

**State of California  
AIR RESOURCES BOARD**

**CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES  
FOR NEW 1996 AND LATER TIER 1, TIER 2, AND TIER 3 OFF-ROAD  
COMPRESSION-IGNITION ENGINES**

**PART II**

Adopted: May 12, 1993

Amended: ~~January 28, 2000~~(date of amendment)

**NOTE:** This document incorporates by reference the International Standards Organization (ISO) 8178 test procedure, Part 1, June 3, 1992, and Part 4, June 30, 1992, and Part 5, June 3, 1992, with modifications. Sections which have been included in their entirety are set forth with the section number and title. California provisions which modify specific ISO language provisions are denoted by the words "DELETE" for the ISO language and "REPLACE WITH" for the new California language. The symbols "\*\*\*\*\*" and "..." mean that the remainder of the ISO text for a specific section is not shown in these procedures but has been included by reference, unchanged. ISO sections which are not listed are not part of the procedures.

This Document is printed in a style to indicate changes from existing provisions. All existing language is indicated by plain type. All additions to language are indicated by underline. All deletions to language are indicated by ~~strikeout~~.

If there is any conflict between the provisions of this document and the California Health and Safety Code, Division 26, or Title 13 of the California Code of Regulations, the Health and Safety Code and Title 13 apply.

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES  
FOR NEW 1996 AND LATER TIER 1, TIER 2, AND TIER 3 OFF-ROAD  
COMPRESSION-IGNITION ENGINES

PART II

To the extent the following provisions of ISO 8178, Part 1, version N95, June 3, 1992, and Part 4, version N97, June 30, 1992, and Part 5, version N99, June 3, 1992, pertain to the testing and compliance of exhaust emissions from off-road compression-ignition engines, they are adopted and incorporated herein by this reference as Part II of the California Exhaust Emission Standards and Test Procedures for New 1996-1999 Heavy-Duty Off-Road Compression-Ignition Engines (1996-1999 Heavy-Duty Test Procedures) and the California Exhaust Emission Standards and Test Procedures for New 2000 and Later Tier 1, Tier 2, and Tier 3 Off-Road Compression-Ignition Engines (2000 ~~and Later~~ Plus Limited Test Procedures), except as altered or replaced by the provisions set forth below.

Since the scope of this regulation is limited to off-road compression-ignition engines, the ISO provisions contained in the procedure identified above which pertain to Otto cycle engines or to engines used for applications other than off-road purposes shall not be applicable to Part II of these procedures.

ISO 8178, RIC Engines – Exhaust emission measurement – Part 1: Test bed measurement of gaseous and particulate exhaust emissions from RIC engines.

1. Scope
2. Normative References
3. Definitions

ADD:

Note: In addition to the definitions listed here, those definitions listed in Section 2 of the 1996-1999 Heavy-Duty Test Procedures and Section 89.2 of the 2000 ~~and Later~~ Plus Limited Test Procedures shall apply.

\* \* \* \* \*

4. Symbols and Abbreviations

ADD:

Note: In addition to the symbols and abbreviations listed here, those symbols and abbreviations listed in Section 3 of the 1996-1999 Heavy-Duty Test Procedures and Section 89.3 of the 2000 ~~and Later~~ Plus Limited Test Procedures shall apply.

\* \* \* \* \*

5. Test Conditions

6. Test Fuels

DELETE  
REPLACE WITH:

Test fuels shall meet the requirements specified in Section 25 of the 1996-1999 Heavy-Duty Test Procedures or Section 89.330 of the 2000 ~~and Later~~ Plus Limited Test Procedures, as applicable.

7. Measurement Equipment and data to be measured

DELETE any reference to the single filter method.

8. Calibration of the analytical instruments

9. Calibration of the particulate sampling system

10. Running conditions (Test cycles)

11. Test run

DELETE any reference to the single filter method.

12. Data evaluation for gaseous and particulate emission

13. Calculation of the gaseous emissions

14. Calculation of the particulate emission

DELETE any reference to the single filter method.

15. Determination of the gaseous emissions

16. Determination of the particulates

## Figures and Explanations

Annex A

Annex B Auxiliary Equipment

Annex C NMHC method, efficiency

Annex D Calculation formulas for u, v, w

Annex E Heat calculation (transfer tube)

Annex F Informative

ISO 8178, RIC Engines – Exhaust emission measurement – Part 4: Test cycles for different engine applications.

1. Scope
2. Normative References
3. Definitions

ADD:

Note: In addition to the definitions listed here, those definitions listed in Section 2 of the 1996-1999 Heavy-Duty Test Procedures and Section 89.2 of the 2000 ~~and Later~~ Plus Limited Test Procedures shall apply.

\* \* \* \* \*

4. Symbols and Abbreviations

ADD:

Note: In addition to the symbols and abbreviations listed here, those symbols and abbreviations listed in Section 3 of the 1996-1999 Heavy-Duty Test Procedures and Section 89.3 of the 2000 ~~and Later~~ Plus Limited Test Procedures shall apply.

\* \* \* \* \*

5. Information regarding preparation of the test

DELETE any reference to ISO 8178-2.

6. Modes and weighting factors for test cycles

\* \* \* \* \*

6.1 DELETE

6.2 DELETE

6.3 Test cycle types C “Off-road vehicles and industrial equipment”

\* \* \* \* \*

6.3.2 DELETE

6.4 DELETE

6.5 DELETE

6.6 DELETE

6.7 DELETE

ISO 8178, RIC Engines – Exhaust emission measurement – Part 5:  
Specifications of test fuels.

1. Scope

DELETE  
REPLACE WITH:

This part specifies the calculation of the specific factors and exhaust flow, which are necessary to determine the emission test results in accordance with ISO 8178, Part 1.

2. Normative References

3. Definitions

ADD:

Note: In addition to the definitions listed here, those definitions listed in Section 2 of the 1996-1999 Heavy-Duty Test Procedures and Section 89.2 of the 2000 ~~and Later~~Plus Limited Test Procedures shall apply.

\* \* \* \* \*

4. Symbols and Abbreviations

ADD:

Note: In addition to the symbols and abbreviations listed here, those symbols and abbreviations listed in Section 3 of the 1996-1999 Heavy-Duty Test Procedures and Section 89.3 of the 2000 ~~and Later~~Plus Limited Test Procedures shall apply.

\* \* \* \* \*

6. Remarks

DELETE

7. Calculation of the Exhaust Gas Flow Using Fuel Specific Factors

8. Calculation of the Fuel Specific Factors

Tables

Appendix A

Appendix B

Appendix C