWWA M23, *PVC Pipe – Design and Installation*, pg. 7 states, “UV degradation of PVC pipe formulated for buried use will not have significant adverse effect with up to two full years of outdoor weathering and direct exposure to sunlight.”

When PVC pipe is properly covered and not exposed to sunlight, the allowable storage time is unlimited. The two year criteria is a cumulative value of the time the pipe is in exposed storage and is not based on the date of manufacture.

TEMPERATURE CONSIDERATIONS

PVC will display a variation in physical properties with changes in temperature. Colder temperatures result in increases in pipe stiffness and tensile strength and decreases in impact strength. The decrease in impact strength requires care in handling during installation in cold temperatures.

The actual rate of expansion/contraction for PVC is 0.36 inch per 100 feet of pipe per 10°F temperature change. Thermal expansion/contraction causes stress in the pipe walls for solvent welded PVC pipe and must be mitigated by the use of expansion joints or other thermal stress management techniques.

Follow IAPMO UPC, Section IS 8-2006.2.4.3.

TRENCH PREPARATION & CONSTRUCTION

Follow ASTM F1668, Sections 6, 7, & 8 and ASTM D2774 Section 6. Follow IAPMO UPC, Section 314 & 609.1-609.3 for building water distribution lines.

BURIAL DEPTH

Minimum burial depth is governed by a few criteria. ASTM D2774, Section 6.4.2 states that “a minimum of 24 in. for pipe shall be required when subjected to heavy overhead traffic. In areas of light overhead traffic, a minimum of 12 to 18 in. is required.” NAPCO recommends that this requirement is followed during project design and construction.

IAPMO UPC, Section 609.1 states that “building supply yard piping shall be not less than 12 inches below the average local frost depth. The cover shall be no less than 12 inches below finish grade.”

Earth loads, from soil above a buried pipe, and live loads, from vehicles and objects on the surface, place vertical loads on the pipe that attempt to deform the pipe from a circle to an oval. The strength of the pipe wall, known as pipe stiffness, and the support afforded to the pipe by surrounding embedment soils counteracts these earth and live loads.

The Modified Iowa formula is widely used to calculate the expected in-situ deflection of PVC pipe at various depths and installation conditions. AWWA C605, Section 8.3, states that “the vertical cross-section long-term ring deflection of the pipe should not exceed 7.5 percent.” We recommend that an engineer familiar with the Modified Iowa equation be consulted to determine if the embedment soil and pipe stiffness is adequate to counterbalance the loading conditions at specific burial depths.

PIPE ASSEMBLY, INSTALLATION, & EMBEDMENT

Follow ASTM F1668, Sections 9, 10, 11, & 12 and ASTM D2774, Sections 5, 7.1, & 10.