

BESST, INC.

Best Environmental Subsurface Sampling Technologies
"Sample Quality You Can Trust"

MaxiSimulProbe™



Soil and Soil-Gas Mode Written SOPs

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STANDARD OPERATING PROCEDURES FOR IN-SITU SAMPLING WITH THE MAXI SimulProbe®

(Collecting Soil and Soil Gas Simultaneously)

1.0	INTRODUCTION.....	2
2.0	DESCRIPTION.....	2
3.0	OPERATION: Assembly and Operating Instructions for Soil/Soil Gas Mode Using Wire-Line Down-Hole Hammer (or Up-Hole Hammer) and Up-Hole Vacuum Pump.....	3
4.0	OPERATION: Assembly and Operating Instructions for Soil/Soil Gas Mode Using the Drive and Sniff Technique for Continuous and Discrete Soil Gas and Pressure Response Profiling of Soil Core...5	5
5.0	DECONTAMINATION.....	5

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1.0 INTRODUCTION

The SimulProbe® is an in-situ sampling device which allows the simultaneous collection of either in-situ soil gas with soil core or in-situ liquid with soil core. The purpose of the tool is to collect soil samples simultaneously with liquid or gas which are directly correlative and can be economically collected in one sampling event. The directly correlative nature of the fluids and solids provides more accurate interpretations about:

- (1) The relationship between contaminant distribution and stratigraphic characteristics.
- (2) The opportunity to compare contaminant concentration in gas and liquid with that found in directly correlative soil core.

2.0 DESCRIPTION

The SimulProbe® (see schematic) is shaped much like a split spoon sampler, but has some distinct differences. A listing of the tool's important dimensions are presented below:

- (1) 3.38 inches outside diameter (OD) along the length of the entire tool; excluding the cutting edge of the Drive Shoe.
- (2) The inside diameter (ID) of the core barrel is 2.5 inches.
- (3) The core barrel length is 18 inches.
- (4) The Drive Shoe length is 3 inches.
- (5) The 2 liter stainless steel water canister is a 19 inch long modular unit to the base unit.

3.0 OPERATION: Assembly and Operating Instructions for Soil/Soil Gas Mode Using Wire-Line Down-Hole Hammer (or Up-Hole Hammer) and Up-Hole Vacuum Pump

- 3.1 Place clean Teflon Tubes along the slots in the edges of the Core Barrel Primary Half and push Teflon Tubes into the fluid pathway holes at the top of the slots. The lower end of the Teflon Tubes should end about 1/4 inch short of the lower end of the slots.
- 3.2 Insert a Stopper (black or green colored) into the Core Barrel Primary Half fluid displacement port at top of the core barrel.
- 3.3 Place 3 Core Sleeves into the Core Barrel Primary Half.

Note: **Do not** use standard 6"-long core sleeves as they will not allow the SimulProbe® Drive Shoe to fully close. (STI Maxi SimulProbe® core sleeves are 5 and 13/16 inches long.)

- 3.5 Place the Core Barrel Cover Half over Core Barrel Primary Half, making sure that the Teflon Tubes are in the grooves between the core barrel halves.
- 3.6 Clamp the core barrel halves together using the chain vise on the driller's breakdown rack. This allows the Coupling to be easily screwed into place.
- 3.7 Place the Circular Screen over circumferential channel and fluid entry ports at the bottom of core barrel. The circumferential channel is the channel on the outside of the core barrel halves just above the threads to which the Coupling is later attached.
- 3.8 Screw the Coupling onto the bottom of the core barrel, being careful to keep you fingers back from the sharp edges of the screen.
- 3.9 Insert the Shoe Sleeve, male threads first, into the bottom (threaded end) of the Cover Sleeve. Attach this assembly to the bottom of the core barrel by screwing it into the Coupling. (See schematic)
- 3.10 Screw the Drive Shoe onto the bottom of the Cover Sleeve.
- 3.11 Screw the Sampler Head into the top of the Core Barrel Primary Half; making sure to place a Black O-Ring above the threads of the Sampler Head.
- 3.12 Wrap Teflon tape around the pipe threads of a 3/8" NPT x 1/4" Swage-lok Connector and screw it into one of the ports on top of the Sampler Head. A 3/8" NPT Plug with Teflon tape should be placed in the second port.

- 3.13 Close the Drive Shoe and pull a Gooch Tube over the junction between the core barrel and the Drive Shoe. A Gooch Tube is a 2-inch piece of rubber tubing which is included in your soil gas (or groundwater) kit. The purpose of the Gooch Tube is to hold the Shoe in the closed position while the tool is lowered into the bore hole.
- 3.14 Attach the down-hole end of a vacuum line to the Swage-lok fitting on the top of Sampler Head; using a 3/16 inch ID, 1/4 inch OD Teflon line.
- 3.15 Attach the SimulProbe® to a down hole hammer using a one-foot long AW rod and lower the SimulProbe® to the bottom of the bore hole.
- 3.16 Attach the up-hole end of the vacuum line to the vacuum pump intake.
- 3.17 For the drive and sniff mode, turn on the vacuum pump after driving the SimulProbe® about 6 inches and use an OVM (or OVA) to monitor the vacuum pump exhaust. Hammer in the SimulProbe® a total of 21 inches to collect the soil core sample, pausing where appropriate to “sniff” the vacuum pump exhaust with an OVM.
- 3.18 Pull SimulProbe® back 1 to 2 inches to retract the sliding Drive Shoe and expose the Circular Screen.
- 3.19 Use vacuum pump to purge vacuum line and collect soil gas sample. The purging process is complete when the OVM readings stabilize, and the flow meter indicates that the specified purge volumes have been removed. The Maxi SimulProbe® in the soil gas mode has a 200 ml purge volume. The 3/16” id Teflon line has a purge volume of 5.43 cc/ft.
- 3.20 Pull SimulProbe® to surface for core retrieval, disassembly, and decontamination.
- 3.21 Preferably use SimulProbe® wrenches to disassemble SimulProbe®, except as noted below. (The wrenches are designed to maximize mechanical advantage and prevent damage.) The chain vise on the driller’s breakdown table may be used to hold the Cover Sleeve while removing the Drive Shoe and to hold the core barrel while removing the Coupling.

4.0 OPERATION: Assembly and Operating Instructions for Soil/Soil Gas Mode Using the Drive and Sniff Technique for Continuous and Discrete Soil Gas and Pressure Response Profiling of Soil Core

- 4.1 Follow assembly instructions as described in Section 3 above.
- 4.2 Drive the SimulProbe® 4 to 6 inches below the bottom of the bore hole so that the length of the drive shoe and the bottom edge of the core barrel are fully buried in the new geologic material.
- 4.3 Turn on the vacuum pump and purge the vacuum line until the OVM (or OVA) and vacuum pressure response readings stabilize and the flow meter indicates that sufficient volume has been purged. Then record OVM (or OVA), vacuum gauge pressure and flow meter response.
- 4.4 Repeat Step 3 as many time as necessary for the desired detail along the core length.
- 4.5 Remove the SimulProbe® after it has penetrated 21 inches. Breakdown core barrel and compare geologic characteristics of the core to the OVM and pressure response logs.

5.0 DECONTAMINATION

Follow procedures specified in site specific work plan and/or quality assurance project plan for standard operating procedures for sampling device decontamination. Always use a new consumable kit for each sample. Reuse of consumables may result in cross contamination of samples through incomplete decontamination or from leakage through damaged O-Rings and Reed Valves.