

## Scope:

This standard operating procedure describes the installation and extraction of the Vapor Pin™<sup>1</sup> for use in 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 Vapor Pin™ for the collection of sub-slab soil-gas samples.

## Equipment Needed:

- Assembled Vapor Pin™ [Vapor Pin™ and silicone sleeve (Figure 1)];
- Hammer drill;
- 5/8-inch diameter hammer bit (Hilti™ TE-YX 5/8" x 22" #00206514 or equivalent);
- 1½-inch diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch diameter bottle brush;
- Wet/dry vacuum with HEPA filter (optional);
- Vapor Pin™ installation/extraction tool;
- Dead blow hammer;
- Vapor Pin™ flush mount cover, as necessary;
- Vapor Pin™ protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel.



**Figure 1.** Assembled Vapor Pin™.

## Installation Procedure:

- 1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.
- 2) Set up wet/dry vacuum to collect drill cuttings.
- 3) If a flush mount installation is required, drill a 1½-inch diameter hole at least 1¾-inches into the slab.
- 4) Drill a 5/8-inch diameter hole through the slab and approximately 1-inch into the underlying soil to form a void.
- 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 Vapor Pin™ assembly into the drilled hole. Place the small hole located in the handle of the extraction/installation tool over the Vapor Pin™ to protect the barb fitting and cap, and tap the Vapor Pin™ into place using a

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<sup>1</sup>Cox-Colvin & Associates, Inc., designed and developed the Vapor Pin™; a patent is pending.

dead blow hammer (Figure 2). Make sure the extraction/installation tool is aligned parallel to the Vapor Pin™ to avoid damaging the barb fitting.



**Figure 2.** Installing the Vapor Pin™.

For flush mount installations, unscrew the threaded coupling from the installation/extraction handle and use the hole in the end of the tool to assist with the installation (Figure 3).



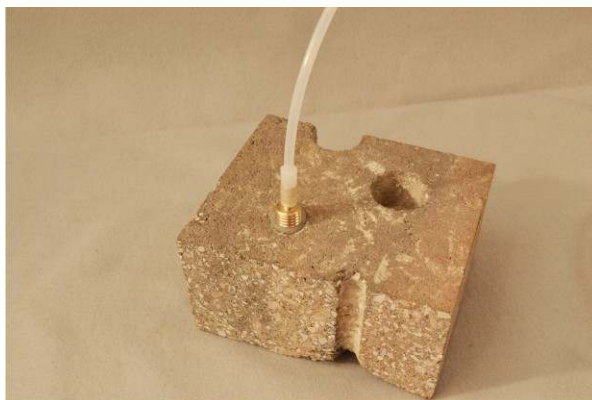
**Figure 3.** Flush-mount installation.

During installation, the silicone sleeve will form a slight bulge between the slab and the Vapor Pin™ shoulder. Place the protective cap on Vapor Pin™ to prevent vapor loss prior to sampling (Figure 4).



**Figure 4.** Installed Vapor Pin™.

- 7) For flush mount installations, cover the Vapor Pin™ with a flush mount cover.
- 8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to equilibrate prior to sampling.
- 9) Remove protective cap and connect sample tubing to the barb fitting of the Vapor Pin™ (Figure 5).



**Figure 5.** Vapor Pin™ sample connection.

- 10) Conduct leak tests [(e.g., real-time monitoring of oxygen levels on extracted sub-slab soil gas, or placement of a water

dam around the Vapor Pin™) Figure 6]. Consult your local guidance for possible tests.

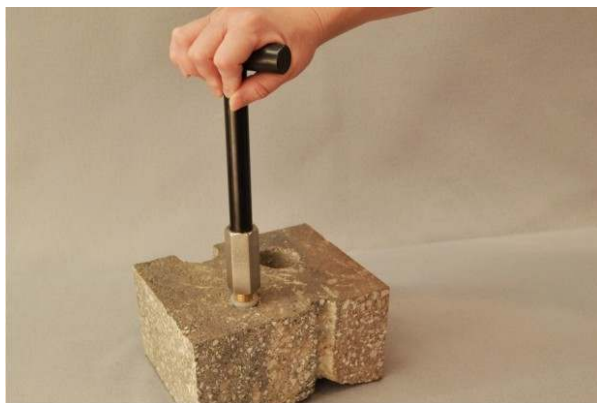


**Figure 6.** Water dam used for leak detection.

- 11) Collect sub-slab soil gas sample. When finished sampling, replace the protective cap and flush mount cover until the next sampling event. If the sampling is complete, extract the Vapor Pin™.

Extraction Procedure:

- 1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the Vapor Pin™ (Figure 7). Continue



**Figure 7.** Removing the Vapor Pin™.

turning the tool to assist in extraction, then pull the Vapor Pin™ from the hole (Figure 8).



**Figure 8.** Extracted Vapor Pin™.

- 2) Fill the void with hydraulic cement and smooth with the trowel or putty knife.
- 3) Prior to reuse, remove the silicone sleeve and discard. Decontaminate the Vapor Pin™ in a hot water and Alconox® wash, then heat in an oven to a temperature of 130° C.

The Vapor Pin™ is designed to be used repeatedly; however, replacement parts and supplies will be required periodically. These parts are available on-line at [www.CoxColvin.com](http://www.CoxColvin.com).

Replacement Parts:

- Vapor Pin™ Kit Case - VPC001
- Vapor Pins™ - VPIN0522
- Silicone Sleeves - VPTS077
- Installation/Extraction Tool - VP1E023
- Protective Caps - VPPC010
- Flush Mount Covers - VPFM050
- Water Dam - VPWD004
- Brush - VPB026