



Standard Operating Procedure Installation and Extraction of the FLX-VP™ VAPOR PIN®

Updated January 18, 2019

Scope:

This standard operating procedure describes the installation, use, and extraction of the FLX-VP™ for sub-slab soil-gas sampling.

Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the FLX-VP™ for the collection of sub-slab soil-gas samples or pressure readings.

Equipment Needed:

- Assembled FLX-VP™ [FLX-VP™ barb fitting with O-ring, FLX-VP™ base, and silicone sleeve (Figure 1)]; Because of sharp edges, gloves are recommended for sleeve installation;
- Hammer drill;
- 5/8-inch (16mm) diameter hammer bit (hole must be 5/8-inch (16mm) diameter to ensure seal. It is recommended that you use the drill guide). (Hilti™ TE-YX 5/8" x 22" (400 mm) #00206514 or equivalent);
- 1½-inch (38mm) diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch (19mm) diameter bottle brush;
- Wet/Dry vacuum with HEPA filter (optional);
- VAPOR PIN® installation/extraction tool;
- Dead blow hammer;

- VAPOR PIN® flush mount cover, if desired;
- VAPOR PIN® drilling guide, if desired;
- VAPOR PIN® protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel for repairing the hole following the extraction of the FLX-VP™.



Figure 1. Assembled FLX-VP™

Installation Procedure:

- 1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.
- 2) Set up wet/dry vacuum to collect drill cuttings.

VAPOR PIN® protected under US Patent # 8,220,347 B2, US 9,291,531 B2 and other patents pending

- 3) If a flush mount installation is required, drill a 1½-inch (38mm) diameter hole at least 1¾-inches (45mm) into the slab. Use of a VAPOR PIN® drilling guide is recommended.
- 4) Drill a 5/8-inch (16mm) diameter hole through the slab and approximately 1-inch (25mm) into the underlying soil to form a void. Hole must be 5/8-inch (16mm) in diameter to ensure seal. It is recommended that you use the drill guide.
- 5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.
- 6) Place the lower end of the assembled FLX-VP™ into the drilled hole. Place the small hole located in the handle of the installation/extraction tool over the barb fitting and tap the FLX-VP™ into place using a dead blow hammer (Figure 2). Make sure the installation/extraction tool is aligned parallel to the FLX-VP™ to avoid damaging the barb fitting.



Figure 2. Installing the FLX-VP™

During installation, the silicone sleeve will form a slight bulge between the slab and the FLX-VP™ shoulder. If the silicone sleeve slides excessively upward, creating a large bulge at the top of the FLX-VP™, reinstall the FLX-VP™ using a new silicone sleeve. The top of the silicone sleeve should only cover the lower one or two barbs of the FLX-VP™. Place the protective cap on FLX-VP™ to prevent vapor loss prior to sampling (Figure 3).



Figure 3. Installed FLX-VP™

- 7) For flush mount installations, cover the FLX-VP™ with a flush mount cover, using either the plastic cover or the optional stainless-steel Secure Cover (Figure 4).



Figure 4. Secure Cover Installed

- 8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to re-equilibrate prior to sampling.
- 9) Remove protective cap and connect sample tubing to the barb fitting of the FLX-VP™. This connection can be made using a short piece of Tygon™ tubing to join the FLX-VP™ with the Nylaflow tubing (Figure 5). Put the Nylaflow tubing as close to the FLX-VP™ as possible to minimize contact between soil gas and Tygon™ tubing.

If you wish to directly connect to FLX-VP™ accessory (e.g. Swagelok fitting, TO-17 tube, or quick connect) unscrew the barb fitting and replace with accessory (Figures 6 and 7).



Figure 5. FLX-VP™ sample connection



Figure 6. FLX-VP™ with Swagelok® connection



Figure 7. FLX-VP™ with TO-17 Sorbent tube connection

10) Conduct leak tests in accordance with applicable guidance. If the method of leak testing is not specified, an alternative can be the use of a water dam and vacuum pump, as described in SOP Leak Testing the FLX-VP™ via Mechanical Means (Figure 8). For flush-mount installations, distilled water can be poured directly into the 1 1/2 inch (38mm) hole.



Figure 8. Water dam used for leak detection

11) Collect sub-slab soil gas sample or pressure reading. When finished, replace the barb fitting and protective cap and flush mount cover until the next event. If the sampling is complete, extract the FLX-VP™.

Extraction Procedure:

- 1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the FLX-VP™ (Figure 9). Continue turning the tool clockwise to pull the FLX-VP™ from the hole into the installation/extraction tool.
- 2) Fill the void with hydraulic cement and smooth with a trowel or putty knife.



Figure 9. Removing the FLX-VP™

- 3) Prior to reuse, remove the silicone sleeve and protective cap and discard. Decontaminate the FLX-VP™ in a hot water and Alconox® wash, then heat in an oven to a temperature of 265° F (130° C) for 15 to 30 minutes. For both steps, STAINLESS – ½ hour, BRASS 8 minutes
- periodically. These parts are available on-line at www.vaporpin.com

The FLX-VP™ is designed to be used repeatedly, however, accessories, replacement parts and supplies will be required