

DIN EN 17359:2020-10 (E)

Stationary source emissions - Bioaerosols and biological agents - Sampling of bioaerosols and collection in liquids - Impingement method

Contents		Page
European foreword		5
1	Scope	6
2	Normative references	6
3	Terms and definitions	7
4	Symbols and abbreviations	11
5	Principle of method	13
6	Theoretical fundamentals	14
6.1	Isokinetic sampling	14
6.2	Determination of concentration and load of the microorganisms	14
7	Device and materials	16
7.1	General	16
7.2	Device and methods for measurement of the exhaust air parameters for the calculation of the main volume flow	16
7.2.1	General	16
7.2.2	Device for determination of the exhaust air velocity	16
7.2.3	Device for determination of pressure, temperature and humidity	17
7.3	Device for the sampling of bioaerosols	17
7.3.1	General	17
7.3.2	Material properties	18
7.3.3	Entry nozzle, bend and sampling probe	18
7.3.4	Emission impinger	18
7.3.5	Suction device and device for measurement of the gas volume or respectively the gas volume flow	20
8	Sampling	20
8.1	General	20
8.2	Preparation of the sampling equipment	20
8.2.1	General	20
8.2.2	Preparation of the emission impinger	20
8.2.3	Preparation of the entry nozzle and the sampling probe	21
8.2.4	Determination of appropriate sampling probe and sampling flow	21
8.3	Performing bioaerosol sampling	24
8.3.1	Leak test and sampling	24
8.3.2	Recovery of deposits upstream of the emission impinger	25
8.3.3	Determination of the mass of the sampling liquid	26
8.3.4	Field blank value	26
8.3.5	Analytical blank value	27
8.4	Transport and storage	27
9	Analysis	27
10	Evaluation	27
10.1	General	27
10.2	Transfer of the results by the analytical laboratory	28

10.3	Sample gas volume during sampling	28
10.4	Microorganism number calculation	30
10.5	Load calculation	31
11	Performance characteristics	31
11.1	Measurement uncertainty	31
11.2	Parameters for the determination of measuring uncertainty in practice	32
12	Maintenance and quality assurance	37
13	Sampling efficiency and limits of the method	37
14	Interferences	38
Annex A(informative) Practical example for moulds and bacteria		39
A.1	General	39
A.2	Determination of the measurement points	39
A.3	Devices and materials	39
A.3.1	General	39
A.3.2	Devices and methods for measurement of the exhaust air parameters for the calculation of the main volume flow	39
A.3.2.1	General	39
A.3.2.2	Devices for determination of the exhaust air velocity	39
A.3.2.3	Devices for determination of pressure, temperature and humidity	40
A.3.3	Devices for sampling of bioaerosols	40
A.3.3.1	General	40
A.3.3.2	Material properties	40
A.3.3.3	Entry nozzle, bend and sampling probe	40
A.3.3.4	Emission impinger	40
A.3.3.5	Measurement system for isokinetic sample volume flow abstraction	40
A.4	Sampling process	40
A.4.1	General	40
A.4.2	Preparation of the sampling equipment	40
A.4.2.1	General	40
A.4.2.2	Preparation of the emission impinger	41
A.4.2.3	Preparation of the entry nozzle, band and sampling probe	41
A.4.3	Measurement of the exhaust air parameters for isokinetic sampling	41
A.4.4	Sampling	42
A.4.4.1	General	42
A.4.4.2	Recovery of deposits upstream of the emission impinger	42
A.4.4.3	Field blank value	42
A.4.5	Transport and storage	43
Annex B(informative) Measurement uncertainty		49
B.1	General	49
B.2	Determination of measurement uncertainty	49
B.2.1	Moulds	49
B.2.2	Mesophilic bacteria	50
B.2.3	Total cell count	50
B.2.4	Measurements in the bioaerosol test channel	50
B.3	Field blank value	51
Annex C(normative) Summary of the requirements to the emission measurement		52
Annex D(informative) Sample protocol for sampling and analysis		54
D.1	Sampling	54
D.2	Analysis	55
Bibliography		56