What are Visible Emissions?

Smoke and dust are the most common types of visible emissions. Visible emissions are comprised of a variety of particulate matter (PM) ranging in size from 0.1 to 200 micrometers (compared to the average human hair, which is 70 micrometers in diameter). Particles are categorized as one of the following:

- Smoke
- Dust
- Fumes
- Soot
- Fly ash
- Liquid droplets

A wide range of industries produce visible emissions, which are introduced into the atmosphere by sources such as stacks, vents, and conveyor lines.

Particles also are formed in the atmosphere by condensation or transformation of emitted gases—such as sulfur dioxide, nitrogen oxides, and volatile organic compounds—into tiny droplets.

Inhaled Particles Can Be Hazardous to Your Health

Major human health concerns from inhaling visible emissions include effects on breathing and respiratory functions, aggravation of existing respiratory and cariovascular disease, alterations in the body's defense systems against foreign materials, damage to lung tissue, carcinogenesis, and premature death.

Particulate matter also may injure crops, trees, and shrubs and may damage various surfaces, such as metal and fabrics. Fine particles impair visibility by scattering light and reducing the visual range in urban, rural, and wilderness areas.

This brochure provides a summary of visible emissions requirements and is not intended to be all-inclusive. Detailed requirements are outlined in DEQ's "Rules for the Control of Air Pollution in Idaho" (IDAPA 58.01.01.625).

For More Information

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Questions?

For more information and tools on how to comply, contact DEQ's Air Quality Division at (208) 373-0502 or visit DEQ's website at *www.deq.idaho.gov/visible-emissions.*

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Air Quality in Idaho

Measuring Visible Emissions at Your Facility

Idaho Department of Environmental Quality
www.deq.idaho.gov

How Are Visible Emissions Measured?

The Ringelmann Chart was developed in the late 1800s and became one of the first tools used to measure visible emissions. Introduced into the United States in 1897, it was soon accepted as the standard measure of black smoke density and later adapted for gray, white, and other colors of smoke plumes. This tool became the basis for many city, state, and federal regulations on smoke density limitations. The Ringelmann Chart is based on the premise that the darker the plume, the more particles are present to block the light and reduce visibility.

Plume opacity is measured in percent: the greater the opacity, the more the background behind the plume is obscured and the less the light can come through. If none of the background is obscured, opacity is 0%. If the entire background is obscured, opacity is 100%.

EPA Reference Method 9

EPA Reference Method 9 is found in 40 CFR Part 60, Appendix A. It was adopted as a visible emissions inspection method in an effort to standardize the training and certification of observers and to ensure that reliable and repeatable opacity observations could be conducted anywhere in the United States.

Idaho Visible Emissions Limit

Idaho's methods for determining opacity are found in DEQ's *Procedures Manual for Air Pollution Control* (1986). These procedures are nearly identical to those contained in EPA Reference Method 9. Both describe the requirements for training and testing of opacity observers as well as steps to follow and data to record while documenting an observation.

The major differences between Idaho's method for determining opacity and Method 9 are the minimum number of readings that must be taken during an evaluation (30 in lieu of 24) and how opacity exceedances are calculated.

Different standards apply to six exempted sources. See the rules for more information about these sources. Additionally, more stringent visible emissions standards may apply to sources subject to Federal New Source Performance Standards found in 40 CFR Part 60.

Visible Emissions Observer Training

Each spring and fall, EPA-certified Visible Emission Evaluation (VEE) training and certification is offered in Boise and Coeur d'Alene to state and industry personnel in a 3-day course. As a "smoke reader," the observer is required by Method 9 and state policy to recertify every 6 months. For more information about this training, contact DEQ's Air Quality Division at (208) 373-0502.

What Constitutes a Visible Emissions Violation in Idaho?

Businesses that generate visible emissions can follow these steps to assess compliance with Idaho's visible emissions standard:

Step 1: Using Method 9, record a minimum of 30 opacity readings.

Step 2: Count the number of readings in excess of the percent opacity limitation (in most cases, 20%).

Step 3: Divide this number by four (each reading represents 15 seconds) to find the number of minutes in excess of the percent opacity limitation.

Step 4: If the opacity limit has not been exceeded for more than 3 minutes, no violation has occurred.

Exceptions
Because Method 9 calculates opacity differently than the Idaho rule, sources subject to federal New Source Performance Standards must calculate opacity as described above and as specified in Method 9.

According to Method 9, a violation has occurred if the *average* of any group of 24 *consecutive* readings (6 minutes) in a 1-hour period exceeds the standard.

Consequences of Noncompliance

Failure to comply with the visible emissions standard may result in enforcement action by DEQ with possible penalties assessed.