



# CAN YOU BREATHE?

Information on clean air



## HARMFUL EMISSIONS –

## SOURCES & CONSEQUENCES

**What are particulate matter (PM<sub>10</sub>, PM<sub>2,5</sub>), NO<sub>2</sub> and ground-level ozone and where do they come from?**

### PARTICULATE MATTER

Particulate matter (PM) refers to all small particles contained in the air. So-called PM<sub>10</sub> (Particulate Matter ≤ 10 micrometers (µm)) includes in simple terms particles with an upper particle diameter of up to 10 µm. Accordingly, PM<sub>2,5</sub> refers to particles with a diameter of 2.5 µm or less.

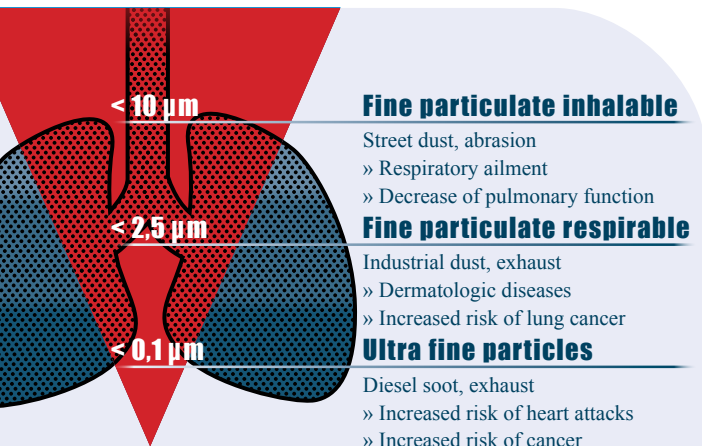
How dangerous the particles we breathe every day are for our health mainly depends on their size and chemical composition. The impact of particulate matter of natural origin (e.g. salt crystals, dust) on human health is relatively low. However, particles e.g. from the combustion of fuel in diesel engines are more dangerous the smaller they are. Soot is one of these especially dangerous particles.

### SOOT

Especially small particles (PM<sub>0,1</sub> or smaller) are referred to as soot. They specially originate from the incomplete combustion of carbon, for example, in diesel engines and heating systems. In Central Europe, the majority of soot particles is generated through emissions from diesel engines without a particle filter.

The World Health Organization (WHO) confirmed the carcinogenic effects of diesel exhaust gas in 2012. The smaller the soot particles are, the deeper they can penetrate into the human lung and even be transported into the blood. This increases the risk of developing respiratory and cardiovascular diseases.

In addition, the wind carries the black particles to areas of ice and snow, where they settle on the surface. Since the black particles in the atmosphere and on the ice increase the absorption of solar radiation, the land and air masses are heating up. Soot is responsible for 50 percent of the temperature rise in the Arctic and thus as relevant to climate change as CO<sub>2</sub>.



## MEASURES

### How is the legislator reacting?

Under EU legislation, member states assess the air pollution levels in their territory themselves. Where the concentration in the air exceeds the set limit values, the member states must prepare an action plan showing how the respective limit value will be achieved in future. Competent authorities are also obliged to inform the public about the assessment and combating of air pollution.

Towns and municipalities which have exceeded the emission limits for air pollutants are obliged to take effective counter measures. The authority responsible for the air quality must then prepare an air quality management plan and action plan.

### Are limit values achieved?

The latest EEA reports show, that a great share of Europe's population lives in areas with poor air quality. Since there is no threshold for PM, Ozone and NO<sub>2</sub> below which no damage to health or climate is observed, all possible action should be taken to reduce air pollution in a way to minimize health and climate effects by a maximum.

But the limits set out by EU as shown in the table below are not sufficient for protecting human health. Therefore further action is need to be done by competent municipals and all of us.

<sup>i)</sup> Source: [www.lanuv.nrw.de/gesundheit/schadstoffe/no2.htm](http://www.lanuv.nrw.de/gesundheit/schadstoffe/no2.htm)










<sup>ii)</sup> Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

Pollutant	Limit value obligatory <sup>ii</sup>	European limit value	WHO guideline values
<b>PM<sub>10</sub></b>	since 1 January 2005	50 µg/m <sup>3</sup> daily limit value may be exceeded on 35 days only 40 µg/m <sup>3</sup> annual mean	50 µg/m <sup>3</sup> daily limit value 20 µg/m <sup>3</sup> annual mean
<b>PM<sub>2.5</sub></b>	from 1 January 2015	25 µg/m <sup>3</sup> annual mean 20 µg/m <sup>3</sup> maximum 3-year annual mean (urban background)	10 µg/m <sup>3</sup> annual mean 25 µg/m <sup>3</sup> daily limit value
<b>NO<sub>2</sub></b>	since 1 January 2010	200 µg/m <sup>3</sup> 1-hour limit value may be exceeded on 18 days only 40 µg/m <sup>3</sup> annual mean	200 µg/m <sup>3</sup> 1-hour limit value 40 µg/m <sup>3</sup> annual mean
<b>O<sub>3</sub></b>	since 1 January 2010	120 µg/m <sup>3</sup> targeted value (maximum 8-hour mean in a day; may be exceeded on 25 days only (3-year mean)	100 µg/m <sup>3</sup> 8-hour limit value

## PLEASE HELP!

### What can you do?

You can improve the air quality by simply:

-  covering short distances by bike or on foot
-  switching to public transport
-  avoiding using your car
-  forming carpools
-  reducing speed when driving
-  participating in preparing local action plans
-  demanding efficient clean air policies (e.g. environmental zones)
-  imposing your right to clean air in court
-  using efficient vehicles with low exhaust emissions (Euro 6 value limits)

## NO<sub>2</sub>

Nitrogen dioxide (NO<sub>2</sub>) is a corrosive irritant gas which has a direct and negative impact on human health. Nitrogen oxides are also formed as a byproduct of combustion processes, especially in motor vehicle engines and heating systems. Here, nitrogen oxides are mainly emitted as nitric oxide (NO). In the atmosphere, they oxidize to form nitrogen dioxide (NO<sub>2</sub>). Nitrogen dioxide attacks the mucous membranes of humans, causing respiratory diseases such as chronic bronchitis and asthma. A higher NO<sub>2</sub> concentration also increases the risk of dying of cardiovascular diseases<sup>i</sup>. Since NO<sub>2</sub> is involved in the formation of ground-level ozone, NO<sub>2</sub> emissions also have an indirect impact on the climate.

## GROUND-LEVEL OZON

Ozone is a greenhouse gas which contributes to global warming. It originates from oxides and carbons in chemical processes when the sun shines. Since it is not directly emitted, ozone is referred to as a secondary pollutant. In the human body, ground-level ozone causes inflammation of the respiratory system, asthma, restricts the functioning of the lungs and affects physical performance.



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## Clean Air

is a project by nine European environmental organisations that fight for clean air in European cities. Despite the existing legislative framework and the citizens' right to clean air, continuing violations of air pollution limits remain a problem in many cities. Air pollution threatens health, environment and climate. It's time to take action!

[www.cleanair-europe.org](http://www.cleanair-europe.org)

Started in 2009, the associated campaign "Sootfree for the Climate" aims to reduce diesel soot emissions, which accelerate climate change and pose a threat to public health. To this day twelve European NGOs have joined the campaign.

[www.sootfreeclimate.org](http://www.sootfreeclimate.org)

a project by



Clean Air Action Group



THE DANISH ECOCOUNCIL



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associated campaign

