

emission rate to at least one more decimal place than the applicable standard. Apply any applicable humidity corrections before weighting emissions.

(2) Apply the regeneration factors if applicable. At this point the emission rate is generally considered to be an official emission result.

(3) Apply the deterioration factor to the official emission result, as described in §1033.245, then round the adjusted figure to the same number of decimal places as the emission standard. This adjusted value is the deteriorated emission level. Compare these emission levels from the emission-data locomotive with the applicable emission standards. In the case of NO<sub>x</sub>+NMHC standards, apply the deterioration factor to each pollutant and then add the results before rounding.

(4) The highest deteriorated emission levels for each pollutant are considered to be the certified emission levels.

(c) An owner/operator remanufacturing its locomotives to be identical to their previously certified configuration may certify by design without new emission test data. To do this, submit the application for certification described in §1033.205, but instead of including test data, include a description of how you will ensure that your locomotives will be identical in all material respects to their previously certified condition. You may use reconditioned parts consistent with good engineering judgment. You have all of the liabilities and responsibilities of the certificate holder for locomotives you certify under this paragraph.

[73 FR 37197, June 30, 2008, as amended at 75 FR 22984, Apr. 30, 2010]

#### § 1033.245 Deterioration factors.

Establish deterioration factors for each pollutant to determine, as described in §1033.240, whether your locomotives will meet emission standards for each pollutant throughout the useful life. Determine deterioration factors as described in this section, either with an engineering analysis, with pre-existing test data, or with new emission measurements. The deterioration factors are intended to reflect the deterioration expected to result during the useful life of a locomotive maintained as specified in §1033.125. If you perform

durability testing, the maintenance that you may perform on your emission-data locomotive is limited to the maintenance described in §1033.125.

(a) Your deterioration factors must take into account any available data from in-use testing with similar locomotives, consistent with good engineering judgment. For example, it would not be consistent with good engineering judgment to use deterioration factors that predict emission increases over the useful life of a locomotive or locomotive engine that are significantly less than the emission increases over the useful life observed from in-use testing of similar locomotives.

(b) Deterioration factors may be additive or multiplicative.

(1) *Additive deterioration factor for exhaust emissions.* Except as specified in paragraph (b)(2) of this section, use an additive deterioration factor for exhaust emissions. An additive deterioration factor for a pollutant is the difference between exhaust emissions at the end of the useful life and exhaust emissions at the low-hour test point. In these cases, adjust the official emission results for each tested locomotive at the selected test point by adding the factor to the measured emissions. The deteriorated emission level is intended to represent the highest emission level during the useful life. Thus, if the factor is less than zero, use zero. Additive deterioration factors must be specified to one more decimal place than the applicable standard.

(2) *Multiplicative deterioration factor for exhaust emissions.* Use a multiplicative deterioration factor if good engineering judgment calls for the deterioration factor for a pollutant to be the ratio of exhaust emissions at the end of the useful life to exhaust emissions at the low-hour test point. For example, if you use aftertreatment technology that controls emissions of a pollutant proportionally to engine-out emissions, it is often appropriate to use a multiplicative deterioration factor. Adjust the official emission results for each tested locomotive at the selected test point by multiplying the measured emissions by the deterioration factor.

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The deteriorated emission level is intended to represent the highest emission level during the useful life. Thus, if the factor is less than one, use one. A multiplicative deterioration factor may not be appropriate in cases where testing variability is significantly greater than locomotive-to-locomotive variability. Multiplicative deterioration factors must be specified to one more significant figure than the applicable standard.

(c) Deterioration factors for smoke are always additive.

(d) If your locomotive vents crankcase emissions to the exhaust or to the atmosphere, you must account for crankcase emission deterioration, using good engineering judgment. You may use separate deterioration factors for crankcase emissions of each pollutant (either multiplicative or additive) or include the effects in combined deterioration factors that include exhaust and crankcase emissions together for each pollutant.

(e) Include the following information in your application for certification:

(1) If you determine your deterioration factors based on test data from a different engine family, explain why this is appropriate and include all the emission measurements on which you base the deterioration factor.

(2) If you determine your deterioration factors based on engineering analysis, explain why this is appropriate and include a statement that all data, analyses, evaluations, and other information you used are available for our review upon request.

(3) If you do testing to determine deterioration factors, describe the form and extent of service accumulation, including a rationale for selecting the service-accumulation period and the method you use to accumulate hours.

**§ 1033.250 Reporting and record-keeping.**

(a) Within 45 days after the end of the model year, send the Designated Compliance Officer a report describing the following information about locomotives you produced during the model year:

(1) Report the total number of locomotives you produced in each engine

family by locomotive model and engine model.

(2) If you produced exempted locomotives, report the number of exempted locomotives you produced for each locomotive model and identify the buyer or shipping destination for each exempted locomotive. You do not need to report under this paragraph (a)(2) locomotives that were temporarily exempted, exported locomotives, locomotives exempted as manufacturer/remanufacturer-owned locomotives, or locomotives exempted as test locomotives.

(b) Organize and maintain the following records:

(1) A copy of all applications and any summary information you send us.

(2) Any of the information we specify in § 1033.205 that you were not required to include in your application.

(3) A detailed history of each emission-data locomotive. For each locomotive, describe all of the following:

(i) The emission-data locomotive's construction, including its origin and buildup, steps you took to ensure that it represents production locomotives, any components you built specially for it, and all the components you include in your application for certification.

(ii) How you accumulated locomotive operating hours (service accumulation), including the dates and the number of hours accumulated.

(iii) All maintenance, including modifications, parts changes, and other service, and the dates and reasons for the maintenance.

(iv) All your emission tests, including documentation on routine and standard tests, as specified in part 40 CFR part 1065, and the date and purpose of each test.

(v) All tests to diagnose locomotive or emission control performance, giving the date and time of each and the reasons for the test.

(vi) Any other significant events.

(4) If you test a development engine for certification, you may omit information otherwise required by paragraph (b)(3) of this section that is unrelated to emissions and emission-related components.

(5) Production figures for each engine family divided by assembly plant.