# S.I. No. 53/2004 — Ozone in Ambient Air Regulations 2004

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STATUTORY INSTRUMENTS.

S.I. No. 53 of 2004.

# OZONE IN AMBIENT AIR REGULATIONS 2004.

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The Minister for the Environment, Heritage and Local Government in exercise of the powers conferred on him by sections 10, 20, 21, 46, 47, 49 and 50 of the Air Pollution Act 1987 (No. 6 of 1987) and by sections 6, 53, 54 and 56 of the Environmental Protection Agency Act 1992 (No. 7 of 1992) and for the purpose of giving effect to Council Directive 2002/3/EC relating to ozone in ambient air ( $^1$ ) hereby makes the following Regulations:

# *Citation* 1. These Regulations may be cited as the Ozone in Ambient Air Regulations 2004.

*Entry into* 2. These Regulations shall come into operation on the 16th day of February 2004. *Force* 

*Definitions* 3. (1) In these Regulations:—

"the Agency" means the Environmental Protection Agency established under section 19 of the Environmental Protection Agency Act 1992 (No. 7 of 1992);

"the Commission" means the Commission of the European Communities;

"the Minister" means the Minister for the Environment, Heritage and Local Government;

"the Directive" means Council Directive 2002/3/EC relating to ozone in ambient air;

"the 1998 Regulations" means the Air Pollution Act 1987 (Marketing, Sale and Distribution of Fuels) Regulations 1998 (S.I. No. 118 of 1998);

"the 2000 Regulations" means the Air Pollution Act 1987 (Marketing, Sale and Distribution of Fuels) (Amendment) Regulations 2000 ( S.I. No. 278 of 2000 ); and

"the 2002 Regulations" means the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002);

- (2) In these Regulations:—
  - (a) any reference to an article or sub-article which is not otherwise identified is a reference to an article or sub-article of these Regulations;
  - (b) a reference to a schedule which is not otherwise identified is a reference to a schedule of these Regulations; and
  - (c) a letter, word, phrase or symbol which has been assigned a meaning by the Directive has that meaning except where otherwise indicated.

*Scope* 4. These Regulations:—

- (*a*) establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole;
- (b) provide for the assessment of concentrations of ozone, and, as appropriate ozone precursors, that is to say oxides of nitrogen and volatile organic compounds, in ambient air on the basis of methods and criteria common to the Member States of the European Communities;
- (c) provide for the obtaining of adequate information on ambient ozone levels and ensure that it is made available to the public;
- (d) provide for the maintenance of ambient air quality where it is good and the improvement of ambient air quality in other cases with respect to ozone levels; and
- (e) promote increased co-operation with Member States of the European Communities, in reducing ozone levels, use of the potential of transboundary measures and agreement on such measures.

Target5. (1) The target values for 2010 in respect of ozone concentrations in ambient air shall be<br/>those specified in Schedule 1.Long-term5. (1) The target values for 2010 in respect of ozone concentrations in ambient air shall be<br/>those specified in Schedule 1.

### *Objectives*

(2) The long-term objectives for ozone concentrations in ambient air shall be those specified in Schedule 2.

(3) The information threshold and alert threshold for ozone concentrations in ambient air shall be those specified in Schedule 3.

Reference Methods 6. (1) The reference methods for the analysis of ozone and for the calibration of ozone instruments shall be those specified in Schedule 9.

(2) The Agency may prescribe alternative methods for the analysis of ozone and calibration of ozone instruments which it can demonstrate gives results equivalent to the reference methods referred to in sub-article (1).

*Air Quality* 7. (1) The Agency shall from time to time, and at least every 5 years, assess ambient air quality in the State with regard to the concentrations of ozone in ambient air.

(2) The Agency shall review the classification of each zone in Schedule 10 of the 2002 Regulations from time to time and at least every 5 years, or earlier in the event of significant changes in activities relevant to concentrations of ozone in ambient air.

(3) In carrying out this review the Agency:—

- (a) shall undertake, or cause to be undertaken, fixed continuous measurement of levels of ozone in ambient air in zones and agglomerations where, during any of the previous five years of measurement, concentrations of ozone in ambient air have exceeded a long-term objective;
- (*b*) may, where, for the purposes of sub-article (1), fewer than five years measurement data are available, combine results of emission inventories and modelling with measurement campaigns of short duration at times and locations likely to be typical of the highest pollution levels;
- (c) shall determine the location of sampling points for the measurement of concentrations of ozone in ambient air in accordance with the criteria specified in Schedule 5;
- (d) shall determine the minimum number of fixed sampling points for continuous measurement of concentrations of ozone in ambient air, including in zones and agglomerations within which measurement is the sole source of information for assessing air quality and, in zones and agglomerations where during each of the previous five years of measurement, concentrations of ozone in ambient air are below the long-term objectives, in accordance with the relevant criteria specified in Schedule 6;
- (e) may supplement information from fixed measurement stations by information from other sources, including but not limited to mobile monitoring units, ozone

precursor emission inventories, indicative measurement methods and air quality modelling;

- (*f*) shall measure nitrogen dioxide at a minimum of 50% of the ozone sampling points required by Section 1 of Schedule 6 on a continuous basis except at rural background stations where other measurement methods may be used;
- (g) may reduce the total number of sampling points specified in Schedule 6 for zones and agglomerations within which information from sampling points for fixed measurement is supplemented by information from modelling or indicative measurement, provided that:
  - (i) the supplementary methods provide an adequate level of information for the assessment of air quality with regard to target values, information and alert thresholds;
  - (ii) the number of sampling points to be installed and the spatial resolution of other techniques are sufficient for the concentration of ozone in ambient air to be established in accordance with the data quality objectives specified in Section I of Schedule 8 and lead to assessment results as specified in Section II of Schedule 8;
  - (iii) 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;
  - (iv) each zone and agglomeration contains at least one sampling point;
  - (v) nitrogen dioxide is measured at all remaining sampling points except at rural background stations; and
  - (vi) the results of modelling or indicative measurement shall be taken into account for the assessment of air quality with respect to the target values; and
- (h) shall measure, or cause to be measured, concentrations in ambient air of such ozone precursor substances as the Agency deems appropriate from those set out in Schedule 7 at a minimum of one measuring station in the State and shall choose the number and siting of such station or stations taking into account the objectives, methods and recommendations set out in Schedule 7.

(4) In the light of the review, the Agency shall draw up a list of zones and agglomerations in which the levels of ozone in ambient air:—

- (a) are higher than the target levels;
- (b) are higher than the long-term objectives but below, or equal to, the target values; and
- (c) meet the long-term objectives.

(5) The Agency shall forward to the Commission annually, and no later than nine months after the end of each year, the list of zones and agglomerations referred to in the preceding sub-article.

(6) The Agency shall make public and shall provide, to the bodies prescribed in Schedule 10, and to any environmental organisation, consumer organisation, organisation representing the interests of sensitive populations considered relevant by the Agency or which so requests, the results of any preliminary or other air quality assessments undertaken by the Agency in connection with these Regulations.

(7) Where a local authority is monitoring, or proposes to monitor, ozone or ozone precursors within the scope of these Regulations, it shall consult with the Agency as regards the arrangements to satisfy the monitoring requirements under these Regulations.

*Public* 8. (1) The Agency shall routinely update on at least a daily basis and, wherever appropriate and practicable, on an hourly basis, and make publicly available clear, comprehensible and accessible information on concentrations of ozone in ambient air.

(2) The information referred to in sub-article (1) shall indicate at least:—

- (*a*) any exceedance of the concentrations for the long-term objective for the protection of human health, or the information and alert thresholds for the relevant averaging period;
- (b) a short assessment in relation to effects on health; and
- (c) forecasting of ambient air quality where practicable.

(3) The Agency shall establish the means to ensure that the information provided for in the foregoing sub-articles of this article is made available to the public as well as to the bodies prescribed in Schedule 10, and to any environmental organisation, consumer organisation, organisation representing the interests of sensitive populations considered relevant by the Agency or which so requests, by the appropriate use of advisory notices to the broadcast media and the press, Agency publications, an internet website, teletext and e-mail.

(4) Where either the information or the alert threshold is exceeded, the Agency shall, and where the information threshold or the alert threshold is predicted to be exceeded, the Agency shall where practicable, as a minimum:—

(*a*) make available as soon as possible, by means of radio, television, teletext, the press and the internet as appropriate, and, by such means as the Agency considers appropriate, to the public and to environmental organisations, consumer organisations, organisations representing the interests of the sensitive populations and health care bodies considered relevant by the Agency, and to the competent authorities in Northern Ireland where exceedances occur in zones close to the national border, or to any relevant body or organisation for the purposes of the preceding sub-article of this article which so requests, clear, comprehensible and accessible up-to-date information, including at least:—

- (i) information on the observed or predicted exceedance including, as appropriate, the location or area of such exceedance, the type of threshold exceeded or predicted to be exceeded, the start time and duration of such exceedance, and the highest 1-hour and 8-hour mean concentration;
- (ii) any forecasts of changes in concentrations for the following afternoon, day or days, the geographical area concerned and any expected improvement, stabilisation or deterioration in pollution;
- (iii) information on the type of population groups potentially at risk from the exceedance or predicted exceedance, possible health effects and recommended conduct, including a description of the likely symptons, recommended precautions to be taken by the population groups concerned and where to find further information; and
- (iv) information on preventive action to reduce pollution or exposure to it, including an indication of the main source sectors and recommendations for action to reduce emissions.

(5) The Agency shall make available to the public, the bodies prescribed in Schedule 10 and to any environmental organisation, consumer organisation, organisation representing the interests of sensitive populations and health care body considered relevant by the Agency or which so requests, an annual report which shall, at least, indicate, in the case of human health, all exceedances of concentrations in the target value, long-term objective, information and alert thresholds for the relevant averaging periods, 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.

Short Term Air Pollution Action Plans

9. (1) The Agency shall identify and notify to the relevant local authority or authorities, including, if appropriate, competent authorities in neighbouring zones in Northern Ireland, those areas, consisting of zones and agglomerations in whole or in part, where the Agency considers measures are likely to be necessary to be taken in the short term where there is a risk of the alert threshold being exceeded, and such identification and notification shall take into account particular local circumstances and be occasioned where the Agency is of the view that there is a significant potential, taking into account national geographical, meteorological and economic conditions, for reducing the risk, or for reducing the duration or severity, of any such exceedance.

(2) With reference to sub-article (1) the Agency may set trigger levels of concentrations of ozone in ambient air, exceedance of which require the preparation of air pollution action plans in accordance with sub-article (3).

(3) When notified by the Agency in pursuance of the preceding sub-article, or where a local authority or local authorities consider such measures are likely to be necessary, the local authority, or local authorities as appropriate, shall, subject to undertaking a cost-effectiveness analysis, prepare an air pollution action plan indicating the measures to be taken in the short term to reduce the risk of the alert threshold being exceeded, or the duration or severity of any such exceedance and providing, as appropriate, for measures to control, and, where necessary, reduce or suspend activities, including motor vehicle traffic, which contribute or may contribute to the alert threshold being exceeded.

(4) Where a local authority prepares, or local authorities prepare as appropriate, an air pollution action plan, proposed measures in which will or may impact upon a neighbouring zone or zones in Northern Ireland, or where ozone concentrations at risk of exceeding the alert threshold are due largely to precursor emissions in Northern Irelan, the local authority, or local authorities as appropriate, shall consult with, and shall send all appropriate information pertaining to the plan to the competent authorities in Northern Ireland with a view to co-operating, where appropriate, in the drawing up of joint plans for the purposes of sub-article (3).

(5) An air pollution action plan prepared by a local authority, or local authorities as appropriate, in accordance with this article shall be co-ordinated, as appropriate and in so far as possible, with any plan or plans prepared in accordance with article 15 of the 2002 Regulations in relation to other pollutants within the scope of the 2002 Regulations.

(6) A local authority, or local authorities as appropriate, shall make available to the public and to any environmental organisation, consumer organisation, organisation representing the interests of sensitive populations and health care body considered relevant by the local authority or local authorities, or which so requests, the results of any investigations and the content of specific air pollution action plans as well as information on the implementation of such plans.

*Air Quality* 10. (1) The Agency shall, within 9 months after the end of a year in which ozone levels *Management* exceed either the target values or the long-term objectives specified in article 5:— *Plans* 

- (a) identify and notify to the relevant local authority or authorities those areas, consisting
   of zones and agglomerations in whole or in part, where the Agency considers
   measures are likely to be necessary to attain the target values or the long-term
   objectives, as appropriate; and
- (b) provide to the local authority or authorities concerned all data relevant to the air quality assessment for the area concerned.

(2) The local authority or authorities notified in accordance with the preceding sub-article shall prepare a clear, comprehensible and accessible air quality management plan, or review and revise an existing plan, in order to attain the target values, save where not achievable through proportionate measures, or with the aim of achieving the long-term objectives through cost-effective measures, as appropriate.

(3) An air quality management plan shall be co-ordinated, as appropriate and insofar as possible, with any plan or plans prepared in accordance with article 16 of the 2002 Regulations in relation to other pollutants within the scope of the 2002 Regulations.

(4) In preparing an air quality management plan for the purposes of this article a local authority, or local authorities as appropriate, and the Agency, as appropriate, shall comply with the relevant notification, content and related requirements specified in article 16(3) of the 2002 Regulations.

(5) Before making the air quality management plan, the local authority, or local authorities

as appropriate, shall consult with the Agency and any statutory body or agency the discharge of whose functions will or may be affected by the measures proposed in the plan, or where ozone concentrations exceeding the target values or long-term objectives are due largely to precursor emissions in other Member States of the European Communities, with the competent authorities in those Member States, with a view to cooperating, where appropriate, in the drawing up of joint plans for the purposes of sub-article (2). (6) The local authority, or local authorities as appropriate, shall implement the air quality management plan insofar as it lies within the functional responsibility of local authorities, and insofar as it lies within the functional responsibility of other statutory bodies or agencies, promote the implementation of the plan. (7) In implementing an air quality management plan for the purposes of this article a local authority, or local authorities as appropriate, and the Agency, as appropriate, shall comply with the relevant information and dissemination requirements specified in article 16, subarticles (6) and (7) of the 2002 Regulations. 11. (1) The Agency shall identify the means by which ozone levels, in those zones or Measures to agglomerations below the long-term objectives, may, insofar as factors including the Maintain Good Air transboundary nature of ozone pollution and meteorological conditions permit, be maintained Quality and the means by which the best ambient air quality compatible with sustainable development may be preserved, and shall advise the relevant local authority or local authorities and any statutory agency or body with relevant functional responsibility accordingly. (2) The Agency and the local authority, or local authorities as appropriate, shall promote the preservation of best ambient air quality compatible with sustainable development and a high level of environmental and human health protection. (3) The functions, duties and responsibilities of the Agency and a local authority, or local authorities as appropriate, under this article shall be undertaken in co-ordination, as appropriate and in so far as possible, with those required by article 17 of the 2002 Regulations in relation to other pollutants within the scope of the 2002 Regulations. 12. The Agency shall notify to the Minister and the Commission for the calendar year 2004 Additional Reporting and thereafter:---(a) no later than two years after the end of the period during which any exceedance of the target values is observed, a report giving an overview of the situation as regards exceedance of the target values and including an explanation of annual exceedances of the target value for the protection of human health, and any plans provided for in article 10; (b) every three years the progress of any plans provided for in article 10;

(c) on a provisional basis, for each month from April to September each year, and by no later than the end of the following month, for each day with an exceedance of the information or the alert threshold, the total hours of exceedance and maximum 1hour values;

- (*d*) on a provisional basis, for each month from April to September each year, and by no later than 31 October each year, any other information specified in Schedule 4;
- (e) for each calendar year no later than 30 September of the following year, the validated information specified in Schedule 4 and the annual average concentrations for that year of the relevant ozone precursor substances specified in Schedule 7 and measured in accordance with article 7(3)(h); and
- (f) every three years, within the framework of the sectoral report referred to in Article 4 of Council Directive 91/692/EEC<sup>2</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 article 7(4);
  - (ii) information on any measures taken or planned under article 10; and
  - (iii) information regarding decisions on short-term air pollution action plans and concerning the design and context, and an assessment of the effects of any such plans prepared in accordance with article 9.

*Revocation* 13. The Environmental Protection Agency Act 1992 (Ozone) Regulations 1997 (S.I. No. 132 of 1997) are hereby revoked with effect from the coming into operation of these Regulations.

### SCHEDULE 1

### Target Values for Ozone

General Note

For the purposes of the Schedules all values are to be expressed in  $\mu g/m^3$ . The volume must be standardised at a temperature of 293°K and a pressure of 101.3kPa. The time is to be specified in Central European Time.

In the Schedules AOT 40 (expressed in  $(\mu g/m^3)$ · hours) means the sum of the difference between hourly concentrations greater than 80  $\mu g/m^3$  (=40 parts per billion) and 80  $\mu g/m^3$  over a given period using only the 1 hour values measured between 8.00 and 20.00 Central European Time each day.

In order to be valid the annual data on exceedances used to check compliance with the target values and long-term objectives must meet the criteria laid down in Section II of Schedule 4.

	Parameter	Target Value for 2010*
Target value for the	Maximum daily 8-hour mean**	$120 \ \mu g/m^3$ not to be exceeded

Protection of human health

on more than 25 days per calendar year averaged over three years\*\*\*

Target value for the	AOT 40, calculated from 1 h	18.000 $\mu g/m^3 \cdot h$ averaged over
protection of vegetation	values from May to July	five years***

\*Compliance with target values will be assessed as of this date. 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.

\*\*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 pervious 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.

\*\*\*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.

### SCHEDULE 2

### LONG-TERM OBJECTIVES FOR OZONE

	Parameter	Long-term Objective
Long-term objective for the protection of human health	Maximum daily 8-hour mean within a calendar year	120 µg/m <sup>3</sup>
Long-term objective for the protection of vegetation	AOT 40, calculated from 1 h values from May to July	6,000 $\mu$ g/m <sup>3</sup> ·h

### SCHEDULE 3

### INFORMATION AND ALERT THRESHOLDS FOR OZONE

Parameter

Threshold

Information threshold	1 hour average	$180 \ \mu g/m^3$
Alert threshold	1 hour average*	240 $\mu$ g/m <sup>3</sup> ·h

\* For the implementation of article 9, the exceedance of the threshold is to be measured or predicted for three consecutive hours.

#### SCHEDULE 4

### INFORMATION TO BE SUBMITTED BY THE AGENCY TO THE MINISTER AND THE COMMISSION AND CRITERIA FOR AGGREGATING DATA AND CALCULATING STATISTICAL PARAMETERS

### Section I: Information to be submitted

	Type of Station	Level	Averaging/ Accumulation Time	Provisional data for each month from April to September	Report for each year
Information threshold	ı Any	180µg/m <sup>3</sup>	1 hour	<ul> <li>for each day with exceedance(s): date, total hours of exceedance, maximum 1 hour ozone and related NO<sub>2</sub> values when required,</li> <li>montly: 1 hour maximum</li> </ul>	- for each day with exceedance(s): date, total hours of exceedance, maximum 1 hour ozone and related NO <sub>2</sub> values when required,
Alert	Anv	240ug/m <sup>3</sup>	1 hour	- for each day	- for each dav
threshold		2.000		with exeedances(s): date, total hours of exceedance, maximum 1 hour ozone and related NO <sub>2</sub> values	with exceedance(s): date, total hours of exceedance, maximum 1 hour ozone and related NO <sub>2</sub> values

when required when required

Health Protection	Any	120µg/m <sup>3</sup>	8 hours	-for each day with exceedance(s): date, 8 hours maximum*	-for each day with exceedance(s): date, 8 hours maximum*
Vegetation protection	Suburban, rural, rural back- ground	AOT40=6,000µg/m <sup>3</sup> ·h	1 hour, accumulated from May to July		Value
Forest protection	Suburban, rural, rural back- ground	AOT40=20,000µg/m <sup>3</sup> ·h	1 hour, accumulated from April to September		Value
Materials	Any	$40\mu g/m^{3*}$	1 year	_	Value

\*See Schedule 1 footnote\*\*

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  $97/101/\text{EC}^3$ :

- for ozone, nitrogen dioxide, nitrogen oxides and the sums of ozone and nitrogen dioxide (added as parts per billion and expressed in  $\mu g/m^3$  ozone) the maximum, 99.9th, 98th, 50th percentiles and annual average and number of valid data from hourly series,
- the maximum, 98th, 50th percentiles and annual average from series of daily 8-hour ozone maxima.

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

### Section II: Criteria for aggregating data and calculating statistical parameters

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 hour 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*
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)

\*In cases where all possible measured data are not available, the following factor shall be used to calculate AOT40 values:

AOT40[estimate]

total possible number of hours#

 $= AOT40_{MEASURED} \times$ 

number of measured hourly values

#being the number of hours within the time period of AOT40 definition (i.e. 8:00 to 20:00 h Central European Time from 1 May to 31 July each year for vegetation protection and from 1 April to 30 September each year for forest protection).

### SCHEDULE 5

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

The following considerations apply to fixed measurements taken in accordance with article 7:

### Section I: Macroscale Siting

Type of Station	Objectives of Measurement	Representativeness*	Macroscale siting criteria
Urban	Protection of human	A few km <sup>2</sup>	Away from the

		health to assess the exposure of the urban population to ozone, i.e. where population density and ozone concentration are relatively high and representative of the exposure of the general population		<ul> <li>influence of local emissions such as traffic, petrol stations etc.;</li> <li>Vented locations where well mixed levels can be measured;</li> <li>Locations such as residential and commercial areas of cities, parks (away from the trees), big streets or squares with little or no traffic, open areas characteristic of educational, sports or recreation facilities</li> </ul>
Subur	ban	Protection of human health and vegetation 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(s) 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		Protection of human health and vegetation to assess the exposure of population, crops and natural ecosystems to sub- regional scale ozone concentrations	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; 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 mountain tops

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.

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

Regional/national

levels (1,000 to

For rural and rural background stations, consideration should be given, where appropriate, to coordination with the monitoring requirements of Commission Regulations (EC) No. 1091/94<sup>4</sup> concerning protection of the Community's forests against atmospheric pollution.

### Section II: Microscale Siting

Rural Back-ground

Protection of

and natural

population

ecosystems to

vegetation and of

the exposure of crops

regional-scale ozone

as exposure of the

concentrations as well

human health to assess  $10,000 \text{ km}^2$ )

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.

- 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 re-circulation 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 co-locating sampling points for different pollutants; and
- 8. planning requirements.

### Section 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 meteorological and photochemical processes affecting the ozone concentrations measured at the respective site.

### SCHEDULE 6

CRITERIA FOR DETERMINING THE MINIMUM NUMBER OF SAMPLING POINTS FOR FIXED MEASUREMENT OF CONCENTRATIONS OF OZONE Section 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)	Agglomeration (urban and suburban)*	Other zones (surburban and rural)*	Rural Background
<250		1	1 station 50,000 km <sup>2</sup> as an average density
<500	1	2	over all
<1,000	2	2	
<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	

\* At least 1 station in suburban area, 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.

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

# Section 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 co-located 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, co-ordination with the number of stations in neighbouring zones must ensure adequate assessment of ozone concentrations against long-term objectives. There should be at least one rural background station.

### SCHEDULE 7

# MEASUREMENTS OF OZONE PRECURSOR SUBSTANCES IN ACCORDANCE WITH ARTICLE 7(3)(*h*)

### **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 (VOCs). A list of volatile organic compounds recommended for measurement is given below:

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

### **Reference Methods**

The reference methods specified in Directive 1999/30/EC<sup>5</sup> or in subsequent Community legislation will apply for nitrogen oxides. The Agency shall inform the Commission of the methods used to sample and measure VOCs.

### Siting

Measurements should be taken in particular in urban and suburban areas at any monitoring sites set up in accordance with the requirements of Directive  $96/62/EC^6$  on ambient air quality assessment and management and considered appropriate with regard to the above monitoring objectives.

### SCHEDULE 8

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

### Section I: Data quality objectives

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

For ozone, NO and  $NO_2$ 

### **Continuous fixed measurement**

Uncertainty of individual measurements	15%
Minimum data capture	90% during summer
	75%during winter
Indicative measurement	
Uncertainty of individual measurements	30%
Minimum data capture	90%
Minimum time coverage	>10% during summer
Modelling	
Uncertainty	

1 hour averages (daytime)	50%
8 hours daily maximum	50%
Objective estimation	
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 concentrations 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.

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.

### Section 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;
- 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; and
- 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 maps should be compiled showing concentration distribution within each zone and agglomeration.

### Section 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<sup>7</sup> relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air will apply.

### SCHEDULE 9

# REFERENCE METHODS FOR ANALYSIS OF OZONE AND CALIBRATION OF OZONE INSTRUMENTS

### Reference method for the 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 CEN has published the relevant standard, the method and techniques described therein shall constitute the reference and calibration method for these Regulations.

#### SCHEDULE 10

#### PRESCRIBED BODIES

(1) The Minister for Health and Children

(2) Health Boards

- (3) Eastern Regional Health Authority
- (4) Local Authorities

(5) An Bord Pleanála

(6) Office of the Director of Consumer Affairs

(7) The Asthma Society of Ireland

(8) Met Éireann

(9) Teagasc

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GIVEN under the Official Seal of the Minister for the Environment, Heritage and Local Government this 11th day of February, 2004.

MARTIN CULLEN,

Minister for the Environment, Heritage and Local Government.

EXPLANATORY NOTE.

(This note is not part of the Instrument and does not purport to be a legal interpretation.)

These Regulations transpose Directive 2002/3/EC relating to ozone in ambient air.

The Regulations specify target values and long-term objectives to be attained for concentrations of ozone in ambient air. The Regulations provide for advice by the Environmental Protection Agency to local authorities about the need for air quality management plans to attain the target values or long-term objectives, and the preparation of such plans by local authorities. Provision is also made for air pollution action plans for shortterm risks of exceedances of the ozone alert threshold. The Regulations also provide for the dissemination of public information, including where the alert threshold is, or is predicted to be, exceeded. This requirement necessitates informing the public of the types of groups potentially at risk, possible health effects and recommended conduct and preventive action.

<sup>1</sup> O.J. L 67 of 9 March 2002, p.14.

<sup>2</sup> O.J. L 377 of 31 December 1991, p.48.

<sup>3</sup> O.J. L 35 of 5 February 1997, p.14.

<sup>4</sup>O.J. L 125 of 18 May 1994, p.1.

<sup>5</sup> O.J. L 163 of 29 June 1999, p.41.

<sup>6</sup> O.J. L 296 of 21 November 1996, p.55.

<sup>7</sup> O.J. L 163 of 29 June 1999, p.41.

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