



### General Sampling Tips

1. Please ensure that you have adequately communicated your project requirements to the laboratory. This will include regulatory requirements, analyte lists and expected analyte levels.
2. TD sample volumes should never exceed 10 liters - the most stringent regulatory limits can be achieved using only 2 liters. Contact the laboratory for recommended sampling volumes based on your specific site conditions.
3. Do not sample during or just after wet weather. This ensures representative vapour samples are collected, and minimizes water saturation on thermal desorption tube (TD) media.
4. Flow rates for sampling from wells should not exceed 200mL/min.
5. It is good practice to purge vapor wells prior to sampling. A general rule is to purge three well volumes before sampling. If you wish to purge with a TD tube in-situ, we can provide specific tubes and tubing for this purpose - Please do not use the media that has been provided for sample collection.
6. Do not smoke, drive or have nearby materials that can contaminate the samples. Keep sample train material (tubing, fittings, etc...) sealed and away from any VOC emitting sources to avoid possible contamination.
7. Ambient samples and field blanks may be collected to ensure that the conditions in the ambient air are not contributing to the site's soil vapour profile.
8. Do not use a tool to tighten the TD caps following sampling as this can damage the tube and impact results. Finger tightening is all that is required.

### Sample Collection Set-Up

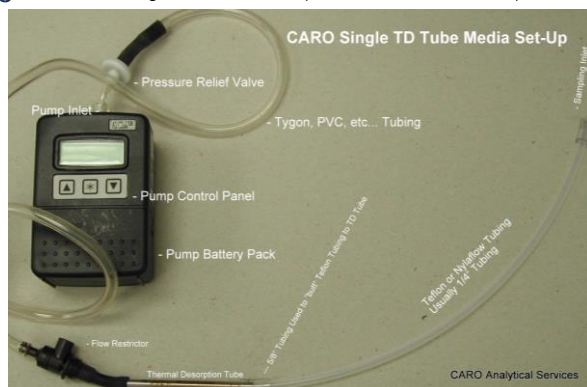
1. Ensure that TD tubes and other media are oriented in the correct direction with the flow of air following the arrow or the writing on the tube from left to right.
2. Do not write directly on, or affix labels directly to, the sample media. Use serial numbers to track tubes instead, and apply labels to the polypropylene containers provided. This ensures that the media is not affected by labels (containing glue/VOCs) or pens (VOCs also).
3. CARO recommends hard Teflon or Nylon tubing from the sample media inlet to the well head to eliminate potential for contamination from sample train. Use the shortest tube length possible from the well head to the sample media. This will eliminate potential for contamination from sample train materials and minimize adsorption effects.
4. Softer and larger diameter tubing is used at connection points. Small lengths of soft tubing (~1 inch) are placed over the hard tubing and sample media using a butt joint.
5. Ensure that the pump and any monitoring devices are downstream from the sample media. Refer to Figures 1 and 2 for common set ups.

## Contact Us Anytime!

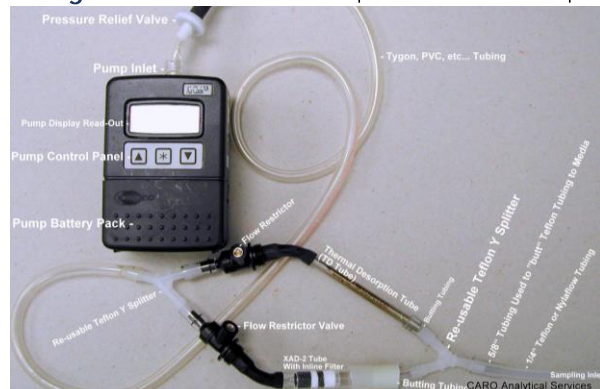
Contact your CARO Project Sidekick with any questions on the fly! Most common challenges can be resolved over the phone, or by consulting the troubleshooting guide that is included with each Soil Vapour Sampling Kit.

**1-877-769-9646**

**Figure 1.** Single Media Sample Collection Set-up



**Figure 2.** Dual Media Sample Collection Set-up





### What soil vapour parameters can CARO test for?

Schedule 3.3 of the BC Environmental Management Act – Contaminated Sites Regulation provides a comprehensive list of potential soil vapour compounds. CARO has currently validated nearly 100 Schedule 11 compounds including: Volatile Organic Compounds (VOCs), VPHv, and Polycyclic Aromatic Hydrocarbons (PAHs).

CARO has developed standard Soil Vapour Capabilities lists through dialogue with various environmental consultants, that are representative of what may be found at typical contaminated sites. Further to these lists, CARO has validated many other compounds, and continues to support our clients by collaborating on various development projects.

### What detection limits can CARO achieve?

CARO's detection limits are based on a minimum detectible analyte mass ( $\mu\text{g}$ ) divided by the sample volume collected ( $\text{m}^3$ ). This provides a minimum reported detection limit (RDL) in  $\mu\text{g}/\text{m}^3$  units. CARO's RDLs are lower than the lowest Schedule 3.3 regulatory limits when using as little as 2L of air. Please contact us to obtain a comprehensive RDL list.

### What is adsorption?

Adsorption is a process that occurs when a gas accumulates on the surface of a solid (sorber) material. For soil vapour applications, this involves drawing ambient air or soil gas through media designed specifically to adsorb certain groups of compounds.

### What “media” types are used to collect soil vapour samples?

**Thermal Desorption (TD) Tubes** - VOCs and aggregate organic parameters are collected onto multi-bed sorbent tubes specifically designed to capture these analyte groups. These compounds are thermally desorbed, then identified and quantified using gas chromatography coupled with mass spectrometry (GC/MS).

**XAD-2 Resin Filters** - PAHs are collected onto a specifically designed proprietary resin (XAD-2). These compounds are solvent extracted then identified and quantified using gas chromatography coupled with mass spectrometry (GC/MS).

### What are the primary advantages & challenges of sorbent media?

We have chosen sorbent media (TD Tubes & XAD-2 Filter Tubes) that provide our clients with the most cost effective, practical and technically sound approach for collecting and analyzing soil vapour.

Sorbent media allow for collection and analysis of relatively large volumes of air compared to direct air analysis approaches. This is important, as larger sample volumes allow for lower detection limit ability. Sorbent media also tends to be more cost effective and they provide a broader list of possible compounds in a single analytical run.

TD sorbent media had traditionally been susceptible to moisture which decreased sorption potential. CARO has worked with our supplier to develop a custom hydrophobic TD media that is optimized for VOC's and for moist conditions. Study data indicates that up to 30L of 90% RH air can be sampled with minimal risk of VOC breakthrough.

Historically, TD Tubes had provided a single analysis opportunity. This caused problems where parameters exceed the instrument calibration range, or where instrument problems occurred. CARO has addressed this by becoming the first BC laboratory to commission next-generation analytical equipment with sample recollection. This provides the ability to run replicates, dilute high samples and conduct rechecks. This equipment is state-of-the-art and also greatly improves performance with a broader scope of detectable parameters and unmatched low-level resolution.

Contact us! 1-877-769-9646