

APPENDIX B

California Environmental Protection Agency
AIR RESOURCES BOARD

PROPOSED

CALIFORNIA EVALUATION PROCEDURES FOR NEW AFTERMARKET CATALYTIC CONVERTERS

NOTE: ~~———— This is a new Evaluation Procedure. For clarity the proposed text~~
~~———— is shown in normal type.~~

Adopted: October 25, 2007
Amended: [INSERT DATE OF AMENDMENT]

Note: The proposed amendments to this document are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions compared to the test procedures as adopted October 25, 2007. Existing intervening text that is not amended in this rulemaking is indicated by “* * * *”.

* * *

(c) DEFINITIONS

* * *

“Full useful life” refers to the FTP emission test standard applicable ~~between~~ to the point that the vehicle ~~has passed its interim useful life and the point that it reaches the end of its full useful life as defined in the certification requirements and test procedures incorporated by reference in title 13, CCR sections 1961(d) and 1961.2(d).~~

* * *

“Low Emission Vehicle (LEV) I standard” refers to the LEV vehicle category exhaust emission standards defined in title 13, CCR sections 1956.8(g), 1960.1(g)(1), and 1960.1(h)(~~4~~2).

* * *

(e) EMISSION TESTING REQUIREMENTS

* * *

(2) Vehicles With Multiple ~~Catalysts~~ Catalytic Converters of the Same Design

If the new aftermarket catalytic converter is intended to replace any of multiple OEM ~~catalysts~~ catalytic converters of the same design on vehicles so equipped (e.g., on vehicles with dual or Y exhaust systems that use ~~catalysts~~ catalytic converters of the same design in each bank), all OEM ~~catalysts~~ catalytic converters of the same design shall be replaced for purposes of emissions and OBD II compatibility testing.

* * *

(4) Emission Performance Testing

* * *

(A) Required Test Vehicle Criteria

* * *

2. Allowable Maintenance

Allowable maintenance may be performed on test vehicles as specified in Table 1. below prior to baseline FTP emission testing. Allowable scheduled

maintenance shall be conducted according to the maintenance allowed in ARB's certification procedures for new vehicles referenced in title 13, CCR sections 1961(d) and 1961.2(d) and applicable to the test vehicle. Records of all vehicle and engine maintenance must be maintained and submitted with the test results. Unscheduled maintenance must first be approved by ARB and will only be approved if ARB determines the maintenance will not affect the vehicle's emissions. Repairs needed to correct detected OBD II malfunctions, except oxygen sensor or ~~catalysts~~ catalytic converter malfunctions, are allowed for all test vehicles prior to baseline emission testing and do not require ARB approval. Any oxygen sensor or catalytic converter repairs require prior ARB approval, and any oxygen sensor or catalytic converter replacement parts approved by ARB for installation must be aged to at least the equivalent of the mileage of the vehicle.

3. Baseline Emission Testing

* * * *

Table 1. Emissions and Maintenance Criteria

Test Vehicle odometer mileage	Baseline Emissions	Allowable Maintenance
Less than 50,000 miles	Must comply with interim useful life certification standards, <u>if applicable</u>	Only scheduled maintenance allowed.
Over 50,000 but less than full useful life miles	Must comply with full useful life certification standards	Only scheduled maintenance allowed.
Over full useful life miles	Must comply with full useful life certification standards	Scheduled maintenance and any reconditioning or repairs needed to return the vehicle to OEM specifications.

(B) Catalytic Converter Installation and Vehicle Stabilization

1. Installation

The test facility shall install the catalytic converter(s) in test vehicles in accordance with the new aftermarket catalytic converter manufacturer's instructions and the installation requirements specified in section (h)(1)(E) through (h)(1)(G). Catalytic converters designed to replace only a portion of the ~~catalyst~~ catalytic converter system in multi-catalytic converter systems shall be tested in combination with all OEM catalytic converters that are not replaced by the catalytic converter. OEM catalytic converters on the test vehicle that are not replaced by aftermarket catalytic converters must be aged in accordance with section (e)(3).

* * * *

(C) Emissions Performance Measurement and Evaluation

The emission performance of the test vehicle with the catalytic converter installed shall be measured and evaluated as follows:

1. Two consecutive FTP emission tests shall be performed in accordance with the applicable test procedures (i.e., the procedures applicable to the model year and classification of the test vehicle) referenced in title 13, CCR sections 1960.1(k) and 1961.2(d).

* * * *

(5) Demonstration of OBD II System Compatibility

The manufacturer shall demonstrate for each OBD II test vehicle selected that the catalytic converter design is compatible with the test vehicle's OBD II system such that: (a) its use will not cause the OBD II system to falsely detect a ~~catalyst~~ catalytic converter or other emission-related malfunction; and (b) its use will not hinder the OBD II system from properly detecting a malfunctioning ~~catalyst~~ catalytic converter or other emission-related component or system. The tests specified in section (e)(5)(A) shall be performed by an independent testing facility. The tests specified in section (e)(5)(B) may be performed by an independent testing facility or by the manufacturer.

* * * *

(A) Demonstration that the Malfunction Indicator Light (MIL) Will Not Falsely Illuminate

For the sole purpose of granting an exemption from California Vehicle Code sections 27156 and 38391 at the time of application, ARB shall conclude that the new aftermarket catalytic converter(s) will not falsely cause the MIL to illuminate if the catalytic converter does not cause the test vehicle's OBD II system to detect a ~~catalyst~~ catalytic converter or other emission-related system malfunction during the testing required in section (e)(4)(C). If the catalytic converter(s) causes the test vehicle's OBD II system to detect a malfunction within the catalytic converter system or any other emission-related component or system during the testing required in section (e)(4)(C), the catalytic converter(s) shall be determined to be noncompliant.

(B) Proper MIL Illumination Demonstration

For the purposes of approval of an exemption at the time of application, the new aftermarket catalytic converter(s) shall be evaluated using the procedures and

criteria specified below to determine if the requirements for proper MIL illumination demonstration are satisfied.

1. Incremental Aging of the Catalytic Converter

The manufacturer or independent test facility shall utilize the procedures specified in either Appendix B or Appendix C of these procedures to incrementally age the catalytic converter to the point of MIL illumination on the test vehicle. The catalytic converter(s) aged for MIL illumination demonstration purposes may not be the same converter(s) used for the emission performance evaluation. A ~~catalyst~~ catalytic converter aged to the point of MIL illumination is required for each monitored location in the test vehicle's exhaust system at which an aftermarket catalytic converter was installed for the emission performance evaluation. Manufacturers may request Executive Officer approval to employ alternate time-and-temperature based methods to age catalytic converters for the purpose of demonstrating compliance with MIL illumination requirements. The Executive Officer shall approve an alternate method if the manufacturer submits data and/or engineering evaluations adequate to demonstrate that the aging process is representative of real world catalytic converter deterioration and/or provides for aging comparable to ARB approved methods.

* * * *

(C) Record Keeping Requirements

The independent test facility shall record OBD II system status during the OBD II compatibility demonstration procedure. At a minimum, the records must include OBD II system readiness status, MIL status, stored fault codes, pending fault codes and, as specified below, ~~catalyst~~ catalytic converter monitoring test results after each of the following conditions: baseline emission testing (section (e)(4)(A)3.); stabilization on the test vehicle (section (e)(4)(B)2); and each FTP emission test (section (e)(4)(C)). The manufacturer shall maintain a copy of these records and shall submit a copy to ARB as part of the application for exemption (see section (g)). ~~Catalyst~~ Catalytic converter monitoring test results ("test results" accessible via Service/Mode \$06 of SAE J1979 as required by title 13, CCR sections 1968.1 or 1968.2) from the test vehicle's OBD II system must be recorded immediately prior to and after each FTP emission test required in sections (e)(4)(A)3 and (e)(4)(C), and immediately before and after each emission test conducted during the incremental aging procedure required in section (e)(5)(B)1.

* * * *

(f) ADDITIONAL REQUIREMENTS FOR EXEMPTION

* * *

(2) Warranty Requirements

* * *

(C) Semi-Annual Manufacturer Warranty Reporting

* * *

4. Emission warranty information reports and updates shall be submitted to the Chief, ~~Mobile Source Operations Division~~ Emissions Compliance, Automotive Regulations and Science Division, 9480 Telstar Avenue, Suite 4, El Monte, CA 91731.

* * *

(5) Quality Control Procedures

* * *

(B) Evaluation Criteria

* * *

4. The ~~catalyst~~ catalytic converter's shell and welds must be free of excessive leakage in accordance with manufacturers' specifications.

* * *

(D) Documentation Requirements

* * *

2. Reports shall be sent to the Chief, ~~Mobile Source Operations Division~~ Emissions Compliance, Automotive Regulations and Science Division, Air Resources Board, 9480 Telstar Avenue, Suite 4, El Monte, CA 91731.

* * *

(h) INSTALLATION REQUIREMENTS

- (1) Installers of exempted new aftermarket catalytic converters shall adhere to the following requirements for proper installation. The manufacturer shall make these

installation requirements available to installers of its products through its normal means for communicating with installers including, but not limited to, the VAC, the manufacturer's website, requests via phone or email for technical help from installers, and other documentation distributed to installers. Installers may not install a new aftermarket catalytic converter in a vehicle unless all of the following conditions are met:

* * * *

- (C) The vehicle is beyond the coverage of the OEM ~~catalyst~~ catalytic converter warranty period (which can vary from 7 years or 70,000 miles to as high as 15 years or 150,000 miles).¹ Installers may reference the vehicle owner's manual/warranty booklet or contact the vehicle manufacturer or its representative to verify the applicable OEM ~~catalyst~~ catalytic converter warranty;

* * * *

- (2) Installers shall keep documentation regarding the installation of the new aftermarket catalytic converters including all of the above information. This documentation shall be made available to ARB or its representative as provided for in title 13, section 2222(b)(8)(f). All such records shall be maintained for four years from the date of sale or installation of the catalytic converter.

* * * *

APPENDIX B

Misfire-based Incremental Aging Procedure for MIL Illumination Demonstration

Set-up

The manufacturer shall install the new aftermarket catalytic converter(s) on the test vehicle in the same configuration as used for FTP emission testing in section (e)(4)(B)1.

To age the catalytic converter, the manufacturer shall implant a spark-related misfire malfunction into the test vehicle's ignition system. The vehicle shall then be operated on a chassis dynamometer to raise the temperature of the catalytic converter(s). The manufacturer shall adjust the induced misfire rate, vehicle engine speed and load, and chassis dynamometer loading until a stabilized ~~catalyst~~ catalytic converter-damaging

¹ The actual manufacturer's ~~catalyst~~ catalytic converter warranty period for an individual vehicle is listed in the vehicle's owner's manual and/or warranty booklet. Examples of current warranty periods include seven years and 70,000 miles, eight years and 80,000 miles, and 15 years and 150,000 miles, depending on the vehicle.

temperature of 1050 degrees Celsius is achieved approximately one inch into the front face of the furthest upstream catalytic converter. If necessary, manufacturers may equip the test vehicle with thermocouples to verify that this temperature is achieved.

The manufacturer may request the use of an alternate temperature as the ~~catalyst~~ catalytic converter-damaging temperature. ARB will approve the request upon submittal and review of data by the manufacturer if the data adequately indicate that the alternate temperature will achieve equivalent deterioration necessary to properly perform the incremental aging procedure.

Incremental Aging

The manufacturer shall operate the vehicle for a maximum of five hours of continuous operation at the ~~catalyst~~ catalytic converter-damaging temperature. The manufacturer shall then allow the catalytic converter to cool down to ambient temperature before operating the test vehicle again. The test vehicle shall then be operated (without the implanted misfire) to exercise the ~~catalyst~~ catalytic converter monitor of the OBD II system. If the ~~catalyst~~ catalytic converter monitor detects a fault and illuminates the MIL, the incremental aging is done. If the ~~catalyst~~ catalytic converter monitor does not detect a fault and illuminate the MIL, the ~~catalyst~~ catalytic converter monitor test results should be recorded and then the incremental aging shall be resumed. The manufacturer shall operate the vehicle at the ~~catalyst~~ catalytic converter-damaging temperature for a period of no less than one hour and no more than three hours before allowing the catalytic converter to cool down to ambient temperature and re-exercising the ~~catalyst~~ catalytic converter monitor of the OBD II system. This process shall be repeated until the ~~catalyst~~ catalytic converter monitor detects a fault. The manufacturer may utilize the information from the ~~catalyst~~ catalytic converter monitoring test results reported from the OBD II system to determine subsequent time intervals for aging. The manufacturer may request ARB approval to re-can the incrementally aged catalytic converter if the matting material was damaged due to the rapid high temperature aging. ARB will grant approval upon the manufacturer demonstrating that the substrates will be re-used and the changes to the can and/or mat material will not affect the performance of the catalytic converter.

APPENDIX C

Furnace-based Incremental Aging Procedure for MIL Illumination Demonstration

Setup

1. The furnace to be used for ~~catalyst~~ catalytic converter aging shall have its temperature controls calibrated to ensure accuracy. Following calibration, the hot zones (i.e., the portions of the furnace interior that reach the intended temperature) shall be mapped using a temperature sensor and shall be noted.

Aging Procedure

* * * *

9. The test vehicle shall be driven on the road or on a chassis dynamometer under operating conditions that will permit monitoring of the catalytic converter(s) to occur.

* * * *

- b. If the readiness indicators show that monitoring has occurred, but all converters have not been detected as malfunctioning by the OBD II system, the ~~catalysts~~ catalytic converters that were not detected as malfunctioning may be incrementally aged further, or new ~~catalysts~~ catalytic converters may be aged according to this procedure at either a higher final temperature, for a longer period of time, or a combination of the two.

* * * *