§ 89.308 Sampling system requirements for gaseous emissions.

(a) For each component (pump, sample line section, filters, and so forth) in the heated portion of the sampling system that has a separate source of power or heating element, use engineering judgment to locate the coolest portion of that component and monitor the temperature at that location. If several components are within an oven, then only the surface temperature of the component with the largest thermal mass and the oven temperature need be measured.
(b) If water is removed by condensation, the sample gas temperature shall be monitored within the water trap or the sample dewpoint shall be monitored downstream. In either case, the indicated temperature shall not exceed 7 °C.

§ 89.309 Analyzers required for gaseous emissions.

(a) Analyzers. The following instruments are required for analyzing the measured gases:

(1) Carbon Monoxide (CO) analysis. (i) The carbon monoxide analyzer must be of the non-dispersive infrared (NDIR) absorption type.
(ii) The use of linearizing circuits is permitted.
(2) Carbon Dioxide (CO₂) analysis. (i) The carbon dioxide analyzer must be of the non-dispersive infrared (NDIR) absorption type.
(ii) The use of linearizing circuits is permitted.
(3) Hydrocarbon (HC) analysis. (i) The hydrocarbon analyzer must be of the heated flame ionization (HFID) type.
(ii) If the temperature of the exhaust gas at the sample probe is below 190 °C, the temperature of the valves, pipework, and so forth, must be controlled so as to maintain a wall temperature of 190 °C ±11 °C. If the temperature of the exhaust gas at the sample probe is above 190 °C, the temperature of the valves, pipework, and so forth, must be controlled so as to maintain a wall temperature greater than 180 °C.
(iii) The FID oven must be capable of maintaining temperature within 5.5 °C of the set point.
(iv) Fuel and burner air must conform to the specifications in §89.312.
(v) The percent of oxygen interference must be less than 3 percent, as specified in §89.319(d).
(5) Oxides of nitrogen (NOₓ) analysis. (i) This analysis device must consist of the subsequent items, following the sample probe, in the given order:
(A) Pipework, valves, and so forth, controlled so as to maintain a wall temperature above 60 °C.
(a) Measurement accuracy—general. The analyzers must have a measuring range which allows them to measure the concentrations of the exhaust gas sample pollutants with the accuracies shown in Table 3 in Appendix A of this subpart.

(1) Response time. As necessary, measure and account for the response time of the analyzer.

(2) Precision. The precision of the analyzer must be, at worst, ±1 percent of full-scale concentration for each range used at or above 100 ppm (or ppmC) or ±2 percent for each range used below 100 ppm (or ppmC). The precision is defined as 2.5 times the standard deviation(s) of 10 repetitive responses to a given calibration or span gas.

(b) Other gas analyzers yielding equivalent results may be used with advance approval of the Administrator.

(c) The following requirements must be incorporated in each system used for testing under this subpart.

(1) Carbon monoxide and carbon dioxide measurements must be made on a dry basis (for raw exhaust measurement only). Specific requirements for the means of drying the sample can be found in §89.309(e).

(2) Calibration or span gases for the NOX measurement system must pass through the NO2 to NO converter.

(d) The electromagnetic compatibility (EMC) of the equipment must be on a level as to minimize additional errors.

(e) Gas drying. Chemical dryers are not an acceptable method of removing water from the sample. Water removal by condensation is acceptable. A water trap performing this function and meeting the specifications in §89.308(b) is an acceptable method. Means other than condensation may be used only with prior approval from the Administrator.


§ 89.310 Analyzer accuracy and specifications.

(a) Measurement accuracy—general. The analyzers must have a measuring range which allows them to measure the concentrations of the exhaust gas sample pollutants with the accuracies shown in Table 3 in Appendix A of this subpart.

(1) Response time. As necessary, measure and account for the response time of the analyzer.

(2) Precision. The precision of the analyzer must be, at worst, ±1 percent of full-scale concentration for each range used at or above 100 ppm (or ppmC) or ±2 percent for each range used below 100 ppm (or ppmC). The precision is defined as 2.5 times the standard deviation(s) of 10 repetitive responses to a given calibration or span gas.

(b) Other gas analyzers yielding equivalent results may be used with advance approval of the Administrator.

(c) The following requirements must be incorporated in each system used for testing under this subpart.

(1) Carbon monoxide and carbon dioxide measurements must be made on a dry basis (for raw exhaust measurement only). Specific requirements for the means of drying the sample can be found in §89.309(e).

(2) Calibration or span gases for the NOX measurement system must pass through the NO2 to NO converter.

(d) The electromagnetic compatibility (EMC) of the equipment must be on a level as to minimize additional errors.

(e) Gas drying. Chemical dryers are not an acceptable method of removing water from the sample. Water removal by condensation is acceptable. A water trap performing this function and meeting the specifications in §89.308(b) is an acceptable method. Means other than condensation may be used only with prior approval from the Administrator.


§ 89.310 Analyzer accuracy and specifications.

(a) Measurement accuracy—general. The analyzers must have a measuring range which allows them to measure the concentrations of the exhaust gas sample pollutants with the accuracies shown in Table 3 in Appendix A of this subpart.

(1) Response time. As necessary, measure and account for the response time of the analyzer.

(2) Precision. The precision of the analyzer must be, at worst, ±1 percent of full-scale concentration for each range used at or above 100 ppm (or ppmC) or ±2 percent for each range used below 100 ppm (or ppmC). The precision is defined as 2.5 times the standard deviation(s) of 10 repetitive responses to a given calibration or span gas.

(b) Other gas analyzers yielding equivalent results may be used with advance approval of the Administrator.

(c) The following requirements must be incorporated in each system used for testing under this subpart.

(1) Carbon monoxide and carbon dioxide measurements must be made on a dry basis (for raw exhaust measurement only). Specific requirements for the means of drying the sample can be found in §89.309(e).

(2) Calibration or span gases for the NOX measurement system must pass through the NO2 to NO converter.

(d) The electromagnetic compatibility (EMC) of the equipment must be on a level as to minimize additional errors.

(e) Gas drying. Chemical dryers are not an acceptable method of removing water from the sample. Water removal by condensation is acceptable. A water trap performing this function and meeting the specifications in §89.308(b) is an acceptable method. Means other than condensation may be used only with prior approval from the Administrator.

VerDate Mar<15>2010 15:09 Sep 08, 2010 Jkt 220162 PO 00000 Frm 00095 Fmt 8010 Sfmt 8002 Y:\SGML\220162.XXX 220162WReier-Aviles on DSKGBLS3C1PROD with CFR