

Soil Gas Probe Model 204

Disclaimer

Any sample collection equipment provided by GeoFrontiers is to be used only by trained field personnel who understand the potentially hazardous conditions that may be present during geochemical sample collection. Geochemical sampling devices are to be used in accordance with the instructions provided and are not to be used in violation of any national or local laws or regulations.

GeoFrontiers Corporation is not responsible for any damages or injuries incurred from the use of the soil gas probe. These damages include all human injury, property, and any buried utilities. It is the user's responsibility to ensure proper usage of the soil gas probe.

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Instructions

This article introduces safety, assembly, maintenance and sample collection using the GeoFrontiers Soil Gas Probe.

Safety

Safety precautions should be exercised when using the soil gas probe. Safety glasses are recommended. With all moving parts there is a chance that struck materials could fracture and be forcefully displaced. Care should be taken to be sure body parts are not going to be in the way of moving slide hammer, or at probe point during hammer impact. Common sense is the best information to use when operating the soil gas probe.

Review local, municipal, state, or federal policies before attempting to sample in North America. Usually mineral permits, utility locations, and surface permissions are required before sampling on any given property. Always request a "utility locate" before sampling to avoid hitting any buried utilities such as water, electricity, phone lines, etc. Most states and provinces supply this service free of charge and should always be utilized to avoid property damage and human injury.

Setup

When the probe is removed from its packing, the only assembly required is to screw the slide hammer onto the probe body. Two open ended wrenches are required for assembly: 15/16 inch (24 mm) wrench and 1 inch (26 mm) wrench. Finger tighten the slide hammer assembly onto threads at top of probe. Slide hammer should screw down approx 1 inch (25 mm). Ensure nut is down all the way by using 1 inch (25 mm) wrench and turning clockwise while holding the probe with the other hand.



Figure 1. Tighten lock nut



Figure 2. Push Septum into hole

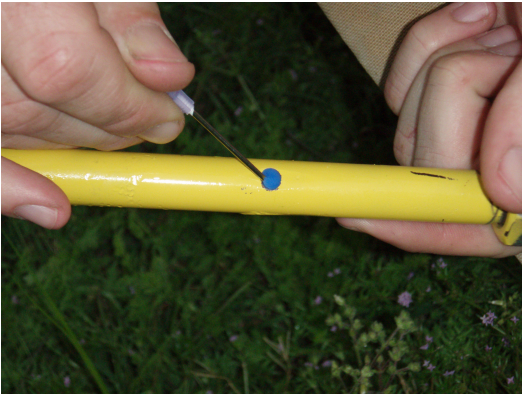


Figure 2.1: Remove old Septum

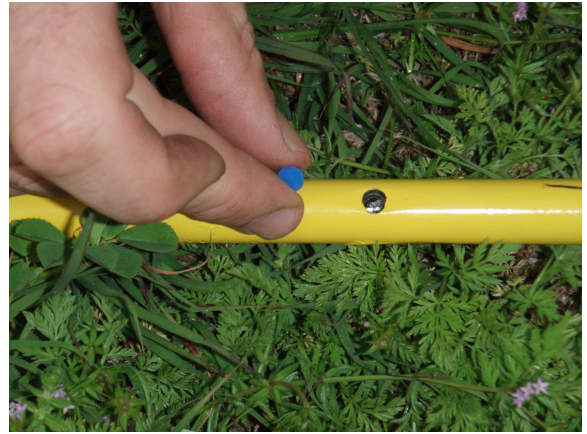


Figure 3: Septum beside Septum hole



Figure 4: Pushing Septum into probe

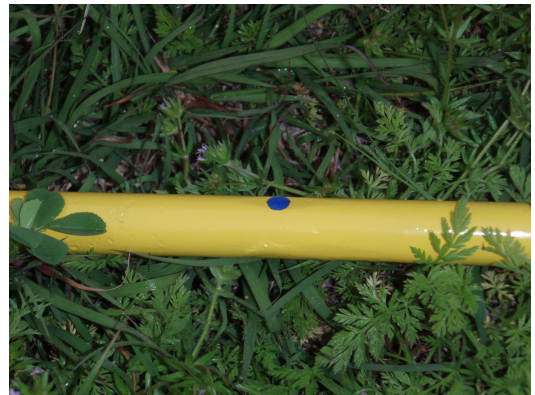


Figure 5: Properly installed Septum

After concluding the slide hammer is threaded all the way onto the probe, tighten jam nut on probe (turning counterclockwise) with adjustable wrench until it contacts bottom of slide hammer nut. After contact, it will be necessary to use both wrenches to “lock” the jam nut into the slide hammer assembly as shown in Figure 1. This ensures that the slide hammer nut will not loosen and thus prevent damage to the threads on the probe. **Caution: Keep the locknut tight during use to avoid damage to the probe or slide hammer threads.**

Leak Test

The Septum hole is located below the jam nut as shown in Figure 3. **Install a new septum each day of use.** To install a new septum, simply remove the old septum with the large needle provided (Figure 2.1). Press the new septum into hole ensuring the top of the septum is level or flush with the probe body (Figure 5). Before first use each day, the probe should be tested for leaks. To leak test, seal the probe inlet (end nearest the steel ball) as shown in Figure 6. A moistened finger, extra septum, or vinyl tape are good methods for temporarily plugging the probe inlet.

While the inlet is sealed, insert a hypodermic needle attached to a syringe into the septum and pull out the syringe plunger as shown in Figure 7. **Caution: Use only the needles supplied for the probe. Longer needles could cause serious damage to the probe.**

When the plunger is released, the plunger should be forced to the bottom of the syringe by atmospheric pressure as shown in Figure 8. If the plunger goes all the way to the bottom of the syringe, the probe passes the leak test. If a leak is present, the plunger will go only part way to the bottom.



Figure 6: Sealing Probe Inlet

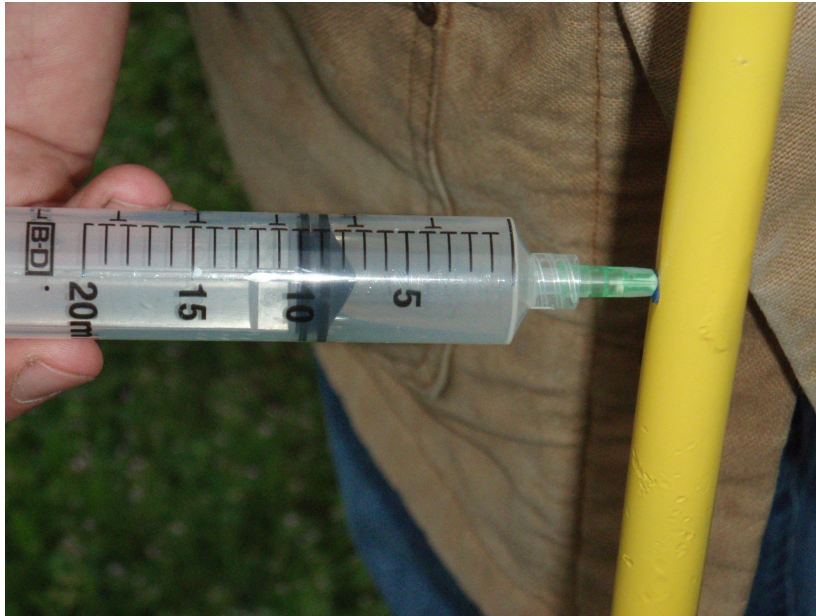


Figure 7: Syringe plunger pulled out makes a vacuum



Figure 8: Atmospheric pressure forcing plunger to bottom syringe signifies no leaks

If a leak is detected, correct as follows: These steps are listed in order of most common cause first.

1. Be sure the probe inlet is completely sealed. Use an extra septum, moisten the septum with water or saliva, and press the moistened septum firmly over the sample inlet. Retest.
2. Test the syringe and needle for leaks. Place a septum over the end of the needle as in Figure 9. Be sure the end of the needle is inside the septum, not all the way through the septum. Pull the plunger up about half the way up and release. The plunger should return to the bottom of the syringe. If the plunger does not return all the way, tighten the needle to syringe connection and try again. If this test continues to fail, replace both the syringe and the needle. Retest the probe.
3. Replace the probe septum.
4. While the septum is removed, be sure the areas the septum contacts are free from particles that might prevent a seal. Retest.
5. If a leak cannot be fixed by these actions, the leak may be internal and the probe must be replaced.



Figure 9: Leak test syringe



Figure 10: Probe at 1m and full sample syringe



Figure 12: Label sample bottle



Figure 11: Inject all of sample in bottle

Sample Collection:

At the sample location, pound the probe into the ground by striking the movable part of the slide hammer firmly in the down direction. Repeat until the probe is at the desired sample depth. Maximum depth is 1 meter when the septum collection port is slightly above ground level (Figure 10).

After the probe is at the desired depth, sample collection requires the following steps.

1. Using the syringe withdraw 4 cc of soil gas and discard. The 4 cc volume is four times the internal sample volume of the probe. Discarding this volume flushes previous sample from the probe.
2. Collect 20 cc of soil gas using the syringe.
3. Inject all the 20 cc of soil gas into the sample bottle. The evacuated bottles have an internal volume about 12 cc. Approximately 8-10 cc of gas will be forced into the bottle by atmospheric pressure (Figure 11). The remaining sample should be forced into the bottle by pressing the syringe plunger. The sample in the vial will be above atmospheric pressure.
4. Be sure to label the sample bottle using a unique sample number (Figure 12). Also, be sure to record the sample location using GPS or other means.