



National Ambient Air Quality Standard (NAAQS) for Ground-Level Ozone

The federal Clean Air Act requires U.S. EPA to set national ambient air quality standards for pollutants considered harmful to public health and the environment.

What is ozone?

Ozone (O₃) is a gaseous form of oxygen that has been linked to a variety of health issues, including:

- Respiratory system irritation – airway irritation, pain and coughing while inhaling
- Reduced lung function – wheezing and breathing difficulties
- Inflammation and damage to cells lining the lungs – much like a sunburn on the skin
- Aggravation of asthma or chronic lung diseases
- Increased susceptibility to respiratory illnesses like pneumonia and bronchitis
- Permanent lung damage caused by repeated exposure

When ozone levels are unhealthy, it can affect various groups of people. Active adults and children are at risk if they spend several hours of the day outside exercising and participating in various activities. In addition to children and active adults, people with asthma or other respiratory illnesses are also at risk. Everyone should be aware of their exposure because high concentrations can be dangerous to all. Ozone also can have detrimental environmental effects on ecosystems and plants.

How do I limit my exposure to ozone?

The most effective way to decrease your exposure during the warmer months of the year is to limit the amount of time spent outdoors. Limit the amount of time spent on a strenuous activity or choose another, less exhausting activity (for example, walk instead of jog). In addition, try to plan outdoor activities when ozone levels are lower, usually in the morning or evening hours.

Where does ozone come from?

Ozone is not directly emitted into the air, but instead is formed as a byproduct of the reaction of nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOCs) in the presence of sunlight.

Ozone exists in the upper and lower atmosphere; however, it acts very differently in each of these layers. A phrase to remember ozone's activity in the different atmospheric levels is "good up high, bad nearby." In the upper atmosphere, ozone occurs naturally and forms a protective layer around the earth, blocking out the sun's harmful rays. In the lower atmosphere, ground-level ozone poses a higher health threat.

NO_x, CO, and VOCs that are released from various sources, most commonly from chemical solvents, cleaning fluids, gasoline vapors, motor vehicle exhausts, and industrial emissions, react to form ground-level ozone. Ground-level ozone is commonly referred to as "smog." Sunlight and high temperatures aid in the creation of a harmful concentration of ozone in the air; therefore, ozone is often identified as a summertime air pollutant. Urban areas tend to have higher concentrations of ozone because of industrial and mobile vehicle activity; however, winds can carry NO_x and other ozone precursors hundreds of miles, causing ozone formation to occur in less populated regions as well.

What is the National Ambient Air Quality Standard (NAAQS) for ozone?

U.S. EPA has air quality standards for the following criteria pollutants: carbon monoxide, lead, nitrogen dioxide, particulate matter (PM₁₀ and PM_{2.5}), ozone, and sulfur dioxide. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

Ozone is measured in parts per million (ppm), which is a volume measure of air. The 2015 8-hour primary and

secondary national ambient air quality standard (NAAQS) for ozone is 0.070 ppm. To attain this standard, the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area must not exceed 0.070 ppm.

When an area does not meet the standard, it is classified as being in nonattainment. For ozone, there are different classifications of nonattainment, depending on how far above the standard the air quality monitoring data is. Ohio EPA submits data and detailed plans (called State Implementation Plans or SIPs) to U.S. EPA to demonstrate compliance and the ability to maintain compliance. Once an area has three years of data showing that it meets the standard, the State must petition U.S. EPA to reclassify it as being in attainment.

What is the current attainment status in Ohio?

On August 3, 2018, U.S. EPA designated three areas in Ohio as “marginal nonattainment” – the lowest classification – for the 2015 ozone NAAQS: Cincinnati, Cleveland and Columbus. Under the Clean Air Act Amendments, marginal areas have up to three years from designation to attain the standard (August 3, 2021). The Columbus area attained the standard and was redesignated to attainment on August 21, 2019. The Ohio portion of the Cincinnati area attained the standard and was redesignated to attainment on June 9, 2022.

The Cleveland nonattainment area did not meet the ozone standard by the marginal attainment date. Effective November 7, 2022, U.S. EPA “bumped-up” the Cleveland area to moderate nonattainment. A bump-up from marginal to moderate nonattainment triggers additional requirements under Clean Air Act (CAA). By January 1, 2023, Ohio EPA will submit a detailed plan to U.S. EPA describing how we expect to attain the ozone standard by the attainment date for moderate areas (August 3, 2024).

Is Ohio’s air quality worse in regard to ozone?

No! Air quality in Ohio has significantly improved over the past 30 years, including in the Cleveland area. In fact, Ohio was able to fully attain several tighter ozone standards over the years. However, despite the improvement in ozone levels, the Cleveland area failed to meet the standard by the date required and was therefore reclassified by U.S. EPA to a higher classification for the 2015 standard. This triggers additional requirements under the CAA which will help improve ozone even further.

How can I help to reduce ozone concentrations?

Ozone concentrations can be reduced by limiting emissions of the pollutants that work together to create ozone. You can reduce NO_x, CO, and VOCs emissions by:

- Choosing a cleaner commute – carpooling, public transportation, biking, walking
- Combine errands to reduce “cold starts” and try to limit extended idling
- Conserve electricity in your home and set your air conditioner at a higher temperature
- Mulch and compost leaves and yard waste instead of burning

Additional Information

- U.S. EPA Ozone Pollution - <https://www.epa.gov/ground-level-ozone-pollution>
- Ohio EPA 2015 Ozone Standard SIP - <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/state-implementation-plans/division-of-air-pollution-control-sip-2015>

Contact

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