

# Direct Push Analytical Corp.

Direct Push Analytical uses State-of-the-Art tooling to conduct subsurface sampling activities. In the past, macrocore technology was the accepted procedure however since the release of the Dual-Tube sampling system, this technology by far exceeds the technology of the macrocore system when sampling at depths greater than 4 to 8 feet.



The dual-tube (DT) technology uses either Geoprobe 2.25 or 3.25 inch OD probe rods as an outer casing and Geoprobe 1.0 or 1.25 inch OD rods for the inner rod string. The outer rods are equipped with a cutting shoe threaded into the lead rod. When driven into the subsurface, the cutting shoe cuts a 1.125-inch OD soil core which is collected inside of the outer casing sliding into the acetate liner held in place by the inside rod string. When at depth, the inside rod string with the soils retained in the acetate liner is removed from inside of the outer rods. The outer rods remain in the ground thereby providing a cased hole. A clean liner is then attached to the inner rods, sent back downhole in the outer rods and another outer rod is added to the drill string. This tooling is then advanced into the subsurface 4 or 5 feet depending upon the equipment being utilized, and the sequence is repeated as described above.



In comparison, the entire macrocore sample system is withdrawn from the borehole after each advancement for sample collection. Then the entire macrocore system is re-inserted into the borehole with a clean liner and pushed to the depth from the previous interval, then advanced.

Re-inserting the macrocore sampler into the open borehole may cause the sampler to collect sidewall soils or soil that may have fallen into the borehole. This might provide the onsite geologist a sample interval that may contain soils that were from somewhere other than the interval of advancement. Therefore,



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using the DT system, you will get a sample completely representative of the sample interval advanced.

Using the DT technology has the following advantages:

1. Collection of continuous soil cores through a cased probe hole from depths representative of the interval advanced. This eliminates the threat of materials falling into the borehole when the liner containing the sample is withdrawn. The macrocore system does not have any means to prevent this from occurring. If "cave-in" occurs using the macrocore system, the material that fell into the open borehole will be retrieved in the liner when withdrawn from the ground and not be representative of the interval sampled. "Cave-in" can not occur using the DT system.
2. The outer rods seal off the formations from above. This is convenient when advancing to depths where there may be saturated zones above the targeted interval. The outer casing keeps the upper units in place and the samples collected from depth are not cross-contaminated as the sample is withdrawn or when a clean liner is inserted.
3. Small diameter wells can be installed directly through the outer rods. Since the equipment is in the ground at the desired termination depth, small diameter well material can be installed at the desired depth with confidence that the well will intercept the zone of interest. This is a perfect method for the installation of prepack well screens. If the macrocore system was utilized here, the well materials would be inserted after the sample tooling is completely withdrawn from the borehole and if any material fell into the borehole, then the well materials might not set at the bottom of the borehole and the interval of interest. Prepack well screens typically can not be installed after sampling with the macrocore system since the well materials would need to be inserted into an open borehole.
4. In some cases where sufficient water is encountered for sampling, because the outer casing prevents "cave-in", groundwater can be collected through the tooling. If necessary, a Groundwater Profiler



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4. (continued) Screen Assembly can be installed through the outer rods and cutting shoe thereby provided a means for collection of groundwater at desired intervals as the probe tooling is withdrawn.

The Dual-Tube sampling system is by far the best approach to retrieve samples representative of the entire borehole eliminating the guesswork out of "cave-in" materials versus native soils. We probably use the DT system on 95% of the projects that we complete. We only use the macrocore system for shallow sampling (ie. 0-4 ft), unless directed otherwise by our customer.



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