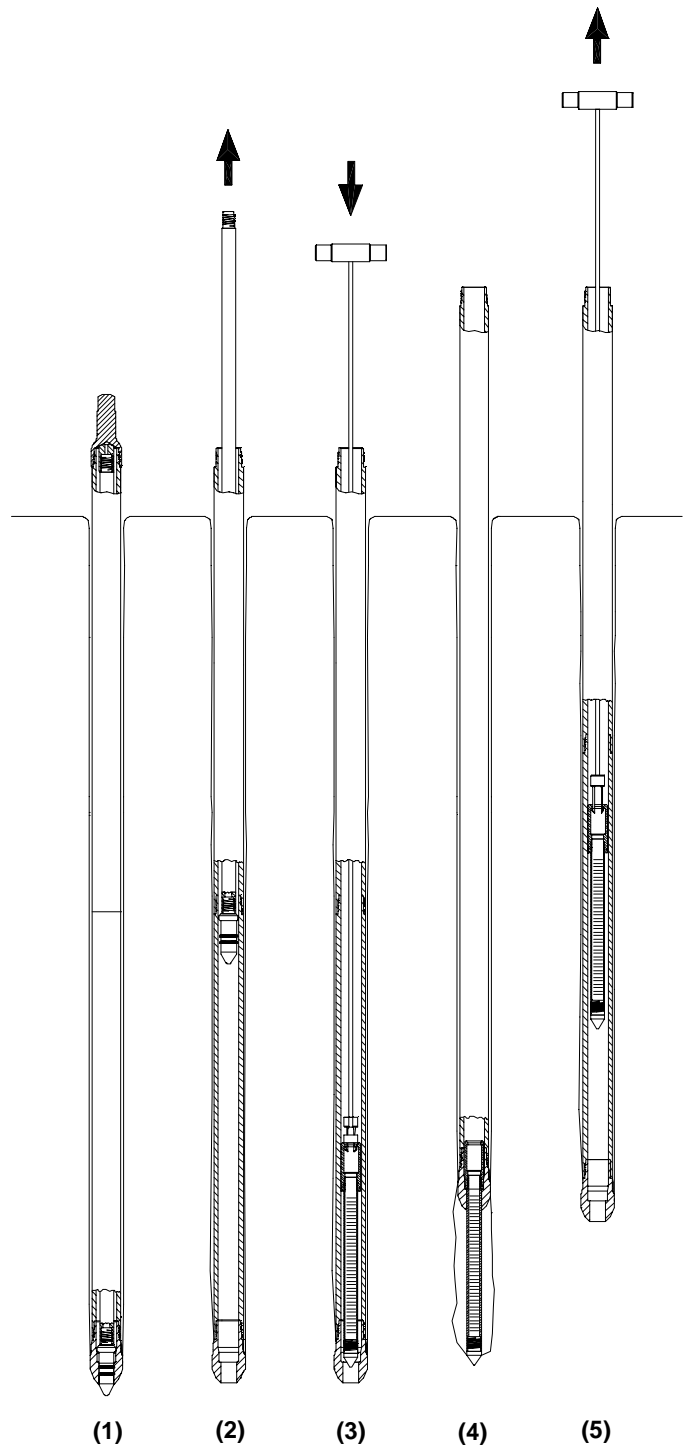


Dual Tube (DT21) Groundwater Profiler Kit

Installation and Operation Instructions

Instructional Bulletin No. 19275
PREPARED: November, 2001



- (1) Advance outer casing to bottom of screen interval.
- (2) Remove inner rod string leaving open outer casing.
- (3) Lower screen to bottom of casing and hold in place with extension rods.
- (4) Retract casing to expose screen to formation, remove extension rods.
- (5) Retrieve screen after development, sampling, and slug testing.

Repeat the above sequence for the entire length of the probe push.

Operating the Dual Tube (DT21) Groundwater Profiler

1.0 Objective

The DT21 Groundwater Profiler is used in conjunction with the DT21 Dual Tube Soil Sampling System to conduct soil sampling, groundwater sampling, and slug testing at multiple depth intervals in one probe push. This document identifies the tools and techniques required to successfully operate the DT21 Groundwater Profiler Kit (PN: GW2100). Refer also to “Geoprobe® DT21 Dual Tube Soil Sampling System”, Standard Operating Procedure (Technical Bulletin No. 982100). A free copy of this SOP may be obtained by contacting Geoprobe Systems®.

2.0 Required Equipment

DT21 Soil Sampling System and Accessory Tools (*refer to DT21 SOP*)

DT21 Groundwater Profiler Kit, PN: GW2100 (*refer to Figure 1*)

- Includes:
- (1) DT21 PVC Screen Head, PN: 16548
 - (1) O-rings for Screen Head Seal, pkg. of 25, PN: 17808
 - (2) PVC Screen, 3/4-in. Sch. 40, 12-in. Length, 10-Slot, PN: 17194
 - (1) O-rings for 3/4-in. Sch. 40 Flush Thread PVC, pkg. of 25, PN: GW4401R
 - (3) PVC Tapered Point, 3/4-in. Sch. 40 Flush Thread, PN: 17192
 - (1) DT21 Screen Installer, PN: 17458
 - (2) DT21 Screen Release Ring, PN: 17457
 - (1) DT21 Screen Retriever, PN: 16549
 - (1) DT21 1/2-in (Sch. 80 Flush Thread) PVC Adapter, PN: 17561
 - (1) O-rings for PVC Adapter Seal, pkg. of 25, PN: AT15R
 - (1) O-rings for 1/2-in. Sch.80 Flush Thread PVC, pkg. of 25, PN: GW430R

Rod Grip Pull System

Extension Rods with Couplers (PN: AT68) and/or Quick Links (PN: AT694K)

Extension Rod Handle, PN: AT69

Water Level Meter, PN: GW2000

Purging and Sampling Equipment (*as determined by project guidelines*)

3.0 Installation of Profiler Screen

The DT21 Groundwater Profiler utilizes a PVC screen that is inserted down the open outer casing of a dual tube sampling system. The outer casing is first advanced to the bottom of the groundwater sampling interval either by removing continuous soil cores or through use of a Solid Drive Point (PN: DT4070) on the inner rod string. After removal of the inner rod string, extension rods equipped with an installation tool are used to hold the PVC screen in place as the outer casing is retracted over the screen.

This section identifies the procedure for installing the PVC Screen in the outer casing of a DT21 Dual Tube Soil Sampling System. Step 1 begins after the inner rod string has been removed from the outer casing.

Note: A 1.0-inch x 12.0-inch Center Stem (PN: 12566) may be used as the leading rod of the inner rod string for dual tube sampling (Figure 2). This ported rod allows fluid to escape from the inner rods during retrieval to minimize the potential for heaving sands and eliminate the mess of unthreading rods that are full of fluid.

Note: As with dual tube soil sampling, it may be necessary to add clean water to the outer casing before removing the inner rod string in preparation for installation of the profiler screen. Heaving sands may otherwise flow into the casing as the rods are retrieved. This can result in plugging of the outer casing that may require pulling the casing to clear.

1. Thread a DT21 Screen Head (PN: 16548) and PVC Tapered Point (PN: 17192) onto a PVC Screen (PN: 17194) as shown in Figure 1. Include O-rings on the screen and point as required by project guidelines.
2. Slide a DT21 Screen Release Ring (PN: 17457) over the fingers of a DT21 Screen Installer (PN: 17458). The release ring must be oriented such that the internal lip is toward the slotted end of the screen installer (Figure 1).
3. Thread the screen installer onto an extension rod. Attach the screen assembly to the extension rod by pushing the tapered end of the installer into the screen head until the fingers snap into place. The internal lip of the release ring

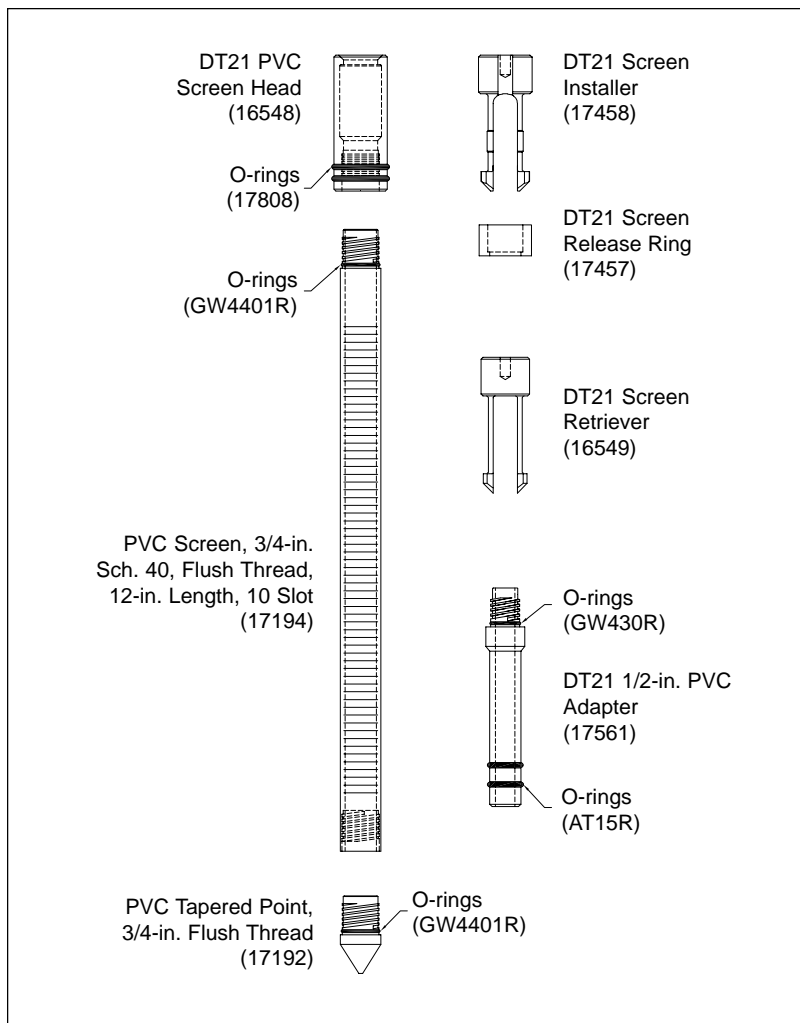


Figure 1. Components of the DT21 Groundwater Profiler Kit (GW2100).



Figure 2. Utilize a 12-inch Center Stem (12566) at the leading end of the dual tube inner rod string.



Figure 3. Screen assembly is lowered into position with extension rods.

must remain below the ridge near the middle of the installer fingers. The screen may detach from the extension rod during installation if the release ring is not properly positioned.

4. Lower the screen assembly to the bottom of the outer casing (Fig. 3) by adding extension rods until the screen point contacts soil in the cutting shoe. Ensure that at least 18 inches of extension rod extends from the outer casing. Attach the extension rod handle to the top rod.
5. Position the hammer of the direct push machine for pulling the outer casing with the rod grip pull system. Install the rod grip handle over the tool string and onto the pull block.
6. Physically hold the extension rods and screen assembly in place while slowly withdrawing the outer casing with the rod grip puller. This raises the cutting shoe up and over the screen exposing it to the formation. Stop pulling the outer casing when the screen head contacts the cutting shoe and the extension rods begin to raise with the casing.
7. External O-rings on the screen head seal inside the cutting shoe to ensure that formation fluid must pass through the screen slots during sampling. The O-rings make for a tight fit at the cutting shoe. Seat the screen head in the cutting shoe by firmly pushing down on the extension rods while slightly retracting the outer casing.
8. Pushing the extension rods down to set the screen assembly also moves the release ring up the fingers of the screen installer. This squeezes the installer fingers together and releases the screen head. Remove the extension rods from the outer casing. The screen should remain in place while the installer and release ring are retrieved on the last rod (Fig. 4). Verify screen placement by measuring with a Water Level Meter (PN: GW2000) or weighted tape.



Figure 4. The screen installer and release ring are retrieved after PVC screen is set in dual tube cutting shoe.



Figure 5. An adapter provides a sealed connection between the screen head and 1/2-in. PVC riser sections.

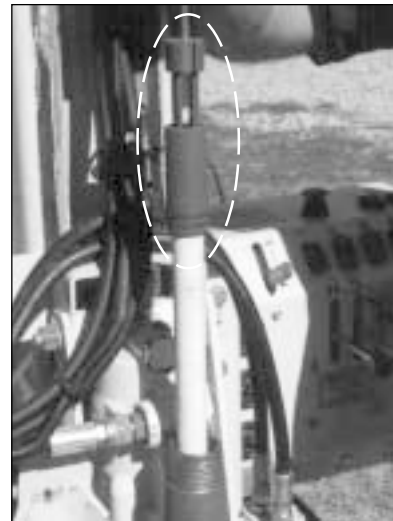


Figure 6. PVC screen is recovered after sampling or testing using extension rods and a screen retriever.

4.0 Development, Sampling, and Testing

The screen interval may be developed with a tubing check valve and samples can be collected with a bladder pump if desired. Slug tests have been successfully performed with this system in formations with hydraulic conductivity over 750 ft/day (2.6×10^{-1} cm.sec). An adapter is available to isolate the ID of the 2.125-inch probe rods (outer casing) with 1/2-inch PVC riser sections (Fig. 5). This option is useful for collecting high integrity samples or conducting slug tests in lower hydraulic conductivity formations.

5.0 Recovering Profiler Screen

Screen recovery is a straight-forward process that is easily accomplished using the DT21 Screen Retriever (PN: 16549). Simply thread the screen retriever onto an extension rod and lower the retriever to the bottom of the outer casing using additional extension rods. Once at the bottom of the casing, the fingers of the retriever will snap into the screen head. Recover the screen assembly from the outer casing with the extension rods (Fig. 6).

6.0 Incremental Advancement (Profiling)

Groundwater profiling involves sampling or testing at multiple depths during a single probe push. After recovering the profiler screen from the initial interval (Section 5.0), the outer casing is advanced to the second interval through the collection of soil cores or use of the solid drive point on the inner rod string. The decontaminated screen is installed at the second interval and then removed after sampling/testing before the outer casing is advanced to the next interval. This cycle is repeated over the entire depth of the probe push.

After profiling is completed (screen removed), seal the probe hole upon removal of the outer casing by conducting bottom-up tremie grouting with an acceptable grout mixture.



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