
40 C.F.R. § 86.509–90

Exhaust gas sampling system.

(a)

(1) *General.* The exhaust gas sampling system is designed to measure the true mass emissions of vehicle exhaust. In the CVS concept of measuring mass emissions, two conditions must be satisfied: the total volume of the mixture of exhaust and dilution air must be measured and a continuously proportioned volume of sample must be collected for analysis. Mass emissions are determined from the sample concentration and totalized flow over the test period.

(2) *Vehicle tailpipe to CVS duct.* For methanol fueled vehicles, cooling of the exhaust gases in the duct connecting the vehicle tailpipe to the CVS shall be minimized. This may be accomplished by:

(i) Using a duct of unrestricted length maintained at a temperature above the maximum dew point of the exhaust, but below 121 °C (250 °F); heating and possibly cooling capabilities are 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 maximum dew point of the exhaust, but below 121 °C (250 °F), prior to the test and during any breaks in the test and uninsulated during the test (insulation may remain in place and/or heating may occur during testing provided 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) Omitting the duct and performing the exhaust gas dilution function at the motorcycle tailpipe exit.

(3) *Positive displacement pump.* The Positive Displacement Pump–Constant Volume Sampler (PDP–CVS), Figure F90–1 satisfies the first condition by metering at a constant temperature and pressure through the pump. The total volume is measured by counting the revolutions made by the calibrated positive displacement pump. The proportional samples are achieved by sampling at a constant flow rate. For methanol–fueled motorcycle sample lines for the methanol and formaldehyde samples are heated to prevent condensation. The temperature of the sample lines shall be more than 3 °C (5 °F) above the maximum dew point of the sample, but below 121 °C (250 °F). (Note: For 1990 through 1994 model year methanol–fueled motorcycles, methanol and formaldehyde sampling may be omitted provided the bag sample (hydrocarbons and methanol) is analyzed using a HFID calibrated with methanol.)

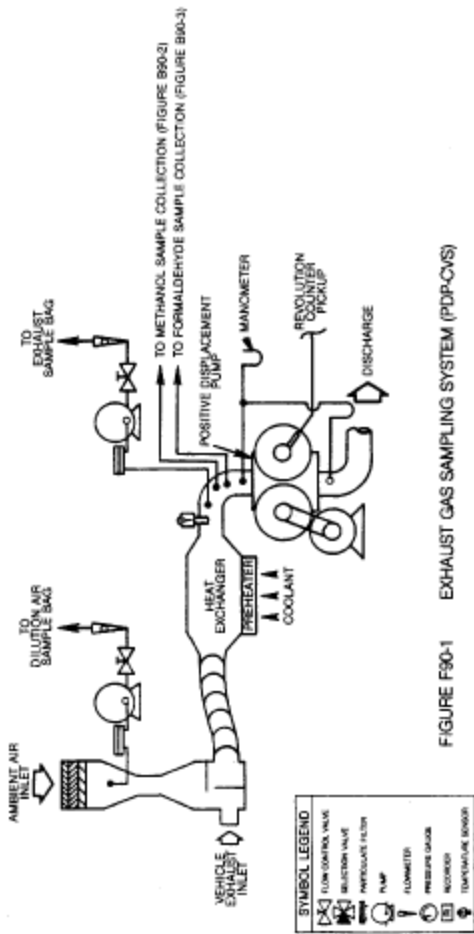


FIGURE F90-1 EXHAUST GAS SAMPLING SYSTEM (PDP-CVS)

(4) *Critical flow venturi.* The operation of the Critical Flow Venturi—Constant Volume Sampler (CFV-CVS) sample system, Figure F90-2, is based upon the principles of fluid dynamics associated with critical flow. Proportional sampling throughout temperature excursions is maintained by use of small CFVs in the sample lines, which respond to the varying temperatures in the same manner as the main CFV. For methanol-fueled motorcycles, the methanol and formaldehyde sample lines are heated to prevent condensation. The temperature of the sample lines shall be more than 3 °C (5 °F) above the maximum dew point of the sample, but below 121 °C (250 °F). Care must be taken to ensure that the CFVs of the sample probes are not heated since heating of the CFVs would cause loss of proportionality. (Note: For 1990 through 1994 model year methanol-fueled motorcycles, methanol and formaldehyde sampling may be omitted provided the bag sample (hydrocarbons and methanol) is analyzed using a HFID calibrated with methanol.) Total flow per test is determined by continuously computing and integrating instantaneous flow. A low response time temperature sensor is necessary for accurate flow calculation.

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