



PRODUCT CATALOGUE



BENZENE SAMPLER

(APS-212)

COMPLETE ENVIRONMENTAL SOLUTIONS

**Air , water , soil pollution & Safety Manufacturing, sales,
calibration, servicing & Sodar technology Solutions**

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GENERAL INFORMATION

The increasing general awareness of atmospheric air pollution and its serious impacts of pollutants and hazards to the health and well-being of industrial workers has resulted in greater stress on accurate, reliable and frequent assessment of work space pollution and worker-exposure. The data so generated are needed for corrective measures to safe guard the workers as per Factory act 1948 and amendment in 1986-87.

Benzene in high concentrations has narcotic effects similar to toluene and other aromatics. Benzene is a myclotoxicant known to suppress bone marrow cell proliferation and to induce hematologic disorders in humans and animals. Chronic exposure to benzene leads to aplastic anemia, and may lead to leukemia

after 6 months to 6 years of chronic exposure. Benzene exposure can cause chromosomal aberrations in animals and humans. Chronic benzene exposure has also been associated with lung cancer in epidemiological studies. Benzene is classified as a human carcinogen by American Conference of Governmental Industrial Hygienists (ACGIH) and International Agency for Research on Cancer (IARC). Benzene is classified as a suspected human carcinogen by OSHA. A risk assessment for benzene exposure performed by Rinsky et al., reported that a worker exposed to 10 ppm benzene for 40 years was 155 times more likely to die from leukemia than an unexposed worker. A worker exposed to 1 ppm benzene was 1.7 times more likely to die from leukemia than an unexposed worker. IARC has published a risk assessment showing that workers exposed to a 10 ppm chronic exposure, had an increase of 14-140 leukemia cases per 1000 people above the rate for an unexposed worker. For 1 ppm chronic exposure, there was an increase of 1.4-14 cases per 1000 above the rate for an unexposed worker. The skin notation cited in the TLV is based on the skin absorption rate

of 0.05% when neat benzene is applied to the skin, indicating benzene exposures through skin absorption can be significant

Our Benzene sampler is based on the method of The collection of benzene using charcoal tubes (SKC lot 107) was evaluated in OSHA Method 12.1., method no 1005. Active samples are collected by drawing workplace air through charcoal tubes with personal sampling pumps. Diffusive samples are collected by exposing either SKC 575-002 Passive Samplers or 3M 3520 Organic Vapor Monitors (OVM) to workplace air. Samples are extracted with carbon disulfide and analyzed by GC using a flame ionization detector (FID).

APS-212 **BENZENE SAMPLER** uses a small light weight battery operated pump to draw air through and through charcoal tube filled with activated charcoal that is suitable absorption of VOC and benzene, While the Carbon monoxide can be monitored through electrochemical sensor and its reading is displayed on the screen of CO monitor.

VOC Samples are collected with 7-cm × 4-mm i.d. × 6-mm o.d. glass sampling tubes packed with two sections of charcoal. The front section contains 100 mg and the back section contains 50 mg of charcoal. The sections are held in place with glass wool and polyurethane plugs. Record sample air volume (liters), sampling time (minutes) and sampling rate (mL/min) for each sample

Rechargeable batteries have been used with sufficient storage to operate the system for 16 hours making it easier to compare workers dose to the TLV levels specified.

A separate charger is provided with APS-212 to recharge the batteries overnight.

Complete environmental solutions - Benzene Sampler

Technical Specifications

Flow Rate	0 – 200ML/MIN
Size	300 x 150 x 110mm. approx
Weight	1.5Kg approx.
Battery	12V ,Li-ion rechargeable
Recharge Time	12 hours
Operation Time	16 hours on fully charged batteries.
Filter	25mm diameter filter discs (Whatman GF/A Grade) or equivalent
Cabinet	Modular powder coated

Analytical Procedure

Adhere to the rules set down in your Chemical Hygiene Plan Avoid skin contact and inhalation of all chemicals and review all MSDSs before beginning this analytical procedure.

Apparatus

Gas chromatograph equipped with an FID
A GC column capable of separating benzene from the extracting solvent, internal standard, and the components of gasoline. A J&W 60-m × 0.32-mm i.d. DB-1 (5- μ m df) capillary column was used in this evaluation.

An electronic integrator or other suitable means of measuring GC detector response.

Glass vials with PTFE-lined caps. For this evaluation 2 and 4-mL vials

A dispenser capable of delivering 1.0 or 2.0 mL of extracting solvent to prepare standards and

samples. If a dispenser is not available, 1.0- and 2.0-mL volumetric pipets may be used.

Volumetric flasks - 10-mL and other convenient sizes for preparing standards.

Calibrated 10-L syringe for preparing standards.

A mechanical shaker.

Reagents

Benzene, Carbon disulfide (CS_2), carbon disulfide used in this evaluation was 99.9+% low benzene content grade

Phenylhexane (n-hexylbenzene) reagent grade or better. The 1-phenylhexane was 97% reagent grade

The extraction solvent used is of 0.25 $\mu\text{L}/\text{mL}$ n-hexylbenzene (1-phenylhexane) in the CS_2 . The n-hexylbenzene was added to the CS_2 as an internal

standard. Other internal standards can be used provided they are fully tested.

Standard preparation

Prepare concentrated stock standards of benzene in the extracting solvent. At least two separate stock standard should be prepared. Prepare working analytical standards by diluting these stock standards with the extracting solution delivered from the same dispenser used to extract the samples. For example, to prepare a target standard (1 ppm), inject 4.5 μ L of benzene in a 10-mL volumetric flask containing the extracting solvent and then make a 1/10 dilution with the extracting solvent to obtain the working standard at the target level. A second set of standards from a different primary standard should be prepared to check the quality of the first set of standards.

Bracket sample concentrations with standard concentrations. If upon analysis, sample

concentrations fall outside the range of prepared standards, prepare and analyze additional standards to confirm instrument response, or dilute high samples with extraction solvent and reanalyze the diluted samples.

Sample preparation

Charcoal tubes

Remove the plastic end caps from the sample tube and carefully transfer each section of the adsorbent to separate 2-mL vials. Discard the glass tube and glass wool and polyurethane plugs.

Add 1.0 mL of extracting solution to each vial and immediately seal the vials with PTFE-lined caps.

Shake the vials on a shaker for 30 min (Shaking is necessary to obtain the extraction efficiency found in this method; without shaking the extraction efficiencies will be lower.)

Mount the samplers in the sampler rack of a specialized shaker and shake the samplers for 1

hour.

Do not leave the extracted sample in the sampler. Transfer each extracted sample by removing the plugs from the sampler ports, firmly inserting the tapered end of a supplied PTFE tube into the outer port and carefully pouring the solution through the PTFE tube into a labeled autosampler vial. Immediately cap each vial.

OVMs

Remove both sampler sections from the metal cans, along with the sections of PTFE tubing. Assure that the closure caps are firmly snapped to the primary and secondary sections of all the samplers. Also assure that all cap plugs are firmly seated in the cap ports. Any deviations must be noted. Make sure each section of the sampler is labeled properly for future reference.

Prepare one section of sampler at time by temporarily removing the cap plugs from the ports and adding 2.0 mL of extraction solvent through the center port. Immediately replace the plugs in

the ports. Repeat the process for the second section.

Allow the sampler sections to extract for 30 min. Periodically apply gentle agitation to the sampler sections during the extraction period.

Do not leave the extracted sample in the sampler. Transfer the solution from each sampler section by removing both plugs from the ports, inserting a decanting spout (a small section of PTFE tubing) into the rim port and pouring the liquid through the spout into a labeled autosampler vial. Immediately cap each vial.