
40 C.F.R. § 86.110-94

Exhaust gas sampling system; diesel-cycle vehicles, and Otto-cycle vehicles requiring particulate emissions measurements.

Section 86.110-94 includes text that specifies requirements that differ from § 86.110-90. Where a paragraph in § 86.110-90 is identical and applicable to § 86.110-94, this may be indicated by specifying the corresponding paragraph and the statement “[Reserved]. For guidance see § 86.110-90.” Where a corresponding paragraph of § 86.110-90 is not applicable, this is indicated by the statement “[Reserved].”

(a) *General.* The exhaust gas sampling system described in this paragraph is designed to measure the true mass of both gaseous and particulate emissions in the exhaust of either diesel-cycle or Otto-cycle light-duty vehicles and light-duty trucks. This system utilizes the CVS concept (described in § 86.109) of measuring mass emissions. The mass of gaseous emissions is determined from the sample concentration and total flow over the test period. The mass of particulate emissions is determined from a proportional mass sample collected on a filter and from the total flow over the test period. General requirements are as follows:

(1) This sampling system requires the use of a PDP-CVS, CFV-CVS (or a CFV-EFC-CVS), sample system with heat exchanger connected to a dilution tunnel. The heat exchanger is not required for the CFV-CVS or EFC-CFV-CVS if electronic flow controllers are used to maintain proportionality for the particulate sample. Figure B94-5 is a schematic drawing of the PDP system. Figure B94-6 is a schematic drawing of the CFV-CVS system. (Methanol-fueled Otto-cycle vehicles may be tested using this test equipment, without measuring particulate emissions.)

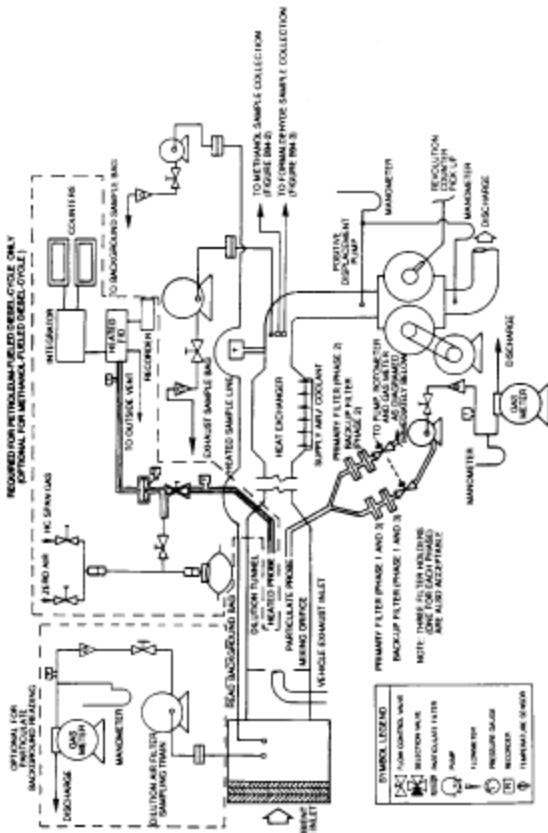


FIGURE B94-5 EXHAUST GAS SAMPLING SYSTEM (POP-CVS) FOR VEHICLES REQUIRING PARTICULATE MEASUREMENT

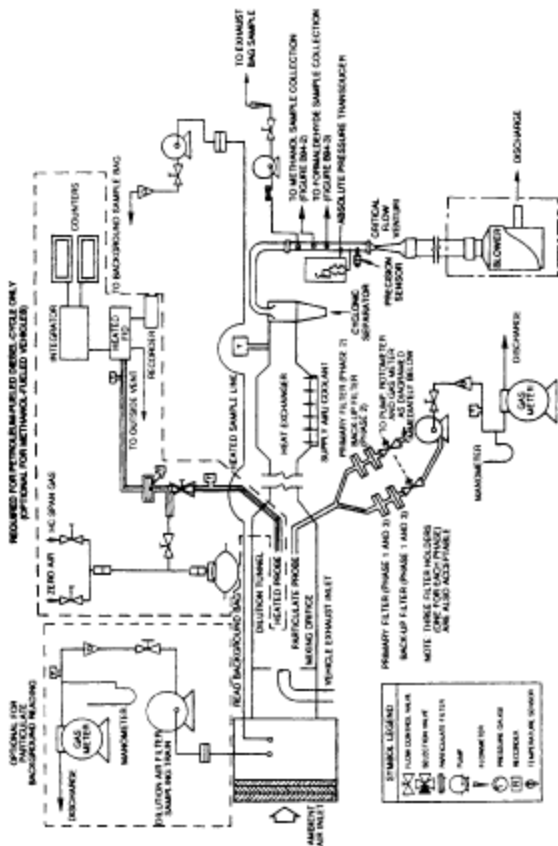


FIGURE B94-6 EXHAUST GAS SAMPLING SYSTEM (CFV-CVS) FOR VEHICLES REQUIRING PARTICULATE MEASUREMENT

(2) Bag, continuous HFID (required for petroleum-fueled diesel-cycle and optional for methanol-fueled, natural gas-fueled and liquefied petroleum gas-fueled diesel-cycle vehicles), and particulate sampling

capabilities as shown in Figure B94-5 (or Figure B94-6) are required to provide both gaseous and particulate emissions sampling capabilities from a single system.

(3) Petroleum-fueled diesel-cycle vehicles require a heated flame ionization detector (HFID) ($375^{\circ} \pm 20^{\circ} \text{F}$ ($191^{\circ} \pm 11^{\circ} \text{C}$)) sample for total hydrocarbon (THC) analysis. The HFID sample must be taken directly from the diluted exhaust stream through a heated probe in the dilution tunnel.

(4) Methanol-fueled vehicles require the use of a heated flame ionization detector (HFID) ($235^{\circ} \pm 15^{\circ} \text{F}$ ($113^{\circ} \pm 8^{\circ} \text{C}$)) for hydrocarbon analysis. With an HFID, the hydrocarbon analysis can be made on the bag sample and the methanol and formaldehyde analyses are performed on the samples collected for these purposes (Figures B94-2 and B94-3).

Note:

For 1990 through 1994 model year methanol-fueled vehicles, methanol and formaldehyde sampling may be omitted provided the bag sample is analyzed using a HFID calibrated with methanol.

(5) For methanol-fueled vehicles, the vehicle tailpipe-to-dilution tunnel connection shall be made by:

(i) A tailpipe to dilution tunnel duct of unrestricted length maintained at a temperature above the dew point of the mixture, but below 250°F (121°C) through heating and cooling as required; or

(ii) Using a short duct (up to 12 feet long) constructed of smooth wall pipe with a minimum of flexible sections maintained at a temperature above the dew point of the mixture, but below 250°F (121°C) prior to the test and during breaks in testing (insulation may remain in place and or heating may occur during the testing provided the maximum temperature is not exceeded); or

(iii) Using smooth wall duct less than five feet long with no required heating. A maximum of two short flexible connectors are allowed under this option; or

(iv) By omitting the duct and performing the exhaust gas dilution function at the vehicle tailpipe exit.

(6) For natural gas-fueled and liquefied petroleum gas-fueled diesel vehicles either a heated flame ionization detector (HFID) [$375^{\circ} \pm 20^{\circ} \text{F}$ ($191^{\circ} \pm 11^{\circ} \text{C}$)] or a non-heated flame ionization detector may be used for hydrocarbon analysis.

This document is only available to subscribers. Please log in or purchase access.

[Purchase Login](#)