

Directive 2002/3/EC of the European Parliament and of the Council  
of 12 February 2002 relating to ozone in ambient air (repealed)

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PARLIAMENT AND OF THE COUNCIL

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relating to ozone in ambient air (repealed)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission<sup>(1)</sup>,

Having regard to the opinion of the Economic and Social Committee<sup>(2)</sup>,

Having regard to the opinion of the Committee of the Regions<sup>(3)</sup>,

Acting in accordance with the procedure laid down in Article 251 of the Treaty<sup>(4)</sup>, in light of the joint text approved by the Conciliation Committee on 10 December 2001,

Whereas:

- (1) On the basis of principles enshrined in Article 174 of the Treaty, the Fifth Environmental Action Programme, approved by the Resolution of the Council and the Representatives of the Governments of the Member States meeting within the Council of 1 February 1993 on a European Community programme of policy and action in relation to the environment and sustainable development<sup>(5)</sup> and supplemented by Decision No 2179/98/EC<sup>(6)</sup> envisages, in particular, amendments to existing legislation on air pollutants. The said programme recommends the establishment of long-term air quality objectives.
- (2) Pursuant to Article 4(5) of Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management<sup>(7)</sup>, the Council is to adopt the legislation provided for in paragraph 1 and the provisions laid down in paragraphs 3 and 4 of that Article.
- (3) It is important to ensure effective protection against harmful effects on human health from exposure to ozone. The adverse effects of ozone on vegetation, ecosystems and the environment as a whole should be reduced, as far as possible. The transboundary nature of ozone pollution requires measures to be taken at Community level.
- (4) Directive 96/62/EC provides that numerical thresholds are to be based on the findings of work carried out by international scientific groups active in the field. The Commission is to take account of the most recent scientific research data in the epidemiological and environmental fields concerned and of the most recent advances in metrology with a view to re-examining the elements on which such thresholds are based.

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- (5) Directive 96/62/EC requires limit and/or target values to be set for ozone. In view of the transboundary nature of ozone pollution, target values should be set at Community level for the protection of human health and for the protection of vegetation. Those target values should relate to the interim objectives derived from the Community integrated strategy to combat acidification and ground-level ozone, which also form the basis of Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants<sup>(8)</sup>.
- (6) In accordance with Directive 96/62/EC, plans and programmes should be implemented in respect of zones and agglomerations within which ozone concentrations exceed target values in order to ensure that target values are met as far as possible by the date specified. Such plans and programmes should to a large extent refer to control measures to be implemented in accordance with relevant Community legislation.
- (7) Long-term objectives should be set with the aim of providing effective protection of human health and the environment. Long-term objectives should relate to the ozone and acidification abatement strategy and its aim of closing the gap between current ozone levels and the long-term objectives.
- (8) Measurements should be mandatory in zones with exceedances of the long-term objectives. Supplementary means of assessment may reduce the required number of fixed sampling points.
- (9) An alert threshold for ozone should be set for the protection of the general population. An information threshold should be set to protect sensitive sections of the population. Up-to-date information on concentrations of ozone in ambient air should be routinely made available to the public.
- (10) Short-term action plans should be drawn up where the risk of exceedances of the alert threshold can be reduced significantly. The potential for reducing the risk, duration and severity of exceedances should be investigated and assessed. Local measures should not be required where examination of benefits and costs shows them to be disproportionate.
- (11) The transboundary nature of ozone pollution may require some coordination between neighbouring Member States in drawing up and implementing plans, programmes and short-term action plans and in informing the public. Where appropriate, Member States should pursue cooperation with third countries, with particular emphasis on early involvement of accession candidate countries.
- (12) As a basis for regular reports, information on measured concentrations should be submitted to the Commission.
- (13) The Commission should review the provisions of this Directive in the light of the most recent scientific research concerning, in particular, the effects of ozone on human health and the environment. The Commission's report should be presented as an integral part of an air quality strategy designed to review and propose Community air quality objectives and develop implementing strategies to ensure achievement of those objectives. In this context, the report should take into account the potential to achieve the long-term objectives within a specified time period.

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- (14) The measures necessary for the implementation of this Directive should be adopted in accordance with Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission<sup>(9)</sup>.
- (15) Since the objectives of the proposed action ensuring effective protection against harmful effects on human health from ozone and reducing the adverse effect of ozone on vegetation, ecosystems and the environment as a whole cannot be sufficiently achieved by the Member States because of the transboundary nature of ozone pollution and can therefore be better achieved at Community level, the Community may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve those objectives.
- (16) Council Directive 92/72/EEC of 21 September 1992 on air pollution by ozone<sup>(10)</sup> should be repealed,

HAVE ADOPTED THIS DIRECTIVE:

#### *Article 1*

#### **Objectives**

The purpose of this Directive is:

- (a) to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air in the Community, designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole;
- (b) to ensure that common methods and criteria are used to assess concentrations of ozone and, as appropriate, ozone precursors (oxides of nitrogen and volatile organic compounds) in ambient air in the Member States;
- (c) to ensure that adequate information is obtained on ambient levels of ozone and that it is made available to the public;
- (d) to ensure that, with respect to ozone, ambient air quality is maintained where it is good, and improved in other cases;
- (e) to promote increased cooperation between the Member States, in reducing ozone levels, use of the potential of transboundary measures and agreement on such measures.

#### *Article 2*

#### **Definitions**

For the purposes of this Directive:

1. 'ambient air' means outdoor air in the troposphere, excluding work places;

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2. 'pollutant' means any substance introduced directly or indirectly by man into the ambient air and likely to have harmful effects on human health and/or the environment as a whole;
3. 'ozone precursor substances', means substances which contribute to the formation of ground-level ozone, some of which are listed in Annex VI;
4. 'level' means the concentration of a pollutant in ambient air or the deposition thereof on surfaces in a given time;
5. 'assessment' means any method used to measure, calculate, predict or estimate the level of a pollutant in the ambient air;
6. 'fixed measurements' means measurements taken in accordance with Article 6(5) of Directive 96/62/EC;
7. 'zone' means part of the territory of a Member State as delimited by it;
8. 'agglomeration' means a zone with a population concentration in excess of 250 000 inhabitants or, where the population concentration is 250 000 inhabitants or less, a population density per km<sup>2</sup> which for the Member State justifies the need for ambient air quality to be assessed and managed;
9. 'target value' means a level fixed with the aim, in the long term, of avoiding harmful effects on human health and/or the environment as a whole, to be attained where possible over a given period;
10. 'long-term objective' means an ozone concentration in the ambient air below which, according to current scientific knowledge, direct adverse effects on human health and/or the environment as a whole are unlikely. This objective is to be attained in the long term, save where not achievable through proportionate measures, with the aim of providing effective protection of human health and the environment;
11. 'alert threshold' means a level beyond which there is a risk to human health from brief exposure for the general population and at which immediate steps shall be taken by the Member States as laid down in Articles 6 and 7;
12. 'information threshold' means a level beyond which there is a risk to human health from brief exposure for particularly sensitive sections of the population and at which up-to-date information is necessary;
13. 'volatile organic compounds' (VOC) means all organic compounds from anthropogenic and biogenic sources, other than methane, that are capable of producing photochemical oxidants by reactions with nitrogen oxides in the presence of sunlight.

### *Article 3*

#### **Target values**

- 1 The target values for 2010 in respect of ozone concentrations in ambient air are those set out in Section II of Annex I.
- 2 Member States shall draw up a list of zones and agglomerations in which the levels of ozone in ambient air, as assessed in accordance with Article 9, are higher than the target values referred to in paragraph 1.

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3 For the zones and agglomerations referred to in paragraph 2, Member States shall take measures to ensure, in accordance with the provisions of Directive 2001/81/EC, that a plan or programme is prepared and implemented in order to attain the target value, save where not achievable through proportionate measures, as from the date specified in Section II of Annex I.

Where, in accordance with Article 8(3) of Directive 96/62/EC, plans or programmes must be prepared or implemented in respect of pollutants other than ozone, Member States shall, where appropriate, prepare and implement integrated plans or programmes covering all the pollutants concerned.

4 The plans or programmes, referred to in paragraph 3, shall incorporate at least the information listed in Annex IV to Directive 96/62/EC and shall be made available to the public and to appropriate organisations such as environmental organisations, consumer organisations, organisations representing the interests of sensitive population groups and other relevant health care bodies.

#### *Article 4*

### **Long-term objectives**

1 The long-term objectives for ozone concentrations in ambient air are those set out in Section III of Annex I.

2 Member States shall draw up a list of the zones and agglomerations in which the levels of ozone in ambient air, as assessed in accordance with Article 9, are higher than the long-term objectives referred to in paragraph 1 but below, or equal to, the target values set out in Section II of Annex I. For such zones and agglomerations, Member States shall prepare and implement cost-effective measures with the aim of achieving the long-term objectives. The measures taken shall, at least, be consistent with all plans or programmes specified in Article 3(3). Furthermore, they shall build upon measures taken under the provisions of Directive 2001/81/EC and other relevant existing and future EC legislation.

3 Community progress towards attaining the long-term objectives shall be subject to successive reviews, as part of the process set out in Article 11 and in connection with Directive 2001/81/EC, using the year 2020 as a benchmark and taking account of progress towards attaining the national emission ceilings set out in the said Directive.

#### *Article 5*

### **Requirements in zones and agglomerations where ozone levels meet the long-term objectives**

Member States shall draw up a list of zones and agglomerations in which ozone levels meet the long-term objectives. In so far as factors including the transboundary nature of ozone pollution and meteorological conditions permit, they shall maintain the levels of ozone in those zones and agglomerations below the long-term objectives and shall preserve through proportionate measures the best ambient air quality compatible with sustainable development and a high level of environmental and human health protection.

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## Article 6

### Information to the public

- 1 Member States shall take appropriate steps to:
  - a ensure that up-to-date information on concentrations of ozone in ambient air is routinely made available to the public as well as to appropriate organisations such as environmental organisations, consumer organisations, organisations representing the interests of sensitive population groups and other relevant health care bodies.

This information shall be updated on at least a daily basis and, wherever appropriate and practicable, on an hourly basis.

Such information shall at least indicate all exceedances of the concentrations in the long-term objective for the protection of health, the information threshold and the alert threshold for the relevant averaging period. It should also provide a short assessment in relation to effects on health.

The information threshold and the alert threshold for concentrations of ozone in ambient air are given in Section I of Annex II;

- b make available to the public and to appropriate organisations such as environmental organisations, consumer organisations, organisations representing the interests of sensitive population groups and other relevant health care bodies comprehensive annual reports which shall at least indicate, in the case of human health, all exceedances of concentrations in the target value and the long-term objective, the information threshold and the alert threshold, for the relevant averaging period, and in the case of vegetation, any exceedance of the target value and the long-term objective, combined with, as appropriate, a short assessment of the effects of these exceedances. They may include, where appropriate, further information and assessments on forest protection, as specified in section I of Annex III. They may also include information on relevant precursor substances, in so far as these are not covered by existing Community legislation;
    - c ensure that timely information about actual or predicted exceedances of the alert threshold is provided to health care institutions and the population.

The information and reports referred to above shall be published by appropriate means, depending on the case, for example the broadcasting media, the press or publications, information screens or computer network services, such as the internet.

2 Details supplied to the public in accordance with Article 10 of Directive 96/62/EC when either threshold is exceeded shall include the items listed in Section II of Annex II. Member States shall, where practicable, also take steps to supply such information when an exceedance of the information threshold or alert threshold is predicted.

3 Information supplied under paragraphs 1 and 2 shall be clear, comprehensible and accessible.

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## Article 7

### Short-term action plans

1 In accordance with Article 7(3) of Directive 96/62/EC, Member States shall draw up action plans, at appropriate administrative levels, indicating specific measures to be taken in the short term, taking into account particular local circumstances, for the zones where there is a risk of exceedances of the alert threshold, if there is a significant potential for reducing that risk or for reducing the duration or severity of any exceedance of the alert threshold. Where it is found that there is no significant potential for reducing the risk, duration or severity of any exceedance in the relevant zones, Member States shall be exempt from the provisions of Article 7(3) of Directive 96/62/EC. It is for Member States to identify whether there is significant potential for reducing the risk, duration or severity of any exceedance, taking account of the national geographical, meteorological and economic conditions.

2 The design of short-term action plans, including trigger levels for specific actions, is the responsibility of Member States. Depending on the individual case, the plans may provide for graduated, cost-effective measures to control and, where necessary, reduce or suspend certain activities, including motor vehicle traffic, which contribute to emissions which result in the alert threshold being exceeded. These may also include effective measures in relation to the use of industrial plants or products.

3 When developing and implementing the short-term action plans, Member States shall consider examples of measures (the effectiveness of which has been assessed), which should be included in the guidance referred to in Article 12.

4 Member States shall make available to the public and to appropriate organisations such as environmental organisations, consumer organisations, organisations representing the interests of sensitive population groups and other relevant health care bodies both the results of their investigations and the content of specific short-term action plans as well as information on the implementation of these plans.

## Article 8

### Transboundary pollution

1 Where ozone concentrations exceeding target values or long-term objectives are due largely to precursor emissions in other Member States, the Member States concerned shall cooperate, where appropriate, in drawing up joint plans and programmes in order to attain the target values or long-term objectives, save where not achievable through proportionate measures. The Commission shall assist in those efforts. In carrying out its obligations under Article 11, the Commission shall consider, taking into account Directive 2001/81/EC, in particular Article 9 thereof, whether further action should be taken at Community level in order to reduce precursor emissions responsible for such transboundary ozone pollution.

2 Member States shall, if appropriate according to Article 7, prepare and implement joint short-term action plans covering neighbouring zones in different Member States. Member States shall ensure that neighbouring zones in different Member States, which have developed short-term action plans, receive all appropriate information.

3 Where exceedances of the information threshold or alert threshold occur in zones close to national borders, information should be provided as soon as possible to the competent

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authorities in the neighbouring Member States concerned in order to facilitate the provision of information to the public in those States.

4 In drawing up the plans and programmes referred to in paragraph 1 and 2 and in informing the public as referred to in paragraph 3, Member States shall, where appropriate, pursue cooperation with third countries, with particular emphasis on accession candidate countries.

#### *Article 9*

### **Assessment of concentrations of ozone and precursor substances in ambient air**

1 In zones and agglomerations where, during any of the previous five years of measurement, concentrations of ozone have exceeded a long-term objective, fixed continuous measurement is mandatory.

Where fewer than five years' data are available, Member States may, to determine exceedances, combine measurement campaigns of short duration at times and locations likely to be typical of the highest pollution levels with results obtained from emission inventories and modelling.

Annex IV sets out criteria for determining the location of sampling points for the measurement of ozone.

Section I of Annex V sets out the minimum number of fixed sampling points for continuous measurement of ozone in each zone or agglomeration within which measurement is the sole source of information for assessing air quality.

Measurements of nitrogen dioxide shall also be made at a minimum of 50 % of the ozone sampling points required by Section I of Annex V. Measurement of nitrogen dioxide shall be continuous, except at rural background stations, as defined in section I of Annex IV, where other measurement methods may be used.

For zones and agglomerations within which information from sampling points for fixed measurement is supplemented by information from modelling and/or indicative measurement, the total number of sampling points specified in Section I of Annex V may be reduced, provided that:

- a the supplementary methods provide an adequate level of information for the assessment of air quality with regard to target values, information and alert thresholds;
- b the number of sampling points to be installed and the spatial resolution of other techniques are sufficient for the concentration of ozone to be established in accordance with the data quality objectives specified in Section I of Annex VII and lead to assessment results as specified in Section II of Annex VII;
- c the number of sampling points in each zone or agglomeration amounts to at least one sampling point per two million inhabitants or one sampling point per 50 000 km<sup>2</sup>, whichever produces the greater number of sampling points;
- d each zone or agglomeration contains at least one sampling point, and
- e nitrogen dioxide is measured at all remaining sampling points except at rural background stations.

In this case, the results of modelling and/or indicative measurement shall be taken into account for the assessment of air quality with respect to the target values.



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2 In zones and agglomerations where, during each of the previous five years of measurement, concentrations are below the long-term objectives, the number of continuous measurement stations shall be determined in accordance with Section II of Annex V.

3 Each Member State shall ensure that at least one measuring station to supply data on concentrations of the ozone precursor substances listed in Annex VI is installed and operated in its territory. Each Member State shall choose the number and siting of the stations at which ozone precursor substances are to be measured, taking into account the objectives, methods and recommendations laid down in the said Annex.

As part of the guidance developed under Article 12, guidelines for an appropriate strategy to measure ozone precursor substances shall be laid down, taking into account existing requirements in Community legislation and the cooperative programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe (EMEP).

4 Reference methods for analysis of ozone are set out in Section I of Annex VIII. Section II of Annex VIII provides for reference modelling techniques for ozone.

F<sup>15</sup> .....

**Textual Amendments**

**F1** Deleted by [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](#).

*Article 10*

**Transmission of information and reports**

1 When forwarding information to the Commission under Article 11 of Directive 96/62/EC, Member States shall also, and, for the first time, for the calendar year following the date referred to in Article 15(1):

- a send to the Commission for each calendar year no later than 30 September of the following year the lists of zones and agglomerations referred to in Article 3(2), Article 4(2) and Article 5;
- b send to the Commission a report giving an overview of the situation as regards exceedance of the target values as laid down in section II of Annex I. This report shall provide an explanation of annual exceedances of the target value for the protection of human health. The report shall also contain the plans and programmes referred to in Article 3(3). The report shall be sent no later than two years after the end of the period during which exceedances of the target values for ozone were observed;
- c inform the Commission every three years of the progress of any such plan or programme.

2 Furthermore, Member States shall, for the first time, for the calendar year following the date referred to in Article 15(1):

- a for each month from April to September each year, send to the Commission, on a provisional basis,
  - (i) by no later than the end of the following month, for each day with exceedance(s) of the information and/or the alert threshold, the following information: date, total hours of exceedance, maximum 1 h ozone value(s);

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- (ii) by no later than 31 October each year, any other information specified in Annex III;
  - b for each calendar year no later than 30 September of the following year, send to the Commission the validated information specified in Annex III and the annual average concentrations for that year of the ozone precursor substances specified in Annex VI;
  - c forward to the Commission every three years, within the framework of the sectoral report referred to in Article 4 of Council Directive 91/692/EEC<sup>(11)</sup>, and no later than 30 September following the end of each three-year period:
    - (i) information reviewing the levels of ozone observed or assessed, as appropriate, in the zones and agglomerations referred to in Articles 3(2), Article 4(2) and Article 5;
    - (ii) information on any measures taken or planned under Article 4(2), and
    - (iii) information regarding decisions on short-term action plans and concerning the design and content, and an assessment of the effects, of any such plans prepared in accordance with Article 7.
- 3 The Commission shall:
  - a ensure that the information submitted pursuant to paragraph 2(a) is promptly made available by appropriate means and is transmitted to the European Environment Agency;
  - b publish annually a list of the zones and agglomerations submitted pursuant to paragraph 1(a) and, by 30 November each year, a report on the ozone situation during the current summer and the preceding calendar year, aiming to provide overviews, in a comparable format, of each Member State's situation, taking into account the different meteorological conditions and transboundary pollution, and an overview of all the exceedances of the long-term objective in the Member States;
  - c check regularly the implementation of the plans or programmes submitted pursuant to paragraph 1(b) by examining their progress and the trends in air pollution, taking account of meteorological conditions and the origin of the ozone precursors (biogenic or anthropogenic);
  - d take into account the information provided under paragraphs 1 and 2 in preparing three-yearly reports on ambient air quality in accordance with Article 11(2) of Directive 96/62/EC;
  - e arrange appropriate exchange of information and experience forwarded in accordance with paragraph 2(c)(iii) regarding the design and implementation of short-term action plans.
- 4 When carrying out the tasks referred to in paragraph 3, the Commission shall, as necessary, call upon the expertise available in the European Environment Agency.
- 5 The date by which Member States shall inform the Commission of the methods used for the preliminary assessment of air quality under Article 11(1)(d) of Directive 96/62/EC shall be no later than 9 September 2003.

## Article 11

### Review and reporting

1 The Commission shall submit to the European Parliament and the Council by 31 December 2004, at the latest, a report based on experience of the application of this Directive. It shall report, in particular, on:

- a the findings of the most recent scientific research, in the light of the World Health Organisation's Guidelines, into the effects of exposure to ozone on the environment and human health, specifically taking into account sensitive population groups; the development of more accurate models shall be taken into account;
- b technological developments, including progress achieved in methods of measuring and otherwise assessing concentrations and evolution of ozone concentrations throughout Europe;
- c comparison of model predictions with actual measurements;
- d the setting of, and levels for, long-term objectives, for target values, for information and alert thresholds;
- e the results on the effects of ozone on crops and natural vegetation of the International Cooperative Programme under UN/ECE Convention on Long-range Transboundary Air Pollution.

2 The report shall be presented as an integral part of an air quality strategy designed to review and propose Community air quality objectives and develop implementing strategies to ensure achievement of those objectives. In this context the report shall take into account:

- a the broad scope for making further reductions in polluting emissions across all relevant sources, taking account of technical feasibility and cost-effectiveness;
- b relationships between pollutants, and opportunities for combined strategies to achieve Community air quality and related objectives;
- c the potential for further action to be taken at Community level in order to reduce precursor emissions;
- d the progress in implementing the target values in Annex I, including the plans and programmes developed and implemented in accordance with Articles 3 and 4, the experience in implementing short-term action plans under Article 7 and the conditions, as laid down under Annex IV, under which air quality measurement has been carried out;
- e the potential to achieve the long-term objectives, set out in Section III of Annex I, within a specified time period;
- f current and future requirements for informing the public and for the exchange of information between Member States and the Commission;
- g the relationship between this Directive and expected changes resulting from measures to be taken by the Community and Member States in order to fulfil commitments relating to climate change;
- h transport of pollution across national boundaries taking account of measures taken in accession candidate countries.

3 The report shall also include a review of the provisions of this Directive in the light of its findings and it shall be accompanied, if appropriate, by proposals to amend this Directive, paying special attention to the effects of ozone on the environment and on human health, with particular reference to sensitive population groups.

## *Article 12*

### **Guidance**

1 The Commission shall develop guidance for implementing this Directive by 9 September 2002. In so doing, it will call upon the expertise available in the Member States, the European Environment Agency and other expert bodies, as appropriate and taking into account existing requirements in Community legislation and EMEP.

2 The guidance shall be adopted in accordance with the procedure laid down in Article 13(2). Such guidance shall not have the effect of modifying the target values, long-term objectives, alert threshold or information threshold either directly or indirectly.

## *Article 13*

### **Committee procedure**

1 The Commission shall be assisted by the committee established by Article 12(2) of Directive 96/62/EC.

2 Where reference is made to this paragraph, Articles 5 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.

The period laid down in Article 5(6) of Decision 1999/468/EC shall be set at three months.

3 The committee shall adopt its rules of procedure.

## *Article 14*

### **Penalties**

Member States shall determine the penalties applicable to breaches of the national provisions adopted pursuant to this Directive. The penalties shall be effective, proportionate and dissuasive.

## *Article 15*

### **Transposition**

1 Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 9 September 2003. They shall forthwith inform the Commission thereof.

When Member States adopt those measures, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2 Member States shall communicate to the Commission the text of the main provisions of national law, which they adopt in the field covered by this Directive.

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*Article 16*

**Repeal**

Directive 92/72/EEC shall be repealed from 9 September 2003.

*Article 17*

**Entry into force**

This Directive shall enter into force on the day of its publication in the *Official Journal of the European Communities*.

*Article 18*

**Addressees**

This Directive is addressed to the Member States.

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## ANNEX I

### DEFINITIONS, TARGET VALUES AND LONG-TERM OBJECTIVES FOR OZONE

#### I. Definitions

All values are to be expressed in  $\mu\text{g}/\text{m}^3$ . The volume must be standardised at the following conditions of temperature and pressure: 293 K and 101,3 kPa. The time is to be specified in Central European Time.

AOT40 (expressed in  $(\mu\text{g}/\text{m}^3)\cdot\text{hours}$ ) means the sum of the difference between hourly concentrations greater than  $80 \mu\text{g}/\text{m}^3$  (= 40 parts per billion) and  $80 \mu\text{g}/\text{m}^3$  over a given period using only the 1 hour values measured between 8:00 and 20:00. Central European Time each day<sup>(12)</sup>.

In order to be valid, the annual data on exceedances used to check compliance with the target values and long-term objectives below must meet the criteria laid down in Section II of Annex III.

#### II. Target values for ozone

	<b>Parameter</b>	<b>Target value for 2010<sup>ad</sup></b>
<b>1. Target value for the protection of human health</b>	Maximum daily 8-hour mean <sup>b</sup>	$120 \mu\text{g}/\text{m}^3$ not to be exceeded on more than 25 days per calendar year averaged over three years <sup>c</sup>
<b>2. Target value for the protection of vegetation</b>	AOT40, calculated from 1 h values from May to July	$18\,000 \mu\text{g}/\text{m}^3 \cdot \text{h}$ averaged over five years <sup>c</sup>

**a** Compliance with target values will be assessed as of this value. That is, 2010 will be the first year the data for which is used in calculating compliance over the following three or five years, as appropriate.

**b** The maximum daily 8-hour mean concentration shall be selected by examining 8-hour running averages, calculated from hourly data and updated each hour. Each 8-hour average so calculated shall be assigned to the day on which it ends. i.e. the first calculation period for any one day will be the period from 17:00 on the previous day to 01:00 on that day; the last calculation period for any one day will be the period from 16:00 to 24:00 on the day.

**c** If the three or five year averages cannot be determined on the basis of a full and consecutive set of annual data, the minimum annual data required for checking compliance with the target values will be as follows:  
 — for the target value for the protection of human health: valid data for one year,  
 — for the target value for the protection of vegetation: valid data for three years.

**d** These target values and permitted exceedance are set without prejudice to the results of the studies and of the review, provided for in Article 11, which will take account of the different geographical and climatic situations in the European Community.

#### III. Long-term objectives for ozone

	<b>Parameter</b>	<b>Long-term objective<sup>a</sup></b>
<b>1. Long-term objective for the protection of human health</b>	Maximum daily 8-hour mean within a calendar year	$120 \mu\text{g}/\text{m}^3$

**a** Community progress towards attaining the long-term objective using the year 2020 as a benchmark shall be reviewed as part of the process set out in Article 11.

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<b>2. Long-term objective for the protection of vegetation</b>	AOT40, calculated from 1 h values from May to July	6 000 µg/m <sup>3</sup> ·h
a Community progress towards attaining the long-term objective using the year 2020 as a benchmark shall be reviewed as part of the process set out in Article 11.		

## ANNEX II

## INFORMATION AND ALERT THRESHOLDS

## I. Information and alert thresholds for ozone

	<b>Parameter</b>	<b>Threshold</b>
<b>Information threshold</b>	1 hour average	180 µg/m <sup>3</sup>
<b>Alert threshold</b>	1 hour average <sup>a</sup>	240 µg/m <sup>3</sup>
a For the implementation of Article 7, the exceedance of the threshold is to be measured or predicted for three consecutive hours.		

## II. Minimum details to be supplied to the public when the information or alert threshold is exceeded or exceedance is predicted

Details to be supplied to the public on a sufficiently large scale as soon as possible should include:

1. information on observed exceedance(s):
  - location or area of the exceedance,
  - type of threshold exceeded (information or alert),
  - start time and duration of the exceedance,
  - highest 1-hour and 8-hour mean concentration;
2. forecast for the following afternoon/day(s):
  - geographical area of expected exceedances of information and/or alert threshold,
  - expected change in pollution (improvement, stabilisation or deterioration);
3. information on type of population concerned, possible health effects and recommended conduct:
  - information on population groups at risk,
  - description of likely symptoms,
  - recommended precautions to be taken by the population concerned,
  - where to find further information;
4. information on preventive action to reduce pollution and/or exposure to it:
  - indication of main source sectors; recommendations for action to reduce emissions.

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## ANNEX III

INFORMATION SUBMITTED BY MEMBER STATES TO  
THE COMMISSION AND CRITERIA FOR AGGREGATING  
DATA AND CALCULATING STATISTICAL PARAMETERS

## I. Information to be submitted to the Commission

The following table stipulates the type and amount of data Member States are to submit to the Commission:

	Type of station	Level	Averaging/accumulation time	Provisional data for each month from April to September	Report for each year
<b>Information threshold</b>	Any	180 µg/m <sup>3</sup>	1 hour	— for each day with exceedance(s): date, total hours of exceedance, maximum 1 hour ozone and related NO <sub>2</sub> values when required, monthly 1 hour maximum ozone	— for each day with exceedance(s): date, total hours of exceedance, maximum 1 hour ozone and related NO <sub>2</sub> values, when required
<b>Alert threshold</b>	Any	240 µg/m <sup>3</sup>	1 hour	— for each day with exceedance(s): date, total	— for each day with exceedance(s): date, total

**a** See definition of AOT40 in Section I of Annex I.

**b** Maximum daily 8-hour mean (see section II of Annex I note (a)).

**c** Value to be reviewed, pursuant to Article 11(3), in the light of developing scientific knowledge.



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					hours of exceedance, maximum 1 hour ozone and related NO <sub>2</sub> values, when required	hours of exceedance, maximum 1 hour ozone and related NO <sub>2</sub> values when required
<b>Health protection</b>	Any	120 µg/m <sup>3</sup>	8 hours	—	for each day with exceedance(s): date, 8 hours maximum <sup>b</sup>	for each day with exceedance(s): date, 8 hours maximum <sup>b</sup>
<b>Vegetation protection</b>	Suburban, rural, rural background	AOT40 <sup>a</sup> = 6 000 µg/m <sup>3</sup> ·h	1 hour, accumulated from May to July	—	Value	
<b>Forest protection</b>	Suburban, rural, rural background	AOT40 <sup>a</sup> = 20 000 µg/m <sup>3</sup> ·h	1 hour, accumulated from April to September	—	Value	
<b>Materials</b>	Any	40 µg/m <sup>3c</sup>	1 year	—	Value	

**a** See definition of AOT40 in Section I of Annex I.

**b** Maximum daily 8-hour mean (see section II of Annex I note (a)).

**c** Value to be reviewed, pursuant to Article 11(3), in the light of developing scientific knowledge.

As part of the yearly reporting, the following must also be provided, if all available hourly data for ozone, nitrogen dioxide and nitrogen oxides of the year in question have not already been delivered under the framework of Council Decision 97/101/EC<sup>(13)</sup>:

- for ozone, nitrogen dioxide, nitrogen oxides and the sums of ozone and nitrogen dioxide (added as parts per billion and expressed in µg/m<sup>3</sup> ozone) the maximum, 99.9th, 98th, 50th percentile and annual average and number of valid data from hourly series,
- the maximum, 98th, 50th percentile and annual average from series of daily 8-hour ozone maxima.

Data submitted in the monthly reports are considered provisional and are to be updated, if necessary, in subsequent submissions.

## II. Criteria for aggregating data and calculating statistical parameters

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Percentiles are to be calculated using the method specified in Council Decision 97/101/EC.

The following criteria are to be used for checking validity when aggregating data and calculating statistical parameters:

Parameter	Required proportion of valid data
1 hour values	75 % (i.e. 45 minutes)
8 hours values	75 % of values (i.e. 6 hours)
Maximum daily 8 hours mean from hourly running 8 hours averages	75 % of the hourly running 8 hours averages (i.e. 18 8 hours averages per day)
AOT40	90 % of the 1 hour values over the time period defined for calculating the AOT40 value <sup>a</sup>
Annual mean	75 % of the 1 hour values over summer (April to September) and winter (January to March, October to December) seasons separately
Number of exceedances and maximum values per month	90 % of the daily maximum 8 hours mean values (27 available daily values per month) 90 % of the 1 hour values between 8:00 and 20:00 Central European Time
Number of exceedances and maximum values per year	five out of six months over the summer season (April to September)

<sup>a</sup> In cases where all possible measured data are not available, the following factor shall be used to calculate AOT40

$$\text{AOT40 [estimate]} = \text{AOT40}_{\text{measured}} \times \frac{\text{total possible number of hours}^*}{\text{number of measured hourly values}}$$

values:

\* being the number of hours within the time period of AOT40 definition, (i.e. 08:00 to 20:00 h CET from 1 May to 31 July each year, for vegetation protection and from 1 April to 30 September each year for forest protection).

## ANNEX IV

### CRITERIA FOR CLASSIFYING AND LOCATING SAMPLING POINTS FOR ASSESSMENTS OF OZONE CONCENTRATIONS

The following considerations apply to fixed measurements:

#### I. Macroscale siting

Type of station	Objectives of measurement	Representativeness <sup>a</sup>	Macroscale siting criteria
Urban	<b>Protection of human health:</b> to assess the exposure of the urban	A few km <sup>2</sup>	Away from the influence of local emissions such as

<sup>a</sup> Sampling points should also, where possible, be representative of similar locations not in their immediate vicinity.

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	population to ozone, i.e. where population density and ozone concentration are relatively high and representative of the exposure of the general population		traffic, petrol stations, etc.; Vented locations where well mixed levels can be measured; Locations such as residential and commercial areas of cities, parks (away from the trees), big streets or squares with very little or no traffic, open areas characteristic of educational, sports or recreation facilities
Suburban	<b>Protection of human health and vegetation:</b> to assess the exposure of the population and vegetation located in the outskirts of the agglomeration, where the highest ozone levels, to which the population and vegetation is likely to be directly or indirectly exposed, occur	Some tens of km <sup>2</sup>	At a certain distance from the area of maximum emissions, downwind following the main wind direction/directions during conditions favourable to ozone formation; Where population, sensitive crops or natural ecosystems located in the outer fringe of an agglomeration are exposed to high ozone levels; Where appropriate, some suburban stations also upwind of the area of maximum emissions, in order to determine the regional background levels of ozone
Rural	<b>Protection of human health and vegetation:</b> to assess the exposure of population, crops and natural ecosystems to sub-	Sub-regional levels (a few km <sup>2</sup> )	Stations can be located in small settlements and/or areas with natural ecosystems, forests or crops;

**a** Sampling points should also, where possible, be representative of similar locations not in their immediate vicinity.

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	regional scale ozone concentrations		Representative for ozone away from the influence of immediate local emissions such as industrial installations and roads; At open area sites, but not on higher mountaintops
Rural background	<b>Protection of vegetation and human health:</b> to assess the exposure of crops and natural ecosystems to regional-scale ozone concentrations as well as exposure of the population	Regional/national/continental levels (1 000 to 10 000 km <sup>2</sup> )	Station located in areas with lower population density, e.g. with natural ecosystems, forests, far removed from urban and industrial areas and away from local emissions; Avoid locations which are subject to locally enhanced formation of ground-near inversion conditions, also summits of higher mountains; Coastal sites with pronounced diurnal wind cycles of local character are not recommended.
<p><b>a</b> Sampling points should also, where possible, be representative of similar locations not in their immediate vicinity.</p>			

For rural and rural background stations, consideration should be given, where appropriate, to coordination with the monitoring requirements of Commission Regulation (EC) No 1091/94<sup>(14)</sup> concerning protection of the Community's forests against atmospheric pollution.

## II. Microscale siting

The following guidelines should be followed, as far as practicable:

1. The flow around the inlet sampling probe should be unrestricted (free in an arc of at least 270°) without any obstructions affecting the air flow in the vicinity of the sampler, i.e. away from buildings, balconies, trees and other obstacles by more than twice the height the obstacle protrudes above the sampler.
2. In general, the inlet sampling point should be between 1.5 m (the breathing zone) and 4 m above the ground. Higher positions are possible for urban stations in some circumstances and in wooded areas.

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3. The inlet probe should be positioned well away from such sources as furnaces and incineration flues and more than 10 m from the nearest road, with distance increasing as a function of traffic intensity.
4. The sampler's exhaust outlet should be positioned so as to avoid recirculation of exhaust air to the sampler inlet.

The following factors may also be taken into account:

1. interfering sources;
2. security;
3. access;
4. availability of electrical power and telephone communications;
5. visibility of the site in relation to its surroundings;
6. safety of public and operators;
7. the desirability of collocating sampling points for different pollutants;
8. planning requirements.

### III. Documentation and review of site selection

Site selection procedures should be fully documented at the classification stage by such means as compass point photographs of the surroundings and a detailed map. Sites should be reviewed at regular intervals with repeated documentation to ensure that selection criteria are still being met.

This requires 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 site.

## ANNEX V

### CRITERIA FOR DETERMINING THE MINIMUM NUMBER OF SAMPLING POINTS FOR FIXED MEASUREMENT OF CONCENTRATIONS OF OZONE

I. Minimum number of sampling points for fixed continuous measurements to assess air quality in view of compliance with the target values, long-term objectives and information and alert thresholds where continuous measurement is the sole source of information

Population(× 1 000)	Agglomerations(urban and suburban) <sup>a</sup>	Other zones(suburban and rural) <sup>a</sup>	Rural background
< 250		1	1 station/50 000 km <sup>2</sup> as an average density over all zones per country <sup>b</sup>
< 500	1	2	
< 1 000	2	2	

**a** At least 1 station in suburban areas, where the highest exposure of the population is likely to occur. In agglomerations at least 50 % of the stations should be located in suburban areas.

**b** 1 station per 25 000 km<sup>2</sup> for complex terrain is recommended.

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< 1 500	3	3
< 2 000	3	4
< 2 750	4	5
< 3 750	5	6
> 3 750	1 additional station per 2 million inhabitants	1 additional station per 2 million inhabitants

**a** At least 1 station in suburban areas, where the highest exposure of the population is likely to occur. In agglomerations at least 50 % of the stations should be located in suburban areas.

**b** 1 station per 25 000 km<sup>2</sup> for complex terrain is recommended.

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## II. Minimum number of sampling points for fixed measurements for zones and agglomerations attaining the long-term objectives

The number of sampling points for ozone must, in combination with other means of supplementary assessment such as air quality modelling and colocated nitrogen dioxide measurements, be sufficient to examine the trend of ozone pollution and check compliance with the long-term objectives. The number of stations located in agglomerations and other zones may be reduced to one-third of the number specified in Section I. Where information from fixed measurement stations is the sole source of information, at least one monitoring station should be kept. If, in zones where there is supplementary assessment, the result of this is that a zone has no remaining station, coordination with the number of stations in neighbouring zones must ensure adequate assessment of ozone concentrations against long-term objectives. The number of rural background stations should be 1 per 100 000 km<sup>2</sup>.

## ANNEX VI

### MEASUREMENTS OF OZONE PRECURSOR SUBSTANCES

#### Objectives

The main objectives of such measurements are to analyse any trend in ozone precursors, to check the efficiency of emission reduction strategies, to check the consistency of emission inventories and to help attribute emission sources to pollution concentration.

An additional aim is to support the understanding of ozone formation and precursor dispersion processes, as well as the application of photochemical models.

#### Substances

Measurement of ozone precursor substances must include at least nitrogen oxides, and appropriate volatile organic compounds (VOC). A list of volatile organic compounds recommended for measurement is given below.

- Ethane
- Ethylene
- Acetylene
- Propane
- Propene
- n-Butane

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i-Butane  
1-Butene  
trans-2-Butene  
cis-2-Butene  
1,3-Butadiene  
n-Pentane  
i-Pentane  
1-Pentene  
2-Pentene  
Isoprene  
n-Hexane  
i-Hexane  
n-Heptane  
n-Octane  
i-Octane  
Benzene  
Toluene  
Ethyl benzene  
m+p-Xylene  
o-Xylene  
1,2,4-Trimeth. benzene  
1,2,3-Trimeth. benzene  
1,3,5-Trimeth. benzene  
Formaldehyde  
Total non-methane hydrocarbons

#### Reference methods

The reference method specified in Directive 1999/30/CE<sup>(15)</sup> or in subsequent Community legislation will apply for nitrogen oxides.

Each Member State must inform the Commission of the methods it uses to sample and measure VOC. The Commission must carry out inter-comparison exercises as soon as possible and investigate the potential for defining reference methods for precursor sampling and measurement in order to improve the comparability and precision of measurements for the review of this Directive in accordance with Article 11.

#### Siting

Measurements should be taken in particular in urban and suburban areas at any monitoring site set up in accordance with the requirements of Directive 96/62/EC and considered appropriate with regard to the above monitoring objectives.

## ANNEX VII

### DATA QUALITY OBJECTIVES AND COMPILATION OF THE RESULTS OF AIR QUALITY ASSESSMENT

#### I.Data quality objectives

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The following data quality objectives, for allowed uncertainty of assessment methods, and of minimum time coverage and of data capture of measurement are provided to guide quality-assurance programmes.

<b>For ozone, NO and NO<sub>2</sub></b>	
<b>Continuous fixed measurement</b>	
Uncertainty of individual measurements	15 %
Minimum data capture	90 % during summer 75 % during winter
<b>Indicative measurement</b>	
Uncertainty of individual measurements	30 %
Minimum data capture	90 %
Minimum time coverage	> 10 % during summer
<b>Modelling</b>	
<b>Uncertainty</b>	
1 hour averages (daytime)	50 %
8 hours daily maximum	50 %
<b>Objective estimation</b>	
Uncertainty	75 %

The uncertainty (on a 95 % confidence interval) of the measurement methods will be evaluated in accordance with the principles of the ISO ‘Guide to the Expression of Uncertainty in Measurement’ (1993), or the methodology of ISO 5725-1 ‘Accuracy (trueness and precision) of measurement methods and results’ (1994) or equivalent. The percentages for uncertainty in the table are given for individual measurements, averaged over the period for calculating target values and long-term objectives, for a 95 % confidence interval. The uncertainty for continuous fixed measurements should be interpreted as being applicable in the region of the concentration used for the appropriate threshold.

The uncertainty for modelling and objective estimation is defined as the maximum deviation of the measured and calculated concentration levels, over the period for calculating the appropriate threshold, without taking into account the timing of the events.

‘Time coverage’ is defined as the percentage of the time considered for setting the threshold value during which the pollutant is measured.

‘Data capture’ is defined as the ratio of the time for which the instrument produces valid data, to the time for which the statistical parameter or aggregated value is to be calculated.

The requirements for minimum data capture and time coverage do not include losses of data due to the regular calibration or normal maintenance of the instrumentation.

## II. Results of air quality assessment

The following information should be compiled for zones or agglomerations within which sources other than measurement are employed to supplement information from measurement:

- a description of the assessment activities carried out,
- specific methods used, with references to descriptions of the method,
- sources of data and information,



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- a description of results, including uncertainties and, in particular, the extent of any area within the zone or agglomeration over which concentrations exceed long-term objectives or target values,
- for long-term objectives or target values whose object is the protection of human health, the population potentially exposed to concentrations in excess of the threshold.

Where possible, Member States should compile maps showing concentration distributions within each zone and agglomeration.

III. Standardisation

For ozone the volume must be standardised at the following conditions of temperature and pressure: 293 K, 101,3 kPa. For nitrogen oxides the standardisation specified in Directive 1999/30/EC will apply.

ANNEX VIII

REFERENCE METHOD FOR ANALYSIS OF OZONE AND CALIBRATION OF OZONE INSTRUMENTS

I. Reference method for analysis of ozone and calibration of ozone instruments

- Analysis method: UV photometric method (ISO FDIS 13964),
- Calibration method: Reference UV photometer (ISO FDIS 13964, VDI 2468, B1.6).

This method is being standardised by the European Committee for Standardisation (CEN). Once the latter has published the relevant standard, the method and techniques described therein will constitute the reference and calibration method in this Directive.

A Member State may also use any other method which it can demonstrate gives results equivalent to the above method.

F<sup>1</sup>II. Reference modelling technique for ozone

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- (1) OJ C 56 E, 29.2.2000, p. 40, and OJ C 29 E, 30.1.2001, p. 291.
- (2) OJ C 51, 23.2.2000, p. 11.
- (3) OJ C 317, 6.11.2000, p. 35.
- (4) Opinion of the European Parliament of 15 March 2000 (OJ C 377, 29.12.2000, p. 154), Council Common Position of 8 March 2001 (OJ C 126, 26.4.2001, p. 1) and Decision of the European Parliament of 13 June 2001 (not yet published in the Official Journal). Decision of the European Parliament of 17 January 2002 and Decision of the Council of 19 December 2001.
- (5) OJ C 138, 17.5.1993, p. 1.
- (6) OJ L 275, 10.10.1998, p. 1.
- (7) OJ L 296, 21.11.1996, p. 55.
- (8) OJ L 309, 27.11.2001, p. 22.
- (9) OJ L 184, 17.7.1999, p. 23.
- (10) OJ L 297, 13.10.1992, p. 1.
- (11) OJ L 377, 31.12.1991, p. 48.
- (12) Or the appropriate time for ultra-peripheral regions.
- (13) OJ L 35, 5.2.1997, p. 14.
- (14) OJ L 125, 18.5.1994, p. 1.
- (15) OJ L 163, 29.6.1999, p. 41.