

Air Quality Fact Sheet 1

How to interpret Air Quality data

Why is it important to correctly interpret air quality data?

Air quality data is now readily available and can be accessed in several ways. In Oxfordshire data is available via: <https://oxfordshire.air-quality.info>. Understanding the differences between various air quality data measurements and their relationship with current legal limit values and guidelines is key for the development of robust, accurate and reliable information on the status of air quality in any given area.

What are the current air quality limit values and World Health Organisation (WHO) guidelines for the main pollutants?

Legal limit values are legally binding EU parameters that must not be exceeded. Limit values are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have more than one limit value covering different endpoints or averaging times. The WHO guidelines are a more restricting set of advisory limit values that were established for the same pollutants, after the review of existing scientific evidence that shows the health impacts of human exposure to these pollutants.

National Air Quality Standards, Objectives and EU Limit Values				WHO Guidelines	
Pollutant	Average period	Value	Comments	Average Period	Value
NO ₂	1 hour mean	200 µgm ⁻³	not to be exceeded more than 18 times a year	1 hour mean	200 µgm ⁻³
NO ₂	annual mean	40 µgm ⁻³		Annual mean	40 µgm ⁻³
O ₃	8 hour mean	100 µgm ⁻³	not to be exceeded more than 10 times a year	8 hour mean	100 µgm ⁻³
PM ₁₀	24 hour mean	50 µgm ⁻³	not to be exceeded more than 35 times a year	24 hour mean	50 µgm ⁻³
PM ₁₀	annual mean	40 µgm ⁻³		Annual mean	20 µgm ⁻³
PM _{2.5}	annual mean	25 µgm ⁻³		Annual mean	10 µgm ⁻³
PM _{2.5}				24 hour mean	25 µgm ⁻³

Why do we have long-term and short term limit values for the same pollutant?

Long and short term air pollutant limit values exist because there are varying impacts on people's health from exposure to pollutants over differing time periods. The main effects of air pollutants on health are to the respiratory and cardiovascular systems. These effects are variable and depend amongst other things on the exposure time to a particular air pollutant. As such, depending on your location and how long you are there, the health impacts from your exposure to air pollution will vary.

Where do the limit values apply to and where should we locate monitoring equipment?

Exceedances of the limit values should be assessed in relation to the quality of the air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present:

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Averaging Period	Limit value applies at	Objectives should generally not apply at
Annual Mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	<u>Building façades of offices</u> or other places of work where members of the public do not have regular access. <u>Hotels</u> , unless people live there as their permanent residence. <u>Gardens of residential properties</u> . <u>Kerbside sites</u> (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean and 8-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties	<u>Kerbside sites</u> (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and: 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	NA

What is the right way of comparing air quality measurement results against the current air quality limit values and WHO guidelines?

If you have air quality monitoring data for a specific location, and you want to use it to assess the status of air quality at that location, it is extremely important that you make sure that you do the right comparison between the data that you have and the available limit values for the specific pollutant that you are interest in so that your conclusions can be considered valid.

For example, if you want to see if your location is in breach of the 1-hour limit value for NO₂ (200 µg/m³), you need to have a minimum of one hour of valid air quality measurements. If you want to understand if a location is in breach of the annual mean, you will need a minimum of 12 months of air quality data.

Air quality limit values are measured as means, so comparing results that are measured at different timescales (ex: comparing one minute data against an hourly or annual mean limit value) will not provide you with a picture of whether or not a site is in breach of air pollution limits.