

**UNDERGROUND HORIZONTAL
DIRECTIONAL DRILLING**

NAVIGATOR[®]



Efficiently Install Underground Service Products
Avoid Landscape and Road Damage
Install Service Products Without Rerouting Traffic
Install Service Products Under Surface Structures and Obstacles
Install Service Products Under Rivers and Creeks



The NAVIGATOR® Horizontal Directional Drilling Process

After locating existing underground obstacles and planning the intended drill path, the Vermeer® NAVIGATOR horizontal directional drilling unit pilot bores a path underground. The pilot bore is performed with minimal disruption to surface structures and above-ground activity.

A transmitter in the drill head provides depth, position and pitch information to an aboveground receiver (locator). The locating device displays this information to the user, allowing the user to determine if any changes need to be made in the direction of the drill path.

After a stem is inserted into the ground, another stem is connected to it at the machine to form the drill string. The drill string bends in response to commands of the operator, allowing the drill head to move in any direction within the drill stem's bend ability.

The innovative design of the NAVIGATOR horizontal directional drilling system allows changes in direction during the pilot bore. The angled drill bit and flexible stem can be steered under, over and around underground obstacles. To change the direction of the pilot bore, the stem is pushed without rotation. When no direction change is needed, the stem is rotated and pushed simultaneously.

Specialized drilling fluids are pumped through the drill stem and head to lubricate and seal the drill path. Drilling fluids cool the transmitter and suspend the drill path cuttings, creating a flowable slurry.



Installing Underground Utilities With The Vermeer NAVIGATOR HDD System

After completing the pilot bore, the operator removes the drill head and attaches a backreamer, which is pulled and rotated to enlarge the drill path. The product is then pulled into place behind the backreamer.



As with the pilot bore, fluid is introduced through the backreamer and mixed with the drill path cuttings to create a flowable slurry, which is displaced by the product being installed in the drill path. The backreamer is sized slightly larger than the product being installed, allowing the slurry in the drill path to flow freely around it.

A swivel attaches multiple sizes and styles of pipe or cable to the backreamer. The product is then pulled behind the backreamer through the prepared drill path.

Horizontal Directional Drilling Terminology

Backreamer: a cutting/mixing tool attached to the end of the drill string that is pulled and rotated through the pilot bore to enlarge the drill path.

Bentonite: a form of powdered clay used to contain fluid in the drill path.

Drill bit: the cutting tool that attaches to the front of the drill head. It mounts to the head at an angle. This angle is what provides steering capability when pushing the drill string.

Drill head: tooling that is connected between the drill stem and drill bit. The drill head houses the locator transmitter.

Gel strength: the ability of the fluid to suspend drill path cuttings.

Locator: Unit that reads the signal from the transmitter. The unit provides location, pitch, roll and depth information.

Pilot bore: the initial path created in the ground during the process of directional drilling.

Pitch: a measurement identifying the drill head's angle of ascent or descent.

Polymer: a compound that enhances gel strength, lowers filtration rate and increases lubricity.

Pullback: the process of installing product in the drill path.

Sonde/Probe/Transmitter: an electronic device that fits inside the drill head and sends out a signal used to locate and determine the depth, pitch and position of the head.

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