

# DIN ISO 16000-34:2019-01 (E)

## Indoor air - Part 34: Strategies for the measurement of airborne particles (ISO 16000-34:2018)

---

<b>Contents</b>	<b>Page</b>
<b>National foreword</b> .....	<b>4</b>
<b>Foreword</b> .....	<b>7</b>
<b>Introduction</b> .....	<b>8</b>
<b>1 Scope</b> .....	<b>9</b>
<b>2 Normative references</b> .....	<b>9</b>
<b>3 Terms and definitions</b> .....	<b>9</b>
<b>4 Origin, properties and health implications of airborne particles</b> .....	<b>12</b>
4.1 Origin and properties.....	12
4.2 Health implications.....	12
<b>5 Sources of indoor particulate matter and particle dynamics indoors</b> .....	<b>14</b>
5.1 General.....	14
5.2 Sources of indoor particulate matter.....	14
5.2.1 Typical indoor sources.....	14
5.2.2 Influence of the premises.....	15
5.2.3 Particle size range generated by typical sources.....	15
5.3 Particle dynamics indoors.....	16
5.3.1 Major particle sinks.....	16
5.3.2 Variations of the particle spectrum.....	16
5.3.3 Effect of air conditioning.....	17
5.3.4 Conditions of room use.....	17
<b>6 Measurement methods for airborne particles indoors</b> .....	<b>17</b>
6.1 General.....	17
6.2 Established method description.....	18
6.2.1 General.....	18
6.2.2 Cyclone.....	21
6.2.3 Impactors (impactor – cascade impactor – LPI – MOI).....	21
6.2.4 Differential mobility analyser (DMA).....	22
6.2.5 Aerosol mass spectrometer (AMS).....	23
6.2.6 Aerosol mass monitor (AMM).....	23
6.2.7 Oscillating microbalance (OMB).....	24
6.2.8 Beta radiation attenuation (BRA) monitor.....	25
6.2.9 Microscopy (OM – SEM – TEM).....	26
6.2.10 Light scattering aerosol spectrometer (LSAS).....	26
6.2.11 Time-of-flight spectrometer (TOF-AS).....	27
6.2.12 Condensation particle counter (CPC – UF CPC – CPC with SES – CPC photometric mode).....	28
6.2.13 Faraday cup aerosol electrometer (FCAE).....	29
6.2.14 Fast response aerosol spectrometer (FRAS).....	29
6.2.15 Low pressure impactor with electric detection (LPI+E).....	30
<b>7 General sampling recommendations</b> .....	<b>30</b>
7.1 Instrumentation and sampling system.....	30
7.2 Measurement location.....	31

7.3	Measurement time and duration.....	31
7.4	Estimated concentration scale (minimum and maximum accuracy).....	31
7.5	Background concentration.....	32
7.6	Impact of outdoor air quality.....	32
7.7	Impact of room conditions.....	33
7.8	Impact of the measurement itself.....	33
<b>8</b>	<b>Measurement strategy for determining airborne particles indoors.....</b>	<b>34</b>
8.1	General.....	34
8.2	Preliminary work — Definition of the measurement objective and list of basic information.....	34
8.2.1	General.....	34
8.2.2	Statement on the purpose of the measurement.....	34
8.2.3	List of main expected sources.....	34
8.2.4	Temporal effects.....	35
8.2.5	Description of the indoor compartment.....	35
8.3	Visual room inspection — Definition of the measurement planning and strategy.....	36
8.4	Preliminary measurements.....	36
8.5	Measurement procedures.....	37
8.5.1	General.....	37
8.5.2	Procedure for the determination of the background.....	37
8.5.3	Procedure for the estimation of the influence of outdoor (ambient air) concentration.....	38
8.5.4	Procedure for the identification of main sources present in a room.....	39
8.5.5	Procedure for the measurement of the average and the time-resolved emission of a specific source.....	40
8.5.6	Procedure for the estimation of the efficiency of an abatement techniques (i.e. filtration by air conditioning system.....	41
<b>9</b>	<b>Uncertainty evaluation.....</b>	<b>42</b>
<b>10</b>	<b>Evaluation and reporting of results.....</b>	<b>43</b>
<b>11</b>	<b>Documentation.....</b>	<b>43</b>
<b>12</b>	<b>Quality assurance.....</b>	<b>44</b>
12.1	Performance specifications.....	44
12.2	Quality assurance when determining particle number concentrations.....	45
12.2.1	General.....	45
12.2.2	Sampling volume flow.....	45
12.2.3	Checking the equipment's parameters.....	45
12.3	Quality assurance when determining particle mass concentrations.....	45
12.3.1	Mass concentration calculation based on measured number concentration.....	45
12.3.2	Gravimetric mass concentration measurement.....	45
	<b>Annex A (normative) Protocol for the measurement of indoor airborne particles.....</b>	<b>47</b>
	<b>Bibliography.....</b>	<b>50</b>