VAPOR SAMPLING DEVICES

Today there are a number of types of equipment that can be used to measure vapor concentrations in air and soil gas. Each has advantages and disadvantages, and at many sites more than one of these devices are used.

Summa™ Canisters

Summa™ canisters are the tried-and-true workhorses of vapor intrusion sampling. They are stainless steel spheres with valves on top, brought to the site with a pre-set vacuum pressure. When the valve is opened for a set amount of time—usually eight or twenty-four hours—for indoor or outdoor air—the vacuum pulls in vapors. To measure soil gas, a probe attached to the valve is inserted through the foundation. The valve is then closed, and the entire canister is sent to a lab for analysis.

Passive Samplers

Passive samplers are small devices that adsorb vapors from the surrounding air onto activated charcoal or other substances. They come in a variety of shapes, including tubes, badges, and radial cylinders. Depending upon the type, they can be left in place for a period of one day to a month or perhaps even longer. Shipped to a lab, the vapors are removed with solvents or heat and then measured.

Summa™ Canister (left) and passive sampler (right)

Real-Time Samplers

While there are many real-time and near-real-time devices capable of measuring volatile organic compounds in air, only a few reach the low detection limits required to measure compounds such as TCE and PCE in indoor air at their action or screening levels. Such equipment is expensive, but the cost per sample may be reduced because many samples can taken and multiple locations can be tested with a single deployment.

Portable gas chromatograph/mass spectrometers (GC/MS) such as the suitcase-size Hapsite® can be moved from room to room. They can be used to seek out preferential vapor pathways as well as background sources.

Electronic capture detectors (ECDs) are slightly larger but less expensive than portable GC/MS devices. These can continuously monitor multiple locations in a single building and communicate results remotely via Internet or wireless networks.

U.S. EPA's Trace Atmospheric Gas Analyzer (TAGA) van can provide continuous measurements of air and soil gas via a long-plastic tube run from the TAGA instrument into the building. The instrument registers continuous concentrations of two target compounds as the end of the tube is moved through the building or attached to soil gas probes.

Inside EPA's TAGA Van

Radon Detectors

This country and others have decades of experience sampling for the intrusion of naturally occurring, radioactive radon gas into homes and other buildings. Some radon detectors are similar to passive samplers. Others directly measure radiation. They are generally less expensive than devices used to sample VOCs. While licensed professionals can be hired to conduct sampling, the average homeowner can emplace his or her own kit. Sampling can be for as short as two days, or if an average level is sought, as long as a year.

If radon levels in a building are above concentrations in the outdoor air, that suggests that soil gas intrusion is taking place. If there are VOCs present in the soil gas, then those vapors are likely intruding. Furthermore, if one samples radon in soil gas and indoors at the same time, one can *roughly* estimate the site-specific attenuation factor for volatile organic compounds.

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