

ISO 22065:2019 (E)

Workplace air — Gases and vapours — Requirements for evaluation of measuring procedures using pumped samplers

Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms and definitions
4	Symbols and abbreviated terms
5	Sampler types
6	Requirements
6.1	General
6.2	Sampler requirements
6.2.1	Flow resistance
6.2.2	Sampler leak test (for Type B samplers)
6.2.3	Shelf life
6.2.4	Sampler identification
6.2.5	Marking
6.2.6	Instructions for use
6.3	Measuring procedure requirements
6.3.1	Sampling procedure requirements
6.3.1.1	General
6.3.1.2	Sample volume
6.3.1.3	Air flow rate
6.3.1.3.1	Determination of the maximum air flow rate (only for impregnated filters)
6.3.1.3.2	Determination of the minimum air flow rate (only for thermal desorption)
6.3.1.4	Storage conditions after sampling
6.3.2	Analytical procedure requirements
6.3.2.1	Limit of quantification
6.3.2.2	Analytical recovery
6.3.2.3	Blank value
6.3.3	Expanded uncertainty
6.3.4	Method description
6.3.4.1	Scope of the measuring procedure
6.3.4.2	Method performance
6.3.4.3	Apparatus and reagents
6.3.4.4	Safety information
7	General test conditions
7.1	Reagents
7.2	Apparatus
7.3	Calibration gas mixture
7.3.1	Generation
7.3.2	Determination of mass concentration
7.3.3	Independent method
8	Test methods
8.1	General
8.2	Sampler test methods

- 8.2.1 Flow resistance
- 8.2.2 Sampler leak test (for Type B samplers)
- 8.2.3 Shelf life (for Type A impregnated supports)
- 8.2.4 Sample identification
- 8.2.5 Marking
- 8.2.6 Instructions for use
- 8.3 Measuring procedure test methods
 - 8.3.1 Determination of the recommended sampling conditions
 - 8.3.1.1 Selection of sampler capacity test
 - 8.3.1.2 Sampler capacity verification test
 - 8.3.1.3 Sampler breakthrough test
 - 8.3.1.3.1 Direct method
 - 8.3.1.3.2 Chromatographic method
 - 8.3.1.4 Determination of the maximum air flow rate (only for impregnated filters)
 - 8.3.1.5 Determination of the minimum air flow rate (only for thermal desorption)
 - 8.3.1.6 Storage after sampling
 - 8.3.1.6.1 Direct method
 - 8.3.1.6.2 Sampling media spiking method
 - 8.3.2 Analytical procedure test methods
 - 8.3.2.1 Analytical limit of quantification
 - 8.3.2.2 Determination of the analytical recovery
 - 8.3.2.2.1 General
 - 8.3.2.2.2 Sampling media spiking method from the vapour phase
 - 8.3.2.2.3 Sampling media spiking method from the liquid phase
 - 8.3.2.2.4 Sampling media spiking method (for Type B samplers)
 - 8.3.2.3 Determination of the blank value
 - 8.3.3 Method recovery and method precision
 - 8.3.3.1 General
 - 8.3.3.2 Effect of the exposure concentration
 - 8.3.3.3 Effect of the relative humidity of the test atmosphere
 - 8.3.3.4 Effect of the temperature of the test atmosphere
- 8.4 Uncertainty of measurement
 - 8.4.1 Identification of random and non-random uncertainty components
 - 8.4.2 Estimation of individual uncertainty components
 - 8.4.2.1 General
 - 8.4.2.2 Uncertainty associated with sampled air volume
 - 8.4.2.3 Uncertainty associated with sample storage and transportation
 - 8.4.2.4 Uncertainty associated with method recovery
 - 8.4.2.5 Uncertainty associated with method variability
 - 8.4.2.6 Calculation of the combined standard uncertainty
 - 8.4.3 Calculation of expanded uncertainty

9 Test report

Annex A (informative) Examples for the determination of the breakthrough volume

- A.1 Direct method
 - A.1.1 Apparatus
 - A.1.2 Determination
- A.2 Chromatographic method
 - A.2.1 General
 - A.2.2 Apparatus
 - A.2.3 Procedure
 - A.2.4 Corrected retention volume
 - A.2.5 Calculations

Annex B (informative) Experiments for method validation

Annex C (informative) Estimation of uncertainty of measurement

- C.1 General
 - C.2 Uncertainty associated with sampled air volume
 - C.2.1 Sources of uncertainty
 - C.2.2 Flow rate measurement
 - C.2.3 Pump flow stability
 - C.2.4 Sampling time

- C.3 Uncertainty associated with sampling efficiency
- C.4 Uncertainty associated with sample storage and transportation
- C.5 Uncertainty associated with method recovery
 - C.5.1 General
 - C.5.2 Analytical recovery
 - C.5.3 Method bias
 - C.5.4 Reference concentration
 - C.5.5 Effect of humidity
 - C.5.6 Effect of temperature
- C.6 Uncertainty associated with method variability
 - C.6.1 General
 - C.6.2 Method precision
 - C.6.3 Concentration of calibration solutions
 - C.6.4 Calibration function
 - C.6.5 Dilution of the sample solutions (if applicable)
 - C.6.6 Instrument response drift
 - C.6.7 Analytical precision
 - C.6.7.1 Estimation using repeatability data
 - C.6.7.2 Estimation using within laboratory reproducibility data
- C.7 Calculation of combined standard uncertainty
 - C.7.1 Random and non-random components of sampling uncertainty and analytical uncertainty
 - C.7.2 Combined standard uncertainty and expanded uncertainty

Annex D (informative) Example for estimation of expanded uncertainty

Page count: 38