# The European Air Quality Index

The European Air Quality Index allows users to understand more about current air quality where they live, work or travel. Displaying up-to-date information for Europe, users can gain insights into the air quality in individual countries, regions and cities.

European Union legislation sets air quality standards both for the short-term (hourly/daily) and long-term (annual) air quality levels: standards for long-term levels are necessarily stricter than for short-term levels, because serious health effects may occur from long-term exposure to such pollutants.

The Index indicates the short-term air quality situation. It does not reflect the long-term (annual) air quality situation, which may differ significantly. The Index is calculated for every hour at more than two thousand air quality monitoring stations across Europe, using up-to-date data reported by EEA's member countries.

By default, the air quality index depicts the situation **6 hours ago** – however users can select any specific hour in the preceding 48 hours.

Data can be filtered based on the "type of station". The stations are classified in relation to the predominant emission sources: traffic stations, industrial stations and background stations (where the pollution level is not dominated by either traffic or industry). The present viewer allows filtering either the traffic stations and all types of stations (so also including industrial stations and background stations).

Please note that the air quality index is based on the up-to-date air quality reported by countries. These data are not formally verified by the countries.

**The air quality index does not aim at compliance checking against air quality standards and can not be considered for this purpose.**

# Methodology

The Index uses 'up-to-date' air quality data officially reported every hour by the EEA's member countries, and complemented, as necessary, by modelled air quality data from the European Union's Copernicus Atmospheric Monitoring Service (CAMS) (see 'Missing data and gap filling' below). Concentrations of up to five key pollutants determine the index level that describes the current air quality situation at each monitoring station. The index corresponds to the poorest level for any of five pollutants according to the following scheme.

### Traffic stations

SO2 concentrations can be high only in much localized areas, and ozone concentrations are normally very low at traffic stations. Therefore, the index for these stations should be ideally calculated only with data (either measured or derived from CAMS models) for both NO2 and PM (i.e. either PM2.5 or PM10 or both).

### All other locations

The index should be calculated for those stations with data (either measured or derived from CAMS models) for at least the three pollutants NO2, O3 and PM (i.e. either PM2.5 or PM10 or both).

### Missing pollutant

To avoid leaving out a certain number of stations, the index is calculated for all monitoring stations with data for at least one pollutant, but those stations not fulfilling the minimum number of pollutants requirement are shown in transparent colour.

### Averaging time

**For NO2, O3 and SO2 , hourly concentrations of NO2, O3 and SO2 are used for the calculation of the index. For PM10 and PM2.5, the 24-hour running means, based on the last 24 hours, are considered for the calculation of the index.**

## Missing data and gap filling

When data from countries has not been reported for a given hour, values are approximated ('gap-filled') using CAMS modelled air quality data. In such cases, it is clearly marked within the Index as being 'modelled data'.

The gap-filling method used depends on the pollutant, i.e.

- for NO2, PM2.5 and PM10 by using a *difference method*;
- for O3 by using a *multiplicative method*;
- for SO2 no gap filling is performed

*Difference method*: the value is approximated by taking the CAMS modelled value, and adding or subtracting a correction difference. This correction is the average difference between previously measured values and the CAMS modelled value for the same hour for at least three of the four previous days

*Multiplicative method*: the value is approximated by taking the CAMS modelled value, and applying a correction factor. This correction is the average ratio between the previously measured values and the CAMS modelled values for the same hour for at least three of the four previous days.

In cases where there no measured values for the same hour over three of the four previous days, the index value for the given pollutant is not calculated and is reported as 'no data'.

## Bands of concentrations and index levels

| Pollutant | Index level (based on pollutant concentrations in µg/m3) | | | | |
|---|---|---|---|---|---|
| | **Good** | **Fair** | **Moderate** | **Poor** | **Very poor** |
| Particles less than 2.5 µm ($PM_{2.5}$) | 0-10 | 10-20 | 20-25 | 25-50 | 50-800 |
| Particles less than 10 µm ($PM_{10}$) | 0-20 | 20-35 | 35-50 | 50-100 | 100-1200 |
| Nitrogen dioxide ($NO_2$) | 0-40 | 40-100 | 100-200 | 200-400 | 400-1000 |
| Ozone ($O_3$) | 0-80 | 80-120 | 120-180 | 180-240 | 240-600 |
| Sulphur dioxide ($SO_2$) | 0-100 | 100-200 | 200-350 | 350-500 | 500-1250 |

Please, note that the air quality measurements that exceed the maximum value shown in the 'Very poor' category in the table are not taken into account for the index calculation, since these values are typically found to be erroneous.