North American Pipe Corporation™

Installation Guide for Solvent Welded PVC Pipe

This installation guide has been developed by North American Pipe Corporation for use as a field installation guide. General information regarding the correct installation of solvent PVC pressure pipe is included.

For more detailed technical information, refer to ASTM D2321 *Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications* and ASTM F1668 *Standard Guide for Construction Procedures for Buried Plastic Pipe*. This installation guide outlines design and construction practices.

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

RECEIVING

When a load of pipe arrives at a job site, it is your responsibility to check it thoroughly. If possible, inspect each piece for damage. Check quantities against the shipping list. Note missing or damaged items on bill of lading. Set aside any damaged items and notify the shipper.

UNLOADING

It is also your responsibility to unload the shipment. DO IT WITH REASONABLE CARE. Careless unloading can result in damaged product or personal injury.

Use a fork-lift or front-end loader with fork attachment, if available. Ensure the fork attachment is long enough to support the bundles. When unloading by hand, remove one piece at a time, and block the shipment to keep pipe from rolling off the truck.

STORAGE

If you can unload the shipment in unit packages, the pipe will be easier to store. Stack it on reasonably level ground. If you unload one piece at a time, place the pipe bevel to bell. Never stack over eight feet in height. Don't stack the pipe next to heat sources such as boilers, steam lines, electrical equipment or engine exhausts.

HANDLING

DO NOT DROP THE PIPE. String pipe close to the trench with the bell ends pointing in the direction of work progress to save extra effort. Be particularly careful in very cold weather.

TRENCHING

Clean trenches save time and money. Don't let the excavated material block sidewalks, drive or utility outlets. Follow all safety rules and regulations. Protect workers with sheeting and trench boxes in hazardous areas and slope walls in dry soils. When sheeting or trench box is moved, make sure the pipe is not moved and the side support material is not disturbed.

WIDTH OF TRENCH

The width of the top of the trench will be determined by local conditions. At the pipe zone, the trench width should be kept to a practical minimum.

The minimum clear width of the trench measured at the springline of the pipe is generally specified at least one foot greater than the outside diameter of the pipe to enable backfill material to be installed in the haunching area. Where embedment compaction is required, the trench shall be wide enough to accommodate the compaction equipment. If minimum trench width is exceeded, and embedment compaction is required, pipe zone haunching should be compacted to a point at least one pipe diameter from the pipe on both sides of the pipe.

DEPTH OF TRENCH

For water distribution and transmission lines, pipe should be buried so that the top of the pipe is at least 6 inches (150 mm) below the deepest recorded penetration of frost. Where surface loads will be encountered and where frost is not a problem, the minimum height of cover over the crown of the pipe is 12 inches (300 mm).

THE BOTTOM OF THE TRENCH

The objective of bedding is to provide a continuous support for the pipe at the required line and grade. Frozen material should not be used to support or bed the pipe. At least 4 inches (100 mm) of bedding material should be placed under the pipe if rocky conditions exist. The bedding may or may not be compacted, the entire pipe should be evenly supported by the bedding. Where the trench bottom is unstable (organic material, or "quick" sand or similar material), the trench bottom should be over-excavated and brought back to grade with approved material.

North American Pipe Corporation™

Installation Guide for Solvent Welded PVC Pipe

ASSEMBLY

Using a fine-tooth hand or power saw to cut the pipe square with its axis. A rotary cutter specifically designed for use with PVC pipe may be used if its use does not raise a burr or ridge at the cut edge. Remove any burrs or ridges that might have developed during the cutting process.

The solvent-cement joint is designed as interference fit joint. Dry fit the joint by inserting the dry spigot into the bell. Typically this interference develops when the spigot is inserted to about 1/3 to 2/3 of the socket depth. If the pipe is at the minimum tolerance and the socket is at the maximum tolerance it is possible that the spigot will inset fully into the socket the fit should be snug. Select a different fitting or pipe if the fit is wobbly.

Make sure that the mating surfaces are clean by removing any moisture, oil, dirt, or other foreign material.

BEFORE APPLICATION

Confirm that the available primer and solvent-cement are compatible and intended for use with the material to be joined. Keep the primer and cement containers closed when not in use. The cement should be discarded if there is an appreciable change in the viscosity.

Bonding of a typical solvent-cement joint develops in two ways. The section with the interference fit the pipe and socket fuses together. In the looser fit section the cement bonds the surfaces. The cement softens the joint surfaces so that fusion or bonding can take place. Primer is used to aid in the softening process and improves the bonding and fusion.

It is important to important consider the atmospheric conditions when applying the primer and cement. With high humidity it is important to apply the cement quickly to minimize condensation of moisture on the cement surface. Surface temperatures should be kept below 110 degrees F to prevent the solvent-cement from drying before the joint can be assembled.

The assembly of sizes six inch and larger requires two people to apply primer and solvent cement and assemble in a prompt manner. A mechanical forcing device may also be required to insert the spigot and hold it in place.

APPLICATION OF PRIMER AND CEMENT

To apply the primer and cement use a natural or nylon brush with a width that is approximately 1/2 the diameter of the pipe. A dauber, again approximately ½ the pipe diameter in width may be used for pipe sizes 2 inch and smaller.

Apply the primer to the inside of the bell first. Use a scrubbing motion to ensure penetration. Next apply primer to the spigot. Be sure that both surfaces are well softened.

Without delay apply the solvent-cement to bell and to the spigot while the surfaces are still wet with primer. At this stage in the assembly time is very important. If the solvent-cement starts to harden quickly apply another light coat. Forcefully insert the spigot into the bell until the spigot bottoms out, turning the pipe or the fitting ¼ turn during the process. Hold the spigot in place for approximately one minute. This process should be performed in about 20 seconds. Take care not to disturb the joint and to allow the joint to set for the period of time recommended by the cement manufacturer.

A properly made joint will develop a bead of cement around its entire perimeter. It is important to wipe away any excess cement. In like manner do not apply cement in the bell to pipe transition area of pipe bells, particularly with pipe wall thicknesses of 1/8 inch or less.

Any gaps between the bell and the spigot generally indicate a defective assembly that is due to insufficient cement or the use of light bodied cements when standard or heavy bodied cements should have been used. This is particularly true with large diameter joints.

COLD WEATHER NOTES

Primers and cements do not penetrate and soften the PVC as quickly in cold weather (below freezing) as in warm weather. Verify the softening by testing a scrap piece. Apply primer to a scrap piece and wait for a few minutes. Scrape the primed surface with a knife edge. A properly softened pipe surface will be removed during scraping.

Do not warm the cement and primer with open flame or electric heaters and attempt to prefabricate as much of the system in a heated area. Remove all ice, snow, or other moisture before applying the primer. It will take longer for the solvents to evaporate in cold temperatures so allow for a longer than normal cure time.

Rev: 04/2012

North American Pipe Corporation™

Installation Guide for Solvent Welded PVC Pipe

INSTALLATION

For pressurized systems, carefully place the pipe in the ditch and snaking the pipe from side to side to allow for expansion and contraction. The actual rate of expansion/contraction for PVC is 3/8 inch per 100 feet of pipe per 10 degrees F temperature change. The pipe should be brought to the approximate operating temperature by shade backfilling or filling with water and allowed to stand overnight to vent to the atmosphere before pressure testing. Because of variances in atmospheric and assembly conditions the necessary time to cure can vary from minutes to days. Consult the manufacturer of the primer and cement for recommendations. Pressure tests should be limited to runs of 5000 ft or less.

OVERNIGHT PRECAUTIONS

At the end of each workday, be sure that all installed pipe ends are covered to keep dirt, debris and animals from entering the pipe. Backfill is needed to avoid flotation.

CHECKLIST – Don't Forget!

- ❑ Take all sensible precautions necessary to protect workers and materials.
- ❑ Cut the pipe square and remove any burrs.
- ❑ Dry fit the joint.
- ❑ Use a primer to soften the bell and spigot.
- ❑ Apply the cement to the bell and then to the spigot before the primer has dried.
- ❑ Twist the pipe a quarter turn as it you insert the spigot completely into the bell.
- ❑ Hold the joint together until the cement begins to set.
- ❑ Allow the joint to cure completely before handling and pressure testing.
- ❑ Refer to ASTM D2855 *Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings* for detailed design installation recommendations.
- ❑ Large diameters require two people.
- ❑ Keep primer and cement away from all sources of ignition
- ❑ Warm temperatures and low humidity accelerate curing times.
- ❑ Cold weather and high humidity slow the curing process.