




# Evaluation of a Miniaturized Diffusive Sampler for True Breathing-Zone Sampling & Thermal Desorption GC Analysis

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 Diffusive (passive) sampling

- User-friendly
- Accurate
- Cost effective
- Suitable for self assessment
- Used for a wide range of volatile substances



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 Breathing - zone sampling

- AIHA 1997: a sphere with a radius of approx 10 inches centered at the worker's nose
- Large concentration variations within the "sphere" depending on where the contaminant source is
- Measurements inside RP equipment requires miniaturized samplers
- For measurements only centimetres away from nose/mouth a head-set is required

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 Miniaturized Personal Air Sampling System - MiniPASS




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 Miniaturized Personal Air Sampling System - MiniPASS

- User-friendly head-set type personal sampling system for true breathing-zone measurements
- For passive (diffusive) and pumped sampling
- Dual flexible sampler holders for two parallel samples with convenient screw or luer fittings



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 Mini sampler for passive sampling and automatic thermal desorption




- Potential for miniaturization
- For many substances the PE ATD sampler has an "over-capacity"

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**Mini sampler for automatic thermal desorption - characteristics**

- Length of mini tube 17 mm, outer diameter 4.9 mm, inner diam. 4.0 mm
- Two-piece POM holder, 38 mm
- Diffusion path length 12 mm
- Desorption inside standard ATD tube



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**Head-set and Mini ATD sampler**



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**Validation of the MiniATD sampler**

- Styrene in laboratory and field validations according to CEN EN 838
- Sampling times 30 – 240 min
- Concentrations 10 – 265 mg/m<sup>3</sup>
- Relative humidity 20, 50 and 80 %
- Uptake rate 0.36 mL/min (CV 9.6 %)
- Detection limit 0.3 mg/m<sup>3</sup> in 8-h sample
- Paired personal sampling with std ATD tube

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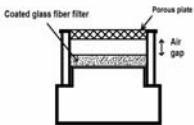
**MiniATD with label holder**



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**Mini sampler for reactive compounds MiniUMEX - characteristics**

- Two-piece screw polypropylene holder
- Length of sampler 13 mm, outer diameter 16 mm, inner diam. 13 mm
- For 13 mm reagent-coated filter
- 1 mm porous (54 μm) plate
- Air gap 2 mm




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**Head-set and MiniUMEX sampler**




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# Evaluation of a Miniaturized Diffusive Sampler for True Breathing-Zone Sampling & Thermal Desorption GC Analysis

 Validation of the MiniUMEX sampler


- Formaldehyde in laboratory validations according to CEN EN 838
- Sampling times 15 – 480 min
- Concentrations 0.10 and 1.70 mg/m<sup>3</sup>
- Relative humidity 18 and 80 %
- Uptake rate 11.7 mL/min (CV 10 %, n = 56)
- Detection limit 0.09 mg/m<sup>3</sup> in 15 min sample and 0.003 mg/m<sup>3</sup> in 8-h sample


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 More MiniPASS applications

- Standard "charcoal-type" adsorbent tubes
- OSHA OVS pumped sampler
- SKC 575 passive sample
- SUPELCO DSD-DNPH passive sampler for formaldehyde
- WATERS SEP-PAK DNPH pumped cartridge for aldehydes
- Standard or modified 25-mm particle sampling cassettes
- Standard or modified 13-mm Swinnex particle sampling cassettes

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 MiniPASS with pump




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 MiniPASS inside RP





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 MiniPASS particle sampling



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 MiniPASS with adsorbent tube



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