



Installation

Drilling

TITAN Injection Anchors are installed by rotary percussive pneumatic or hydraulic drill hammers without the need for a casing. The method of installation, however, is similar as if casings for cased holes were drilled. The tubular threaded anchor acts as a drill rod, anchor tendon and grouting conduit all in one. Thus, pulling-out the casing and inserting the anchor becomes obsolete. Consequently the productivity of installation doubles in comparison to conventional installations which require casings. For gravel and sand (soil class 2-5) cross-cut drill bits are most useful, since they allow a controlled reaming with their radial flushing holes. For displaceable soil and high water level piling cones are suitable, since they can also be installed with drill hammers. For rock (soil class 5-7) we recommend button type drill bits, or carbide-tipped bits for granite.

If the soft soil collapses, the annulus is stabilized by flushing with a cement/water mixture. Under a flushing pressure of approx. 15 bars (215 psi) the water in sand or gravel is filtered-out rapidly and the remaining cement cures on the borehole walls and stabilizes the annulus. The final pressure grouting is then interlocking with the granular structure of the soil and an infiltration dowelling effect is being achieved.

Grouting and post grouting

After drilling the designed total anchor length, the drill hammer continues rotating and pressure grouting starts through the TITAN flushing head (grout with a w/c ratio of 0,4). The rotating and vibrating TITAN anchor in the bore hole acts like a regular concrete vibrator and compresses and ruptures the constantly curing grout. The effect resulting from this action is the same effect as being utilized for post-grouting cohesive soils. The curing grout is ruptured and into the cracks new grout is being pressed-in again until chunks of grout are wedged between the rotating anchor tube and the annulus, thus forming a natural packer which allow an even further increase of the grouting pressure.

Standard anchoring methods often require post-grouting, an additional working sequence a few hours after grouting, whereas with TITAN Injection Anchors postgrouting is already integrated into the unique pressure grouting process. For TITAN 73/53 and 103/78: during the grouting process, the rotary drive of the hydraulic hammer increases to upto 100 bars (1400 psi). An experienced drill operator can hear this and these two indications tell the operator that the anchor holds. During the drilling, the flushing pressure required is around 20 bars (280 psi).

