

## Air Quality Data

Start Date	2019-01-01 00:00:00
End Date	2023-06-30 23:45:00
N. of Entries	255 709

### Origin

This data is collected by *Monitar* ([MonitarSense](#)), the company responsible for the provision and maintenance of urban sensors scattered within Porto Municipality to monitor the air quality by measuring air pollutants concentrations.

The data was provided by the company mentioned above, in monthly *Excel Sheets*.

### Transformations

The data was transformed, in order to be read in a *csv* format:

- Columns were eliminated (empty);
- All data was aggregated into a single Dataframe;
- Columns format was changed in order to provide a clearer tabular format;
- Only 15-minutes measurements frequency were selected;

### Data Dictionary

Name	Description	Type	Default	Example
name	Sensors' name	object	null	Porto – SmartAirSense – Arca d'Agua
timestamp	Date & Time of measurement taken	datetime64[ns]	null	2019-01-01 00:00:00
co	CO (Carbon Monoxide) measured (micrograms per cubic meter, $\mu\text{g}/\text{m}^3$ )	float64	null	874.7

no2	NO <sub>2</sub> (Nitrogen Dioxide) measured (micrograms per cubic meter, µg/m <sup>3</sup> )	float64	null	20.4
o3	O <sub>3</sub> (Ozone) measured (micrograms per cubic meter, µg/m <sup>3</sup> )	float64	null	7.1
pm10	PM <sub>10</sub> (Particulate Matter under 10 microns in width) measured (micrograms per cubic meter, µg/m <sup>3</sup> )	float64	null	60.8
pm2.5	PM <sub>2.5</sub> (Particulate Matter under 2.5 microns in width) measured (micrograms per cubic meter, µg/m <sup>3</sup> )	float64	null	45.5

## Urban Sensor Characteristics

Main Characteristics of CO Sensor from MONITARSENSE Station	Description
Type	Electrochemical
Measuring Range	0 – 15 mg/m <sup>3</sup>
Resolution	0.1 mg/m <sup>3</sup>
O <sub>x</sub> - Accuracy	± 25 %
Temperature – Operating Range	-30 °C – +50 °C
Relative Humidity – Operating Range	15 % - 90 %
Lifetime	> 24 Months
Response Variation	0 – 100 ppb/year

Main Characteristics of O <sub>x</sub> (O <sub>3</sub> + NO <sub>2</sub> ) Sensor from MONITARSENSE Station	Description
Type	Electrochemical
Measuring Range	0 – 500 µg/m <sup>3</sup>
Resolution	0.1 µg/m <sup>3</sup>
O <sub>x</sub> - Accuracy	± 25 %
Temperature – Operating Range	-30 °C – +40 °C
Relative Humidity – Operating Range	15 % - 85 %
Lifetime	> 24 Months
Response Variation	0 – 20 ppb/year

Main Characteristics of PM <sub>2.5</sub> and PM <sub>10</sub> Sensor from MONITARSENSE Station	Description
Type	Optic - Laser
Measuring Range	0 – 500 µg/m <sup>3</sup>
Resolution	1 µg/m <sup>3</sup>
PM <sub>2.5</sub> - Accuracy	0 – 100 µg/m <sup>3</sup> ± 15 µg/m <sup>3</sup> 101 ~ 500 µg/m <sup>3</sup> ± 15 % of measurement
PM <sub>10</sub> - Accuracy	0 – 100 µg/m <sup>3</sup> ± 25 µg/m <sup>3</sup> 101 ~ 500 µg/m <sup>3</sup> ± 25 % of measurement
Temperature – Operating Range	-10 °C – +50 °C

Relative Humidity – Operating Range	0 % - 95 %
Lifetime	> 24 Months

## Info

- There are missing values (measurements) and missing timestamps in the data.
- There is a missing Sensor.