

Air Emissions Glossary

Carbon Monoxide (CO)

Carbon monoxide is a colorless, odorless gas produced whenever incomplete fuel combustion occurs. In the United States, more than two-thirds of the carbon monoxide emissions come from transportation sources. In urban areas, motor vehicle contributions to carbon monoxide pollution can exceed ninety percent.

When inhaled, the gas forms carboxyhemoglobin, a compound that disrupts normal respiration by inhibiting the transfer of oxygen to specialized blood cells that transport the oxygen throughout the body. Symptoms from exposure include impairments in visual perception, manual dexterity, learning functions and the ability to perform complex tasks. Sensitive individuals, such as infants, the elderly or respiratory patients may be highly susceptible to acute symptoms of carbon monoxide poisoning.

Particulate Matter (PM₁₀ and PM_{2.5})

Particulate matter consists of airborne solid particles and liquid droplets. These particles are classified as "coarse" if they are smaller than 10 microns, or "fine" if they are smaller than 2.5 microns. Coarse airborne particles are produced during grinding operations, or from the physical disturbance of dust by natural air turbulence processes, such as wind. Fine particles can be a by product of fossil fuel combustion, such as diesel and bus engines.

Fine particles can easily reach remote lung areas, and their presence in the lungs is linked to serious respiratory ailments such as asthma, chronic bronchitis and aggravated coughing. Exposure to these particles may aggravate other medical conditions such as heart disease and emphysema and may cause premature death. In the environment, particulate matter contributes to diminished visibility and particle deposition (soiling).

Ozone (O₃)

Ozone is a chemically unstable molecule composed of three oxygen atoms. Ground level ozone is formed by sunlight and heat acting upon fuel combustion by products such as nitrogen oxides and hydrocarbons. Ozone occurs naturally in the upper atmosphere and shields the Earth from ultraviolet radiation. However, at ground level, ozone is a severe irritant and the primary component of "smog". In urban areas, at least half of the ozone producing components come from transportation sources such as automobiles. Because ozone formation is directly related to atmospheric temperatures, problematic ozone levels occur most frequently on hot summer afternoons.

Ozone exposure is linked to respiratory illnesses such as asthma and lung inflammation. Extended ozone exposure can exacerbate existing respiratory ailments such as chronic bronchitis and emphysema. Ozone pollution can severely damage vegetation including agricultural crops and forest habitats.

Nitrogen Oxides (NO_x)

Nitrogen oxides form when nitrogen and oxygen atoms chemically react inside the high pressure and temperature conditions in an engine. Nitrogen oxides are precursors for ozone, and in the environment, they contribute to the formation of acidic rain.

Hydrocarbons (HC) or Volatile Organic Compounds (VOC)

Hydrocarbon emissions are a product of partial fuel combustion, fuel evaporation and refueling losses caused by spillage and vapor leakage. Hydrocarbons react with nitrogen oxides and sunlight to form ozone. Some hydrocarbons are toxic and may be carcinogenic.