

vehicles or engines that operate on different fuels.

(g) Continue testing any engine family for which the sample mean,  $\bar{x}$ , is greater than the emission standard. This applies if the sample mean for either HC, NO<sub>x</sub> (or HC+NO<sub>x</sub>), or CO (or other regulated pollutants) is greater than the emission standard. Continue testing until one of the following things happens:

(1) The sample size,  $n$ , for an engine family is greater than the required sample size,  $N$ , and the sample mean,  $\bar{x}$ , is less than or equal to the emission standard. For example, if  $N = 3.1$  after the third test, the sample-size calculation does not allow you to stop testing.

(2) The engine family does not comply according to § 1051.325.

(3) You test 30 vehicles or engines from the engine family.

(4) You test one percent of your projected annual U.S.-directed production volume for the engine family.

(5) You choose to declare that the engine family fails the requirements of this subpart. (h) If the sample-size calculation allows you to stop testing for a pollutant, you must continue measuring emission levels of that pollutant for any additional tests required under this section. However, you need not continue making the calculations specified in this section for that pollutant. This paragraph does not affect the requirements in section § 1051.320.

(i) You may elect to test more randomly chosen vehicles or engines than we require. Include these vehicles or engines in the sample-size calculations.

**§ 1051.315 How do I know when my engine family fails the production-line testing requirements?**

This section describes the pass-fail criteria for the production-line testing requirements. We apply this criteria on an engine family basis. See § 1051.320 for the requirements that apply to individual vehicles or engines that fail a production-line test. (a) Calculate your test results. Round them to the number of decimal places in the emission standard expressed to one more decimal place.

(1) *Initial and final test results.* Calculate and round the test results for each vehicle or engine. If you do sev-

eral tests on a vehicle or engine, calculate the initial test results, then add them together and divide by the number of tests and round for the final test results on that vehicle or engine.

(2) *Final deteriorated test results.* Apply the deterioration factor for the engine family to the final test results (see § 1051.240(c)).

(b) Construct the following CumSum Equation for each engine family for HC, NO<sub>x</sub> (or HC+NO<sub>x</sub>), and CO emissions (and other regulated pollutants):

$$C_i = C_{i-1} + X_i - (\text{STD} + 0.25 \times \sigma)$$

Where:

$C_i$  = The current CumSum statistic.

$C_{i-1}$  = The previous CumSum statistic. For the first test, the CumSum statistic is 0 (i.e.  $C_1 = 0$ ).

$X_i$  = The current emission test result for an individual vehicle or engine.

STD = Emission standard.

(c) Use final deteriorated test results to calculate the variables in the equation in paragraph (b) of this section (see § 1051.315(a)).

(d) After each new test, recalculate the CumSum statistic.

(e) If you test more than the required number of vehicles or engines, include the results from these additional tests in the CumSum Equation.

(f) After each test, compare the current CumSum statistic,  $C_i$ , to the recalculated Action Limit,  $H$ , defined as  $H = 5.0 \times \sigma$ .

(g) If the CumSum statistic exceeds the Action Limit in two consecutive tests, the engine family fails the production-line testing requirements of this subpart. Tell us within ten working days if this happens. You may request to amend the application for certification to raise the FEL of the engine family at this point if you meet the requirements of § 1051.225(f).

(h) If you amend the application for certification for an engine family under § 1051.225, do not change any previous calculations of sample size or CumSum statistics for the model year.

**§ 1051.320 What happens if one of my production-line vehicles or engines fails to meet emission standards?**

(a) If you have a production-line vehicle or engine with final deteriorated test results exceeding one or more