§ 1066.15  Overview of test procedures.

This section outlines the procedures to test vehicles that are subject to emission standards.

(a) In the standard-setting part, we set emission standards in g/mile (or g/km), for the following constituents:
   (1) Total oxides of nitrogen, NO\textsubscript{X}.
   (2) Hydrocarbons (HC), which may be expressed in the following ways:
      (i) Total hydrocarbons, THC.
      (ii) Nonmethane hydrocarbons, NMHC, which results from subtracting methane (CH\textsubscript{4}) from THC.
      (iii) Total hydrocarbon-equivalent, THCE, which results from adjusting THC mathematically to be equivalent on a carbon-mass basis.
      (iv) Nonmethane hydrocarbon-equivalent, NMHCE, which results from adjusting NMHC mathematically to be equivalent on a carbon-mass basis.
   (3) Particulate mass, PM.
   (4) Carbon monoxide, CO.

(b) Note that some vehicles may not be subject to standards for all the emission constituents identified in paragraph (a) of this section.

(c) We generally set emission standards over test intervals and/or drive schedules, as follows:
   (1) Vehicle operation. Testing may involve measuring emissions and miles travelled in a laboratory-type environment or in the field. The standard-setting part specifies how test intervals are defined for field testing. Refer to the definitions of “duty cycle” and “test interval” in §1066.701. Note that a single drive schedule may have multiple test intervals and require weighting of results from multiple test phases to calculate a composite distance-based emission value to compare to the standard.
   (2) Constituent determination. Determine the total mass of each constituent over a test interval by selecting from the following methods:
      (i) Continuous sampling. In continuous sampling, measure the constituent’s concentration continuously from raw or dilute exhaust. Multiply this concentration by the continuous (raw or dilute) flow rate at the emission sampling location to determine the constituent’s flow rate. Sum the constituent’s flow rate continuously over the test interval. This sum is the total mass of the emitted constituent.
      (ii) Batch sampling. In batch sampling, continuously extract and store a sample of raw or dilute exhaust for later measurement. Extract a sample proportional to the raw or dilute exhaust flow rate, as applicable. You may extract and store a proportional sample of exhaust in an appropriate container, such as a bag, and then measure HC, CO, and NO\textsubscript{X} concentrations in the container after the test phase. You may deposit PM from proportionally extracted exhaust onto an appropriate substrate, such as a filter. In this case, divide the PM by the amount of filtered exhaust to calculate the PM concentration. Multiply batch sampled concentrations by the total (raw or dilute) flow from which it was extracted during the test interval. This product is the total mass of the emitted constituent.
      (iii) Combined sampling. You may use continuous and batch sampling simultaneously during a test interval, as follows:
         (A) You may use continuous sampling for some constituents and batch sampling for others.
         (B) You may use continuous and batch sampling for a single constituent, with one being a redundant measurement, subject to the provisions of 40 CFR 1065.201.
   (d) Refer to the standard-setting part for calculations to determine g/mile emission rates.

(e) The regulation highlights several specific cases where good engineering judgment is especially relevant. You must use good engineering judgment for all aspects of testing under this part, not only for those provisions where we specifically re-state this requirement.

§ 1066.20  Units of measure and overview of calculations.

(a) System of units. The procedures in this part follow both conventional English Units and the International System of Units (SI), as detailed in NIST Special Publication 811, which we incorporate by reference in §1066.710.