



NATIONAL CLAY PIPE INSTITUTE

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Procedure For Installation of Carrier Pipe Within Steel Casing

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The following procedure for “*Installation of Carrier Pipe Within Steel Casing*” is taken from past projects, where this method produced successful installations.

Standard Bell and Spigot VCP or VCP Jacking Pipe can be used as a carrier pipe inside a previously installed steel casing. The decision on which product is utilized depends on the drive length and the internal diameter of the casing.

Bell and Spigot Carrier Pipe

If Bell and Spigot pipe is used, casing spacers or wooden skids are needed to elevate the pipe bells from the casing invert during installation. Bell and Spigot pipe is not specifically designed to be direct jacked and thus, typically used for runs within a casing at drive lengths less than 200 LF.



Fig 1: 30-inch Bell and Spigot pipe being pushed with a Horizontal Auger Bore Machine via the spigot end.

Bell and Spigot pipe does not have machined pipe ends and needs to have a wood cushion between the section being jacked and the steel push plate on the jacking frame.



Fig 2: Stainless Steel Casing Spacers with polyethylene runners designed for a 30-inch Bell and Spigot VCP Pipe.

When pushing on the bell end, the force shall be applied to the pipe barrel inside the bell only and not to the clay bell itself. This can be accomplished by the use of wood cribbing, plywood, or a combination with a steel ring push plate. Unlike Jacking Pipe, wood rings (cushions) are not used between each assembled Bell and Spigot joint. These joints are not designed for wood rings between the pipe ends; inclusion could result in joint leakage.

Casing spacers, attached to the pipe barrel, need to be placed at intervals sufficient enough to take the weight of each pipe section being installed (usually 2 spacers per pipe section).

Casing spacers need to resist the abrasion/ sliding wear during installation without failure within the tunnel.



Fig 3: Wood skids attached to 12-inch Bell and Spigot VCP using steel banding.

If skids are used in place of the casing spacers; commonly two wood skids per section of pipe are held in place with steel straps/ banding. Lubrication within the installed casing could be used to reduce the sliding friction (and thus jacking forces) on longer push lengths when using skids or casing spacers.

Flush Bell Jacking Carrier Pipe

Specialized VCP Jacking Pipe (*currently manufactured in 8 to 24-inch diameters*) can be direct jacked through the casing, using skids, casing spacers, on 2-inch black steel pipe rails, or directly on the casing invert when the casing is installed to grade tolerances. Pipe jacked directly on the casing invert eliminates the need for casing spacers. Additionally, since jacking pipe has a smooth profile joint and eliminates the large bell O.D., the O.D. of casing can be reduced and thus provide additional cost savings.



Fig 4: 36-inch Vitrified Clay Jacking Pipe installed directly on the invert of a 48-inch steel casing.

Drive length is not an issue when using VCP jacking pipe as it is designed and manufactured to be loaded axially.



Fig 5: 12-inch Vitrified Clay Jacking pipe being installed via a Horizontal Auger Boring Machine.

Note: the pipe adapter push plate ring on the front of the frame (fits inside the SS collar). A wood ring is required between each section of jacking pipe and at the push plate.

The horizontal auger-bore jacking frame should be used to install the carrier (Bell and Spigot or Jacking Pipe) after the steel casing installation and auger retrieval. The jacking frame needs to provide a uniform circumferential force to the end of the carrier pipe.

Prior to installation of jacking pipe on the casing invert, black steel pipe are commonly located and welded to the inside top of the casing (perpendicular to casing and directly above carrier pipe) in a manner, which will prevent carrier pipe from floating. The carrier pipe can then be installed directly on casing invert.

Note: *Welding steel tubes inside the casing can only be accomplished when the casing size is large enough to allow for manned entry.*

When the annular space between the casing and carrier line is required to be filled; fill materials may be 3/8-inch pea gravel, sand or one of the many mix varieties of flowable/ cellular fill/ grout. Some grout mix designs could cause the carrier pipe to float if steel tubes are not used. Bulkheads at the ends of the casing or alternative casing end seal closures may be used to prevent water and/or soil from entering annular space if it is not filled.



Fig 6: 8-inch Jacking Pipe being installed with a steel casing. A stack of wood rings was used in lieu of a pipe adapter push ring.