PVC PIPE BELL DIRECTION – SOMETIMES IT MATTERS

Questions about bell direction are sometimes asked by designers, installers, and operators of PVC pipelines. The questions fall into two categories:

1. Design-related – does the direction of flow in a PVC pipeline matter hydraulically?
2. Installation-related – can PVC pipe be installed by pushing the bell end over the spigot end? Or should the spigot end always be inserted into the bell?

DESIGN: IS HYDRAULIC DESIGN AFFECTED BY BELL DIRECTION? – NO

The flow surface on the interior of a PVC pipe is a smooth surface interrupted by a small gap at every joint. For flow in the spigot-to-bell direction, the flow encounters a square edge as it crosses the gap. For flow in the bell-to-spigot direction, the flow encounters a slightly rounded edge as it crosses the gap.

In their research, Neale and Price found that there was a slight difference in hydraulics depending on bell direction (because of the squared edge versus the rounded edge as described above). However, their conclusion was: "The head loss incurred by reversal direction is of such a small magnitude that it need not be considered for ordinary design purposes."

For flow, bell direction does not matter. Much more important is bell direction during installation, as discussed below.

INSTALLATION: IS PIPE ASSEMBLY AFFECTED BY BELL DIRECTION? – YES

The answer to this question is a definite "Yes!"

PVC pipe joints are designed for insertion of the male spigot end into the female bell end. There are two reasons:

1. Leakage – pushing the larger bell end onto the smaller spigot end results in a greater chance of scooping soil into the joint, which would compromise the sealing capability.
2. Assembly force – straight alignment of bell and spigot reduces the force required to assemble the joint. It is easier to achieve correct alignment when the smaller spigot is inserted into the larger bell.

Always Push the Spigot into the Gasketed Bell: As explained above, to reduce potential joint problems it is important to install PVC pipe by pushing the spigot into the bell. Said a different way, the bell should always be visible at the end of the installed pipe as the work progresses.

MORE INFORMATION

For more information on PVC pipe joint assembly, see the following Uni-Bell documents:

1. Uni-Bell's *Handbook of PVC Pipe*, Chapters 10 – 12
2. Uni-Bell's Tech Brief on insertion lines
3. Uni-Bell's Tech Brief on expansion gaps

References: "Flow Characteristics of PVC Sewer Pipe," Neale, L. and Price, R. (1964); *Handbook of PVC Pipe*, Uni-Bell (2013); Tech Brief: "Expansion Gaps for Gasketed PVC Pipe: Maximizing Joint Performance," Uni-Bell (2013); Tech Brief: "Gasketed PVC Pipe: The Importance of Insertion Lines," Uni-Bell (2013).

11.23.16

PVCPIPE association
Uni-Bell PVC Pipe Association | 2711 LBJ Freeway, Suite 1000 | Dallas, TX 75234
Phone: (972) 243-3902 | Fax: (972) 243-3907 | info@uni-bell.org