

Sampling Using Midget Impinger Kit

Please Read The Following Important Information before Starting

- *This Procedure describes collecting samples using the EAS midget impinger kit. This kit can be used for both source sampling and ambient air sampling.*
- *Recommended flows for the midget impingers are between 200 mL/min and 1000 mL/min. For low detection limits the higher flow is recommended, but sampling at 1000 mL/min can result in excessive bubbling in the impingers in some cases.*
- *Figure 1 shows a diagram of how the midget impinger kit is set-up. The first two impingers have about 15 mL of the impinger solution, and the last impinger is left empty or can be filled with silica gel to protect the pump.*
- *Rinse the impingers when done and put a piece of paper between the ground glass joints to prevent them from seizing.*

PROCEDURE:

- The sampling apparatus is assembled and should be similar to that shown in Figure 1. A combined needle valve rotometer can be used instead of separate need valve and rotometer at exit of pump. All glassware (e.g. impingers, sampling bottles, etc.) must be thoroughly rinsed with distilled water and dried before use.
- Prior to sample collection the entire assembly (including empty sample impingers) is set up as shown in Figure 1, and the flow rate checked at a value near the desired rate. In general flow rates of 100-1000 mL/minute are useful. Flow rates greater than 1000 mL/minute should not be used because impinger collection efficiency may decrease. Generally the rotometer calibration is accomplished using a soap bubble flow meter or it can be done by the laboratory. ASTM Method D3686 describes an appropriate calibration scheme not requiring a sealed flow system downstream of the pump.
- Ideally a dry gas meter is included in the system to record total flow. If a dry gas meter is not available the operator must measure and record the sampling flow rate at the beginning and end of the sampling period to determine sample volume. If the sampling period exceeds two hours the flow rate should be measured at intermediate points during the sampling

- period. Ideally a rotometer should be included to allow observation of the flow rate without interruption of the sampling process.
- To collect an air sample, fill the first two midjet impingers with 15 mL of the supplied impinger solution as indicated in the table below (Note: for EPA 26 the impingers have different solutions). The third impinger is left empty or filled with dessicant to protect the pump. The dessicant type can vary based on client request.

Method	Compound	Impinger Solution	Impinger
EPA TO-8	Phenols	0.1 N NaOH	Impinger 1,2
NIOSH 6015	Ammonia	0.1 N H ₂ SO ₄	Impinger 1,2
NIOSH 7904	HCN	0.1 N KOH	Impinger 1,2
VOA	Organic Acids	0.01 N NaOH	Impinger 1,2
EPA 26	HCl, HBr, HF Cl ⁻ , Br ⁻ , F ⁻	0.1 N H ₂ SO ₄ 0.1 N NaOH	Impinger 1 Impinger 2

- The inlet of the impinger train is connected to the sample location and the sample flow is started. The following parameters are recorded on the data sheet: Date, sampling location, time, ambient temperature, barometric pressure (if available), relative humidity (if available), dry gas meter reading (if appropriate), flow rate, rotometer setting, reagent batch number, and dry gas meter and pump identification numbers.
- The sampler is allowed to operate for the desired period, with periodic recording of the variables listed above. The operator must ensure that at least 5 mL of solution remains in the first impinger at the end of the sampling interval.
- At the end of the sampling period the parameters are recorded and the sample flow is stopped. If a dry gas meter is not used the flow rate must be checked at the end of the sampling interval. If the flow rate at the beginning and end of the sampling period differ by more than 15% the sample should be marked as suspect.
- Immediately after sampling the impingers are removed from the sampling system. The contents of the first and second impinger are emptied into a clean 40 mL glass vial having a teflon-lined screw cap. If the sample plan calls for separate analysis of the impingers, transfer the contents of each impinger to a separate vial.

Figure 1
Sampling with Midget Impingers

