



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 23210:2009

Stationary source emissions -  
Determination of PM<sub>10</sub>/PM<sub>2,5</sub> mass  
concentration in flue gas -  
Measurement at low concentrations by  
use of impactors (ISO 23210:2009)

## I.S. EN ISO 23210:2009

*Incorporating amendments/corrigenda issued since publication:*

<i>This document replaces:</i>	<i>This document is based on:</i> EN ISO 23210:2009	<i>Published:</i> 1 August, 2009	
This document was published under the authority of the NSAI and comes into effect on: 21 September, 2009		ICS number: 13.040.40	
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Údarás um Chaighdeáin Náisiúnta na hÉireann			

ICS 13.040.40

English Version

**Stationary source emissions - Determination of PM<sub>10</sub>/PM<sub>2,5</sub>  
mass concentration in flue gas - Measurement at low  
concentrations by use of impactors (ISO 23210:2009)**

Émissions de sources fixes - Détermination de la  
concentration en masse de PM<sub>10</sub>/PM<sub>2,5</sub> dans les effluents  
gazeux - Mesurage à des faibles concentrations au moyen  
d'impacteurs (ISO 23210:2009)

Emissionen aus stationären Quellen - Ermittlung der  
Massenkonzentration von PM<sub>10</sub>/PM<sub>2,5</sub> im Abgas -  
Messung bei niedrigen Konzentrationen mit Impaktoren  
(ISO 23210:2009)

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## **Foreword**

This document (EN ISO 23210:2009) has been prepared by Technical Committee ISO/TC 146 "Air quality" in collaboration with Technical Committee CEN/TC 264 "Air quality", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2010, and conflicting national standards shall be withdrawn at the latest by February 2010.

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### **Endorsement notice**

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I.S. EN ISO 23210:2009  
**INTERNATIONAL  
STANDARD**

**ISO  
23210**

First edition  
2009-08-01

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**Stationary source emissions —  
Determination of PM<sub>10</sub>/PM<sub>2,5</sub> mass  
concentration in flue gas — Measurement  
at low concentrations by use of  
impactors**

*Émissions de sources fixes — Détermination de la concentration en  
masse de PM<sub>10</sub>/PM<sub>2,5</sub> dans les effluents gazeux — Mesurage à des  
faibles concentrations au moyen d'impacteurs*



Reference number  
ISO 23210:2009(E)

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Published in Switzerland



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## **Foreword**

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 23210 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 1, *Stationary source emissions*.

## Introduction

In order to quantify the amount of PM<sub>10</sub> and PM<sub>2,5</sub> particles in stationary source emissions or to identify the contribution sources of PM<sub>10</sub> and PM<sub>2,5</sub> in ambient air, it is necessary to measure fine particulate matter in the flue gas of industrial sources.

This International Standard describes a measurement method for the determination of mass concentrations of PM<sub>10</sub> and PM<sub>2,5</sub> emissions, which realizes the same separation curves as those specified in ISO 7708:1995 for PM<sub>10</sub> and PM<sub>2,5</sub> in ambient air. The method is based on the principle of impaction. During sampling, the particle fraction is divided into three groups with aerodynamic diameters greater than 10 µm, between 10 µm and 2,5 µm and smaller than 2,5 µm.

The measurement method allows the simultaneous determination of concentrations of PM<sub>10</sub> and PM<sub>2,5</sub> emissions. The method is designed for stack measurements at stationary emission sources.

The contribution of stationary source emissions to PM<sub>10</sub> and PM<sub>2,5</sub> concentrations in ambient air can be classified as primary and secondary. Those emissions that exist as particulate matter within the stack gas and that are emitted directly to air can be considered "primary". Secondary particulate consists of those emissions that form in ambient air due to atmospheric chemical reactions. The measurement technique in this International Standard does not measure the contribution of stack emissions to the formation of secondary particulate matter in ambient air.

This International Standard includes normative references to ISO 12141:2002. The corresponding requirements in ISO 12141:2002 are identical to those in European Standards EN 13284-1:2001 and EN 15259:2007.



# Stationary source emissions — Determination of PM<sub>10</sub>/PM<sub>2,5</sub> mass concentration in flue gas — Measurement at low concentrations by use of impactors

## 1 Scope

This International Standard specifies a standard reference method for the determination of PM<sub>10</sub> and PM<sub>2,5</sub> mass concentrations at stationary emission sources by use of two-stage impactors. The measurement method is especially suitable for measurements of mass concentrations below 40 mg/m<sup>3</sup> as half-hourly averages in standard conditions (273 K, 1 013 hPa, dry gas). It is an acceptable method for the measurement in the flue gas of different installations, such as cement and steel production plants, as well as combustion processes.

This International Standard is not applicable to the sampling of flue gases that are saturated with water vapour.

This International Standard is not applicable where the majority of the particles are likely to exceed PM<sub>10</sub>, for example, in the case of raw gases or plant operating failures.

NOTE 1 Measurements of particulate concentrations higher than 40 mg/m<sup>3</sup>, as a half-hourly average in standard conditions (273 K, 1 013 hPa, dry gas), can lead to overloading of the collecting plates and backup filters and also could result in shorter sampling times.

NOTE 2 The collecting plates and backup filters can be used for further chemical analysis.

This International Standard cannot be used for the determination of the total mass concentration of dust.

NOTE 3 For data assessment purposes, it can be useful to perform measurements of total particulate matter in parallel to the PM<sub>10</sub> and PM<sub>2,5</sub> measurements.

This International Standard describes the design, use and theory of round-nozzle impactors. It does not exclude other types of impactors, provided these systems meet the performance criteria specified in this International Standard in a validation of the impactor performed by an independent testing laboratory.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7708:1995, *Air quality — Particle size fraction definitions for health-related sampling*

ISO 12141:2002, *Stationary source emissions — Determination of mass concentration of particulate matter (dust) at low concentrations — Manual gravimetric method*

ISO 20988:2007, *Air quality — Guidelines for estimating measurement uncertainty*

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