§ 1065.267 Gas chromatograph with a flame ionization detector.

(a) Application. You may use a gas chromatograph with a flame ionization detector (GC–FID) to measure CH₄ concentrations of diluted exhaust for batch sampling. While you may also use a nonmethane cutter to measure CH₄, as described in §1065.265, use a reference procedure based on a gas chromatograph for comparison with any proposed alternate measurement procedure under §1065.10.

(b) Component requirements. We recommend that you use a GC–FID that meets the specifications in Table 1 of §1065.205, and it must also meet the linearity verification in §1065.307. You may use a heated or unheated CLD, and you may use a CLD that operates at atmospheric pressure or under a vacuum. You may use a CLD that has compensation algorithms that are functions of other gaseous measurements and the engine’s known or assumed fuel properties. The target value for any compensation algorithm is 0% (that is, no bias high and no bias low), regardless of the uncompensated signal’s bias.

(c) NO₂-to-NO converter. Place upstream of the CLD an internal or external NO₂-to-NO converter that meets the verification in §1065.378. Configure the converter with a bypass line if it is needed to facilitate this verification.

(d) Humidity effects. You must maintain all CLD temperatures to prevent aqueous condensation. If you remove humidity from a sample upstream of a CLD, use one of the following configurations:

(1) Connect a CLD downstream of any dryer or chiller that is downstream of an NO₂-to-NO converter that meets the verification in §1065.378.

(2) Connect a CLD downstream of any dryer or thermal chiller that meets the verification in §1065.376.

(e) Response time. You may use a heated CLD to improve CLD response time.

NOₓ AND N₂O MEASUREMENTS

§ 1065.270 Chemiluminescent detector.

(a) Application. You may use a chemiluminescent detector (CLD) to measure NOₓ concentration in raw or diluted exhaust for batch or continuous sampling. We generally accept a CLD for NOₓ measurement, even though it measures only NO and NO₂ when coupled with an NO₂-to-NO converter, since conventional engines and aftertreatment systems do not emit significant amounts of NOₓ species other than NO and NO₂. Measure other NOₓ species if required by the standard-setting part. While you may also use other instruments to measure NOₓ, as described in §1065.272, use a reference procedure based on a chemiluminescent detector for comparison with any proposed alternate measurement procedure under §1065.10.

(b) Component requirements. We recommend that you use a CLD that meets the specifications in Table 1 of §1065.205. Note that your CLD-based system must meet the quench verification in §1065.370 and it must also meet the linearity verification in §1065.307. You may use a heated or unheated CLD, and you may use a CLD that operates at atmospheric pressure or under a vacuum. You may use a CLD that has compensation algorithms that are functions of other gaseous measurements and the engine’s known or assumed fuel properties. The target value for any compensation algorithm is 0% (that is, no bias high and no bias low), regardless of the uncompensated signal’s bias.

(c) NO₂-to-NO converter. Place upstream of the CLD an internal or external NO₂-to-NO converter that meets the verification in §1065.378. Configure the converter with a bypass line if it is needed to facilitate this verification.

(d) Humidity effects. You must maintain all CLD temperatures to prevent aqueous condensation. If you remove humidity from a sample upstream of a CLD, use one of the following configurations:

(1) Connect a CLD downstream of any dryer or chiller that is downstream of an NO₂-to-NO converter that meets the verification in §1065.378.

(2) Connect a CLD downstream of any dryer or thermal chiller that meets the verification in §1065.376.

(e) Response time. You may use a heated CLD to improve CLD response time.