

COMMISSION OF THE EUROPEAN COMMUNITIES

COM(91) 220 final

Brussels, 24 June 1991

Proposal for a
COUNCIL DIRECTIVE
ON
AIR POLLUTION BY OZONE

(presented by the Commission)

EXPLANATORY MEMORANDUM

1. Introduction

Air quality problems have been tackled at Community level since the 1980s. Since then the presence in the air of a number of recognized pollutants (SO₂, particulates, Pb and NO₂) has been regulated.

At the present time, however, the problem of air pollution by photochemical oxidants* is regarded as one of the major environmental problems of the turn of the century.

The concentrations of photo-oxidants in general and ozone in particular recorded in Europe are a source of concern because they have adverse effects on:

- human health: causing eye irritations, headaches, respiratory difficulties;
- nature: slowing down or disturbing plant growth;
- materials: damaging buildings (paint, polymers, etc.).

Ozone concentration measurement in Europe is of recent origin and is far from being general practice in all Member States; the measurement networks in place at present do not guarantee optimum and complete monitoring of the levels of ozone in the air; moreover, the information available does not allow an accurate overall assessment of the problem. Also, the mechanisms involved in the phenomena in question are multifarious, complex and at present inadequately understood.

The Commission would therefore like to see action taken to monitor ozone, collect and exchange information and inform the public. Only in this way will it be possible to obtain a better understanding of the problem, formulate rational plans of action, decide upon the most suitable measures to be taken and identify the sources to be addressed.

* Also known as photo-oxidants. Ozone (O₃) is the main photo-oxidant among all the compounds in this category.

2. Action to combat photochemical pollution

At Community level a series of measures are in progress or in preparation to reduce emissions of a number of sources of air pollutants and in particular the precursors of ozone (oxides of nitrogen and volatile organic compounds). These measures concern both stationary sources (large combustion plants) and mobile sources (cars/lorries).

Given that it takes several years to implement these measures in the Member States (in view of transposition times, gradual application and the replacement rate), it is proposed that initially the impact of these measures on ozone levels in Europe should be monitored. During this first stage, and in view of the difficulty of monitoring emissions of other sources of less significant precursors, it is preferable to leave it to each Member State to take the initiative with regard to other emission reductions for other industrial sectors. These additional measures could be optimized during a second stage.

3. Permissible concentrations of O₃ in the air

The World Health Organization (WHO) recommends that, in order to protect first of all human health and then vegetation, the following values for O₃ concentration levels in the air should not be exceeded:

Criterion	Exposure (hours)	Recommended concentrations ($\mu\text{g}/\text{m}^3$)
Health	1	150 - 200
	8	100 - 120
Vegetation	1	200
	24	65
	Growing period (100 days)	60

The thresholds set in this Directive are based on these values.

4. Monitoring, exchange of information and warning system for air pollution by ozone

The ozone levels now recorded in Europe are regularly above the values recommended to guarantee the protection first of all of health and then of ecosystems; the current state of knowledge of this problem does not allow a date to be set from which these recommendations could be met. It would therefore be premature to set objective and binding limit values for ozone concentrations in the air at present.

It is, however, possible now to launch at Community level a number of measures designed to improve our understanding of the problem of O₃ pollution and to limit the impact on human health of episodes of heavy O₃ concentrations. The measures envisaged are as follows:

4.1 Monitoring

It is proposed that the Member States should set up new or supplement existing networks for the measurement of O₃ in ambient air; a number of station-siting criteria set out in Annex II have to be met.

A reference method for measuring ozone is proposed, but any other method is permissible, subject to proof of equivalence.

4.2 Exchange of information

Some of the data collected in the context of this monitoring will be exchanged between the Member States and the Commission in order to pool individual experience and knowledge and to provide objective information for a subsequent stage in the control of photochemical pollution. In order to limit the amount of information to be exchanged, only annual statistics and values in excess of the thresholds above which there is a risk for health or vegetation will have to be transmitted.

4.3 Warning system

When an ozone pollution episode occurs, it is no longer possible (because of the nature of the phenomena involved) to reduce concentration levels by reducing precursor emissions; the Directive therefore seeks to limit the impact of such episodes on public health by setting up public information or warning systems for cases where ozone levels exceed the thresholds above which there is a health risk. This should enable the public to take a number of precautions and preventive measures in the event of pollution episodes. Such a public information procedure is also part of the new approach to access to information on the environment, the principles of which are laid down in Directive 90/313/EEC.

The thresholds set out in the Directive are reference levels corresponding to health or vegetation protection requirements in accordance with WHO recommendations.

5. Subsequent action

A second stage is already provided for in this process of combating ozone pollution: a further proposal setting limit values for O₃ in the air, together with an implementation timetable, will be prepared after five years of operation of the procedure envisaged in this proposal. This subsequent proposal could also be based on other ideas developed in connection with the introduction of a new overall approach to the establishment of air quality Directives. That will be a two-stage approach: a framework Directive will first of all be prepared to cover general aspects connected with air pollution: objectives pursued, minimum criteria for the establishment of networks, setting of various types of limit values corresponding to specific objectives (statutory inspection, activation of warning system, information, etc.), frequency of transmission of information; following this general Directive, specific Directives are envisaged: they will concern specific pollutants and will be limited to a small number of provisions (numerical concentration limit values, measurement methods, etc.).

Proposal for a Council Directive on air pollution by ozone

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 130s thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament,

Having regard to the opinion of the Economic and Social Committee,

Whereas the 1987 fourth Community action programme on the environment¹ provides for the possibility of action on photochemical pollution, and in particular ozone, in view of its harmful effects and the state of knowledge concerning its impact on human health and the environment;

Whereas, in order to protect human health, ozone concentrations in the air should be limited; whereas the scientific and technical information available and knowledge of the formation and transport of photochemical pollutants does not make it possible at present to adopt limit values for those concentrations;

Whereas, however, as complete a knowledge as possible of ozone pollution levels is required in all Member States;

Whereas to obtain this knowledge it is necessary to set up measurement stations to provide data on ozone concentrations in the air;

Whereas, in order to obtain comparable results, the methods used by the Member States to determine concentrations should be equivalent;

Whereas, in view of the special nature of photochemical pollution, the reciprocal exchange of information between the Member States and the Commission including, once it is effectively set up, the European Environment Agency,² is essential for a better understanding of the problem;

1 OJ No C 328, 7.12.1989, p. 1.

2 OJ No L 120, 11.5.1990, p. 1.

Whereas the setting of warning levels at which precautions should be taken by the public will make it possible to limit the impact of pollution episodes on health;

Whereas the numerical values of these levels should be based on the findings of work carried out in the framework of the World Health Organization (WHO), in particular as regards the dose-effect relationships established for the pollutant in question;

Whereas the information collected under this Directive will make it possible to monitor the development of air pollution by ozone and the impact of national and Community provisions to reduce photochemical precursors and establish in the future new provisions concerning ozone and air quality,

HAS ADOPTED THIS DIRECTIVE:

Article 1

1. The purpose of this Directive is to establish a common procedure:
 - for monitoring,
 - for the exchange of information,
 - for warning,

concerning air pollution by ozone in order to enable the competent authorities of the Member States and the Commission to obtain wider knowledge of this form of air pollution in the Community and guarantee a minimum amount of public information where concentration thresholds are exceeded and there may be a risk to human health or vegetation.

2. For the purposes of this Directive:
 - "health protection threshold" means the O₃ concentration value given in Annex I, point 1 beyond which there is a risk to human health in the event of prolonged pollution episodes;
 - "vegetation protection thresholds" means the O₃ concentration values given in Annex I, point 2 beyond which there is a risk to vegetation;
 - "warning threshold" means the O₃ concentration value given in Annex I, point 3 beyond which there is a risk to human health in the event of short exposure and at which steps must be taken by the Member States as specified in the following articles.

Article 2

Each Member State shall designate at national level a central body to implement the procedure set out in Article 1 point 1, and shall forthwith inform the Commission thereof.

Article 3

Member States shall establish measuring stations to supply the data necessary for the application of this Directive. Such stations must meet the specifications in Annex II.

Article 4

1. For the measurement of O₃ concentrations, Member States shall use:
 - either the reference method referred to in Annex V;
 - or any other method of analysis shown to produce measurement results equivalent to those obtained using the reference method.

To this end, each Member State shall designate one or more central laboratories responsible for evaluating the method used at national level in relation to the reference method.

Furthermore, they shall organize at national level intercomparisons between laboratories taking part in the collection and analysis of the data.

2. Once the measuring stations have been established, Member States shall provide the Commission with the following information:
 - the method used to determine O₃ concentrations and, if it is different from the reference method, proof of its equivalence with the latter;
 - the geographical coordinates of the measuring stations, a description of the area covered by the stations, and the site-selection criteria;
 - the results of any indicative measurement programmes carried out under the provisions of Annex II, point 2.
3. The Commission may organize, on a Community scale, intercomparison programmes between central laboratories.

Article 5

Member States shall make the necessary arrangements for informing the public by the most appropriate means (radio, television, newspapers) where the warning value given in Annex I, point 3 is exceeded. The data to be diffused is that be found on the text contained in Annex IV.

Article 6

1. As from [1 January 1994], Member States shall provide the Commission with the following information no later than three months following the annual reference period:

- the maximum, the median and the 98th percentile of the mean values over one hour and eight hours recorded during the year in each measuring station; the percentiles shall be calculated in accordance with the method given in Annex III;
- the number, date and duration of periods during which the thresholds in Annex I, points 1 and 2 are exceeded.

2. Where the warning threshold in Annex I, point 3 is exceeded, Member States shall inform the Commission no later than seven days following the period in question of:

- the date of the occurrence;
- the duration of the occurrence;
- the maximum hourly concentration recorded during this period.

Where possible, this information should be supplemented by relevant data concerning sources of precursors and weather conditions which might explain the reasons for the occurrence.

3. Where the data referred to in paragraphs 1 and 2 above are available in the Member States for periods preceding the date referred to in Article 9 of this Directive, Member States shall send them to the Commission at the latest when they send the data relating to the first reference period.

Article 7

Member States and the Commission shall regularly exchange information concerning:

- the data collected under this Directive;
- measures taken or planned and programmes established by the Member States to improve air quality;
- experience and knowledge concerning the problem of photochemical pollution.

Article 8

On the basis of the information collected, the Commission shall submit to the Council no later than [1 July 1997] a proposal on the control of air pollution by O₃, including in particular limit values for O₃ concentrations in the air and time limits for compliance therewith.

Article 9

Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive no later than [31 December 1992]. They shall forthwith inform the Commission thereof.

When Member States adopt such provisions, they shall contain a reference to this Directive or shall be accompanied by such a reference at the time of their official publication. The procedures for making such a reference shall be laid down by the Member States.

Article 10

This Directive is addressed to the Member States.

Done at Brussels,

For the Council
The President

ANNEX I

Thresholds for ozone concentrations in the air¹

(The values are expressed in $\mu\text{g O}_3/\text{m}^3$. The volume must be standardized at the following conditions of temperature and pressure: 293° K and 101.3 kPa).

1 - Health protection threshold (Lengthy exposure)

110 $\mu\text{g}/\text{m}^3$ for the mean value over eight hours²

2 - Vegetation protection thresholds

200 $\mu\text{g}/\text{m}^3$ for the mean value over one hour
65 $\mu\text{g}/\text{m}^3$ for the mean value over 24 hours

3 - Health protection warning value (Short exposure)

175 $\mu\text{g}/\text{m}^3$ for the mean value over one hour

1 Concentrations must be measured continuously.
2 The mean over eight hours is a simple moving average calculated each hour h from the eight hourly values between h and h-9.

ANNEX II

Monitoring of ozone concentrations

1. The purpose of measuring ozone concentrations in ambient air is to assess:

- (1) as closely as possible the individual risk of exposure of human beings to values in excess of the health protection thresholds;
- (11) the exposure of vegetation (e.g. forests, natural ecosystems, crops) to the values given in Annex I.

2. The measurement points shall be located at geographically and climatologically representative sites where:

- (1) the risk of approaching or exceeding the thresholds in Annex I is the highest;
- (11) it is likely that one of the targets mentioned in paragraph 1 is exposed.

At places where the Member States do not have information concerning the sites mentioned under (1) and (11), they shall carry out indicative measurement programmes in order to determine the siting of the measurement points to supply the data necessary for the application of this Directive.

3. Member States shall establish additional measurement points in order:

- (1) to contribute towards the identification and description of the formation and transport of ozone and its precursors;
- (11) to monitor changes in ozone concentrations in areas affected by background pollution.

Parallel measurement of photochemical precursors (oxides of nitrogen, volatile organic compounds) is recommended in order to make it possible to identify links between the different pollutants.

4. The final reading of the measurement instruments must be carried out in such a way that the mean values over one hour and eight hours can be calculated, in accordance with the provisions of Annex III.

ANNEX III

Calculation of the measurement results for the annual reference period

1. Concentrations must be measured continuously.
2. The annual reference period shall begin on 1 January and end on 31 December in any given calendar year.
3. For the validity of the calculation of the percentiles* to be recognized, 75% of the possible values must be available and, as far as possible, distributed uniformly throughout the period in question for the particular measurement site. If that is not the case, this fact must be mentioned when the results are communicated.

The calculation of the 50th (98th) percentile on the basis of the values recorded throughout the year shall be carried out as follows: the 50th (98th) percentile must be calculated from the values actually measured. The measured values shall be rounded off to the nearest $\mu\text{g}/\text{m}^3$. All the values are to be listed in increasing order for each site:

$$X_1 \leq X_2 \leq X_3 \leq \dots \leq X_k \leq \dots \leq X_{N-1} \leq X_N$$

The 50th (98th) percentile is the value of k , to be calculated from the following formula:

$$k = 0.50 (0.98).N$$

N being the number of values actually measured. The value of 0.50 (0.98). N shall be rounded off to the nearest whole number.

* The median shall be calculated as the 50th percentile.

ANNEX IV

The information set out below must be circulated on a sufficiently large scale as soon as possible to enable the public to take all appropriate preventive protective action.

Standard text for informing the public
about a high level of ozone in the air

Situation

Today,¹ at hrs, significant concentrations of ozone in the air were recorded.

At the following measurement points:,

concentrations in excess of $175 \mu\text{g}/\text{m}^3$ (European warning value) were recorded.

The details of the recorded values are as follows:

Station	Time	Concentration (hourly mean)

Forecast:

Since no significant change in weather conditions is foreseeable in the next few days, significant concentrations can still be expected tonight/tomorrow/this weekend between hrs and hrs

or

The most recent weather forecasts indicate an improvement in the situation by hrs/ within days.

¹ Where information is provided in newspapers a reference to the previous day may be added.

Precautions:

- As a precaution, those people who are particularly at risk from air pollution (children, the elderly, people with respiratory problems, etc.) should avoid unaccustomed physical effort and all outdoor exercise during the next hrs.

In general, it is recommended that sustained physical effort (e.g. jogging) should be avoided during this period.

- For the public in general, it is recommended that all physical effort should be avoided. A number of symptoms such as eye irritations, headaches, respiratory difficulties and a reduction in physical capacities may occur.¹

¹ This paragraph is to be added in the event of concentrations in excess of $350 \mu\text{g}/\text{m}^3$.

ANNEX V

Reference method of analysis to be used for the purposes of this Directive

The reference method of analysis used to determine ozone shall be the chemiluminescence method. This method is being standardized by the ISO. Once the latter has published the standard in question, the method described therein shall constitute the reference method.

The following points must be taken into consideration when the measurement methods and instruments are used by the Member States in the field:

1. The conformity of the operating characteristics of the measurement instrument with those indicated by the manufacturer, in particular background noise, response time and linearity, must be verified in the laboratory.
2. The instrument must be totally calibrated regularly, using *ad hoc* preconditioned standard gases. The potassium iodide method or the method based on gas titration using NO as reagent is to be used in parallel in the laboratory to analyse the O₃ content of the standard gases and/or the accuracy and precision of the other methods of measurement provided for in Article 4 (double-checking principle).

Special care must be taken with regard to interferences inherent in the method and the instrument in order to optimize flow rates and guarantee the condition of the apparatus during the calibration procedure.

3. In the field, the instruments must be calibrated regularly, e.g. every 23 or 25 hours.
In addition, the validity of the calibration must be verified by regularly operating in parallel an instrument calibrated in accordance with paragraph 1.
If the instrument inlet filter is changed before calibration, calibration must be carried out after an appropriate period of exposure (from 30 minutes to several hours) of the filter to ambient O₃ concentrations.
4. The sampling head must be placed at least 1 m away from buildings in order to avoid any screening effect.
5. The sampling head opening must be protected against rain and insects. No prefilter is to be used.

6. Sampling must not be influenced by adjoining installations (the air-conditioning or data-transmission equipment).
7. The sampling line must be of inert material (e.g. glass, PTFE, stainless steel) which is not affected by the presence of O₃. It must be exposed beforehand to appropriate O₃ concentrations.
8. The sampling line between the sampling head and the analysis instrument must be as short as possible. In particular, the time taken for the gas volume sample to pass through the sampling line must be as short as possible (e.g. of the order of a few seconds in the presence of other reagents such as NO).
9. Condensation in the sampling line must be avoided.
10. The sampling line must be cleaned regularly, taking local conditions into account.
11. The sampling line must be tight and the flow rate must be inspected regularly.
12. Sampling must not be influenced by gas discharges from the instrument or from the calibration system.
13. All necessary precautions must be taken to prevent temperature variations from producing measurement errors.

FICHE D'IMPACT SUR LA COMPETITIVITE ET L'EMPLOI**I. Quelle est la justification principale de la mesure?**

Il s'agit d'initialiser sur le plan communautaire une série d'actions en matière de pollution atmosphérique par l'ozone. A l'heure actuelle la pollution photochimique, à laquelle l'ozone contribue de manière importante, constitue un problème sérieux; les concentrations en ozone observées en Europe peuvent présenter des risques pour la santé et la végétation.

II. Caractéristiques des entreprises concernées. En particulier:

Les PME ne sont pas directement concernées.

a) Y a-t-il un grand nombre de PME?

b) Note t-on des concentrations dans des régions?

- éligibles aux aides régionales des Etats membres?

- éligibles au FEDER?

III. Quelles sont les obligations imposées directement aux entreprises?

Aucune

IV. Quelles sont les obligations susceptibles d'être imposées indirectement aux entreprises via les autorités locales?

Sans objet

V. Y a-t-il des mesures spéciales pour les PME? Lesquelles?

Non

VI. Quel est l'effet prévisible?

a) sur la compétitivité des entreprises

aucun effet

b) sur l'emploi

aucun effet

VII. Les partenaires sociaux ont-ils été consultés? Quels sont leurs avis?

Pas applicable dans le cadre de cette proposition.

ISSN 0254-1475

COM(91) 220 final

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Catalogue number : CB-CO-91-271-EN-C

ISBN 92-77-73533-3
