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JET GROUTING TOOLING

TRIPLE PHASE TYPE

03/2026



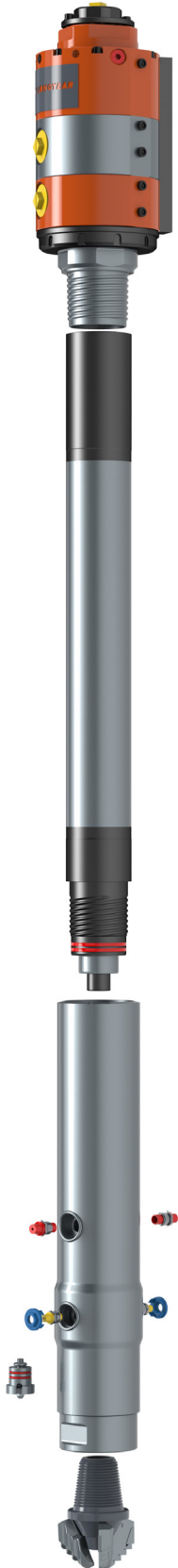
DRILLING SYSTEM

APPLICATION

Jet grouting or high-pressure Injection is a ground stabilization technique as well as a sealing method used in soil conditions ranging from loose sediment up to soft rock structures.

In the jet grouting process, a cement suspension is injected at pressures of 100-600 bar (1,450-8,700 psi) through the jet grouting tooling and into the soil in the drilled hole. The cement suspension mixes with the surrounding soil as the jet grouting tool string is slowly rotated and retracted from the hole. The result is a subsurface grout column.

Jet grouting is performed with either single, double, or triple tube jet grouting systems based on the ground conditions, the grout injection, air and/or water for the ground jetting and mixing.



DRILLING SYSTEM



JET GROUTING- TRIPLE TYPE



FLUSHING HEAD (1)

Flushing heads for triple tube jet grouting systems provide the connection point to the drill string for the flushing media during drilling. Flushing heads also manage the grout and separate water jet and air supply during grout injection. The inner rod connection is designed for high-pressure injection with 400-600 bar. Flushing, grout, water and air for the shrouded high-pressure jet stream pass through separate channels within the system. The grout injection supply goes separately through another channel. Flushing heads are mounted to a flushing head carrier which allows the head to move up the mast extension on the rig.

ROD (2)

Triple tube jet grouting rods provide three different channels for drilling, jet-grouting and the air-curtain for the grouting. Rod ends are constructed of high strength nitrided steel and friction-welded to an annealed mid-body. Inner and middle tubes in the triple tube systems are secured inside the outer or middle rod utilizing a circlip or wire fuse connection. Rods come with special seals between rods which resist damage from abrasive grouts and multiple cycles of making and breaking rod joints.

VALVE FASTENER (MONITOR) (3)

The valve fastener (also called a monitor) mounts between the drill rod string and the drill bit. The valve fastener contains the injection nozzles as well as the automatic valve. It includes the air shrouded water jet nozzle and a separate grout nozzle. The valve fastener provides the medium from the inner drill string, middle drill string and outer rod through channels to their associated nozzles.

AUTOMATIC VALVE (4)

The automatic valve is located within the valve fastener and controls the flow of both low-pressure flushing fluids and high-pressure grouting media. During the drilling operation the spring-loaded automatic valve allows for flushing fluids to pass out through the drill bit. When high-pressure water is introduced into the drill string the automatic valve will close directing the jet grouting media and air/water out through the injection nozzles in the valve fastener. The pressure, when the valve should close for jet grouting, can be adjusted in front of the drilling start.

INJECTION NOZZLE (5)

The grout injection nozzles mounted in the valve fastener are the exit point for the pressure grout into the grouting zone and the air shrouded high-pressure water jet for the ground cuttings and mix. Injection nozzles are constructed with a tungsten carbide body with a threaded steel base. The nozzles are available with various sizes of a standard round injection orifice or a ribbed injection orifice. The ribbed orifice creates an injection with less turbulence by incorporating a more compact jet.

AIR NOZZLE (6)

The air nozzles mounted in the valve fastener are the exit point for the low-pressure phase into the grouting zone. The compressed air reduces the spray effect, resulting in a more focused, piercing jet.

ROTARY BIT (7)

The rotary bit for a triple tube jet grouting system mounts below the valve fastener. They are designed for rotary drilling only in overburden. They come in a variety of winged bit designs with tungsten carbide inserts and flushing ports.

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