

# **BESST, INC.**

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

## **SimulProbe™** Written SOPs (vacuum box)

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# STANDARD OPERATING PROCEDURES FOR THE SIMULPROBE VACUUM BOX

## 1.0 INTRODUCTION:

The SimulProbe Vacuum Box is designed to allow you to collect a soil gas sample directly from the soil gas line into a Tedlar Bag without first passing the sample through a pump. This eliminates the question of cross contamination from the pump's interior parts (rubber diaphragm, filters, gauges, etc.) or the need to disassemble and/or decontaminate the pump after each sample. The concept is simple: The pump is used to evacuate the air from around the outside of the bag, causing natural atmospheric pressure to push the soil gas sample directly in the Tedlar Bag from the soil gas tubing.

## 2.0 ASSEMBLY:

- 2.1 Connect the Whitey Valve (valve with black handle) to the metal fitting on the side of the Vacuum box.
- 2.2 Connect the White and red plastic valve to the plastic port on the side of the Vacuum box by *gently* pushing the valve on to the fitting. The long silicon rubber tube should connect the metal T-fitting to the barbed nipple on the side of the white and red plastic valve. Set the control on the valve so that the middle black arrow points at the barbed nipple with the silicon rubber tube attached. Make sure that the red plug on the end of the valve is snug.
- 2.3 Connect the line from the SimulProbe, SVE well, or other soil gas source to the compression fitting on the bottom of the Whitey Valve. This fitting is designed to connect to 1/4" OD tubing using Swagelok ferrels. Brass Ferrels are fine for this application.
- 2.4 Connect the line from the Vacuum Pump to the barbed nipple on the bottom of the Stainless Steel T-fitting.
- 2.5 Point the handle of the Whitey Valve away from the Vacuum box and toward the T-fitting. This routes the soil gas directly to the pump for purging the system, bypassing the Tedlar bag.

- 2.6 Attach the Tedlar Bag to the end of the Teflon Tube inside of the Vacuum box. (Insert the inlet tube of the Tedlar Bag into the end of the Teflon Tube which extends in from the metal fitting.)
- 2.7 Open the Tedlar Bag's valve.
- 2.8 Wipe the O-ring groove at the top edge of the Vacuum box base with a clean, damp paper towel or soft cloth and place the o-ring in the groove. (Skip this step if your o-ring is already glued into place.) Wipe the bottom edge of the Vacuum box top and place it on the base, making sure that the edge of the Tedlar bag is clear of the seal.

### **3.0 OPERATION:**

- 3.1 Make sure that the arrow on the handle of the Whitey Valve is pointed away from the Vacuum box. This is the purge position.
- 3.2 Purge the volume of gas required by your project specific requirements. The flow indicator on the SimulProbe Vacuum Pump can be used to measure the purge if the flow rate five liters per minute or less. If the flow rate is greater than five LPM, the valve on the flow meter can be used to choke the flow back to the range of the meter, if exact measurements are required.
- 3.3 During the purge, check the Tedlar Bag. If it shows any inflation, the connection between the Whitey Valve and the Vacuum Box is leaking. Tighten the knurled nut to stop the leak.
- 3.4 To collect a gas sample, simply turn the control on the Whitey valve so that the arrow points at the Vacuum Box and the Tedlar Bag. This is the fill position. The pump is now pulling air out of the Vacuum Box, causing the soil gas sample to flow into the bag.
- 3.5 Do not overfill the Tedlar Bag or it will break. As the bag approaches being full, choke back the pump by closing down the valve on the Vacuum Pump's flow meter.
- 3.6 Turn the Whitey Valve back to the purge position. (Arrow pointing away from the Tedlar Bag.) Shut off the pump, remove the red plug on the red and white plastic valve to relieve any residual Vacuum. Replace the red plug, open the Vacuum Box and close the Tedlar Bag's valve. Pull the Tedlar Bag off of the Teflon Tube.
- 3.7 Note that in cases where the gauge on the Vacuum Box indicates high vacuum during the fill, the Tedlar bag will appear to be full, but will

collapse when the vacuum is released from the box. This occurs in tight soil conditions. To fill the sample bag in these circumstances, loosen the plug in the red and white plastic valve as the Tedlar begins to *look* full. Use this connection to slowly bleed down the vacuum so that the Tedlar continues to appear full. (If the Tedlar collapses, you are bleeding the vacuum off too rapidly. Soil gas molecules are continuing to flow into the Tedlar during this bleed-off process.) The sample is complete when you have bled off most of the vacuum and the Tedlar still appears full.

- 3.8 To purge the valve of any residual soil gas in preparation for the next soil gas sample, simply place the Vacuum Box top back on the base, disconnect the soil gas line from the valve, remove the red plug from the plastic valve and turn on the Vacuum Pump. Run the Vacuum Pump for several minutes with the Whitey Valve's black handle pointed at the Vacuum Box at first and then away from the Vacuum Box. Shut off the Vacuum Pump and replace the red plug.

#### **4.0 MAINTENANCE:**

Wash the Vacuum box in mild, cool soap solutions only. DO NOT use organic solvents on the Vacuum Box under ANY circumstances as they will significantly weaken the polycarbonate material of the Vacuum Box. Inspect the Vacuum Box before each use. If it shows any sign of cracking, DO NOT USE IT.