



EUROPEAN COMMISSION
 DIRECTORATE-GENERAL ENVIRONMENT
 Directorate C - Sustainable Resource Management, Industry and Air
ENV.C.3 – Industrial Emissions, Air Quality & Noise

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**STANDARDIZATION MANDATE TO CEN, CENELEC AND ETSI IN SUPPORT OF THE
 IMPLEMENTATION OF THE AMBIENT AIR QUALITY LEGISLATION**

1. TITLE

Standardisation mandate to CEN, CENELEC and ETSI (ESOs) under Directive 2008/50/EC on ambient air quality and cleaner air for Europe¹ for standards concerning automated measurements of particle matter in ambient air and the measurement of its chemical composition (organic and elemental carbon, inorganic components).

2. OBJECTIVE

Directive 2008/50/EC on ambient air quality and cleaner air for Europe imposes Member States to monitor air pollution by particle matter (PM₁₀ and PM_{2.5}) and its chemical composition (organic and elemental carbon, inorganic components). This mandate is required to develop and validate standard measurement methods for the automated monitoring of particulate matter and for the measurement of its chemical composition, in order to ensure a harmonized implementation of Directive 2008/50/EC in the EU.

3. POLICY AND/OR LEGAL FRAMEWORK

Directive 2008/50/EC on ambient air quality and cleaner air for Europe sets limit values for particulate matter PM₁₀ and fine particulate matter PM_{2.5}. The reference measurement methods have already been standardised by ESOs (EN12341:1998² and EN14907:2005³), but they are manual/semi-automated methods. The Member States indicated a need for a standard for automated PM measurements (Article 32.3), as most of the measurements performed today are made by the automated methods. In addition, difficulties with the use of existing EN12341 and EN14907 reference methods were recently reported with respect to biases introduced by the choice of filter material, and a revision of the existing standards is therefore required.

Directive 2008/50/EC also requires the measurement in the PM_{2.5} fraction of elemental and organic (EC/OC) and inorganic components (anions/cations) in background areas

¹ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0050:en:NOT>

² EN 12341:1998 Air quality - Determination of the PM 10 fraction of suspended particulate matter - Reference method and field test procedure to demonstrate reference equivalence of measurement methods

³ EN14907:2005 Ambient air quality - Standard gravimetric measurement method for the determination of the PM_{2,5} mass fraction of suspended particulate matter

(Article 6.5), with the objective to support air quality assessment and management. In order to ensure better data comparability, validated standard methods are therefore equally required.

4. DESCRIPTION OF THE MANDATED WORK

The Commission entrusts ESOs with the following work: establishing of three European standards for 1) automated measuring systems for particulate matter (PM₁₀ and PM_{2.5}), 2) determination of elemental carbon and organic carbon in PM_{2.5} and 3) the determination of anions and cations in PM_{2.5}.

4.1. Measurement method for PM

The European standard for automated measurement systems (AMS) for particulate matter (PM₁₀ and PM_{2.5}) shall combine principles from existing standards for gases (EN 14211:2005⁴, EN14212:2005⁵, EN14625:2005⁶, EN14626:2005⁷ and EN 14662-3:2005⁸) dealing with instrument type approval and QA/QC in the field, with elements from the Guide to the Demonstration of Equivalence of Ambient Air Monitoring Methods (GDE: 2010).

The type approval part consists of a series of laboratory tests and field tests, the latter to be performed and evaluated based on GDE: 2010 by comparison with reference methods for measurement of PM (EN 12341 and EN 14907). The ongoing QA/QC combines technical performance checks with continuous comparisons with implementations of the reference method for measurement of PM.

The following measuring principles should be evaluated: oscillating microbalance, a β -attenuation monitor and an optical instrument. The feasibility will not only depend on the practicability of performing the tests/checks and meeting the criteria, but also on the availability of ancillary measurement equipment with sufficiently low uncertainties.

Recent findings indicate a lack of robustness of the reference method due to lack of comparability of the various filter types (and even brands) that currently may be used.

Consequently, research is needed into the setting of criteria for suitability of filters together with the tests to demonstrate compliance with these criteria. A number of issues associated with filter selection are common also to other European Standards. Joint effort with standardisation work outside the scope of this mandate is therefore recommended.

⁴ 14211:2005 Ambient air quality - Standard method for the measurement of the concentration of nitrogen dioxide and nitrogen monoxide by chemiluminescence

⁵ EN14212: 2005 Ambient air quality - Standard method for the measurement of the concentration of sulphur dioxide by ultraviolet fluorescence

⁶ EN14625:2005 Ambient air quality - Standard method for the measurement of the concentration of ozone by ultraviolet photometry

⁷ EN14626:2005 Ambient air quality - Standard method for the measurement of the concentration of carbon monoxide by nondispersive infrared spectroscopy

⁸ EN 14662 – 3:2005 Ambient Air Quality - Standard method for the measurement of benzene concentrations - Part 3: Automated pumped sampling with in situ gas chromatography

4.2. Determination of EC/OC in PM_{2.5}

The European standard shall describe a method on the measurement of airborne elemental carbon (EC) and organic carbon (OC) in PM_{2.5} in accordance to the new Air Quality Directive 2008/50/EC (Air Quality Directive, AQD). No European standard currently exists and this standard is seen as a prerequisite to ensure compliance with the European legislation.

The method shall be applicable for rural background sites according to the AQD. There is an urgent need that the same sampling and analysis method should also be applicable for suburban and urban background sites as well, if possible, for street sites, to achieve coherence in the European approach.

As there are no traceable primary reference materials available for EC and OC analysis and moreover there is no absolute scientific distinction between EC and OC the method set out in the European Standard will provide operational definitions of the measured quantities.

The validated method will focus on the harmonization and improvement of the data quality of thermal-optical measurement method for EC and OC used in monitoring networks, and develop guidance regarding the use of different protocols (analytical parameters) used currently within that method. The method should be suitable for practical use in routine monitoring networks.

The Commission recommends to ESOs to take account as much as possible of the resume of the EC/OC workshop - A preparatory workshop for a future standard measurement method that took place in February 2009.

The European Standard should not be developed in isolation from relevant work in other communities especially European Monitoring and Evaluation Programme (EMEP), European Supersites for Atmospheric Aerosol Research (EUSAAR) and the US/Canada.

4.3. Determination of cations/anions in PM_{2.5}

The European Standard will describe a validated method for the determination of the mass of water soluble anions and cations (NO_3^- , SO_4^{2-} , Cl^- , NH_4^+ , Na^+ , K^+ , Mg^{2+} , Ca^{2+}) in the PM_{2.5} fraction of particulate air pollutants.

The validated measurement method will comprise the sampling of anions and cations as part of the PM_{2.5} particulate phase, the sample extraction and analysis of anions and cations by ion chromatography. Alternately, cations, excluding ammonium can be analysed by inductively coupled plasma optical emission spectrometry (ICP-OES).

The validated method will be suitable to be used at rural background monitoring sites in accordance with the requirements of Directive 2008/50/EC.

The validated method may also be used for the measurement of anions and cations in the PM₁₀ fraction of particulate matter with the aim of quantifying contributions from natural sources to the concentrations of PM₁₀.

The European Standard should not be developed in isolation from relevant work in other communities especially EMEP.

5. EXECUTION OF THE MANDATE

The standard will take into account other ongoing standardization work, in particular in CEN/TC 264 Air Quality. The standard can also take into account indications of other technical committees/working groups.

The standard will be developed in full cooperation with the Commission services.

ESOs are requested to indicate, within one month, following the receipt of the request, if they accept this mandate.

ESOs are requested to communicate to the Commission, within 2 months as of the acceptance of this mandate, the time schedule and the work programme for the execution of this mandate.

ESOs are requested to provide to the Commission the standards (EN) within 36 months after the acceptance of the mandate.

ESOs are requested to report every 12 months after the acceptance of the mandate on the progress of the tasks set out in this mandate and to give a final report after delivering the requested European standard(s) to notify the fulfilment of this mandate.

ESOs are requested to provide to the Commission a copy of the European standards in the respective working language(s) of ESOs.

6. BODIES TO BE ASSOCIATED

As appropriate, ESOs will invite the representative organisations of consumers' interests (ANEC), environmental protection (ECOS), workers (ETUI), and small and medium-size enterprises (NORMAPME) to take part in the standardisation work.

CEN, CENELEC and ETSI are also requested to consult with the European Commission Directorate-General Joint Research Centre in order to explore if the Commission's research institutes dispose of specific competence to support the standardisation work.