

DIN EN 12341:2023-10 (E)

Ambient air - Standard gravimetric measurement method for the determination of the PM<(Index)10> or PM<(Index)2,5> mass concentration of suspended particulate matter

Contents

Page

European foreword	4
1 Scope.....	6
2 Normative references.....	6
3 Terms, definitions, symbols and abbreviations	6
3.1 Terms and definitions.....	6
3.2 Symbols and abbreviations	10
4 Principle	12
4.1 Description of the standard measuring principle.....	12
4.2 Initial use and procedures for ongoing QA/QC.....	12
4.3 Evaluation of measurement uncertainty.....	12
5 Equipment, facilities and testing.....	12
5.1 Sampling system components and programme for type testing	12
5.1.1 General.....	12
5.1.2 Sampler design	16
5.1.3 Standard inlet design.....	16
5.1.4 Connecting pipe work	17
5.1.5 Filter holder and filter	17
5.1.6 Flow control system.....	18
5.1.7 Temperature sensors	20
5.1.8 Ambient pressure sensor.....	20
5.1.9 Sampling period	20
5.1.10 Leak tightness of the sampling system	20
5.1.11 Storage conditions.....	22
5.1.12 Recording of operational parameters.....	22
5.1.13 Effect of failure of mains power	23
5.1.14 Effect of ending sampling early due to filter clogging	23
5.1.15 Firmware, software and manual versions	23
5.2 Sampling system components and programme for type testing	24
5.3 Field tests for type testing	25
5.3.1 General.....	25
5.3.2 Performance tests.....	25
5.4 Type testing report.....	26
6 Filter conditioning, sampling, weighing facilities and weighing procedures	26
6.1 General.....	26
6.2 Weighing Facilities	28
6.2.1 Weighing room	28
6.2.2 Balance	28
6.3 Filter conditioning and weighing prior to sampling	28
6.4 Sampling procedure.....	29
6.4.1 Filter cassette loading.....	29
6.4.2 Filter sampling.....	29
6.4.3 Sample storage and transport procedures.....	29
6.5 Filter conditioning and weighing after sampling.....	29
6.6 Weighing room procedures	30
6.7 Filter blanks for ongoing quality control	30
6.7.1 General.....	30

6.7.2	Weighing room blanks.....	30
6.7.3	Field blanks.....	31
7	Ongoing quality control.....	31
7.1	General	31
7.2	Frequency of calibrations, checks and maintenance.....	31
7.3	Recording of operational parameters.....	32
7.4	Maintenance of the sampling system	33
7.5	Checks of sampler sensors	33
7.6	Calibration of sampler sensors.....	33
7.7	Checks of the sampler flow rate	34
7.8	Calibration of the sampler flow rate.....	34
7.9	Leak check of the sampling system	34
7.10	Checks of weighing facility sensors.....	34
7.11	Calibration of weighing facility sensors	34
7.12	Balance	34
7.13	Check of the accuracy of sampler clock	35
8	Expression of results	35
9	Performance characteristics of the method	35
9.1	General	35
9.2	GUM concept.....	35
9.3	Individual uncertainty sources	37
9.3.1	General	37
9.3.2	Collected particulate mass	37
9.3.3	Time (t).....	40
9.3.4	Uncertainty budget	40
9.4	Expanded uncertainty vs. EU Data Quality Objectives	42
Annex A	(normative) Design drawing of standard inlet for the sampling of PM ₁₀ and PM _{2,5}	43
Annex B	(informative) Scheme of PM standard sampler.....	44
Annex C	(informative) Suitability tests for filters	45
Annex D	(normative) Initial suitability testing of weighing facilities	47
Annex E	(informative) Results of experimental work.....	48
Annex F	(informative) Impactor efficiency	50
Annex G	(normative) Elements of type testing report.....	52
Annex H	(informative) Example for uncertainty budget calculation	54
Annex I	(informative) Technical changes in EN 12341 with respect to version 2014 [21]	58
Bibliography	59