

Ozone: “Good Up High, Bad Nearby”

Ozone is a very misunderstood molecule. Its presence in the upper atmosphere helps to preserve the very delicate balance of life on earth, yet its presence in the lower atmosphere and at ground level can cause serious health issues. It can also lead to significant molecular damage. “Good up high, bad nearby”

(<https://cfpub.epa.gov/airnow/index.cfm?action=gooduphigh.index>) is a phrase heard to characterize ozone. This discussion is the first in a series of briefs to explore ozone.

The element oxygen (symbol O) exists in nature in several different molecular forms. The predominant form is the molecule O₂. This is the kind of oxygen we breathe and is essential to life. The other molecular form is O₃, which is also known as ozone. Ozone is very reactive, which can have both positive and negative consequences. In the upper stratosphere, ozone is necessary for protecting life on earth as it intercepts incoming harmful UV radiation. At ground level, ozone is generated by electrical discharges, such as from lightning strikes and electrical motors. It is also generated by the reaction of nitric oxides (NO_x), which are common outdoor air pollutants, with VOCs in the presence of sunlight. Peak ozone generation occurs on sunny hot summer days, especially in high traffic areas where NO_x are abundant.

At ground level, ozone can destroy materials of construction and can damage crops, trees, and vegetation. Recently, this “reactive” nature of ozone has led to development of machines that can produce ozone to help eradicate indoor air pollutants, such as tobacco smoke and other harmful species that can exist indoors. However, the potential collateral damage caused by using ozonation must also be taken into account when remediating using ozone, a topic for future discussion. Clearly, the topic of ozone is a complex balance between “good” and “bad”. As always, the ultimate goal is for better understanding that will lead to better indoor air quality.

About Prism Analytical Technologies, Inc.

Prism Analytical Technologies, Inc. is a leading consultative air testing laboratory in the United States that is devoted to the chemical identification and analysis of contaminants in the air. We are a recognized leader in the development and deployment of ambient air testing methodologies for Fortune 100 and 500 companies, industrial hygienists, and environmental consultants. Prism's science-based technologies and wide range of air testing support help clients solve indoor air quality, process control, industrial, and environmental challenges.