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Air Pollution in the UK 2010 – Compliance Assessment Summary



A report prepared by AEA for Defra and the Devolved Administrations.

Title Air Pollution in the UK 2010 – Compliance Assessment Summary

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Executive Summary

The UK is required to report air quality data on an annual basis under the following European Directives:

- The Council Directive on ambient air quality and cleaner air for Europe (2008/50/EC).
- The Fourth Daughter Directive 2004/107/EC under the Air Quality Framework Directive (1996/62/EC).

This document has been prepared to accompany and summarise the UK's 2010 submission on air quality to the EU Commission, presenting a summary of the UK's compliance with the above directives, based upon measurements from national air pollution monitoring networks and air pollution modelling. This includes details of the exceedences reported in 2010.

This document is an extract from a larger report, "Air Pollution in the UK 2010", which, in addition to the compliance summary also provides background information on the pollutants covered by these Directives and the UK's own Air Quality Strategy, their sources, effects, how they are measured and modelled in the UK, and details of their spatial distribution and changes over time.

These data are produced on behalf of Defra (the Department for Environment, Food and Rural Affairs) and the Devolved Administrations of Scotland, Wales and Northern Ireland.

The 2010 results can be summarised as follows:

- No exceedences of the SO₂ limit values were reported in 2010 or in recent years.
- The UK exceeded the limit value for hourly mean nitrogen dioxide in three zones, and for annual mean nitrogen dioxide in 40 zones (out of a total of 43 zones). This is similar to the numbers of zones exceeding (both measured and modelled) in previous years.
- One zone (Greater London Urban Area) exceeded the daily limit value for PM₁₀ during the year, after subtraction of the contribution from natural sources. A time extension has been granted in respect of this zone and limit value and consequently a margin of tolerance is in force. The limit value plus margin of tolerance was not exceeded in 2010.
- Exceedences were reported for the long term ozone objective for human health in 41 zones, and exceedences were reported for the long term ozone objective for vegetation in six of the 43 zones.
- Two exceedences of the target values for nickel were reported in 2010, as was the case in 2009 and 2008.
- Eight exceedences of the target values were reported for benzo[a]pyrene in 2010 (compared with six in 2009).

Copies of previous annual submissions can be found on the Commission website: <http://cdr.eionet.europa.eu/gb/eu/annualair>. For more information on air quality in the UK visit the Defra website at www.defra.gov.uk/environment/quality/air/index.htm and the UK Air Quality websites at <http://uk-air.defra.gov.uk>, www.scottishairquality.co.uk, www.welshairquality.co.uk and www.airqualityni.co.uk.

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1 Introduction

All Member States of the European Union must comply with EU Directives on ambient air quality. These require all Member States, including the UK, to undertake air quality assessment, and to report the findings to the European Commission on an annual basis. Between 1996 and 2008, these were:

- The Air Quality Framework Directive (1996/62/EC)¹
- Its four “Daughter Directives” (DDs) covering different groups of pollutants (1st DD 1999/30/EC², 2nd DD 2000/69/EC³, 3rd DD 2002/3/EC⁴ and 4th DD 2004/107/EC⁵).

In June 2008, a new Directive came into force: the Council Directive on ambient air quality and cleaner air for Europe (2008/50/EC)⁶, known as the “Air Quality Directive”. This Directive consolidated the first three Daughter Directives, and was transposed into the Regulations in England, Scotland, Wales and Northern Ireland in June 2010. The 4th Daughter Directive remains in force.

The UK has statutory monitoring networks in place to meet the requirements of these Directives, with air quality modelling used to supplement the monitored data.

The results are submitted to the European Commission each year, in the form of a standard questionnaire which each Member State must complete. The UK’s annual submission, together with those from previous years, can be found on the Commission website: <http://cdr.eionet.europa.eu/gb/eu/annualair>.

This document presents an assessment of the UK’s compliance with the limit values, target values and long term objectives set out in the Air Quality Directive and the 4th Daughter Directive, and compares this with recent years. This is based upon the data submitted to the European Commission.

Links to the EU Directives on ambient air quality are provided on Defra’s web pages at www.defra.gov.uk/environment/quality/air/air-quality/eu/. The Air Quality Directive itself can also be found at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:152:0001:0044:EN:PDF>.

Further information on air quality in the UK can be found on Defra’s online UK Air Information Resource (UK-AIR), at <http://uk-air.defra.gov.uk/>.

2 Definition of Zones

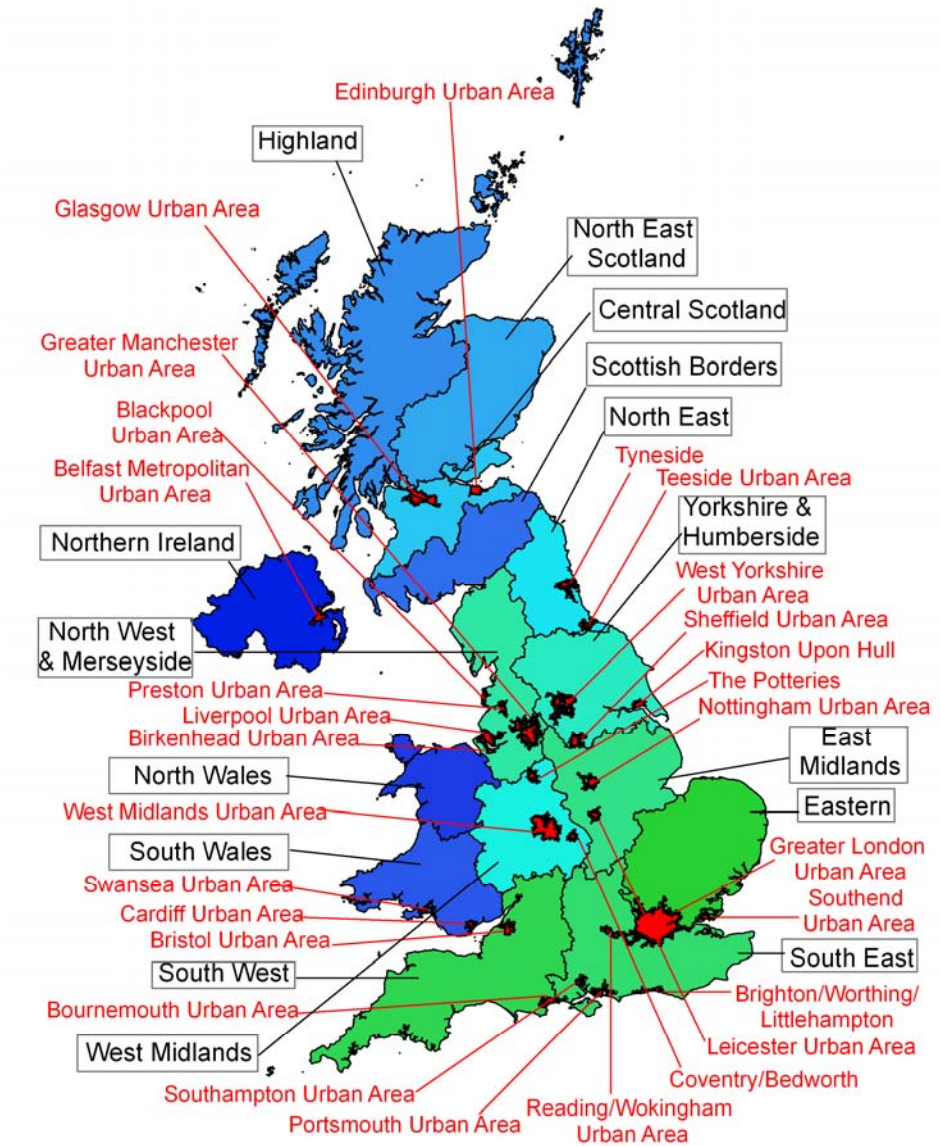
The UK is divided into 43 zones for air quality assessment. There are 28 agglomeration zones (large urban areas) and 15 non-agglomeration zones. Details are included in Form 2 of the Questionnaire (the annual compliance assessment report to the European Commission). Each zone is assigned an identification code: these are listed in Table 1 and the zones are illustrated in Figure 1.

Table 1 UK Zones and Agglomerations for Ambient Air Quality Reporting 2010

Zone	Zone code	Ag or non-ag*
Greater London Urban Area	UK0001	Ag
West Midlands Urban Area	UK0002	Ag
Greater Manchester Urban Area	UK0003	Ag
West Yorkshire Urban Area	UK0004	Ag
Tyneside	UK0005	Ag
Liverpool Urban Area	UK0006	Ag
Sheffield Urban Area	UK0007	Ag
Nottingham Urban Area	UK0008	Ag
Bristol Urban Area	UK0009	Ag
Brighton/Worthing/Littlehampton	UK0010	Ag
Leicester Urban Area	UK0011	Ag
Portsmouth Urban Area	UK0012	Ag
Teesside Urban Area	UK0013	Ag
The Potteries	UK0014	Ag
Bournemouth Urban Area	UK0015	Ag
Reading/Wokingham Urban Area	UK0016	Ag
Coventry/Bedworth	UK0017	Ag
Kingston upon Hull	UK0018	Ag
Southampton Urban Area	UK0019	Ag
Birkenhead Urban Area	UK0020	Ag
Southend Urban Area	UK0021	Ag
Blackpool Urban Area	UK0022	Ag
Preston Urban Area	UK0023	Ag
Glasgow Urban Area	UK0024	Ag
Edinburgh Urban Area	UK0025	Ag
Cardiff Urban Area	UK0026	Ag
Swansea Urban Area	UK0027	Ag
Belfast Metropolitan Urban Area	UK0028	Ag
Eastern	UK0029	Non-ag
South West	UK0030	Non-ag
South East	UK0031	Non-ag
East Midlands	UK0032	Non-ag
North West & Merseyside	UK0033	Non-ag
Yorkshire & Humberside	UK0034	Non-ag
West Midlands	UK0035	Non-ag
North East	UK0036	Non-ag
Central Scotland	UK0037	Non-ag
North East Scotland	UK0038	Non-ag
Highland	UK0039	Non-ag
Scottish Borders	UK0040	Non-ag
South Wales	UK0041	Non-ag
North Wales	UK0042	Non-ag
Northern Ireland	UK0043	Non-ag

ag = agglomeration zone, non-ag = non-agglomeration zone

Figure 1 UK zones and agglomerations for ambient air quality reporting 2010



Agglomeration zones (red)

Non-agglomeration zones (blue/green)

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3 Air Quality Assessment for 2010

The air quality assessment for each pollutant is derived from a combination of measured and modelled concentrations. Where both measurements and model results are available the assessment of compliance for each zone is based on the higher concentration of the two.

The results of the air quality assessment submitted to the European Commission are summarised in the tables below. The tables have been completed as follows:

- Where all measurements were within the relevant limit values, (or limit values with margins of tolerance where applicable) in 2010, the table shows this as "OK".
- Where compliance was determined by modelling or supplementary assessment, this is shown as "OK (m)".
- Where locations were identified as exceeding a limit value, target value or long-term objective, this is identified as ">LV", ">TV" or ">LTO" as applicable.
- Where an exceedence was determined by modelling or supplementary assessment, this is indicated by (m), as above.

Zones that complied with the relevant limit values, targets or long-term objectives are shaded blue, while those that did not are shaded red.

The abbreviation "n/a" (not applicable) means that an assessment is not relevant for this zone, such as for the NO_x vegetation critical level in agglomeration zones.

3.1 Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe

Sulphur dioxide: the results of the air quality assessment for sulphur dioxide are presented in Form 8a of the Questionnaire.

In 2010, all zones and agglomerations within the UK complied with the limit values for 1-hour mean and 24-hour mean SO₂ concentration, set for protection of human health.

All non-agglomeration zones within the UK also complied with the critical levels for annual mean and winter mean SO₂ concentration, set for protection of ecosystems. (These are not applicable to built-up areas).

Nitrogen dioxide: the results of the air quality assessment for nitrogen dioxide for each zone are presented in Form 8b of the Questionnaire, and summarised in Table 2.

Three agglomeration zones - **Greater London Urban Area (UK0001)**, **Teesside Urban Area (UK0013)** and **Glasgow Urban Area (UK0024)** had locations which exceeded the 1-hour limit value (200 µg m⁻³) on more than the permitted number of occasions (18) during 2010.

The majority of zones and agglomerations in the UK had locations with measured or modelled annual mean NO₂ concentrations higher than the annual mean limit value (40 µg m⁻³). This was the case in 40 out of the 43 zones. Only the following three zones **met** the annual mean limit value in 2010:

- Blackpool Urban Area (UK0022)
 - Highland (UK0039)
 - Scottish Borders (UK0040)
- **all others showed some exceedences of the annual mean limit value.**

All non-agglomeration zones within the UK complied with the critical level for annual mean NO_x concentration, set for protection of vegetation.

Particulate matter: the results of the air quality assessment for PM₁₀ and PM_{2.5} for each zone are presented in Forms 8c and 9c of the Questionnaire respectively, and summarised in Table 3.

One zone had locations where modelled PM₁₀ concentrations exceeded the daily mean limit value of 50 µg m⁻³ on more than the permitted number of days (35): **Greater London Urban Area (UK0001)**. This (modelled) exceedence of the daily mean limit value remained after subtraction of the contribution from natural sources, as allowed by the Directive.

However, it should be noted that the UK has been granted a time extension for compliance with the daily mean PM₁₀ limit value in the Greater London Urban Area. The time extension means that the maximum margin of tolerance for this limit value is in force until 11th June 2011. This exemption applies for the period from 11th June 2008 to 10th June 2011.

Although the daily mean limit value was exceeded in this zone in 2010, **the daily mean limit value plus the maximum margin of tolerance (75 µg m⁻³ daily mean not to be exceeded on more than 35 times per calendar year) was not exceeded in 2010**. The UK was therefore compliant for daily mean PM₁₀ in 2010 for all zones and agglomerations.

Article 2 of the Commission Decision of 11th March 2011 requires the UK to provide the Commission with data indicating that the concentration levels in this zone have remained below the daily limit value plus the maximum margin of tolerance specified in Annex XI to Directive 2008/50/EC (daily mean of 75 µg m⁻³, not to be exceeded more than 35 times per calendar year). **The daily mean limit value plus the maximum margin of tolerance was also not exceeded during the period from 11th June 2008 to 31st December 2008 nor in 2009.**

All zones and agglomerations complied with the annual mean limit value of 40 µg m⁻³ for PM₁₀.

Annual mean concentrations of PM_{2.5} were below the target value in all zones and agglomerations.

Carbon monoxide, benzene and lead: the results of the air quality assessment for lead, benzene and CO are presented in Forms 8d, 8e and 8f of the Questionnaire respectively. All zones or agglomerations were compliant with the limit values for these three pollutants in 2010.

Ozone: the results of the air quality assessment for ozone for each zone are presented in Form 9a of the Questionnaire, and summarised in Table 4.

All zones and agglomerations were compliant with the two target values, which are based on the maximum daily 8-hour mean and on the AOT40 statistic⁴. The AOT40 statistic (expressed in µg m⁻³.hours) is the sum of the difference between hourly concentrations greater than 80 µg m⁻³ (= 40 ppb) and 80 µg m⁻³ over a given period using only the one-hour values measured between 0800 and 2000 Central European Time each day.

There are also two long-term objectives, one for human health, and one for vegetation. Forty-one zones and agglomerations were above the long-term objective (LTO) for health, and six zones were above the long-term objective for vegetation.

Table 2 Results of Air Quality Assessment for Nitrogen Dioxide in 2010

Zone	Zone code	NO₂ LV for health (1hr mean)	NO₂ LV for health (annual mean)	NOx critical level for vegetation (annual mean)
Greater London Urban Area	UK0001	> LV	> LV	n/a
West Midlands Urban Area	UK0002	OK	> LV	n/a
Greater Manchester Urban Area	UK0003	OK	> LV	n/a
West Yorkshire Urban Area	UK0004	OK	> LV	n/a
Tyneside	UK0005	OK	> LV (m)	n/a
Liverpool Urban Area	UK0006	OK	> LV (m)	n/a
Sheffield Urban Area	UK0007	OK	> LV (m)	n/a
Nottingham Urban Area	UK0008	OK	> LV (m)	n/a
Bristol Urban Area	UK0009	OK	> LV	n/a
Brighton/Worthing/Littlehampton	UK0010	OK	> LV (m)	n/a
Leicester Urban Area	UK0011	OK	> LV	n/a
Portsmouth Urban Area	UK0012	OK	> LV (m)	n/a
Teesside Urban Area	UK0013	> LV	> LV (m)	n/a
The Potteries	UK0014	OK	> LV (m)	n/a
Bournemouth Urban Area	UK0015	OK	> LV (m)	n/a
Reading/Wokingham Urban Area	UK0016	OK (m)	> LV (m)	n/a
Coventry/Bedworth	UK0017	OK	> LV (m)	n/a
Kingston upon Hull	UK0018	OK	> LV (m)	n/a
Southampton Urban Area	UK0019	OK	> LV (m)	n/a
Birkenhead Urban Area	UK0020	OK	> LV (m)	n/a
Southend Urban Area	UK0021	OK (m)	> LV (m)	n/a
Blackpool Urban Area	UK0022	OK (m)	OK (m)	n/a
Preston Urban Area	UK0023	OK (m)	> LV (m)	n/a
Glasgow Urban Area	UK0024	> LV	> LV	n/a
Edinburgh Urban Area	UK0025	OK	> LV (m)	n/a
Cardiff Urban Area	UK0026	OK	> LV (m)	n/a
Swansea Urban Area	UK0027	OK	> LV (m)	n/a
Belfast Urban Area	UK0028	OK	> LV (m)	n/a
Eastern	UK0029	OK	> LV (m)	OK (m)
South West	UK0030	OK	> LV	OK
South East	UK0031	OK	> LV	OK (m)
East Midlands	UK0032	OK	> LV (m)	OK (m)
North West & Merseyside	UK0033	OK	> LV (m)	OK (m)
Yorkshire & Humberside	UK0034	OK	> LV	OK
West Midlands	UK0035	OK	> LV (m)	OK (m)
North East	UK0036	OK	> LV (m)	OK (m)
Central Scotland	UK0037	OK	> LV (m)	OK (m)
North East Scotland	UK0038	OK	> LV	OK (m)
Highland	UK0039	OK	OK	OK (m)
Scottish Borders	UK0040	OK	OK	OK
South Wales	UK0041	OK	> LV (m)	OK (m)
North Wales	UK0042	OK	> LV (m)	OK
Northern Ireland	UK0043	OK	> LV (m)	OK (m)

Table 3 Results of Air Quality Assessment for PM₁₀ and PM_{2.5} in 2010 prior to Subtraction of Natural Sources.

Zone	Zone code	PM ₁₀ LV (daily mean)	PM ₁₀ LV (annual mean)	PM _{2.5} Target value (annual mean)
Greater London Urban Area	UK0001	> LV (m) *	OK	OK
West Midlands Urban Area	UK0002	OK	OK	OK
Greater Manchester Urban Area	UK0003	OK	OK	OK
West Yorkshire Urban Area	UK0004	OK	OK	OK
Tyneside	UK0005	OK	OK	OK
Liverpool Urban Area	UK0006	OK	OK	OK
Sheffield Urban Area	UK0007	OK	OK	OK
Nottingham Urban Area	UK0008	OK	OK	OK
Bristol Urban Area	UK0009	OK	OK	OK
Brighton/Worthing/Littlehampton	UK0010	OK (m)	OK (m)	OK (m)
Leicester Urban Area	UK0011	OK	OK	OK (m)
Portsmouth Urban Area	UK0012	OK (m)	OK (m)	OK (m)
Teesside Urban Area	UK0013	OK	OK	OK
The Potteries	UK0014	OK	OK	OK
Bournemouth Urban Area	UK0015	OK (m)	OK (m)	OK (m)
Reading/Wokingham Urban Area	UK0016	OK (m)	OK (m)	OK
Coventry/Bedworth	UK0017	OK (m)	OK (m)	OK
Kingston upon Hull	UK0018	OK	OK	OK
Southampton Urban Area	UK0019	OK	OK	OK
Birkenhead Urban Area	UK0020	OK (m)	OK (m)	OK
Southend Urban Area	UK0021	OK (m)	OK (m)	OK
Blackpool Urban Area	UK0022	OK (m)	OK (m)	OK (m)
Preston Urban Area	UK0023	OK (m)	OK (m)	OK
Glasgow Urban Area	UK0024	OK	OK	OK
Edinburgh Urban Area	UK0025	OK	OK	OK
Cardiff Urban Area	UK0026	OK (m)	OK (m)	OK
Swansea Urban Area	UK0027	OK	OK	OK
Belfast Urban Area	UK0028	OK (m)	OK (m)	OK
Eastern	UK0029	OK	OK	OK
South West	UK0030	OK (m)	OK (m)	OK
South East	UK0031	OK	OK	OK
East Midlands	UK0032	OK	OK	OK
North West & Merseyside	UK0033	OK	OK	OK
Yorkshire & Humberside	UK0034	OK	OK	OK
West Midlands	UK0035	OK	OK	OK
North East	UK0036	OK	OK	OK
Central Scotland	UK0037	OK	OK	OK
North East Scotland	UK0038	OK	OK	OK
Highland	UK0039	OK	OK	OK
Scottish Borders	UK0040	OK (m)	OK (m)	OK (m)
South Wales	UK0041	OK (m)	OK (m)	OK
North Wales	UK0042	OK	OK	OK
Northern Ireland	UK0043	OK	OK	OK (m)

*Note: The UK has been granted a time extension to achieve compliance with the daily mean limit value for PM₁₀ in Greater London Urban Area. Consequently, the maximum margin of tolerance is in force for the duration of the extension. Following the subtraction of natural sources, the assessment indicated that concentrations of PM₁₀ in 2010 did not exceed the LV + maximum margin of tolerance in this zone.

Table 4 Results of Air Quality Assessment for Ozone in 2010

Zone	Zone code	O ₃ TV and LTO for health (8hr mean)	O ₃ TV and LTO for vegetation (AOT40)
Greater London Urban Area	UK0001	Meets TV, >LTO	Meets TV, >LTO
West Midlands Urban Area	UK0002	Meets TV, >LTO	OK
Greater Manchester Urban Area	UK0003	Meets TV, >LTO (m)	OK
West Yorkshire Urban Area	UK0004	Meets TV, >LTO (m)	OK
Tyneside	UK0005	Meets TV, >LTO	OK
Liverpool Urban Area	UK0006	Meets TV, >LTO	OK
Sheffield Urban Area	UK0007	Meets TV, >LTO (m)	OK
Nottingham Urban Area	UK0008	Meets TV, >LTO	OK
Bristol Urban Area	UK0009	Meets TV, >LTO	OK
Brighton/Worthing/Littlehampton	UK0010	Meets TV, >LTO (m)	OK
Leicester Urban Area	UK0011	Meets TV, >LTO (m)	OK (m)
Portsmouth Urban Area	UK0012	Meets TV, >LTO (m)	OK
Teesside Urban Area	UK0013	Meets TV, >LTO (m)	OK
The Potteries	UK0014	Meets TV, >LTO (m)	OK
Bournemouth Urban Area	UK0015	Meets TV, >LTO (m)	OK
Reading/Wokingham Urban Area	UK0016	Meets TV, >LTO	OK
Coventry/Bedworth	UK0017	Meets TV, >LTO	OK
Kingston upon Hull	UK0018	Meets TV, >LTO (m)	OK
Southampton Urban Area	UK0019	Meets TV, >LTO (m)	OK (m)
Birkenhead Urban Area	UK0020	Meets TV, >LTO (m)	OK
Southend Urban Area	UK0021	Meets TV, >LTO	OK
Blackpool Urban Area	UK0022	Meets TV, >LTO (m)	OK (m)
Preston Urban Area	UK0023	Meets TV, >LTO (m)	OK
Glasgow Urban Area	UK0024	Meets TV, >LTO (m)	OK
Edinburgh Urban Area	UK0025	Meets TV, >LTO (m)	OK
Cardiff Urban Area	UK0026	Meets TV, >LTO (m)	OK
Swansea Urban Area	UK0027	Meets TV, >LTO	OK
Belfast Urban Area	UK0028	OK	OK
Eastern	UK0029	Meets TV, >LTO	Meets TV, >LTO
South West	UK0030	Meets TV, >LTO	Meets TV, >LTO
South East	UK0031	Meets TV, >LTO	Meets TV, >LTO (m)
East Midlands	UK0032	Meets TV, >LTO	Meets TV, >LTO (m)
North West & Merseyside	UK0033	Meets TV, >LTO	OK
Yorkshire & Humberside	UK0034	Meets TV, >LTO	Meets TV, >LTO (m)
West Midlands	UK0035	Meets TV, >LTO	OK
North East	UK0036	Meets TV, >LTO (m)	OK
Central Scotland	UK0037	Meets TV, >LTO	OK
North East Scotland	UK0038	Meets TV, >LTO (m)	OK
Highland	UK0039	Meets TV, >LTO (m)	OK
Scottish Borders	UK0040	Meets TV, >LTO	OK
South Wales	UK0041	Meets TV, >LTO	OK
North Wales	UK0042	Meets TV, >LTO (m)	OK
Northern Ireland	UK0043	OK	OK

Measured exceedences of limit values, target values, long term objectives, information thresholds and alert thresholds are also listed within the annual air quality assessment questionnaire. Summary statistics for the exceedences identified at specific monitoring sites are provided in Table 5 to Table 9.

Table 5 Measured Exceedences of the NO₂ Limit Value for Health (1 hour mean)

Site name	Zone code	Number of 1-hour exceedences of LV	Maximum 1-hour concentration ($\mu\text{g m}^{-3}$)
Camden Kerbside	UK0001	129	399
London Marylebone Road	UK0001	539	332
Billingham	UK0013	21	340
Glasgow Centre	UK0024	56	1209
Glasgow Kerbside	UK0024	97	365

Table 6 Measured Exceedences of the NO₂ Limit Value for Health (annual mean)

Site name	Zone code	Annual mean concentration ($\mu\text{g m}^{-3}$)
Camden Kerbside	UK0001	82
Haringey Roadside	UK0001	45
London Bloomsbury	UK0001	58
London Hillingdon	UK0001	54
London Marylebone Road	UK0001	98
London Westminster	UK0001	52
Tower Hamlets Roadside	UK0001	66
Birmingham Tyburn Roadside	UK0002	51
Manchester Piccadilly	UK0003	45
Salford Eccles	UK0003	42
Leeds Headingley Kerbside	UK0004	51
Bristol Old Market	UK0009	63
Leicester Centre	UK0011	42
Glasgow Centre	UK0024	44
Glasgow City Chambers	UK0024	49
Glasgow Kerbside	UK0024	84
Bath Roadside	UK0030	60
Oxford Centre Roadside	UK0031	58
York Fishergate	UK0034	49
Aberdeen Union Street Roadside	UK0038	59

Table 7 Measured Exceedences of the Ozone Information Threshold Value

Site name	Zone code	Number of 1-hour exceedences of alert threshold	Maximum 1-hour concentration ($\mu\text{g m}^{-3}$)
Weybourne	UK0029	9	376

Table 8 Measured Exceedences of the Ozone Alert Threshold Value

Site name	Zone code	Number of 1-hour exceedences of information threshold	Maximum 1-hour concentration ($\mu\text{g m}^{-3}$)
Weybourne	UK0029	5	376

Table 9 Measured Exceedences of the ozone long term objective for health protection

Site name	Zone code	Number of days with exceedences	Maximum 8-hour concentration ($\mu\text{g m}^{-3}$)
London Eltham	UK0001	2	131
London Harlington	UK0001	3	133
London N. Kensington	UK0001	2	132
London Teddington	UK0001	7	152
London Westminster	UK0001	1	123
Birmingham Tyburn	UK0002	3	140
Birmingham Tyburn Roadside	UK0002	2	121
Sandwell West Bromwich	UK0002	3	147
Newcastle Centre	UK0005	1	137
Liverpool Speke	UK0006	1	125
Nottingham Centre	UK0008	2	128
Bristol St Paul's	UK0009	1	124
Reading New Town	UK0016	3	137
Southend-on-sea	UK0021	1	122
Port Talbot Margam	UK0027	1	122
Norwich Lakenfields	UK0029	1	130
Sibton	UK0029	4	158
St Osyth	UK0029	1	123
Weybourne	UK0029	9	270
Wicken Fen	UK0029	2	143
Charlton Mackrell	UK0030	2	145
Yarner Wood	UK0030	3	145
Harwell	UK0031	3	141
Bottesford	UK0032	2	126
Ladybower	UK0032	2	134
Market Harborough	UK0032	3	148
Northampton	UK0032	3	147
Glazebury	UK0033	1	140
High Muffles	UK0034	2	133
Coventry Memorial Park	UK0017	3	142
Leamington Spa	UK0035	3	153
Leominster	UK0035	3	130
Auchencorth Moss	UK0037	1	128
Bush Estate	UK0037	1	130
Eskdalemuir	UK0040	1	123
Peebles	UK0040	2	123
Cwmbran	UK0041	2	134

3.2 Fourth Daughter Directive 2004/107/EC

The results of the air quality assessment for arsenic (As), cadmium (Cd), nickel (Ni) and benzo[a]pyrene (B[a]P) for each zone are presented in Form 9b of the Questionnaire, and illustrated in Table 10.

All zones and agglomerations met the target values for arsenic and cadmium. Two zones exceeded the target value for nickel. Concentrations of B[a]P were above the target value in eight zones and below in all remaining zones.

Table 10 Results of Air Quality Assessment for As, Cd, Ni and benzo(a)pyrene in 2010

Zone	Zone code	As TV	Cd TV	Ni TV	B(a)P TV
Greater London Urban Area	UK0001	OK	OK	OK	OK
West Midlands Urban Area	UK0002	OK	OK	OK	OK
Greater Manchester Urban Area	UK0003	OK	OK	OK	OK
West Yorkshire Urban Area	UK0004	OK (m)	OK (m)	OK (m)	OK
Tyneside	UK0005	OK (m)	OK (m)	OK (m)	OK
Liverpool Urban Area	UK0006	OK (m)	OK (m)	OK (m)	OK
Sheffield Urban Area	UK0007	OK	OK	OK	OK (m)
Nottingham Urban Area	UK0008	OK (m)	OK (m)	OK (m)	OK (m)
Bristol Urban Area	UK0009	OK	OK	OK	OK (m)
Brighton/Worthing/Littlehampton	UK0010	OK (m)	OK (m)	OK (m)	OK
Leicester Urban Area	UK0011	OK (m)	OK (m)	OK (m)	OK (m)
Portsmouth Urban Area	UK0012	OK (m)	OK (m)	OK (m)	OK (m)
Teesside Urban Area	UK0013	OK	OK	OK	> TV (m)
The Potteries	UK0014	OK (m)	OK (m)	OK (m)	OK (m)
Bournemouth Urban Area	UK0015	OK (m)	OK (m)	OK (m)	OK (m)
Reading/Wokingham Urban Area	UK0016	OK (m)	OK (m)	OK (m)	OK (m)
Coventry/Bedworth	UK0017	OK (m)	OK (m)	OK (m)	OK (m)
Kingston upon Hull	UK0018	OK (m)	OK (m)	OK (m)	OK (m)
Southampton Urban Area	UK0019	OK (m)	OK (m)	OK (m)	OK (m)
Birkenhead Urban Area	UK0020	OK (m)	OK (m)	OK (m)	OK (m)
Southend Urban Area	UK0021	OK (m)	OK (m)	OK (m)	OK (m)
Blackpool Urban Area	UK0022	OK (m)	OK (m)	OK (m)	OK (m)
Preston Urban Area	UK0023	OK (m)	OK (m)	OK (m)	OK (m)
Glasgow Urban Area	UK0024	OK	OK	OK	OK
Edinburgh Urban Area	UK0025	OK (m)	OK (m)	OK (m)	OK
Cardiff Urban Area	UK0026	OK	OK	OK	OK
Swansea Urban Area	UK0027	OK	OK	> TV (m)	OK
Belfast Urban Area	UK0028	OK	OK	OK	> TV (m)
Eastern	UK0029	OK	OK	OK	OK
South West	UK0030	OK	OK	OK	OK (m)
South East	UK0031	OK	OK	OK	OK
East Midlands	UK0032	OK	OK	OK	OK
North West & Merseyside	UK0033	OK	OK	OK	OK
Yorkshire & Humberside	UK0034	OK	OK	OK	> TV
West Midlands	UK0035	OK (m)	OK (m)	OK (m)	> TV (m)
North East	UK0036	OK	OK	OK	> TV (m)
Central Scotland	UK0037	OK	OK	OK	OK
North East Scotland	UK0038	OK	OK	OK	OK (m)
Highland	UK0039	OK (m)	OK (m)	OK (m)	OK
Scottish Borders	UK0040	OK	OK	OK	OK (m)
South Wales	UK0041	OK (m)	OK (m)	> TV (m)	> TV (m)
North Wales	UK0042	OK (m)	OK (m)	OK (m)	> TV (m)
Northern Ireland	UK0043	OK (m)	OK (m)	OK (m)	> TV

4 Comparison with Previous Years

Table 11 to Table 16 summarise the results of the air quality assessment for 2010 and provide a comparison with the results of the assessments carried out in previous years. In Table 12, “n/a” (not applicable) indicates that there was no applicable margin of tolerance for the specified year

Table 11 (Part 1 of 2) Exceedences of Limit Values for Ambient Air Quality Directive (1st and 2nd Daughter Directives prior to 2008)

Pollutant	Averaging time	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
SO ₂	1-hour	None	None	None	None	1 zone modelled (Eastern)	1 zone modelled (Eastern)	1 zone modelled (Eastern)	1 zone modelled (Eastern)	None	None
SO ₂	24-hour ⁱ	None	None	None	None	1 zone modelled (Eastern)	1 zone modelled (Eastern)	None	1 zone modelled (Eastern)	None	1 Zone measured (Belfast Urban Area)
SO ₂	Annual ⁱⁱ	None	None	None	None	None	None	None	None	None	None
SO ₂	Winter ⁱⁱ	None	None	None	None	None	None	None	None	None	not assessed
NO ₂	1-hour ⁱⁱⁱ	3 zones measured (London, Teesside, Glasgow)	2 zones measured (London, Glasgow)	3 zones measured (London, Glasgow, NE Scotland)	2 zones measured (London, Glasgow)	1 zone measured (Greater London Urban Area)	2 zones measured (London, Bristol)	1 zone measured (Greater London Urban Area)	3 zones measured (London, Glasgow, South East)	1 zone measured (Glasgow Urban Area)	4 zones measured
NO ₂	Annual	40 zones (11 measured + 29 modelled)	40 zones (9 measured + 31 modelled)	40 zones (10 measured + 30 modelled)	41 zones (8 measured + 33 modelled)	39 zones (7 measured + 32 modelled)	38 zones (8 measured + 30 modelled)	39 zones (9 measured + 30 modelled)	42 zones (10 measured + 32 modelled)	36 zones (6 measured + 30 modelled)	38 zones (6 measured + 32 modelled)
NO _x	Annual ⁱⁱ	None	None	None	None	None	None	None	None	None	None

ⁱ No MOT defined, LV + MOT = LV

ⁱⁱ Applies to vegetation and ecosystem areas only. Critical Levels are already in force, no MOT.

ⁱⁱⁱ No modelling for 1-hour LV.

Table 11 is continued on next page.

Table 11 (Part 2 of 2) Exceedences of Limit Values for Ambient Air Quality Directive (1st and 2nd Daughter Directives prior to 2008)

Pollutant	Averaging time	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
PM ₁₀	Daily	1 (modelled, after subtraction of natural contribution: time ext. granted.)	3 zones (1 measured + 2 modelled) <i>1 zone modelled after subtraction of natural contribution</i>	2 zones (1 measured + 1 modelled) <i>1 zone measured after subtraction of natural contribution</i>	6 zones (3 measured + 3 modelled)	30 zones (5 measured + 25 modelled)	29 zones (3 measured + 26 modelled)	27 zones (2 measured + 25 modelled)	33 zones (10 measured + 23 modelled)	18 zones (1 measured + 17 modelled)	26 zones (5 measured + 21 modelled)
PM ₁₀	Annual	None	None	None	1 zone measured (Greater London Urban Area)	2 zones (1 measured + 1 modelled)	4 zones (1 measured + 3 modelled)	2 zones (1 measured, London + 1 modelled, West Midlands Urban Area)	15 zones (1 measured + 14 modelled)	2 zones (Greater London Urban Area measured, Eastern modelled)	2 zones (London measured, Manchester modelled)
Lead	Annual	None	None	None	None	None	None	None	None	None	None
Benzene	Annual	None	None	None	None	1 zone modelled (Yorkshire & Humberside)	2 zones modelled (Yorkshire & Humberside, Central Scotland)	None	1 zone modelled (Greater London Urban Area)	not assessed	not assessed
CO	8-hour	None	None	None	None	None	None	None	None	not assessed	not assessed

Table 12 Exceedences of Limit Values Plus Margins of Tolerance (where applicable) for Ambient Air Quality Directive (1st and 2nd Daughter Directives prior to 2008). (This table only shows limit values that have been exceeded during 2001-2010).

Pollutant	Averaging time	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
SO ₂	1-hour	n/a	n/a	n/a	n/a	n/a	n/a	1 zone modelled (Eastern)	1 zone modelled (Eastern)	None	None
SO ₂	24-hour	n/a	n/a	n/a	n/a	n/a	n/a	None	1 zone modelled (Eastern)	None	1 zone measured (Belfast Urban Area)
NO ₂	1-hour ⁱ	n/a	2 zones measured (London, Glasgow)	2 zones measured (London, Glasgow)	1 zone measured (Greater London Urban Area)	1 zone measured (Greater London Urban Area)	1 zone measured (Greater London Urban Area)	1 zone measured (Greater London Urban Area)	1 zone measured (Greater London Urban Area)	None	None
NO ₂	Annual	n/a	40 zones (9 measured + 31 modelled)	40 zones (7 measured + 33 modelled)	39 zones (6 measured + 33 modelled)	38 zones (6 measured + 32 modelled)	35 zones (6 measured + 29 modelled)	34 zones (6 measured + 28 modelled)	35 zones (5 measured + 30 modelled)	19 Zones (5 measured + 14 modelled)	21 Zones (4 measured + 17 modelled)
PM ₁₀	Daily	None	None	None	None	None	None	19 zones (1 measured + 18 modelled)	18 zones (2 measured + 16 modelled)	1 zone modelled (Greater London Urban Area)	1 zone modelled (Greater London Urban Area)
PM ₁₀	Annual	n/a	n/a	n/a	n/a	n/a	n/a	1 zone modelled (Gr. London Urban Area)	10 zones (1 measured + 9 modelled)	1 zone modelled (Gr. London Urban Area)	1 zone modelled (Gr. London Urban Area)
Benzene	Annual	n/a	None	None	None	None	None	None	None	not assessed	not assessed

ⁱ No modelling for 1-hour LV

Table 13 Ambient Air Quality Directive (3rd Daughter Directive) Target Values

Pollutant	Averaging time	2010	2009	2008	2007	2006	2005	2004
O ₃	8-hour	None	None	1 zone measured (Eastern)	None	None	None	None
O ₃	AOT40	None	None	None	None	None	None	None

Table 14 Ambient Air Quality Directive (3rd Daughter Directive) Long Term Objectives

Pollutant	Averaging time	2010	2009	2008	2007	2006	2005	2004
O ₃	8-hour	41 zones (19 measured + 22 modelled)	39 zones (25 measured + 14 modelled)	43 zones (35 measured + 8 modelled)	41 zones (24 measured + 17 modelled)	43 zones (41 measured + 2 modelled)	37 zones (22 measured + 15 modelled)	43 zones (36 measured + 7 modelled)
O ₃	AOT40	6 zones (3 measured + 3 modelled)	10 zones (8 measured + 2 modelled)	41 zones (25 measured + 16 modelled)	3 zones (1 measured + 2 modelled)	41 zones (32 measured + 9 modelled)	16 zones (9 measured + 7 modelled)	7 zones (5 measured + 2 modelled)

Table 15 4th Daughter Directive Target Values

Pollutant	Averaging time	2010	2009	2008	2007
As	Annual	None	None	None	None
Cd	Annual	None	None	None	None
Ni	Annual	2 zones modelled (Swansea, S Wales)	2 zones modelled (Swansea, S Wales)	2 zones modelled (Swansea, S Wales, measured at non-network site, so reported as m)	1 zone (Swansea Urban area, measured but low data capture, so reported as m)
B[a]P	Annual	8 zones, (2 zones measured Yorkshire & Humberside, N Ireland + 6 zones modelled; Teesside, Belfast, W Midlands, North East, S Wales, N Wales.)	6 zones, (2 zones measured Yorkshire & Humberside, N Ireland + 4 zones modelled Teesside, Swansea, North East, S Wales)	6 zones, (3 zones measured Yorkshire & Humberside, Teesside, N Ireland + 3 zones modelled Swansea, S Wales, Belfast)	1 zone measured (Yorkshire & Humberside)

Table 16 Ambient Air Quality Directive Target Value

Pollutant	Averaging time	2010	2009
PM _{2.5}	Annual	None	None

References

- ¹ Council of the European Union (1996) "Directive 96/62/EC on Ambient Air Quality Assessment and Management". [online]. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996L0062:EN:NOT> (Accessed 21 July 2011)
- ² Council of the European Union (1999) "Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air". [online]. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31999L0030:EN:NOT> (Accessed 21 July 2011)
- ³ European Parliament and Council of the European Union (2000) "Directive 2000/69/EC of the European Parliament and of the Council of 16 November 2000 relating to limit values for benzene and carbon monoxide in ambient air". [online]. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000L0069:EN:NOT> (Accessed 21 July 2011)
- ⁴ European Parliament and Council of the European Union (2002) "Directive 2002/3/EC of the European Parliament and of the Council of 12 February 2002 relating to ozone in ambient air". [online]. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0003:EN:NOT> (Accessed 21 July 2011)
- ⁵ European Parliament and Council of the European Union (2004) "Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air". [online]. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004L0107:EN:NOT>, (Accessed 21 July 2011)
- ⁶ European Parliament and Council of the European Union (2008) "Council Directive on ambient air quality and cleaner air for Europe (2008/50/EC)". [online]. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0050:EN:NOT> (Accessed 21 July 2011)