

outdoor dust

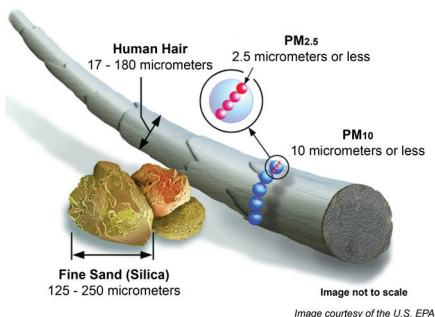
WHAT IS OUTDOOR DUST?

Atmospheric or outdoor dust is made of small particles (pieces) that can be carried through the air by wind over both short and very long distances. For example, dust particles from the Sahara Desert in Africa can reach the United States! Typically, smaller particles can travel high in the air and far away, while the larger ones settle back to the ground.

Dust particles are very small, ranging in size from less than one micrometer (one millionth of a meter) to 100 micrometers. They usually cannot be seen without a microscope.

Dust is also called “**particulate matter**” or “PM,” and can be described by its size:

- Particulate matter less than 10 micrometers across is called **PM₁₀**.
- Smaller particulate matter less than 2.5 micrometers is known as **PM_{2.5}** and is especially harmful to health because it can be inhaled all the way into the lungs.

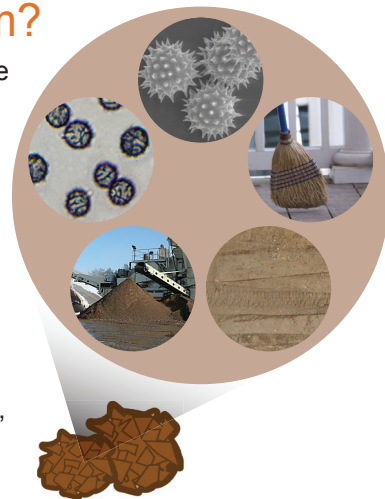


Outdoor dust can come from
eroded top soil
combustion
dirt roads
construction sites
industrial activities

Where does dust come from?

Dust can come from both natural and man-made sources. Areas with few plants can be a natural source of dust. Plants act as a windbreak and hold soil particles in place so they won't be carried away. Pollen and spores produced by plants are another natural source of dust that can be easily spread by the wind. When a lot of pollen is in the air, it can cause a haze seen by the naked eye.

Human activities can increase dust in the air in many ways. For example, rock crushing, drilling, demolition, shoveling, and sweeping can create dust. Driving on dirt roads and plowing of agricultural fields breaks up clumps of soil and grinds soil particles into smaller sizes, which can be lifted into the air without strong wind. Burning can result in very small particles of soot. Mining, mine tailings, and smelting are other human activities that create dust.



What are dust storms?

Dust storms can occur in small areas or over regions spanning thousands of square miles and can vary in intensity. Less intense dust storms produce a hazy effect over a large area. In very intense dust storms, visibility can be suddenly and drastically reduced to less than a few meters.

In drylands such as Arizona, an intense dust storm called a **haboob** can occur when the air contained in the towering clouds of a thunderstorm cools and is pushed down quickly to the surface. If this sudden downdraft is over a dust source, the winds pick up the soil, creating what looks like a wall of dust that is pushed away from the storm. The dust wall can be a mile high, many miles wide, and can travel many miles.

Smaller dust events can also be very intense. Localized high winds blowing continuously over a dust source cause “corridors” or “plumes” of dust. This kind of dust storm can be too small to identify from weather stations or satellites and can lower visibility down to just meters. Small dust events can also strike with little warning and last up to an hour or more. **Dust devils** are another form of a local, hard-to-detect but intense dust event that whirls dust up in the air.



Haboob dust storm in Phoenix, Arizona.
Photo credit: National Weather Service



Dust devil on old mine tailings.
Photo credit: Alex Valentin-Vargas



FACT!

Dust particles can serve as seeds that form cloud droplets and even ice crystals!

Ways to avoid and control outdoor dust

Visit the National Weather Service website to check for dust warnings in your area. Also, use your local **air quality forecast** (<http://goo.gl/mD3k2a>) to help protect your health. The forecast consists of six, color-coded air quality indexes that go from “good” to “hazardous”.

You can also do the following:

- Stay indoors during dust events. This is especially true for sensitive groups such as those with lung and breathing problems, the elderly, and children.
- Water areas that produce dust, such as dirt roads or dirt lots. Gravel, mulch, or wood chips can also be spread over surfaces.
- Windbreaks such as fences and trees can be placed along property lines.
- Plant vegetation on open areas around your home. Plants can help remove dust particles!
- Wet sweep or mop outdoor areas covered with dust.
- Protect your eyes, nose, and mouth when involved in outdoor activities that create dust (e.g., leaf blower or dirt bikes).

How is health affected by outdoor dust?

One of the major problems with dust is reduced visibility. Large amounts of dust can block/reflect light and bring visibility to zero, creating a dangerous situation for ground and air transportation. If you are caught in a dust storm while driving your vehicle, remember, “**Pull aside, stay alive.**” This means to get off the roadway, turn off all lights (to prevent other motorists behind you from thinking that you are in motion), and wait out the storm.

Dust may get into the eyes causing irritation or injury. Particles can also cause breathing issues and can make asthma and bronchitis more serious.

Other problems with inhaling dust have to do with what it contains. Lead and arsenic can attach to dust particles and enter the body. Even germs can hitch a ride on dust particles. In the American Southwest, the Valley Fever fungus attaches to soil and dust particles. When people or animals breathe in the Valley Fever fungus, they can get very sick.

How is outdoor dust regulated?

Each state is responsible for ensuring good air quality by presenting an “implementation plan” that outlines how standards will be achieved and maintained. Particulate matter is one of the six air pollutants for which the United States Environmental Protection Agency (US EPA) has set standards (**regulations**). These standards separate particulate matter into two groups that include PM₁₀ and PM_{2.5}. The US EPA works with state and local governments to put into action these standards. To learn more about these standards, visit: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>.

Particulate matter is a common air pollutant in Arizona. Maricopa, Pima, and Pinal counties have their own air pollution control programs while the AZ Department of Environmental Quality assists other counties. Air monitors gather air quality information and then this information is reviewed. If particulate matter samples are above the standards, then local and state agencies work together to develop a reduction plan. These agencies are also in charge of issuing dust permits, inspecting dust-producing activities, and responding to dust complaints.

Want to learn more about outdoor dust?

U.S. ENVIRONMENTAL PROTECTION AGENCY
www3.epa.gov/pm/

AIRNOW

www.airnow.gov/index.cfm?action=aqbasics.particle

PULL ASIDE, STAY ALIVE
www.pullasidestayalive.org/

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
www.azdeq.gov/environ/air/prevent/download/pm.pdf

PIMA DEPARTMENT OF ENVIRONMENTAL QUALITY
<http://webcms.pima.gov/cms/one.aspx?portalId=169&pageId=54362>

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