

Particulate Matter

Particulates, alternatively referred to as particulate matter (PM) or fine particles, are tiny particles of solid or liquid suspended in a gas. The major components of PM are sulfate, nitrates, ammonia, sodium chloride, carbon, mineral dust and water. Particulate matter (PM) includes dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires and natural windblown dust. Particles formed in the atmosphere by condensation or the transformation of emitted gases such as SO₂ and VOCs (Volatile Organic compounds) are also considered particulate matter.

When we use the word “aerosol” we mean the combination of both, particles and the gas to which they cling.

Sources of particulate matter can be manmade or natural. Some particulates occur naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation, and sea spray.

Human activities, such as the burning of fossil fuels in vehicles, power plants and various industrial processes (déjà vu?) also generate significant amounts of PM. Sulphur compounds react with other compounds in the atmosphere to form particulate matter or PM.

Why is the presence of Particulate matter dangerous to human health?

PM affects more people than any other pollutant. These particulates penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and can aggravate existing heart disease, leading to increased hospital admissions and even premature death.

Particulate matter (PM) can

Ø adversely affect human health. The effects of inhaling particulate matter are asthma, lung cancer, cardiovascular issues, and premature death. The smaller the PM, the greater its ability to penetrate deep inside our bodies. Some penetrate deep inside our arteries causing atherosclerosis or hardening of arteries which can lead to heart attacks. The finer PMs are easily inhaled, causing tissue damage, emphysema, bronchitis, and cardiovascular complications.

Ø damage materials

Ø clog stomata openings of plants and interfere with photosynthesis. This can stunt the growth of plants or even kill them.

Ø contribute to acid rain formation.

Ø form atmospheric haze that degrades visibility.

The most concentrated particulate matter pollution tends to be in densely populated metropolitan areas in developing countries. The primary cause is the burning of fossil fuels by transportation and industrial sources. Traffic exhaust is the single most serious preventable

cause of heart attack in the general public. Children, seniors, and individuals with pre-existing respiratory diseases are most susceptible to these health risks.

In developing countries, exposure to pollutants from indoor combustion of solid fuels on open fires or traditional stoves increases the risk of acute lower respiratory infections and associated mortality among young children; indoor air pollution from solid fuel use is also a major risk factor for chronic obstructive pulmonary disease and lung cancer among adults.