

Fugitive dust emissions management and best practices

What is fugitive dust?

Fugitive dust refers to particulate matter that has become airborne by wind or human activities and is not emitted from a stack, chimney, or vent. Dust, also known as particulate matter (PM), is made up of solid particles in the air that consist primarily of dirt and soil but can also contain ash, soot, salts, pollen, heavy metals, asbestos, pesticides, and other materials. Fugitive dust is a concern due to its negative impacts on productivity, public health, the environment and has been linked to several health and environmental issues as outlined below:

Health & environmental effects

The Environmental Protection Agency (EPA) estimates 25 million tons of fugitive dust emissions per year; the majority from unpaved roads and miscellaneous agricultural lands which cause:

- Reduce visibility
- Reduce plant growth
- Health concerns
- Nuisance

Because fugitive dust particles are very small and can be easily inhaled, they can enter the respiratory system and increase the risk of respiratory and cardiovascular effects particularly in young children, the elderly, and persons with respiratory problems resulting in serious breathing problems (e.g., lung cancer, Asthma, Chronic bronchitis) etc. Additional information can be found here:

www.pca.state.mn.us/pollutants-and-contaminants/fine-particles

It has been scientifically proven that fugitive dust has the potential to adversely affect the environment by causing:

- Regional haze which impairs visibility.
- Reduced plant's ability to photosynthesize.
- Dust migration into surface water causing nutrient loading of the surface water ecosystem communities.

Sources of fugitive dust

The primary sources of fugitive dust emissions include agricultural and construction activities and unpaved roads. Below are further examples of activities that would create fugitive dust:

- Earth-moving, crushing and screening activities.
- Discharging dry materials where exhaust is not directed to a collection device, such as to a baghouse, cyclone, or wet scrubber.
- Storing piles of materials on site, like grain, coal, sand, or scrap.

Abrasive blasting used to remove paint and other contaminants from a surface.

This is not a full list of the possible activities that create fugitive dust as there are many other possible sources.

What are the requirements for controlling fugitive dust?

Minnesota requires any business or individual creating fugitive dust take all reasonable measures to control the dust and keep them from escaping into the environment. See [Minn. R. 7011.0150](#). One way to do that is to develop a fugitive dust control plan and follow best management practices.

Prevention and best management practices of fugitive dust

Fugitive dust management is beneficial for the environment, businesses, and surrounding communities. To minimize dust, consider the following best practices:

Storage piles

- Keep stockpiles stabilized and fully covered when not in use.
- Monitor the moisture content and size of exposed material.
- Install wind breaks or barriers around storage piles.
- Regularly apply water or other approved dust suppressants.

Material transfer points

- Limit the material drop distance and keep the pile height as low as possible.
- Install and maintain dust curtains around material transfer points to reduce air movement and isolate dust from forming.
- Enclose conveyor belts and use belt wipers when possible.
- Spray water or other approved dust suppressant during material transfer.
- Clean up spillage at conveyor transfer points.

Paved roads

- Frequently wash, sweep, or vacuum streets to control particulate emissions.
- Establish speed limit for vehicles on site, at most 10 mph.

Unpaved roads

- Pave unpaved roads. This option is expensive and is probably most applicable to high volume (more than a few hundred passes per day).
- Reduce silt content by adding gravel to unpaved surfaces.
- Limit truck speeds. The heavier and faster a truck is moving the more dust it creates. Set maximum speeds for drivers to follow, at most 5 mph.
- Apply water or other approved dust suppressants on a regular basis to prevent dust.

Grain elevator - unloading and loading

- Enclose the receiving area and restrict the flow of the grain when the receiving container is empty or only partly full.
- Limit material handling during high winds.
- Use approved dust suppressants on grain at receiving stations.
- Use aeration fans as little as possible when loading grain into storage bins.

Fugitive dust control plan

A dust control plan will help your facility prevent and manage fugitive dust. Any facility with the requirement in their permit must prepare and follow a fugitive dust plan. Below are key concepts to include in your plan:

- Identify all sources of fugitive dust and briefly describe the measures and practices employed to control fugitive emissions at each source.
- Document operating and maintenance procedures to verify the working condition of any control measures and keep records of any maintenance conducted.
- Develop a facility layout showing the location of each potential source of fugitive dust.
- Report fugitive dust emissions to the MPCA Air Compliance Unit.
- Keep records of all monitoring, inspections, maintenance and completed work practices (including the name of the person conducting the activity), weather conditions, time of observation, area or operation observed, and corrective actions taken.
- Train staff responsible for implementing the fugitive dust control plan and specify training contents in the plan. See link for details: [Fugitive Dust Control Measures and Best Practices \(epa.gov\)](https://www.epa.gov/fugitive-dust-control-measures-and-best-practices)

Dust control treatments

Studies have shown that dust suppressants have been used to minimize fugitive dust, control erosion, and reduce maintenance costs on unpaved drives and lots. Some common dust control treatments and applications include:

Surface treatment - This control technique requires reapplication and falls into the two main categories (1) Wet suppression (i.e., watering, possibly with wetting agent or other additives), which keeps the surface wet to control emissions, and (2) Chemical stabilization- which attempts to change the physical and the emissions characteristics of the roadway. However, continuous management is required to prevent dust. For example, applying water keeps surfaces wet to control emissions. But the effectiveness of unpaved road watering depends on:

- How much water per unit area is applied to the road.
- Frequency of reapplication.
- Traffic volume during that period.
- Prevailing weather conditions during the period.

As an example - The most common dust control measure at construction sites and unpaved roads is sprinkling/irrigation which involves spraying the ground surface with water until it is moist.

Chemical stabilization -You can also use alternative dust control treatments including, vegetable oils, acrylic polymers, petroleum oils (not used oil), or brines. However, there are drawbacks of using these such as oxygen depletion, ammonia, sulfates, chloride toxicity and heavy metals impacting waters. If you still decide to use a liquid dust control treatment, make sure to follow these general guidelines:

- Ensure that dust suppressants do not enter and contaminate waterbodies, including surface water and groundwater wetlands, and there is no runoff. Chloride containing dust suppressants will eventually make its way into surface waters or groundwater. It is a permanent pollutant that will not degrade over time and is toxic to freshwater aquatic life. To minimize the impact, use the Minnesota Pollution Control Agency (MPCA) [Smart Salting tool](#) (SST), Dust Control section for guidance on best practices. The SST is a free web-based tool hosted by the MPCA to assist organizations with assessing and reducing salt use during winter maintenance and dust control activities. The goal is for the SST to be used as a resource to help inform necessary decisions for improving winter maintenance and dust control programs for reduced salt use. Consider non-chloride materials near surface waters or drinking water wells. To learn more about the impacts of chloride on water resources visit the MPCA's Chloride website: [Chloride | Minnesota Pollution Control Agency \(state.mn.us\)](#)
- Know all the ingredients and health effects of the dust control treatment before using it.

- Fully understand the frequency of reapplication and the amount of treatment required.
- Document the name of the chemical dust suppressant used, the proposed method of application and frequency, daily average and maximum rates of use, and the date of MPCA approval. See link for details: [Dust Control Treatments for Roads and Surfaces \(state.mn.us\)](https://state.mn.us). Many dust control treatments can cause surface or ground water pollution for which you may be liable. You may want to consider the use of dust control measures other than treatments as much as possible.
- Ensure proper storage of chemicals- There are specific requirements for proper storage of other regulated substance. Guidance and regulation can be found in this factsheet: www.pca.state.mn.us/sites/default/files/p-tr1-12.pdf

Reporting

Air Emissions permitted facilities whose dust exceeds either air permit limits or ambient air limits for particulate matter can submit a Deviation Reporting Form (DRF-2) ([aq-f6-drf2](#)) to report this excess emission to MPCA Air Compliance.

Some sources are required to report fugitive dust emissions through emission inventory by April 1st. Facilities that do not have an air permit can submit an incident report to a duty officer if there is an incident that creates excess fugitive dust. Facilities do not need an air permit to submit a duty officer report.

For more information

Guidance and requirements in this handout were compiled from [Minn. R. 7011.0150](#). Visit the Office of the Revisor of Statutes at www.revisor.mn.gov/pubs to review statutes and rules. For confidential assistance on regulatory and pollution prevention matters contact the MPCA Small Business Environmental Assistance Program at: 651-282-6143 or e-mail smallbizhelp.pca@state.mn.us