



Air Quality in Idaho: A Guide to Visible Emissions Evaluations

Introduction

Idaho's methods for determining opacity are found in the Procedures Manual for Air Pollution Control (1986). These procedures are nearly identical to those contained in EPA Reference Method 9, which is found in 40 CFR Part 60, Appendix A. This method has been adopted throughout the country 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 can be conducted anywhere in the United States.

The major difference between Idaho's method for making opacity determinations and Method 9 is how opacity exceedances are calculated.

Following is a summary of visible emissions certification requirements and required observation techniques. It is not intended to be all-inclusive. Detailed requirements are found in Method 9 at <http://www.epa.gov/ttn/emc/promgate/m-09.pdf>.

Visible Emissions Certification Requirements

Visible emissions certification has two components:

- a one-day classroom session (initial certification only); and
- a field certification test

Initial certification by the state of Idaho requires new visible emissions observers to attend a one-day classroom session to gain the following:

- knowledge of the history of opacity observation;
- training in proper recording and presentation of data; and
- updates on new opacity observation techniques and ideas.

After successful completion of the classroom session, new observers and those needing recertification must take a field certification test.

The field certification test demonstrates the observer's ability to assign opacity readings in 5% increments to 25 different black plumes and 25 different white plumes, with an error not to exceed 15% opacity on any one reading and an average error not to exceed 7.5% opacity in each category.

The certification is valid for six months, after which the observer must recertify by successfully repeating the field certification test.

Visible Emissions Certification Procedure

The certification test consists of showing the observer a complete run of 50 smoke plumes (25 black and 25 white) generated by a smoke generator. Plumes within each set of 25 black and 25 white runs are presented in random order. The observer assigns an opacity value to each plume and records his observation on provided forms. At the completion of each run of 50 readings, the score of the observer is determined. Once the field test is completed successfully, the observer is certified as a visible emissions observer. This certification is valid for six months.

If the observer fails to qualify, the complete run of 50 readings must be repeated until certification is achieved.

Visible Emission Observation Techniques (Requirements)

After obtaining certification, the observer is qualified to conduct field visible emissions evaluations. Following is a summary of observation techniques that must be followed according to Method 9.

Observer Position

The observer must:

- Stand at a distance that provides a clear view of the emissions with the sun orientated in the 140° sector to his back. (If the observer faces the emission/viewing point and places the point of a pencil on the sun location line of the visible emission observation form such that the shadow crosses the observer's position, the sun location must be within the 140° sector of the line. If the observer ensures that the emission point is north of the observation point, this requirement should be satisfied. This is a requirement of the method and must be followed even during cloudy or overcast weather conditions. The observer should avoid conducting an observation between 11 a.m. and 1 p.m. when the sun is usually in a position where it cannot be located in the 140° sector to the observer's back, even during overcast or cloudy weather conditions.)
- Make observations from a position perpendicular to the plume direction.
- When observing opacity of emissions from rectangular outlets (e.g. roof monitors, open baghouses, noncircular stacks), the observer's position should be approximately perpendicular to the longer axis of the outlet.
- The observer's line of sight should not include more than one plume at a time when multiple stacks are involved. If more than one plume is visible, make sure that the observation is conducted on a single plume, not a combined plume. If the plumes cannot be distinguished from each other, discontinue reading the plume until they are clearly separated, or wait until a single plume is visible before continuing the observation.

It is important to be able to see the stack outlet. The preferred reading distance is no closer than three stack heights and no further than one-quarter of a mile from the stack. This is a recommendation only. If the viewer can clearly distinguish a plume from a greater distance, a valid reading is possible.

Field Record

The observer must record the following information on the visible emissions evaluation form:

- name of the plant
- emission location
- type of facility
- observer's name and affiliation
- date and time
- estimated distance to the emission location
- approximate wind direction and speed
- description of the sky condition (presence and color of clouds)
- plume background

Opacity Observations

Opacity observations must be conducted as follows:

- Observations must be made at the point of greatest opacity in that portion of the plume where condensed water vapor is not present.
- The observer must not look continuously at the plume, but instead observe the plume momentarily at 15-second intervals.
- When condensed water vapor is present within the plume as it emerges from the emission outlet (attached steam plume), opacity observations must be made beyond the point in the plume at which condensed water vapor is no longer visible. The observer must record the approximate distance from the emission outlet to the point in the plume at which the observations are made.
- When water vapor in the plume condenses and becomes visible at a distinct distance from the emission outlet (detached steam plume), the opacity of emissions should be evaluated at the emissions outlet prior to the condensation of water vapor and the formation of the steam plume.

Other considerations:

- A clearly visible background of contrasting color results in greatest reading accuracy.
- The best viewing spot is usually within one stack diameter above the stack exit. This spot is where the plume is densest and the plume width is approximately equal to the stack diameter.

Recording Observations

- Opacity observations must be recorded to the nearest 5% at 15-second intervals on an observational record.
- Recording of a minimum of 30 readings (7.5 minutes) is required by the Idaho method when making opacity observations.

Calculating Opacity

To determine compliance with the Idaho visible emissions standard, calculate opacity as follows:

Step 1: Count the number of readings in excess of the percent opacity limitation (in most cases, 20%).

Step 2: Divide this number by four (each reading represents 15 seconds) to find the number of minutes in excess of the percent opacity limitation.

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

Exceptions

Because Method 9 calculates opacity differently than Idaho methods, 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** (six minutes) in a one-hour period exceeds the standard.

Idaho Visible Emissions Limit

In Idaho, visible emissions from any point of emission cannot exceed 20% opacity for more than three minutes in any 60-minute period. *Rules for Control of Air Pollution in Idaho*, IDAPA 58.01.01.625. (Different standards apply to six types of 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.)