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Considerations When Using Large Diameter Hubless Pipe

by William M. Huitt

(From a letter dated March 30, 2004 in response to a request to use large diameter hubless pipe.)

As a general rule hubless pipe joints are limited to 8". This is not to say that using the hubless joint installation above 8" is not acceptable, it instead requires added consideration from the standpoint of integrity.

The reason for this is two-fold:

1. Fabrication tolerance, in the case of ovality, is determined by a percentage. The larger the pipe then the larger the ovality tolerance. The seal integrity of the neoprene coupling seal is directly related to the pipe joint ovality. While the neoprene coupling is accommodating with regard to pipe imperfections it does have its limits. In addition, proper installation becomes more difficult with the larger sizes. These are potential leakage problems that are not always made apparent at the time of leak testing, but have a tendency to evolve over time depending on the dynamics of the system. These problems are subsequently left for maintenance to chase.
2. Surge is the second concern for limiting the size of the hubless joint. The hubless joint, while flexible and accommodating, is not a flex joint. It does not accommodate movement well. Movement of an installed system is caused, from a practical standpoint, by flow surge, the intensity of which is in direct proportion to the size of the pipe. Installers, while testing multiple floors without proper thrust restraints at bends and Y's, generally cause these surges, but they can also occur during operation. Thrust occurs when a column of water filling a vertical stack is allowed to discharge in a free-flow manner. A ten-foot column of water (used for static leak testing) produces a static head pressure of 4.3 PSI at the base of the column, but thrust increases as the diameter of the column of water increases. That same four-inch stack with ten feet of static head produces 65 pounds of thrust at the base of the stack. For a ten-inch pipe that same ten-foot static head produces 337 pounds of thrust even though the static head pressure in both stacks is only 4.3 PSI. This thrust pushes against the pipe and fittings at the base of the stack where the vertical line turns horizontal. This force, if the piping is not properly restrained, can cause the joint to move, which could result in partial joint separation, and leaks (especially in large diameter pipe and fittings).

Therefore, in attempting to minimize these potential problems on a general basis it is best to limit pipe size to 8" for hubless joints. If a project wishes to extend the use of the hubless joint to 10" and 12" pipe sizes it is acceptable as long as the above points have been considered.

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