

§ 86.1823-01 Durability demonstration procedures for exhaust emissions.

This section applies to light-duty vehicles, light-duty trucks, and heavy-duty vehicles certified under the provisions of § 86.1801-01(c)(1). Eligible small volume manufacturers or small volume test groups may optionally meet the requirements of §§ 86.1838-01 and 86.1826-01 in lieu of the requirements of this section. For model years 2001, 2002, and 2003 all manufacturers may elect to meet the provisions of paragraph (c)(2) of this section in lieu of these requirements.

(a) The manufacturer shall propose a durability program consisting of the elements discussed in paragraphs (a)(1) through (a)(3) of this section for advance approval by the Administrator. The durability process shall be designed to effectively predict the expected deterioration of candidate in-use vehicles over their full and intermediate useful life and shall be consistent with good engineering judgment. The Administrator will approve the program if he/she determines that it is reasonably expected to meet these design requirements.

(1) *Service accumulation method.* (i) Each durability program shall include a service accumulation method designed to effectively predict the deterioration of emissions in actual use over the full and intermediate useful life of candidate in-use vehicles.

(ii) Manufacturers may propose service accumulation methods based upon whole-vehicle full-mileage accumulation, whole vehicle accelerated mileage accumulation (e.g., where 40,000 miles on a severe mileage accumulation cycle is equivalent to 100,000 miles of normal in-use driving), bench aging of individual components or systems, or other approaches approved by the Administrator.

(A) For whole vehicle mileage accumulation programs, all emission control components and systems (including both hardware and software) must be installed and operating for the entire mileage accumulation period.

(B) Bench procedures shall simulate the aging of components or systems over the applicable useful life and shall simulate driving patterns and vehicle operational environments found in ac-

tual use. For this purpose, manufacturers may remove the emission-related components (and other components), in whole or in part, from the durability vehicle itself and deteriorate them independently. Vehicle testing for the purpose of determining deterioration factors may include the testing of durability vehicles that incorporate such bench-aged components.

(2) *Vehicle/component selection method.* The manufacturer shall propose a vehicle/component selection method for advance approval by the Administrator. The procedure for selecting durability data vehicles and components shall meet the requirements of § 86.1822-01.

(3) *Use of deterioration program to determine compliance with the standard.* The manufacturer shall propose procedures for the determination of compliance with the standards for advance approval by the Administrator. The calculation of deterioration factors and/or the determination of vehicle compliance shall be according to the procedures approved in advance by the Administrator. The Administrator will allow two methods for using the results of the deterioration program to determine compliance with the standards. Either a deterioration factor (DF) is calculated and applied to the emission data vehicle (EDV) emission results or aged components are installed on the EDV prior to emission testing. Other methods may be approved by the Administrator if they result in an effective prediction of intermediate and full useful life emission levels on candidate in-use vehicles.

(i) *Use of deterioration factors.* (A) Deterioration factors are calculated using all FTP emission test data generated during the durability testing program except as noted:

(1) Multiple tests at a given mileage point are averaged together unless the same number of tests are conducted at each mileage point.

(2) Before and after maintenance test results are averaged together.

(3) Zero-mile test results are excluded from the calculation.

(4) When calculating intermediate and full useful life deterioration factors all data points should be included in the calculations, except that total hydrocarbon (THC) test points beyond

the 50,000-mile (useful life) test point shall not be included in the calculations.

(5) A procedure may be employed to identify and remove from the DF calculation those test results determined to be statistical outliers providing that the outlier procedure is consistently applied to all vehicles and data points and is approved in advance by the Administrator.

(B) The deterioration factor shall be based on a linear regression, or an other regression technique approved in advance by the Administrator. The deterioration may be a multiplicative or additive factor. Separate factors will be calculated for each regulated emission constituent and for the full and intermediate useful life periods as applicable. Separate DF's are calculated for each durability group except as provided in paragraph (c) of this section.

(1) A multiplicative DF will be calculated by taking the ratio of the full or intermediate useful life mileage level, as appropriate (rounded to four decimal places), divided by the stabilized mileage (reference § 86.1831-01(c), e.g., 4000-mile) level (rounded to four decimal places) from the regression analysis; the result shall be rounded to three-decimal places of accuracy. The rounding required in this paragraph shall be conducted in accordance with the Rounding-Off Method specified in ASTM E29-93a, Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications (incorporated by reference, see § 86.1). Calculated DF values of less than one shall be changed to one for the purposes of this paragraph.

(2) An additive DF will be calculated to be the difference between the full or intermediate useful life mileage level (as appropriate) minus the stabilized mileage (reference § 86.1831-01(c), e.g., 4000-mile) level from the regression analysis. The full useful life regressed emission value, the stabilized mileage regressed emission value, and the DF result shall be rounded to the same precision and using the same procedures as the raw emission results according to the provisions of § 86.1837-01. Calculated DF values of less than zero shall be changed to zero for the purposes of this paragraph.

(C) The DF calculated by these procedures will be used for determining compliance with FTP exhaust emission standards, SFTP exhaust emission standards, and cold CO emission standards. At the manufacturer's option and using procedures approved by the Administrator, a separate DF may be calculated exclusively using cold CO test data to determine compliance with cold CO emission standards. Also at the manufacturer's option and using procedures approved by the Administrator, a separate DF may be calculated exclusively using US06 and/or air conditioning (SC03) test data to determine compliance with the SFTP emission standards.

(ii) *Installation of aged components on emission data vehicles.* For full and intermediate useful life compliance determination, the manufacturer may elect to install aged components on an EDV rather than applying a deterioration factor. Different sets of components may be aged for full and intermediate useful life periods. The list of components to be installed, the techniques used to select physical parts to be aged, and the aging techniques employed to age the components must be approved in advance by the Administrator.

(b) In addition to the provisions of paragraph (a) of this section, manufacturers shall submit the following information when applying for the Administrator's approval of a durability program:

(1) Analysis and/or data demonstrating the adequacy of the manufacturer's durability processes to effectively predict emission compliance for candidate in-use vehicles. All regulated emission constituents and all test procedures shall be considered in this analysis. This data and discussion shall cover the breadth of the manufacturer's product line that will be covered by this durability procedure.

(2) Discussion of the manufacturer's in-use verification procedures including testing performed, vehicle procurement procedures used, and vehicles rejection criteria used. Any questionnaires used or inspections performed should also be documented in the manufacturer's submission. The in-use

verification program shall meet the requirements of §§ 86.1845-01, 86.1846-01 and 86.1847-01.

(c) *Carryover and carryacross.* (1) Manufacturers may carry over or carry across mileage accumulation data, aged hardware, or deterioration factors according to the provisions of § 86.1839-01 using good engineering judgment.

(2) For the 2001, 2002, and 2003 model years, the manufacturer may carry over exhaust emission DF's previously generated under the Standard AMA Durability Program described in § 86.094-13(c), the Alternate Service Accumulation Durability Program described in § 86.094-13(e) or the Standard Self-Approval Durability Program for light-duty trucks described in § 86.094-13(f) in lieu of complying with the durability provisions of paragraph (a)(1) of this section.

(i) This provision is limited to the use of existing data used for a 2000 model year or earlier certification. All new exhaust durability data must be generated according to the provisions of paragraph (a)(1) of this section.

(ii) The manufacturer shall exercise good engineering judgment when determining the eligibility to use carryover exhaust emission DF's and the selection of the vehicle used as the source of carryover.

(iii) Starting with the 2004 model year, manufacturers must meet the provisions of paragraphs (a) and (b) of this section.

(d) *Data reporting requirements.* Data reporting requirements are contained in § 86.1844-01.

(e) *Emission component durability.* The manufacturer shall use good engineering judgment to determine that all emission-related components are designed to operate properly for the full useful life of the vehicles in actual use.

(f) *In-use verification.* The durability program must meet the requirements of § 86.1845-01.

(g) The manufacturer shall apply the approved durability process to a durability group, including durability groups in future model years, if the durability process will effectively predict (or alternatively, overstate) the deterioration of emissions in actual use over the full and intermediate useful life of candidate in-use vehicles. The

manufacturer shall use good engineering judgment in determining the applicability of the durability program to a durability group.

(1) The manufacturer may make modifications to an approved durability process using good engineering judgment for the purpose of ensuring that the modified process will effectively predict, (or alternatively, overstate) the deterioration of emissions in actual use over the full and intermediate useful life of candidate in-use vehicles.

(2) The manufacturer shall notify the Administrator of its determination to use an approved (or modified) durability program on particular test groups and durability groups prior to emission data vehicle testing for the affected test groups (preferably at an annual preview meeting scheduled before the manufacturer begins certification activities for the model year).

(3) Prior to certification, the Administrator may reject the manufacturer's determination in paragraph (g) of this section if it is not made using good engineering judgment or it fails to properly consider data collected under the provisions of §§ 86.1845-01, 86.1846-01, and 86.1847-01 or other information if the Administrator determines that the durability process has not been shown to effectively predict emission levels or compliance with the standards in use on candidate vehicles for particular test groups which the manufacturers plan to cover with the durability process.

(h) The Administrator may withdraw approval to use a durability process or require modifications to a durability process based on the data collected under §§ 86.1845-01, 86.1846-01, and 86.1847-01 or other information if the Administrator determines that the durability processes have not been shown to accurately predict emission levels or compliance with the standards in use on candidate vehicles (provided the inaccuracy could result in a lack of compliance with the standards for a test group covered by this durability process). Such withdrawals shall apply to future applications for certification and to the portion of the manufacturer's product line (or the entire product

line) that the Administrator determines to be affected. Prior to such a withdrawal the Administrator shall give the manufacturer a preliminary notice at least 60 days prior to the final decision. During this period, the manufacturer may submit technical discussion, statistical analyses, additional data, or other information which is relevant to the decision. The Administrator will consider all information submitted by the deadline before reaching a final decision.

(i) Any manufacturer may request a hearing on the Administrator's withdrawal of approval in paragraph (h) of this section. The request shall be in writing and shall include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objection. If, after review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, she/he shall provide the manufacturer a hearing in accordance with § 86.1853-01 with respect to such issue.

§ 86.1824-01 Durability demonstration procedures for evaporative emissions.

This section applies to gasoline-, methanol-, liquefied petroleum gas-, and natural gas-fueled LDV/Ts and MDPVs. The manufacturer shall determine a durability process that will predict the expected evaporative emission deterioration of candidate in-use vehicles over their full useful life. The manufacturer shall use good engineering judgment in determining this process.

(a) *Service accumulation method.* (1) The manufacturer shall develop a service accumulation method designed to effectively predict the deterioration of candidate in-use vehicles' evaporative emissions in actual use over its full useful life. The manufacturer shall use good engineering judgement in developing this method.

(2) The manufacturers may develop a service accumulation methods based upon whole-vehicle full-mileage accumulation, whole vehicle accelerated mileage accumulation (e.g., where 40,000 miles on a severe mileage accumulation cycle is equivalent to 100,000

miles of normal in-use driving), bench aging of individual components or systems, or other approaches approved by the Administrator.

(i) For whole vehicle mileage accumulation programs, all emission control components and systems (including both hardware and software) must be installed and operating for the entire mileage accumulation period.

(ii) Bench procedures shall simulate the aging of components or systems over the applicable useful life and shall simulate driving patterns and vehicle operational environments found in actual use. For this purpose, manufacturers may remove the emission-related components (and other components), in whole or in part, from the durability vehicle itself and deteriorate them independently. Vehicle testing for the purpose of determining deterioration factors may include the testing of durability vehicles that incorporate such bench-aged components.

(iii) For gasoline fueled vehicles certified to meet the evaporative emission standards set forth in § 86.1811-04(e)(1), any service accumulation method for evaporative emissions must employ gasoline fuel for the entire service accumulation period which contains ethanol in, at least, the highest concentration permissible in gasoline under federal law and that is commercially available in any state in the United States. Unless otherwise approved by the Administrator, the manufacturer must determine the appropriate ethanol concentration by selecting the highest legal concentration commercially available during the calendar year before the one in which the manufacturer begins its service accumulation. The manufacturer must also provide information acceptable to the Administrator to indicate that the service accumulation method is of sufficient design, duration and severity to stabilize the permeability of all non-metallic fuel and evaporative system components to the service accumulation fuel constituents.

(iv) For flexible-fueled, dual-fueled, multi-fueled, ethanol-fueled and methanol-fueled vehicles certified to meet the evaporative emission standards set forth in § 86.1811-04(e)(1), any service accumulation method must employ