

## Appendix A

### Exhaust Emission Standards and Test Procedures for Off-Road Diesel Engines and Equipment (50 <= hp <175)

NOTE: This document incorporates by reference various sections of the Code of Federal Regulations, some with modifications. California provisions which replace specific federal provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" for the new California language. The symbols "\*\*\*\*\*" and "..." mean that the remainder of the federal text for a specific section, which is not shown in these procedures, has been included by reference, with only the printed text changed. Federal regulations which are not listed are not part of the procedures.

The following provisions of Subparts A to E, Part 89, Title 40, Code of Federal Regulations, as adopted or amended by the U.S. Environmental Protection Agency on the date listed, and only to the extent they pertain to the testing and compliance of exhaust emissions from nonroad diesel cycle vehicles/engines/equipment, are adopted and incorporated by reference as the Exhaust Emission Standards and Test Procedures for Exempting Add-on and Modified Parts for Off-Road Diesel Engines and Equipment rated from 50 to 175 hp and certified to meet federal emission standards and certification provisions, except as altered or replaced by the provisions set forth below.

#### Subpart A- General

89.1 Applicability. April 16, 1998.

(a) ... greater than or equal to 50 horsepower (hp) and less than 175 hp ...

\* \* \* \* \*

89.2 Definitions. April 16, 1998.

\* \* \* \* \*

"Administrator" DELETE

REPLACE WITH: "Administrator" means the Executive Officer of the Air Resources Board.

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"EPA enforcement officer" DELETE

REPLACE WITH: "EPA enforcement officer" means the Executive Officer or his or her delegate.

\* \* \* \* \*

"Off road aftermarket parts manufacturer" means any person engaged in the manufacturing or assembling of add-on or modified parts, as defined in Section 1900(b),

(1) and (10), Chapter 3, Title 13, California Code of Regulations, for off-road vehicles, engines, or equipment subject to California or federal emission standards.

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“Presentation of Credentials” DELETE

REPLACE WITH: “Presentation of Credentials” means the display of the document designating a person as an EPA enforcement officer or ARB authorized representative.

\* \* \* \* \*

89.3 Acronyms and abbreviations. June 17, 1994.

89.4 Section numbering. June 17, 1994.

89.5 Table and figure numbering; position. June 17, 1994.

89.6 Reference materials. June 17, 1994.

Appendix A to Subpart A -

State Regulation of Nonroad Internal Combustion Engines. December 30, 1997

#### Subpart B - Emission Standards and Certification Provisions

89.101-96 Applicability. June 17, 1994.

89.102-96 Effective dates, optional inclusion. June 17, 1994.

(a)(3) - DELETE

(a)(4) - DELETE

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89.103-96 Definitions. June 17, 1994.

89.106-96 Prohibited Controls. June 17, 1994.

89.108-96 Adjustable parameters, requirements. June 17, 1994.

89.111-96 Averaging, banking, and trading of emissions. June 17, 1994.

89.112-96 Oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter exhaust emission standards. June 17, 1994.

(a)(2)-DELETE

(a)(3)-DELETE

(a)(4)-DELETE

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89.113-96 Smoke emission standard. June 17, 1994.

89.114-96 Special test procedures. June 17, 1994.

89.118-96 Service accumulation. June 17, 1994.

89.119-96 Emission tests. June 17, 1994.

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(b) DELETE

(c) DELETE  
(d) DELETE "EPA"  
REPLACE WITH: "ARB"

89.120-96 Compliance with emission standards. June 17, 1994.

\* \* \* \* \*

(c) DELETE

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#### Subpart D - Emission Test Equipment Provisions

89.301-96 Scope; applicability. June 17, 1994.  
89.302-96 Definitions. June 17, 1994.  
89.303-96 Symbols/abbreviations. June 17, 1994.  
89.304-96 Equipment required for gaseous emissions; overview. June 17, 1994.  
89.305-96 Equipment measurement accuracy/calibration frequency. June 17, 1994.  
89.306-96 Dynamometer specifications and calibration weights. June 17, 1994.  
89.307-96 Dynamometer calibration. June 17, 1994.  
89.308-96 Sampling system requirements for gaseous emissions. June 17, 1994.  
89.309-96 Analyzers required for gaseous emissions. June 17, 1994.  
89.310-96 Analyzer accuracy and specifications. June 17, 1994.  
89.311-96 Analyzer calibration frequency. June 17, 1994.  
89.312-96 Analytical gases. June 17, 1994.  
89.313-96 Initial calibration of analyzers. June 17, 1994.  
89.314-96 Pre- and post-test calibration of analyzers. June 17, 1994.  
89.315-96 Analyzer bench checks. June 17, 1994.  
89.316-96 Analyzer leakage and response time. June 17, 1994.  
89.317-96 NOx converter check. June 17, 1994.  
89.318-96 Analyzer interference checks. June 17, 1994.  
89.319-96 Hydrocarbon analyzer calibration. June 17, 1994.  
89.320-96 Carbon monoxide analyzer calibration. June 17, 1994.  
89.321-96 Oxides of nitrogen analyzer calibration. June 17, 1994.  
89.322-96 Carbon dioxide analyzer calibration. June 17, 1994.  
89.323-96 NDIR analyzer calibration. June 17, 1994.  
89.324-96 Calibration of other equipment. June 17, 1994.  
89.325-96 Engine intake air temperature measurement. June 17, 1994.  
89.326-96 Engine intake air humidity measurement. June 17, 1994.  
89.327-96 Charge cooling. June 17, 1994.  
89.328-96 Inlet and exhaust restrictions. June 17, 1994.  
89.329-96 Engine cooling system. June 17, 1994.  
89.330-96 Lubricating oil and test fuels. June 17, 1994.  
89.331-96 Test conditions. June 17, 1994.

Appendix A to Subpart D - Tables. June 17, 1994

Table 1 - Abbreviations Used in Subpart D.

Table 2 - Symbols Used in Subpart D.

Table 3 - Measurement Accuracy Calibration Frequency (MY96 and Later)

Table 4 - Test Fuel Specifications for MY96 and Later: Federal Specifications

Table 5- Test Fuel Specifications for MY96 and Later: California Specifications

Appendix B to Subpart D - Figures. June 17, 1994.

Figure 1 - Exhaust Gas Sampling and Analytical Train

Figure 2 - NOx Converter Efficiency Detector

### Subpart E- Exhaust Emission Test Procedures

89.401-96 Scope; applicability. June 17, 1994.

89.402-96 Definitions. June 17, 1994.

89.403-96 Symbols/abbreviations. June 17, 1994.

89.404-96 Test procedure overview. June 17, 1994.

89.405-96 Recorded information. June 17, 1994.

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#### (b) DELETE

REPLACE WITH: *Engine description and specification.* A copy of the information specified in this paragraph must accompany each off-road aftermarket parts manufacturer's emissions test data sent to the Administrator.

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89.406-96 Pre-test procedures. June 17, 1994.

89.407-96 Engine dynamometer test run. June 17, 1994.

89.408-96 Post-test procedures. June 17, 1994.

89.409-96 Data logging. June 17, 1994.

89.410-96 Engine test cycle. June 17, 1994.

89.411-96 Exhaust sample procedure-gaseous components. June 17, 1994.

89.412-96 Raw gaseous exhaust sampling and analytical system description. June 17, 1994.

89.413-96 Raw sampling procedures. June 17, 1994.

89.414-96 Air flow measurement specifications. June 17, 1994.

89.415-96 Fuel flow measurement specifications. June 17, 1994.

89.416-96 Raw exhaust gas flow. June 17, 1994.

89.417-96 Data evaluation for gaseous emissions. June 17, 1994.

89.418-96 Raw emission sampling calculations. June 17, 1994.

89.419-96 Dilute gaseous exhaust sampling and analytical system description. June 17, 1994.

89.420-96 Background sample. June 17, 1994.

89.421-96 Exhaust gas analytical system; CVS bag sample. June 17, 1994.

89.422-96 Dilute sampling procedures- CVS calibration. June 17, 1994.

89.423-96 CVS calibration frequency. June 17, 1994.

89.424-96 Dilute emission sampling calculations. June 17, 1994.

89.425-96 Particulate adjustment factor. June 17, 1994.

Appendix A to Subpart E -Figures

Figure 1 - Sample Probe and Typical Hole Spacing

Figure 2 - Gaseous and Particulate Emissions Sampling System (PDP-CVS)

Figure 3 - Gaseous and Particulate Emissions Sampling System (CVF-CVS)

Figure 4 - Exhaust Gas Analytical System

Figure 5 - PDP-CVS Calibration Configuration

Figure 6 - CFV-CVS Calibration Configuration

Figure 7 -Sonic Choking

Appendix B to Subpart E -Tables

Table 1 - 8 Mode Test Cycle (MY96 and Later)