

## Sampling Instructions

The Analytics technical staff, including our CIH, are available to discuss sampling strategies, sample requirements, and laboratory capabilities. Please direct inquiries through client services.

The volume of air to be collected for your samples is based on a number of factors, including:

- Threshold Limit Value (TLV) or Permissible Exposure Limit (PEL)
- Sensitivity of the analytical procedure
- Capacity of the collection device
- Concentration range to be measured

The recommendations for air volumes, sampling rates and suggested media in our directory of services are provided for your convenience and are intended only as a guide to sample collection. With few exceptions, these air volumes enable the laboratory to report one-tenth of the TLV as the detection limit.

Fees for analyses of samples submitted on sorbent tubes include separate desorption, analysis, and reporting of both front and back sections.

Clearly label every tube, badge, vial, or sample container with your sample field number or your identification number. This number should also be printed on the chain of custody/test request form.

To facilitate testing and reporting, please type or clearly print all required information on the chain of custody/test request form (COC) form. To initiate the COC, fill out and sign the appropriate sections designating time, date, and requested analysis. Submit the original with your samples and retain the copy for your records. The COC form should be submitted with each group of samples using a separate form for each sample type.

Blanks act as a control for analysis by accounting for contamination that can occur during handling, storage or shipment of samples. Therefore, they are recommended as standard industrial hygiene practice. Please handle them the same as samples, but draw no air through them. Submit one blank with each sample group of 10 or less, two blanks with 11-20 samples, etc. (i.e., 10% blanks). Since blanks are analyzed as any other sample in the laboratory, they are priced according to the analysis requested. Additional support documentation, including instrument calibration, chromatograms, etc. is available at a preparation charge of 20% of the total analytical cost.

Analytics reserves the right to refuse to process any sample, which is deemed by the laboratory to be non-compliant with the quality assurance requirements. In such cases, client services will notify the client. If sample issues cannot be resolved, the client may be billed a sample-handling fee for costs incurred up to that point.

## Solid Sorbent Tube Sampling

Solid sorbent tubes include large and small charcoal tubes, porous polymer tubes such as XAD and XAD-7, large and small silica gel tubes, DNPH (dinitrophenyl hydrazine) tubes, Orbo tubes, Porapak Q, Tenax tubes, Firebrick tubes, Hydrar tubes and Florisil tubes. Sampling should be performed in the following manner:

1. Calibrate each pump at the recommended flow rate for the analyte of interest, using a representative solid-sorbent tube in-line. Calibrate each pump with a bubble meter or equivalent flow measuring device.
2. Break the ends of the solid sorbent tube immediately before sampling. The openings should be at least  $\frac{1}{2}$  of the internal diameter of the tube. Use a tube tip breaker or file.
3. Connect the solid sorbent tube to the tube holder, making sure the smaller sorbent section (backup section) is nearest the pump. The air that is being sampled should not pass through any hose or tubing before entering the solid sorbent tube. To avoid channeling and premature breakthrough, position the tube vertically during sampling.
4. Prepare field blanks by breaking the ends of tubes from the same lot as the tubes that are being used for sampling. Handle the blanks in the same manner as the samples, but do not draw air through the blanks.
5. Sample at an accurately known flow rate for the length of time necessary to obtain the specified air volume. Check the pump periodically during sampling to detect any changes in flow rate. If the accurate measurement of volume cannot be determined due to inconsistent flow rates, discard the sample.
6. Be sure to keep an accurate record of sampling data including sample location, beginning and ending times of air sampling, temperature, relative humidity, atmospheric pressure or elevation above sea level, and name of employee.
7. Seal the ends of the tubes with plastic caps immediately after sampling. Clearly label each sample with an appropriate identification number. Label each blank tube as a blank.
8. Pack the tubes tightly for shipment to the laboratory, with adequate packing to minimize the possibility of breakage. Enclose a completed sample analytical request form (chain of custody) with each batch.

Bulk samples are recommended when sampling chemical mixtures such as fuel oil, kerosene, etc. When it is necessary to ship a bulk sample along with the air samples, the bulk sample must be shipped in a separate package to avoid possible cross contamination.

## Sampling Using Filters

Filters include glass fiber filters, Teflon filters, mixed cellulose ester membranes, polyvinyl chloride filters, and treated filters and pads.

Sampling with filters can be done open or closed faced. Open-faced sampling is done with three (3) piece cassettes with just the top of the cassette removed. Closed-faced sampling

is performed with only the buttons removed from the cassette. Open-faced sampling is used in situations where even dispersal of the analyte over the filter is desired, such as in asbestos sampling or on certain coated filters such as for isocyanate sampling. Closed-faced sampling is performed in most cases of particulate sampling, which deposits the analyte near the center of the cassette.

### Sampling should be performed in the following manner

1. Calibrate the sampling pump at the recommended flow rate with a representative filter in line using a bubble meter or equivalent flow measuring device.
2. Remove the cassette buttons (closed faced sampling) or cassette top (open faced sampling). Air being sampled should not pass through any hose or tubing before entering the cassette.
3. Attach the cassette to the sampling pump using flexible tubing or a cassette holder, making sure the filter pad end of the cassette is closest to the pump.
4. Prepare field blanks using cassettes from the same lot by briefly removing and replacing cassette buttons and handling these blanks in the same manner as the samples, without drawing air through the blanks.  
Sample at a known flow rate for the length of time necessary to obtain the specified air volume, or until there is evidence of excessive filter loading. Check the pump during sampling to detect any changes in flow rate. If the accurate measurement of volume cannot be determined due to inconsistent flow rates, discard the sample.
5. Disconnect the filter after sampling. Replace the buttons (or top) and properly label the sample and blanks. Be sure to keep an accurate record of sample data including sample location, beginning and ending times or air sampling, temperature, relative humidity, atmospheric pressure or elevation above sea level, and name of employee or area.
6. Ship the samples to the laboratory as soon as possible in a container designed to prevent damage in shipment. Enclose a completed chain of custody with each batch.

### Sampling for Respirable Aerosols

Respirable aerosol sampling is performed using a cyclone and filter sampler. Sampling for respirable aerosols should be performed in the same manner as sampling a filter except:

- Calibrate each pump at the flow designated by the type of cyclone being used with a representative cyclone and filter in line. Note that the filter is mounted upside down with the cyclone in place.
- Inspect the interior of the cyclone. If there is visible scoring or damage inside, discard the cyclone since the dust separation characteristics may have been altered. Clean the interior of the cyclone.
- Attach the cyclone to the filter according to the manufacturer's instructions. Connect the assembly to the sampling pump.
- During sampling, make sure the cyclone hangs vertically and that the assembly does not get inverted during sampling. If an accurate and consistent flow rate cannot be maintained, discard the sample.

## Sampling for Inhalable Aerosols

We can provide pre-weighing of inhalable samplers, as well as post-weighing.

Contact the laboratory for details on this relatively new technique.

### Completing the Laboratory Test Request (Chain of Custody)

Sample Custody is a set of procedures used to provide an accurate written record that can be used to trace the possession of a sample from the time of collection through its introduction into a data set. The Laboratory Test Request/Chain of Custody is used to record the transfer, possession, and custody of samples to ensure their integrity from collection through data reporting. Until you relinquish custody, you are responsible to ensure no one tampers with your samples. Custody is a critical part of the process because data reported without a complete and accurate chain of custody will not withstand legal challenge. The following items must be completed on the chain in order to ensure sample integrity and accurate analysis/reporting:

1. Date Shipping Samples
2. Total Number of Samples
3. Type of Media
4. Project Name or Number
5. PO or Release Number
6. Contact – Who the Report Will be Sent to
7. Telephone Number
8. Turnaround Time Required
9. Special Instructions, if needed
10. Where to fax/e-mail results
11. Sample ID or Sample Number
12. Sample Date
13. Sample volume
14. Analysis
15. Initiate COC
16. Laboratory Receipt Information (for laboratory use)