

3.21 Equipment Leaks (Fugitive Emission Sources)

3.21.2 Applicability and Designation of Sources

- (a) The provisions of this source category apply to each of the following sources that are intended to operate in volatile hazardous air pollutant (VHAP)¹ service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, flanges and other connectors, product accumulator vessels, and control devices or systems required by 40CFR61, Subpart V.
- (b) The provisions of this source category apply to the sources listed in paragraph (a) after the date of promulgation of a specific subpart in Title 40 of the Code of Federal Regulations, Part 61, or as may otherwise be required by the Director.

3.21.2 Test Methods and Procedures

- (a) Each owner or operator subject to the provisions of this source category shall comply with the test methods and procedures requirements provided in this section.
- (b) Monitoring as required for this source category and other source categories where this section is referenced shall comply with the following requirements:
 - (1) Monitoring shall comply with Method 21.
 - (2) The detection instrument shall meet the performance criteria of Method 21.
 - (3) The instrument shall be calibrated before use on each day of its use by the procedures specified in Method 21.
 - (4) Calibration gases shall be:
 - (i) Zero air (less than 3 ppm of hydrocarbon in air); and
 - (ii) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 ppm methane or n-hexane.
 - (5) The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Method 21.
- (c) When equipment is tested for compliance with or monitored for no detectable emissions, the owner or operator shall comply with the following requirements:
 - (1) The requirements of paragraphs (b)(1)-(4) shall apply.
 - (2) The background level shall be determined, as set forth in Reference Method 21.
 - (3) The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Method 21.
 - (4) The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared with 655 ppm for determining compliance.

- (d) (1) Each piece of equipment within a process unit that can conceivably contain equipment in VHAP service is presumed to be in VHAP service unless an owner or operator demonstrates that the piece of equipment is not in VHAP service. For a piece of equipment to be considered not in VHAP service, it must be determined that the percent VHAP content can be reasonably expected never to exceed 10 percent by weight. For purposes of determining the percent VHAP content of the process fluid that is contained in or contacts equipment, procedures that conform to the methods described in ASTM Method D-2267 (incorporated by the reference as specified in Section 1.6) shall be used.
- (2) (i) An owner or operator may use engineering judgment rather than the procedures in paragraph (d)(1) of this section to demonstrate that the percent VHAP content does not exceed 10 percent by weight, provided that the engineering judgment demonstrates that the VHAP content clearly does not exceed 10 percent by weight. When an owner or operator and the Director do not agree on whether a piece of equipment is not in VHAP service, however, the procedures in paragraph (d)(1) of this section shall be used to resolve the disagreement.
- (ii) If an owner or operator determines that a piece of equipment is in VHAP service, the determination can be revised only after following the procedures in paragraph (d)(1) of this section.
- (3) Samples used in determining the percent VHAP content shall be representative of the process fluid that is contained in or contacts the equipment or the gas being combusted in the flare.
- (e) (1) Method 22 shall be used to determine compliance of flares with the visible emission provisions of this source category.
- (2) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.
- (3) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K \left(\sum_{i=1}^n C_i H_i \right)$$

Where:

- H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C.
- K = Constant, 1.740×10^7 (1/ppm) (g-mole/scm) (MJ/kcal) where standard temperature for (g-mole/scm) is 20°C.
- C_i = Concentration of sample component i in ppm, as measured by Reference Method 18 of Appendix A of 40 FR Part 60 and ASTM D2504-67 (reapproved 1977) (incorporated by reference as specified in Section 1.6).

H_i = Net heat of combustion of sample component i , kcal/g-mole. The heats of combustion may be determined using ASTM D2382-76 (incorporated by reference as specified in Section 1.6) if published values are not available or cannot be calculated.

(4) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Method 2, 2A, 2C, or 2D, as appropriate, by the unobstructed (free) cross section area of the flare tip.

(5) The maximum permitted velocity, V_{max} , for air-assisted flares shall be determined by the following equation:

$$V_{max} = 8.76 + 0.7084(H_T)$$

Where:

V_{max} = Maximum permitted velocity, m/sec.

8.706 = Constant.

0.7084 = Constant.

H_T = The net heating value as determined in paragraph (e)(3) of this section.

¹"In VHAP service" means that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight a volatile hazardous air pollutant (VHAP) as determined according to the provisions of Section 3.21.2(d). The provisions of Section 3.21.2(d) also specify how to determine that a piece of equipment is not in VHAP service.

²Code of Federal Regulations, Title 40, Part 61.