FACT SHEET

Fine Particle Pollution

What is fine particle pollution?

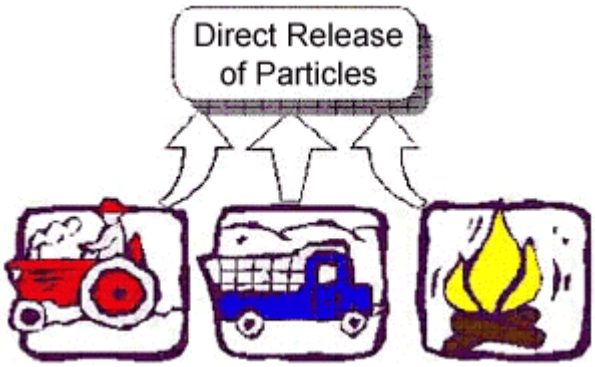
Fine particle pollution (soot) consists of microscopic particles in the air that result from car and truck exhaust, industrial emissions, dirt, dust, smoke, road salt, water vapor, and many other sources.

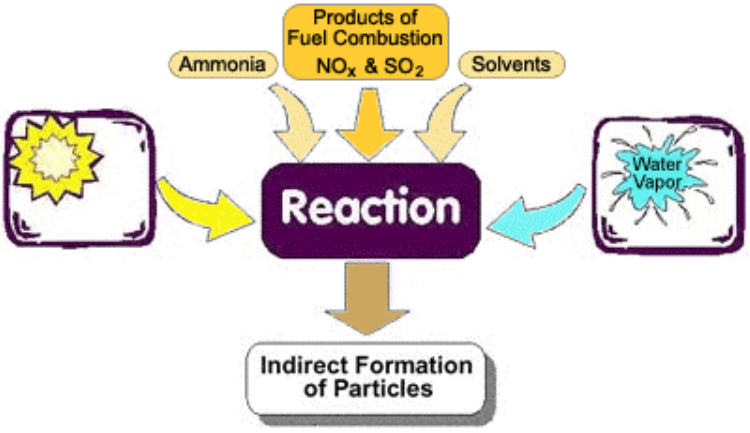
It is also visible as haze.

Fine particles are emitted directly from sources or are formed indirectly from the combination of pollutants, such as oxides of nitrogen (NOx), sulfur oxides (SOx), volatile organic compounds (VOCs), and ammonia.

The fine particles that are emitted directly into the air come from a variety of sources such as cars, trucks, buses, industrial facilities, power plants, construction sites, tilled fields, trash burning, and wood-burning stoves, fireplaces and backyard fire pits.

Fine particles formed indirectly result when gases from burning fuels react with other chemicals and water in the atmosphere. Many combustion sources, such as motor vehicles and power plants, emit fine particles directly and also emit the precursor pollutants that form fine particles indirectly.





How does fine particle pollution affect Northeast Ohio?

Fine particle pollution is the main ingredient of haze, soot, smoke, and airborne dust. These airborne particles present serious air quality problems in many areas of the United States, including Northeast Ohio. Currently, seven counties in Northeast Ohio fail to meet the federal health standards for particle pollution. The counties include Cuyahoga, Lake, Lorain, Medina, Portage, and Summit and a portion of Ashtabula.

In the American Lung Association "State of the Air 2005" report, the Cleveland-Akron-Elyria area ranked eighth worst for fine particle pollution compared to other regions in the United States. http://lungaction.org/reports/stateoftheair2005.html

What are the health effects of fine particle pollution?

The size of particles is directly linked to their potential to cause health problems. Small particles of 2.5 micrometers or less in diameter ($PM_{2.5}$) pose the greatest problems because they can bypass respiratory defenses and get imbedded deep into lungs, and some may even get into the bloodstream. Exposure to such particles can affect both lung and heart functions.

Numerous scientific studies have linked particle pollution exposure to a variety of problems including:

- increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing
- decreased lung function
- aggravated asthma
- development of chronic bronchitis
- irregular heartbeat
- nonfatal heart attacks
- increased hospital admissions for heart or lung disease
- premature death in people with heart or lung disease.

(Source: The Particle Pollution Report, United States Environmental Protection Agency, Dec. 2004, EPA 454-R-04-002)

How does fine particle pollution affect the quality of life in Northeast Ohio?

Fine particle pollution has many adverse affects, for example:

Visibility reduction: Fine particles are the major cause of reduced visibility (haze) in parts of the United States, including many treasured national parks and wilderness areas. For more information about visibility, visit www.epa.gov/visibility.

Environmental damage: Fine particles can be carried over long distances by wind and then settle on ground or water. The effects of this settling include making lakes and streams acidic; changing the nutrient balance in coastal waters and large river basins; depleting the nutrients in soil; damaging sensitive forests and farm crops; and affecting the diversity of ecosystems.

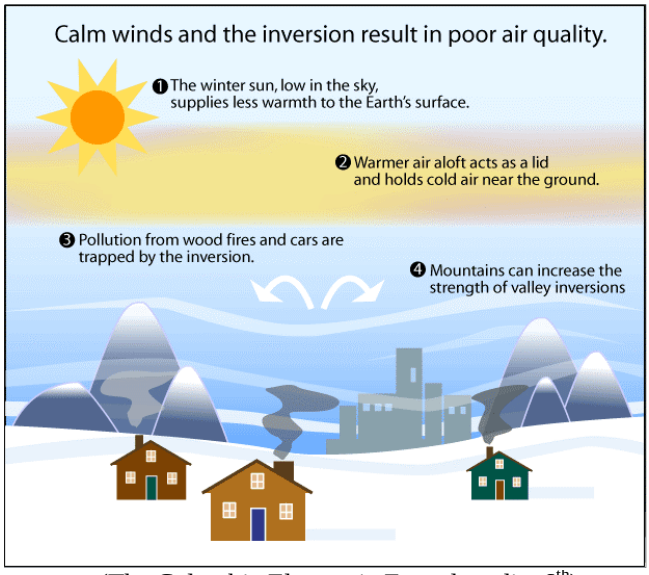
Aesthetic damage: Fine particle pollution can stain and damage stone and other materials, including culturally important objects such as statues and monuments. For more information, visit www.epa.gov/airmarkets/acidrain/effects/index.html.

What causes high levels of fine particle pollution?

Episodes of fine particle pollution can occur all year long, unlike ozone episodes, which typically occur during the summer months.

Weather and geography play an intricate role in air pollution.

Temperature inversions: A temperature inversion occurs when warm air traps cold air closer to the ground. Temperature inversions may occur during the passage of a cold front or may result from the stacking of warm air on top of colder air.



(The Columbia Electronic Encyclopedia, 6th)

During a temperature inversion, air pollution released into the atmosphere's lowest layer is trapped close to the ground. This pollution will remain trapped until weather conditions change, usually with the onset of strong winds. Episodes of fine particle pollution may result from high-pressure systems that are often combined with temperature inversion conditions and low wind speeds.

Fine particle pollution is more localized, while ground-level ozone can be transported by the prevailing wind. Fine particles do not have the capacity to travel the distances that ozone molecules do. However, fine particles may be suspended in the air for days under certain weather conditions.

How is fine particle pollution regulated?

The federal Clean Air Act regulates particulate matter. In December 2004, Northeast Ohio was designated as being in "nonattainment" of the new health standard set for fine particles. The federal standards are referred to as the National Ambient Air Quality Standards (NAAQS), and they are set by the United States Environmental Protection Agency based on scientific review of health studies. The Ohio EPA and the local air agencies provide local enforcement of these rules.

A 24-hour average of 40 micrograms per cubic meter (40 $\mu g/m^3$) of fine particles is considered "Unhealthy for Sensitive Groups" and a 24-hour average of 65 $\mu g/m^3$ is determined "Unhealthy" for the entire population. Particle monitors exist throughout Northeast Ohio, some of which have the ability to take readings every hour. A website has been established where Northeast Ohio residents can "Check Today's Air Quality" by viewing a map of current monitor reading at www.noaca.org/fp3.html.

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If Northeast Ohio fails to meet these standards by 2010, it may face sanctions such as stricter requirements on new businesses and loss of federal highway funds. For more information on how the region is planning to reach "attainment," visit www.noaca.org/sipplan.html.

What can Northeast Ohio do to reduce fine particle pollution?

Here are a few things individuals, businesses, and other organizations can do immediately to reduce fine particle pollution:

- Avoid unnecessary fuel consumption.
- Use public transportation, bicycling, walking, and fuel-efficient vehicles.
- Combine errands to eliminate wasted fuel and time.
- Carpool, either informally or through RIDESHARE! at 1-800-825-RIDE.
- **Avoid idling. Turn off the key and be idle-free!**
- For diesel-powered vehicles, consider filling up with biodiesel.
- For diesel trucks and buses, install particulate filters.
- Drive slowly on unpaved roads and other dirt surfaces.
- Limit using wood stoves and fireplaces.
- Consider using natural gas logs or burn only dry, seasoned wood.
- Avoid using leaf blowers and other dust-producing equipment.
- Compost leaves, twigs, and other yard waste instead of burning them.
- Reduce pollution from electric power plants - turn off lights and appliances when not in use.
- Keep your car, boat, and other engines properly tuned. Avoid engines that smoke.
- Avoid vigorous physical activity on days that have poor air quality.
- Check Today's Air Quality at www.noaca.org/fp3.html
- Get involved with NOACA's Fine Particle Pollution Program by receiving free email health advisories through www.noaca.org/fp3.html

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