

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure	NUMBER IH75175
	REVISION Final Rev 0
SUBJECT: INSTRUMENT OPERATION: Atmosphere Testing Using Indicator Tubes and <i>MSA Samplair</i>® Pump	DATE 10-02-01
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- 1.0 Purpose/Scope** This field procedure provides standardization of the method for the MSA *Samplair*® pump and its indicator tubes (detector tubes). It allows relatively inexperienced field testers to gain accurate, instantaneous results.

The *Samplair* system, when used properly with its matching detector tubes, is designed to reliably test more than 120 hazardous gases and vapors. Due to the approximate 25% margin of error in the test at the TLV/PEL, the results of the *Samplair* should not be used as the only evidence of the presence or absence of a particular substance in employee exposure monitoring scenarios. The *Samplair* system should be used in conjunction with other test means or information to confirm the identity of an unknown atmosphere.

- 2.0 Responsibilities** This procedure will be implemented through the SHSD Industrial Hygiene Group, RCD Facility Support Group, and other appropriate BNL organizations to address concerns of the presence of atmospheric contaminants primarily in emergency situations and for leak detection. This procedure can be used to measure atmospheric concentrations in operating processes and equipment when more accurate methods are not available. Only persons who thoroughly understood this procedure should use the *Samplair* system.

- 3.0 Definitions**

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3.1 **Samplair Pump:** A manually operated piston pump of 100-cc capacity sold by MSA, Inc. Part No. 463998. Components of the *Samplair* pumps include:

- Tube holder: Rubber mounting for attaching detector tubes or remote sampling lines.
- Filter Disc: Porous plastic disc, mounted in the rubber tube holder to protect the pump from dirt and dust particles that may alter the flow or damage the pump.
- Exhaust Valve: Valve located under the valve cover that closes as the bellows re-inflates, and opens on the exhaust stroke so that blowback through the tube holder is negligible.

3.2 **Detector Tubes:** Thin tubes made of glass having two break off tips on either end. The tubes are filled with treated chemical granules specific for sampling a variety of substances. Most detector tubes are packaged 10 in a box and have a shelf life of 24 to 30 months.

4.0 Prerequisites

4.1 Prior to testing with the *Samplair* system, determine if the life expectancy date on the box of the detector tubes has expired. Do not use tubes that have exceeded the date printed on the box. If the detector tubes have expired, return the tube to the box and follow the waste disposal procedures. Do not use a tube that has exceeded its printed shelf life. Failure to do so may result in a greater margin of error or false negative indications.

4.2 Only persons who thoroughly understand this procedure and have demonstrated competency to the satisfaction of their supervision should use the *Samplair* system.

5.0 Precautions

5.1 Do not perform any test with a previously used detector tube.

5.2 Do not perform any test with a detector tube with an unknown or expired manufacturer's expiration date.

5.3 Do not discard of tubes in normal trash. Follow the waste disposal procedures.

5.4 Verify that interfering compounds, listed in the tube instruction sheets or MSA publications, are not present.

6.0 Procedure

6.1 **Routine Maintenance** (to be performed by the SHSD IH Group Technician or other competent equipment owner)

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- 6.1.1 If shaft becomes dirty, remove the shaft by unscrewing; then clean with wax or oil.
- 6.1.2 Periodically check the performance of the pump.
 - Plug pump inlet by inserting an unbroken Detector tube into the tube holder.
 - Pull handle back fully and wait 10 minutes. The pump is leak free if the vacuum is still present (by suction detected on finger) after 10 minutes. If the pump leaks, check the tube holder and, if necessary, the replace valves.
- 6.1.3 Check operation of the valves (when operating performance decreases or fails)
 - With valve cover removed, check the valves for dirt or debris.
 - Remove dirt with a gentle puff of air or by using a soft brush.
 - Replace valve if necessary.
- 6.1.4 Periodically remove filter disc (when operating performance decreases or fails)
 - Remove the filter disc from the tube holder by rolling flange part of tube holder down and away from the disc.
 - Gently tap or blow on the surface to remove any foreign matter.
 - Replace Disc so previously exposed surface is once again facing away from pump.

6.2 Equipment:

- 6.2.1 *Samplair* pump
- 6.2.2 **Detector tube** (listed by MSA to detect the airborne contaminant of concern).



6.3 Test Protocol

- 6.3.1 Using the breaker on the pump, break off both tips of the detector tube.
- 6.3.2 Using a twisting motion, insert the tube into the rubber tube holder. The arrow on the tube must point toward the pump.
- 6.3.3 Check the number of strokes needed to complete test. (number of strokes can be found on the instructions in the tube box and on the tube itself; labeled as n= (number of strokes))
- 6.3.4 Grasp the handle and pull back until “100” is visible on the plunger. Align the handle notches and the line on the syringe barrel.
- 6.3.5 Release the handle, it should remain at “100”.
- 6.3.6 Wait 45 - 60 seconds between strokes to allow vacuum to completely pull the full volume of air into tube.
- 6.3.7 Continue making complete strokes of the pump until the n= (number of strokes) have been done. Be sure to allow the pump *end-of-stroke*



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indicator to return to black before each subsequent stroke.

- 6.3.8 At the end of n= (number of strokes), determine the air concentration by reading the appropriate scale value on the tube. The



reading should be made at the front edge of the band of color change.

- 6.3.9 Record results on the “BNL Direct Reading Instrument” form. Record the MSA *Samplair* and type of tube on the form.

6.4 Waste Disposal:

- 6.4.1 After a Detector tube has been used or identified age expired, return the tube to the original manufacturer’s package (tube box.).



- 6.4.2 When all tubes in the package have been used or the whole package expired, dispose of the package with its tubes via the Waste Management Division. Determination of the hazardous waste category can be determined based on the chemical reactants used on the tubes. The contents of the tube can be found on the instruction sheet enclosed with the tube package.

7.0 References

- 7.2 MSA Document: Detector Tubes and Dosimeters Data Sheet #08-00-02, (1989).

8.0 Attachments: none

The only official copy is on-line at the SHSD IH Group website.
 Before using a printed copy, verify that it is current by checking the document issue date on the website.

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9.0 Documentation

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