



See What's Really There™

HDS™
Personal Monitor



HDS
PERSONAL
— Monitor —

The Next Generation in IH Monitoring.

Laboratory Verification of Sample Collection


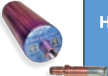


Although the HDS™ Personal Monitors are very consistent, there is no reason to have to assume proper sample collection for analysis as with other workplace sampling devices. Since air is 7.3 times heavier than helium, the amount of air collected can be determined in the laboratory by weight. Measuring the weight to the nearest 0.1mg and then subtracting the weight of the sampler after evacuation will provide the % air collected to an accuracy of ± 1%. No other workplace monitoring technique offers this level of certainty and defensibility.

Accurate and Defensible Sample Analysis

Whether performing GC/FID or GCMS, accuracy depends upon the ability to reproducibly measure a sample aliquot and completely transfer the sample to the analyzer while eliminating unwanted matrix components (air, water, CO₂). Concentrations down to 0.1 PPMv can be quantified by loop injection with no matrix management, typically yielding precision from 1–3%. Lower detection limits can be achieved by preconcentrating 10–20mL prior to GC/FID or GCMS injection, providing detection limits down to about .003 PPM. In either case, the response of an internal standard (added during the 5 psig pressurization process) provides reliable confirmation of the actual volume analyzed. Monitoring accuracy and sampler inertness is also validated by recovery of the BFT surrogate.

Why is the HDS™ Monitor so sensitive?

An HDS™ Personal Monitor can sample at a much lower rate than conventional badges and tubes. The collection of far less sample on a weight basis is one of the reasons why the HDS™ Personal Monitor allows for greater stability of chemicals, especially in a multi-chemical matrix, as bimolecular reaction rates are concentration dependent. During analysis, a much larger “percentage” of the sample is utilized, making up for the decreased sampling rate.

| Sampling Media | Sampling Rate (cc/min) | Sampling Time (min) | Total Sample Collected | Extraction Solvent | Injection Volume | Injection Split | Equiv. Sample Injected (cc) | Badge Normalized Sensitivity |
|---|------------------------|---------------------|------------------------|--------------------|------------------|-----------------|-----------------------------|------------------------------|
|  Badge Sampler (8 Hour Version) | 30 | 480 | 14400cc | 2000µl | 1µl | 20:1 | 0.36 | 1.00 |
|  HDS™ Personal Monitor (8 Hour Version) | 0.033 | 480 | 16cc | N/A | 10cc | 1 | 2.6 | 7.2 |
|  Badge Sampler (15 Minute Version) | 30 | 15 | 450cc | 2000µl | 1µl | 20:1 | 0.01 | 1.00 |
|  HDS™ Personal Monitor (15 Minute Version) | 1 | 15 | 13cc | N/A | 10cc | 1 | 2.2 | 220 |



Monitor Holder
PN 39-35026



30" Hg-0-30psig Compound Gauge
PN 29-70020QT

| Description | Unit | Part # |
|-----------------------------------|------|------------|
| 15 Minute HDS™ Personal Monitors* | EA | HDS-PM15M |
| 1 Hour HDS™ Personal Monitors* | EA | HDS-PM1HR |
| 2 Hour HDS™ Personal Monitors* | EA | HDS-PM2HR |
| 4 Hour HDS™ Personal Monitors* | EA | HDS-PM4HR |
| 8 Hour HDS™ Personal Monitors* | EA | HDS-PM8HR |
| HDS™ Personal Monitor Holder | EA | 39-35026 |
| 30" Hg-0-30psig Compound Gauge | EA | 29-70020QT |

* All Monitors (Helium + Bromofluorotoluene 1 PPM)
Add "PK" to end of part number to order a 4 pack of that Personal Monitor.

Reproducible Sample Collection

The sampling rate of the HDS™ Personal Monitor is unaffected by changing face velocities caused by air movement around the sampler. Uptake rate is also unaffected by analyte concentrations, matrix variations, and sample collection temperatures from 0°C to 40°C. With diffusive badges, a multi-chemical sampling event may adversely affect uptake and analyte stability to an unknown degree. The adsorption of these compounds concentrates them, allowing for much higher potential reaction rates as compared to the HDS™ Personal Monitor, where the compounds remain diluted in the gas phase. Changes in relative humidities can also affect the hydrophobic properties of badge samplers, creating different uptake rates. Conversely, humidity does little to change the diffusion rate of helium and the active collection of the wet or dry air sample. After verification of a positive pressure to confirm a leak-free sampler, the HDS Personal Monitor is positioned on the individual to be monitored near their breathing zone, and the valve is removed to expose the inlet to the surrounding air. After the desired sample collection period, the valve is replaced and sampling duration is recorded. The sampler is now ready to be sent to the laboratory for analysis.

How does Helium Diffusion Sampling work?

Helium diffuses much faster than air and other chemicals to be sampled. The vacuum created by escaping helium actively draws surrounding air into the sampler. This active air sampling causes the collection rates for all compounds to be the same, so individual sampling factors do not have to be determined as with other diffusion sampling devices. The net result is a technique that is more of a helium driven TO15 sampling canister than a diffusive sampling device, as only the helium is operating under the control of diffusion.

The 15 minute, 1, 2, 4, and 8 Hour HDS™ Monitors use different diffusion zones to achieve their respective sampling rates. This design means all monitors feature the SAME detection limits whether performing TWA or STEL measurements. Every HDS™ Monitor also contains the surrogate recovery compound BFT (Bromofluorotoluene). The recovery of this compound ensures sample integrity. Replacing the valve on the HDS™ Monitor after a sampling event effectively isolates the sample until analysis.

Universal Sampling

There is no need to select media based upon a target analyte. Just like other whole air Silonite™ canisters, the HDS™ Personal Monitor is universal.

Reliable Sampling Rates

Sampling rates are not affected by humidity, temperature, or sample matrix variables. Best of all, the HDS™ Monitor is not affected by changes in face velocities and works effectively in absolutely "still" air.

Amazing Detection Limits

Analysis of 4–8 Hour HDS™ Monitors utilizing 10cc gives detection limits 5 to 7 times lower than badges. The 1 Hour and 15 Minute HDS™ Monitors provide detection limits as much as 100 times lower than badges. All 5 HDS™ Personal Monitors provide the SAME detection limits – because they all collect the same amount of sample.

Superior Quality Assurance

Contamination free sampling is assured by field pressure measurement prior to sampling and by BFT recovery. No solvent workup needed, making the HDS™ Personal Monitors ideal for analysis by GCMS.



HDS Personal Monitor User's Guide

- 1 Confirm under positive pressure (3–10psig helium) using gauge. Test Gauge PN: 29-70020QT (Available separately)
- 2 Place HDS™ in holder near breathing zone and remove valve for 50–100% of the suggested sampling periods. HDS™ Holder PN: 39-35026 (Available separately)
- 3 Replace valve and record time duration of sampling event.
- 4 Send to laboratory for analysis.
- 5 Request type of analysis:
 - Standard 0.1 PPM and higher
 - Trace 0.01 PPM to 1 PPM
 - Ultra Trace (SIM) 0.001 PPM

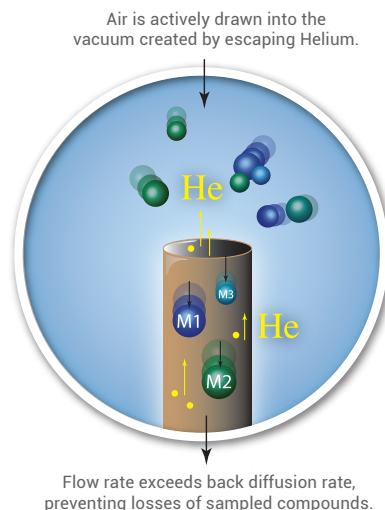




Entech HDS Personal Monitors

The future of personal monitor technology has arrived.

Introducing the latest HDS™ (Helium Diffusion Sampling) Personal Monitor from Entech. A breakthrough technology based on helium diffusion which yields a sampler that is small, light weight, cost-effective, universal, and defensible. HDS™ Personal Monitors simplify the collection of chemicals in the workplace and deliver highly reliable results unaffected by factors that create errors in other diffusive samplers – such as matrix concentrations, varying humidities, and fluctuating face velocities. An HDS™ sample is easily collected based upon the reproducible diffusion of helium, creating a vacuum that pulls air in actively as helium escapes. A surrogate recovery compound is added to prove recovery during laboratory analysis.



HDS Personal Monitor Highlights

- Incredibly easy to use.
- No Pumps. No Batteries. No Selection of Media.
- Same approach for all sample concentrations.
- Same approach for all compounds.
- Matrix does not affect sampling rates.
- No breakthrough or recovery concerns.

Laboratory Advantages of Whole Air Sampling:

- No solvent extraction.
- Ideal for GCMS or GC/FID.
- Wide Dynamic Range (0.01-1000 ppm).
- Long storage times without cooling.
- Gravimetric validation of volume sampled.

Proof of Sampler Integrity in the Field

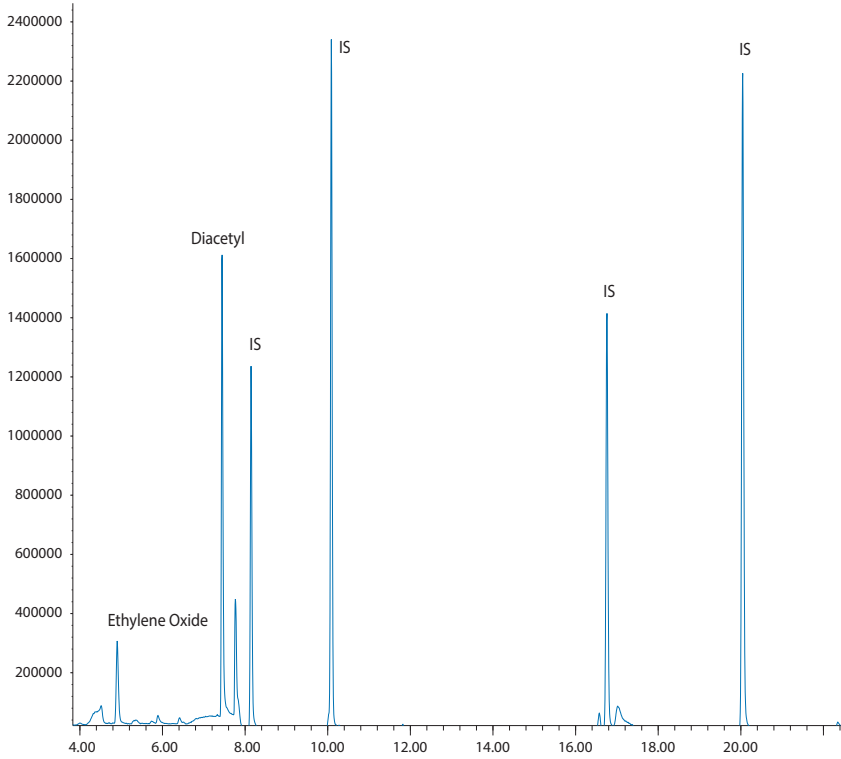
Before going out to the field, each HDS™ Personal Monitor is vacuum cleaned and then pressurized with helium at 5–10 psig. The helium also contains a PPM level surrogate chemical called Bromofluorotoluene (BFT) to validate leak-free operation and ensure the inertness of every sampler by monitoring BFT recovery. Entech offers a pressure gauge to confirm a positive helium pressure immediately before field sampling to verify that unwanted sampling into the HDS™ Personal Monitor has not occurred. This pressure is measured and recorded at the time of sampling as proof of sampler integrity. Sampling starts when the control valve is removed and stops when the valve is re-attached.



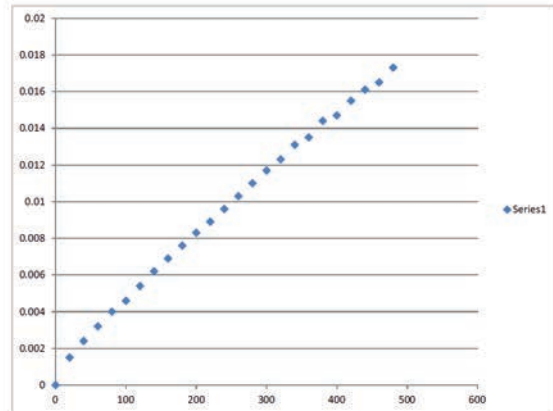
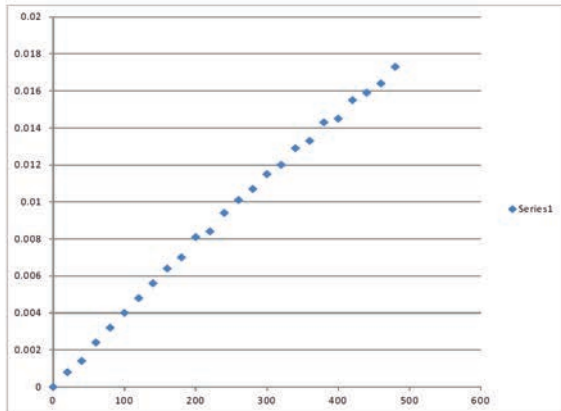
HDS™ Personal Monitors are available with this handy reusable shipping box.

HDS™ Personal Monitoring

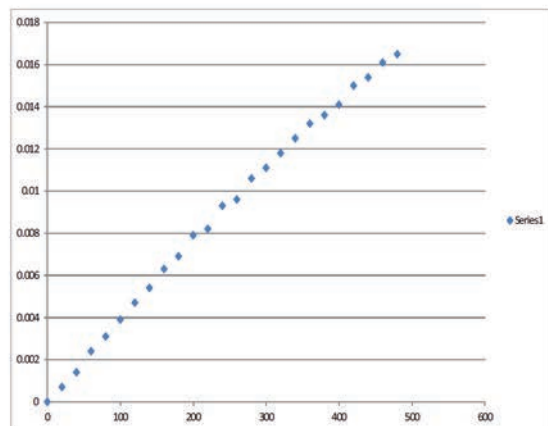
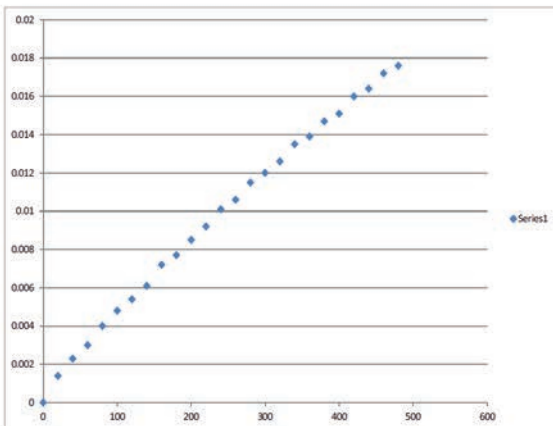
Ethylene Oxide / Diacetyl HDS™ Analysis



Inlet: 7100A / 7200
Sample Size: 10cc
Concentration: 1 ppmv
Concentration Procedure: 3-Stage Trap
Column: DB1, 60m, 0.32mm ID, 1µm film
Oven Start Temp: 35°C
GCMS: Agilent 5975C
MS Operation: Full Scan
Tune: BFB



Weight gain into 8 hour samplers A and B in the vertical orientation, still air



Weight gain into 8 hour samplers A and B in the horizontal orientation, still air



7650-L10 HDS™ System – High-Throughput PPM Level Headspace Inlet

The 7650-L10 Loop Injection System is perfect for high-throughput HDS™ Personal Monitor Analysis.

The 7650-L10 Autosampler configured for Loop Injection creates an ideal, high-throughput system for HDS™ Personal Monitor and other PPM level sample analysis. An elegant, direct to sample container transfer line connection creates far less of an opportunity for carryover and cross-contamination. No connective fittings, no stream select rotary valves, minimal contact time with the sample, and minimal sample path fittings all come together to make the 7650-L10 system an ideal choice to handle the wide range of concentrations that are often present within many industrial workplace environments.

The 7650-L10 HDS™ Loop Injection System can easily handle compounds with PEL's to 2PPM by full scan, or PEL's below 1PPM (eg - Benzene) using single ion monitoring.

Analyze up to 172 samples unattended. *It's the ultimate system for full scan GCMS analysis of C₂-C₁₂ compounds down to 0.05 PPM.*



| Description | Unit | Part # |
|---|------|--------------|
| High Throughput HDS™ Personal Monitor Analysis Instruments and Options: | | |
| 7650 Loop Injection System (Contact Entech to configure your 7650 Loop Injection options) | EA | 7650-L10 |
| 86-Position Long Tray* | EA | HS-LT119-086 |
| 50-Position Short Tray* | EA | HS-ST119-050 |



7200
Preconcentrator



7650-L20
GC Gas Autosampler



HDS-EC1
Personal Monitor Exposure Chamber



HDS-PS1
Personal Monitor Prep Station



3108D
Canister Cleaning System

*The Recognized Global Leaders
in Air Monitoring Solutions.*

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