

11

6. The method of claim 5, including the step of continuously analyzing said diluted exhaust gas sample.

7. The method of claim 5, including the step of collecting said diluted exhaust gas sample in at least one sample bag by metering said diluted exhaust gas sample at a flow rate proportional to the flow rate of said diluted exhaust gas sample using said metering device.

8. The method of claim 7, including the step of using a mass flow controller as said metering device.

9. The method of claim 7, further comprising the steps of: determining the total exhaust volume of said diluted exhaust gas sample; analyzing said at least one sample bag to obtain a total mass of any individual constituents in said diluted exhaust gas sample; obtaining a concentration for said individual constituents in said diluted exhaust gas sample; and multiplying said concentration of individual constituents in said diluted exhaust gas sample found in said sample bag by said dilution ratio and said total exhaust volume to obtain a total mass of said individual constituents in said diluted exhaust gas sample.

10. The method of claim 5, wherein said step of establishing a dilution ratio further comprises the following steps: introducing a calibration gas from a calibration gas source; passing said calibration gas through said diluent line; extracting a diluted calibration gas through said diluent line; maintaining the volumetric ratio of said diluted calibration gas and said calibration gas at a substantially constant rate; directing said diluted calibration gas to the exhaust emission analyzer to obtain a concentration for said calibration gas and a concentration for said diluted calibration gas; and dividing said concentration of said calibration gas by said concentration of said diluted calibration gas to determine said dilution ratio.

11. The method of claim 10, further comprising the steps of: obtaining individual diluted concentration rates for any individual constituents in said diluted exhaust gas sample; multiplying said diluted concentration rates of said individual constituents in said diluted exhaust gas sample by said dilution ratio to obtain an instantaneous exhaust concentration for said individual constituents; and

12

multiplying said instantaneous exhaust concentration by an exhaust mass flow rate to obtain an instantaneous mass flow rate for said individual constituents in said diluted exhaust gas sample.

12. The method of claim 11, further comprising the step of: integrating said instantaneous mass flow rate over time, to obtain a total mass of pollutants produced.

13. An apparatus for controlling the dilution of an exhaust gas sample from the exhaust system of an engine for analysis, the apparatus comprising:

an exhaust gas sampling line having first and second ends, said first end being fluidly connected to the exhaust system;

an exhaust gas sampling line orifice fitted to said exhaust gas sampling line, said exhaust gas sampling line orifice having an inlet;

a source of substantially pollutant-free diluent gas;

a diluent line having first and second ends, said first end being connected to said source of substantially pollutant-free diluent gas;

a diluent line orifice fitted to said diluent line, said diluent line orifice having an inlet;

a diluent pressure regulator fitted to said diluent line and connected to said exhaust gas sampling line for controlling pressure such that said exhaust gas sampling line orifice and said diluent line orifice are configured so as to produce substantially equal pressure drops thereacross;

a diluted gas outlet line having first and second ends, said first end being connected to an exhaust emission analyzer;

a fluid junction, said second ends of said exhaust gas sampling line, said diluent line, and said diluted gas outlet line being connected to said fluid junction; and

a system for drawing diluted exhaust gas sample through said diluted gas outlet line.

14. The apparatus of claim 13, wherein said system includes a pressure regulator to allow continuous analyzing of said diluted exhaust gas sample.

15. The apparatus of claim 13, wherein the exhaust emission analyzer includes at least one sample bag and means for metering the flow of said diluted exhaust gas sample to said at least one sample bag in proportion to the flow of said diluted exhaust gas sample.

16. The apparatus of claim 15, wherein said means for metering the flow to said at least one sample bag comprises a mass flow controller.

* * * * *