

DIN EN 13936:2014-04 (E)

Workplace exposure - Procedures for measuring a chemical agent present as a mixture of airborne particles and vapour - Requirements and test methods

Contents	Page
Foreword	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Requirements	7
4.1 General	7
4.2 Sampler requirements	7
4.3 Pumps	7
4.4 Measurement procedure requirements for mixtures of airborne particles and vapour	7
4.4.1 Storage test	7
4.4.2 Expanded uncertainty	7
4.4.3 Method description	7
5 Test methods	8
5.1 Sample distribution between the collection substrate for airborne particles and the collection substrate for vapour	8
5.2 Compliance with EN 1076	9
5.3 Storage	9
5.4 Uncertainty of the measurement	10
5.4.1 Calculation of the combined standard uncertainty	10
5.4.2 Calculation of the expanded uncertainty	10
6 Test report	10
Annex A (informative) Possible approaches to sample mixtures of airborne particles and vapour	11
A.1 General	11
A.2 Filter plus pumped sorbent tube	11
A.2.1 General	11
A.2.2 Sampling flow rate	11
A.3 Reagent-impregnated sampling system	12
A.4 Transport and storage	12
Annex B (informative) Physical behaviour of a mixture of airborne particles and vapour	13
B.1 Generation of a mixture of airborne particles and vapour	13
B.2 Sampling of chemical agents having a vapour pressure of more than 100 Pa at room temperature (process temperature)	13
B.3 Sampling of chemical agents having a vapour pressure of more than 0,001 Pa and less than or equal to 100 Pa at room temperature	13
B.4 Sampling of chemical agents having a vapour pressure of less than 0,001 Pa at room temperature	15
Annex C (informative) Estimation of uncertainty of measurement	16

C.1	Uncertainty components	16
C.2	Two collection substrates for airborne particles and vapour	16
C.2.1	Sampled air volume and sampling efficiency	16
C.2.2	Sample storage	16
C.2.3	Effects of temperature and humidity	16
C.2.4	Analysis	17
C.2.5	Bias of sample distribution between the collection substrate for airborne particles and the collection substrate for vapour (distribution bias)	17
C.2.6	Calculation of the relative combined uncertainty	17
C.2.6.1	Samples analysed separately	17
C.2.6.1.1	General	17
C.2.6.1.2	Same sampling volume for airborne particles and vapour	18
C.2.6.1.3	Different sampling volumes for airborne particles and vapour	18
C.2.6.1.4	Airborne particles or vapour collection substrate not analysed	19
C.2.6.2	Samples analysed together	19
C.3	One collection substrate for airborne particles and vapour	19
C.3.1	General	19
C.3.2	Sampling	19
C.3.3	Analysis	19
C.3.4	Calculation of the relative combined standard uncertainty	20
	Bibliography	21