

RULES OF THUMB

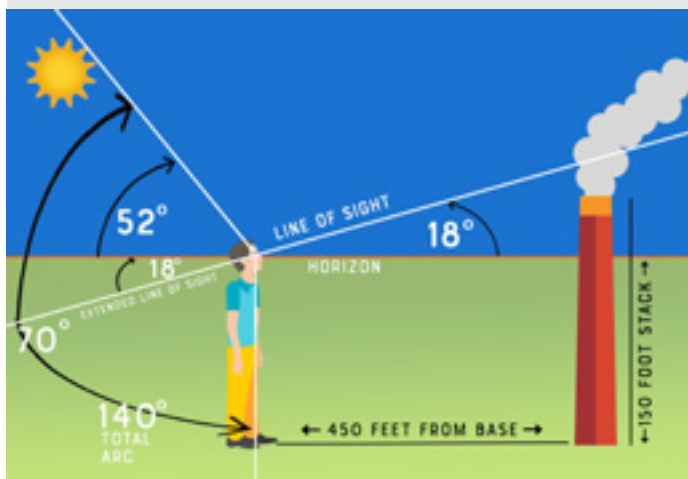
RULES OF THUMB FOR VEO

The following guidelines are used when instructing students on performing opacity readings:

- The observer should stand at a distance from the stack about three times the height of the stack.
- The observer's line of sight shall be approximately perpendicular to the track of the plume. This places the observer in a position that causes them to look up from the horizon by about 18° (within the 20° approximation).

Recall the Method 9 requirement:

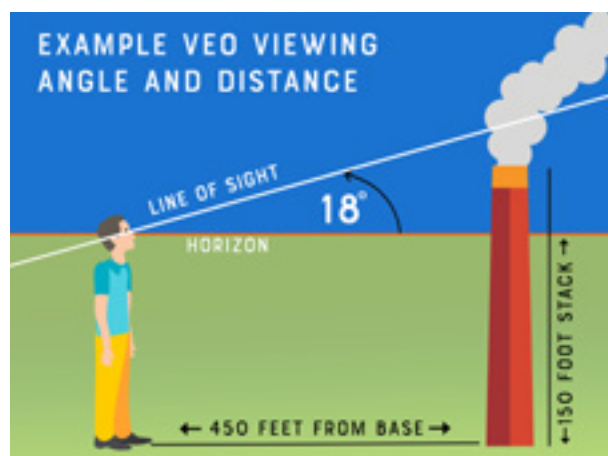
The angle created by the line of sight of the observer and the line from the sun to the observer must be at least 110°. This places the sun in the 140° cone-shaped sector to the observer's back. Sun angle has both horizontal and vertical components, and both must be reviewed.



EXAMPLE

EXAMPLE VEO OBSERVATION

- For a plume that is being observed 150 feet above the ground, the observer should stand about 450 feet away.
- The observer typically is looking at the stack at about 18° degree angle from the horizon.



Typical positioning creates a line of sight where a sector 52° above and 88° degrees below the horizon is established by the extended line of site (see diagram, right).

NOTE THE FOLLOWING:

- For proper sun position, the sun must be within this sector (52° + 88° = 140°).
- If the observer is looking at an 18° angle, the sun can be AT MOST 52° above the horizon.

In Seattle, on May 25, the sun rises above 52° at about 10:45 AM and does not drop below 52° until about 3:30 PM. *Therefore, observations made during that time interval have the sun out of the required location.*