

Ambient air quality and cleaner air for
Europe (recast) (April 24 2024)

And its
Relation to the EMEP Monitoring Strategy

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III. Coordination and cooperation

13. Due to the significant interactions between the suite of chemical constituents and the associated physical properties of air pollutants, as well as the synergies in abatement measures, national and international monitoring efforts should be closely coordinated. Such an approach will be pursued by EMEP to ensure a sound observational basis by combining resources and avoiding duplication of efforts.

14. Taking into account the complexity and costs of atmospheric composition monitoring, EMEP will, as far as possible, continue to harmonize with, and make use of relevant data compiled under, other conventions and frameworks. In particular, such data would include observations of local air quality, climate change, water quality and biodiversity. As a result, there is a significant overlap in technical infrastructures at national levels, i.e. most EMEP level 2 sites (see below) represent core infrastructures for observations supporting related initiatives. Within the Convention, there is close collaboration with the Working Group on Effects and the International Cooperative Programmes, with EMEP observations being used to derive pollution exposure data to assess impacts and effects.

15. At the European level, EMEP observations are fundamental in relation to the European Union Air Quality Directive¹ and the National Emission Ceilings Directive,² and there are close links between EMEP monitoring requirements and the Directives. Furthermore, EMEP observations are used as a part of European Environment Agency assessments of the air quality situation in Europe, and EMEP sites typically also deliver parts of their data to the European Environment Agency database.

16. There is close scientific and technical cooperation between EMEP and the World Meteorological Organization Global Atmosphere Watch Programme in Europe, comprised

Content of the new directive

«**Whereas**» (a preamble that builds a case for the directive's importance)

- **Chapter I – General provisions**
- **Chapter II – Assessment of ambient air quality and deposition rates**
- *Chapter III Ambient Air Quality Management*
- *Chapter IV. Plans*
- *Chapter V Information and reporting*
- *Chapter VI Delegated and Implementing acts.*
- *Chapter VII Access to justice, compensation and penalties*
- *Chapter VIII Transitional and final provisions*

Whereas (preamble) ;

- (6) ...further improvement of monitoring methods, better international cooperation, better information to public.. are needed.
- (9) Fixed measurements mandatory in zones where assessment thresholds are exceeded...
- **Additional monitoring of background concentrations and deposition of pollutants in ambient air should also be carried out to enable better understanding of pollution levels and dispersion.**
- **(11) It is important that pollutants of emerging concern, such as ultrafine particles, black carbon and elemental carbon, as well as ammonia and the oxidative potential of particulate matter, be monitored in both rural and urban supersites in order to support scientific understanding of their effects on health and the environment, as recommended by WHO. For states whose territory is less than 10.000 km² (Cyp, Lux, Malta), monitoring in supersites at urban locations would be sufficient.**
- **(12) Detailed measurements of fine particulate matter (PM_{2,5}) should be made in order to understand better the impact of that pollutant and to develop appropriate policies. Such measurements should be made in a manner consistent with those of EMEP.**
- (13) standardized methods should be used
- (14) Reference methods and CEN. **In the absence of CEN standard methods, the use of international, national standard reference measurement methods or CEN technical specifications should be permitted**
- (34) Air pollution has no boundaries and is shared across the Union. In most member states a significant share of the pollution is generated outside their territory. Where appropriate, Member States should cooperate with one another (...if levels exceed any limit value..)
- (35) Collect and disseminate air quality information
- **(45) ...cannot be sufficiently achieved by the Member States by reason of the transboundary nature of air pollutants, and can therefore be better at Union level, the Union may adopt measures...**

Chapter II – Assessment of ambient air quality and deposition rates

- Reference to annex IV (assessment of ambient air quality and location of sampling points)
- 4. One or more sampling points adapted to the monitoring objective specified in Section 2, Point A of Annex VII (monitoring at supersites), **shall be installed in a member states territory to supply data on concentrations of the ozone precursor substances** listed in Point B of that Section at locations determined in accordance with Point C of that Section.
- 4a. Nitrogen dioxide shall be measured at a minimum of 50% of the ozone sampling points required under Table 2 of Section A of Annex III (Minimum number of sampling points for fixed measurements). **That measurement shall be continuous except at rural background stations**, as referred to in Section B (microscale siting of sampling points) of Annex IV
- 8. To assess the contribution of BaP in ambient air, each **MS shall monitor other relevant PAHs** at a limited number of sampling points. These shall include benzo(a)anthracene + 5 more.... Sampling points for these PAHs shall be co-located with sampling points for BaP and shall be selected in such a way that geographical variation and long-term trends can be identified.
- 9. In addition to monitoring required under article 10, **member states shall monitor ultrafine particles levels** in accordance with point D of annex III and section 3 of Annex VII. **Monitoring of black carbon concentrations may be undertaken** at the same locations.

Chapter II – Assessment of ambient air quality and deposition rates

Article 10 Monitoring supersites

1) Each MS shall establish at least one monitoring supersite per 10 mill inhabitants. MS with less than 10 mill inhabitants shall establish at least one monitoring supersite at an urban background location.

Member states whose territory is over 10000 km², but no more than 100.000 km² shall establish at least one monitoring supersite at a rural background location. Each MS whose territory is over 100.000 km² shall establish at least one monitoring supersite per 100.000 km² at a rural background location.

2) The siting of monitoring supersites shall be determined for urban locations and rural background locations in accordance with Point B of Annex IV.

4) member state may establish, with one or more neighboring MS, one or more joint monitoring supersites to meet the requirements set out in paragraph 1. This does not affect the obligation of each MS to establish at least one supersite at urban, and at rural if territory is over 10.000 km².

4a) Measurements at monitoring supersites at urban and rural background stations shall include the pollutants listed in Tables 1 and 2 of Section -1 of Annex VII and may also include the pollutants listed in Table 3 of section -1 of Annex VII.

4b) A member state may choose not to measure black carbon, ultrafine particles or ammonia in half of its rural background monitoring supersites if the number of its rural background monitoring supersites exceeds the number of its urban background monitoring supersites by at least the ratio of 2:1, as long as the selection of sites is representative for these three pollutants.

8) Where appropriate, monitoring shall be coordinated with the monitoring strategy and measurement programme of the Cooperative Programme for Monitoring and Evaluation of Long-Range Transmission of Air Pollutants in Europe (EMEP), the Aerosol, Cloud and Trace Gases Research Infrastructure (ACTRIS) and the monitoring of air pollution impacts undertaken under Directive EU 2016/2284

Annexes :

- ANNEX I Air Quality standards
- ANNEX II Assessment thresholds
- **ANNEX III Minimum number of sampling points for fixed measurements**
- **ANNEX IV Assessment of ambient air quality and location of sampling points**
- **ANNEX V – Data Quality Objectives**
- **ANNEX VI Reference methods for assessment of concentrations in ambient air and deposition rates**
- **ANNEX VII – Monitoring at supersites and of mass concentrations, chemical composition of PM_{2,5}, ozone precursor substances and UFPs**
- ANNEX VIII – Information to be included in air quality plans and Air quality roadmaps
- ANNEX VIIIa – Emergency measures to be considered for inclusion in the short-term action plans required under Article 20.
- ANNEX IX – Public information
- ANNEX X – other Directives..
- ANNEX XI – Correlation table with previous directives.

Annex III – minimum number of sampling points for fixed measurement:

- A) Minimum number of sampling points for fixed measurements to assess compliance with limit values and target values for the protection of human health. Four tables listing minimum number of sampling points. At least one background sampling point in each zone. NO₂, SO₂, CO, benzene, PM₁₀, PM_{2,5}, Pb, Cd, Ni, As in PM₁₀, BaP in PM₁₀, O₃.
- B) Minimum number of sampling points for fixed measurements to assess compliance with the PM_{2,5} and NO₂ average exposure reduction obligation of human health: at least one sampling point per average exposure territorial unit, and at least one sampling point per million inhabitants
- C) Minimum number of sampling points for fixed measurements to assess compliance with critical levels for SO₂ and NO_x and with long-term objectives for ozone
 - 1. Critical levels for protection of vegetation and natural ecosystems (1 point per 20.000 km² if maximum concentration exceeds the critical levels, and 1 point per 40.000 km² if maximum concentration exceeds the assessment threshold).
 - 2. Long term objective for protection of human health and vegetation for ozone: **For rural background measurements MS shall ensure at least 1 sampling point per 50.000 km² as an average density over all zones per country. For complex terrain 1 sampling point per 25.000 km² is recommended.**
- D) Minimum number of sampling points for fixed measurements of **ultrafine particles where high concentrations** are likely to occur (at least one sampling point per 1 mill inhabitants (or at least one site if < 1 mill inhabitants).

Annex IV – assessment of ambient air quality and location of sampling points

A) General

B) Macroscale siting of sampling points

1. Information (take into account emission inventories)
2. Protection of human health
3. Protection of vegetation and natural ecosystems
4. Additional criteria for ozone sampling points
5. Criteria for determining the spatial representativeness area of sampling points

C) Microscale siting of sampling points

- a. Unrestricted flow around inlet
- b. Height 0,5 to 4 meters above ground
- c. Inlet probe not positioned in the immediate vicinity of sources
- d. Samplers exhaust outlet shall be positioned...
- e. Specific conditions for road traffic
- f. For deposition measurements in background locations the guidelines of EMEP shall apply**
- g. Special conditions for ozone close to pollution sources
- h. Other factors

Annex IV – assessment of ambient air quality and location of sampling points

D) Site selection, its review and documentation

1. **Competent authority** shall for all zones fully document the site selection procedure, and record information to support the network design and choice of locations for all monitoring sites. The design of the network shall be supported at least by either modeling applications or indicative measurements.
2. The documentation shall include the location... detailed maps, photographs and shall include information on the spatial representativeness of all sampling points.
3. The documentation shall include evidence as regards reasons for the network design and demonstrating compliance with Points B and C of this Annex, in particular
 1. Justification for the selection of locations representative of the highest levels of pollution in the zone or agglomeration for each pollutant
 2. Reasons for selection of locations representative of the general exposure of populations
 3. Any deviation from the micro-scale siting criteria, their underlying reasons and the likely impact on measured levels
4. Where indicative, modelling...
5. Where indicative, modelling..
6. For ozone measurements, MS shall apply proper screening and interpretation of the monitoring data in the context of the meteorological and photochemical processes affecting the ozone concentrations measured at the respective sites.
7. When applicable, the list of ozone precursor substances, the objective sought for measuring them and the methods used to sample and measure them shall be part of the documentation
8. When applicable, information of the measurement methods used for the measurements of the chemical composition of PM_{2,5} shall also be part of the documentation
9. At least every 5 years the selection criteria, network design and monitoring site locations, defined by the competent authorities in view of the requirements of this annex, shall be reviewed to ensure they remain valid and optimal over time. The review shall be supported at least by either modeling applications or indicative measurements
10. The documentation shall be updated following every review and other relevant changes to the network, and shall be made public through appropriate communication channels.

Annex V – Data Quality Objectives

- A) Uncertainty of measurements and modeling application for AAQA
- B) Data coverage of measurements for AAQA
- C) Methods for assessing compliance and estimating statistical parameters to account for low data coverage or significant data losses.
- D) Results of air quality assessment
- E) Quality assurance for ambient air quality assessment. Data validation**
- F) Promotion of harmonized air quality modelling approaches

ANNEX VI Reference methods for assessment of concentrations in ambient air and deposition rates

A) Reference methods for SO₂, NO_x, PM_{2,5}, PM₁₀, As, Cd, Pb, Ni, Benzene, CO, PAHs, TGM, deposition of (As, Cd, Pb, Ni, Hg), PAHs, Ozone, elemental carbon, organic carbon, inorganic ions in PM_{2,5}.

- **Ozone precursors, methane, UFP, BC, size distribution of ultrafine particles, ammonia, Mercury, nitric acid, levoglucosan and oxidative potential of particulate matter: MS can choose sampling and measuring methods. Where international, CEN or national standards are available, these may be used.**

B) Demonstration of equivalence

C) Standardisation (T, P)

D) Mutual recognition of data

E) Reference air quality modelling applications

Table 2 - Pollutants to be measured at supersites at rural background locations

Pollutant	Type of measurement
PM ₁₀ , PM _{2.5} , UFP, BC	Fixed measurements
NO ₂ , O ₃ and ammonia (NH ₃)	Fixed measurements
SO ₂ , CO	Fixed or indicative measurements
Total deposition of benzo(a)pyrene and other polycyclic aromatic hydrocarbons (PAH) as relevant	Fixed or indicative measurements
Total deposition of arsenic, cadmium, lead, nickel and mercury	Fixed or indicative measurements
Benzo(a)pyrene, other polycyclic aromatic hydrocarbons (PAH) as relevant ⁽¹⁾	Fixed or indicative measurements
Arsenic, cadmium, lead, and nickel	Fixed or indicative measurements
Chemical composition of PM _{2.5} in accordance with Section 1 of Annex VII	Fixed or indicative measurements
Total gaseous mercury	Fixed or indicative measurements

⁽¹⁾ benzo(a)pyrene and the other polycyclic aromatic hydrocarbons referred to in Article 9(8)

- EMEP L1
- «EMEP L1»
- EMEP L2
- EMEP L3

Table 3 - Pollutants recommended to be measured at supersites at urban and rural locations if not covered by the requirements of Tables 1 and 2

Pollutant	Type of measurement
Size distribution of UFP	Fixed or indicative measurements
Particulate matter oxidative potential	Fixed or indicative measurements
Total deposition of benzo(a)pyrene and other polycyclic aromatic hydrocarbons (PAH) as relevant	Indicative measurements
Ammonia (NH ₃)	Fixed or indicative measurements
Levoglucosan to be measured as part of the chemical composition of PM _{2.5}	Fixed or indicative measurements
Total gaseous mercury	Fixed or indicative measurements
Particulate and gaseous divalent mercury	Fixed or indicative measurements
Nitric acid	Fixed or indicative measurements

EMEP has «fixed» measurements only

Annex VII - Monitoring at supersites and of mass concentration, chemical composition of PM_{2,5}, ozone precursor substances and ultrafine particles

Table 2 - Pollutants to be measured at monitoring supersites at rural background locations

Pollutant	Type of measurement
PM ₁₀ , PM _{2,5} , UFP, BC	Fixed measurements
NO ₂ , O ₃ and ammonia (NH ₃)	Fixed measurements
SO ₂ , CO	Fixed or indicative measurements
Total deposition of benzo(a)pyrene and other polycyclic aromatic hydrocarbons (PAH) as relevant	Fixed or indicative measurements
Total deposition of arsenic, cadmium, lead, nickel and mercury	Fixed or indicative measurements
Benzo(a)pyrene, other polycyclic aromatic hydrocarbons (PAH) as relevant ⁽¹⁾	Fixed or indicative measurements
Arsenic, cadmium, lead, and nickel	Fixed or indicative measurements
Chemical composition of PM _{2,5} in accordance with Section 1 of Annex VII	Fixed or indicative measurements
Total gaseous mercury	Fixed or indicative measurements

- EMEP L1
- «EMEP L1»
- EMEP L2
- EMEP L3

Table 3 - Pollutants recommended to be measured at monitoring supersites at urban background locations and rural background locations if not covered by the requirements of Tables 1 and 2

Pollutant	Type of measurement
Size distribution of UFP	Fixed or indicative measurements
Particulate matter oxidative potential	Fixed or indicative measurements
Ammonia (NH ₃)	Fixed or indicative measurements
Levoglucosan to be measured as part of the chemical composition of PM _{2,5}	Fixed or indicative measurements
Total gaseous mercury	Fixed or indicative measurements
Particulate and gaseous divalent mercury	Fixed or indicative measurements
Nitric acid	Fixed or indicative measurements

EMEP has «fixed» measurements only

‘fixed measurements’ means measurements taken at sampling points, either continuously or by random sampling, at constant locations for at least 1 calendar year to determine the levels in accordance with the relevant data quality objectives;

‘indicative measurements’ means measurements, *taken either at regular intervals during a calendar year or by random sampling, to determine the levels in accordance with* data quality objectives that are less strict than those required for fixed measurements;

Annex VII – Monitoring at supersites and of mass concentration, chemical composition of PM_{2,5}, ozone precursor substances and ultrafine particles

Section 1 Measurements of mass concentrations and chemical composition of PM_{2,5} (SO₄, NO₃, NH₄, Cl, Ca, Mg, EC, OC)

Section 2 Measurements of ozone precursor substances

List of Alcohols, Aldehydes, Alkynes, Alkanes, Aromatic hydrocarbons, Ketones, Terpenes (~45 substances)

Section 3 Measurements of UFPs

- a) Objective to ensure that adequate information is available at locations where high concentrations of UFP occur that are mainly influenced by sources from air, water or road transport, industrial sites or domestic heating. Siting at locations where high UFP concentrations are likely to occur and downwind from the main sources within the relevant predominant wind direction of these sources.

Conclusions

- EMEP monitoring requirements largely fulfill and go beyond the obligations for supersites set by the new directive
- Specific requirements not included in EMEP MS: oxidative capacity of particulate matter.
- It is recommended that Parties/Member States avoid duplication of efforts when responding to the monitoring obligations
 - Specifically than any new observations to be established are made at EMEP sites and data reported to EMEP
- EMEP-CCC are available for support/discussions