

**APPENDIX A: MANUFACTURER STANDARDS AND TEST PROCEDURES**  
**Part 3**

Proposed Regulation Order Part 3: Amendments to the incorporated “California Exhaust and Standards and Test Procedures for New 2001 and Later Off-Road Large Spark-Ignition Engines” (ISO 8178)



State of California  
AIR RESOURCES BOARD

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES  
FOR NEW 2001 ~~AND LATER~~ THROUGH 2006 OFF-ROAD LARGE SPARK-IGNITION  
ENGINES

PART II

Adopted: September 1, 1999

**NOTE:** This document incorporates by reference the International Standards Organization (ISO) 8178 test procedure, Part 1, August 15, 1996, Part 4, August 15, 1996, and Part 5, May 15, 1998, 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 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 all newly adopted text.~~

The sole amendments are to the title and years of applicability of the regulations.

CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES  
FOR NEW 2001 ~~AND LATER~~ THROUGH 2006 OFF-ROAD LARGE SPARK-IGNITION  
ENGINES

PART II

To the extent the following provisions of ISO 8178, Part 1, August 15, 1996, Part 4, August 15, 1996, and Part 5, May 15, 1998, pertain to the testing and compliance of exhaust emissions from off-road large spark-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 2001 ~~and Later~~ through 2006 Off-Road Large Spark-Ignition Engines (Test Procedures), except as altered or replaced by the provisions set forth below.

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

International Standards Organization (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 Part I of these Test Procedures 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 Part I of these Test Procedures shall apply.

\* \* \* \* \*

5. Test Conditions

6. DELETE and

REPLACE WITH:

6. Test fuels

Test fuels shall meet the requirements specified in section 25 of Part I of these Test Procedures.

7. Measurement Equipment and data to be measured

DELETE all references to subsection 7.5 (Determination of the Particulates).

8. Calibration of the analytical instruments

9. DELETE

10. Running conditions (Test cycles)

11. Test run

DELETE all references to the particulates and particulate sampling method.

12. Data evaluation for gaseous and particulate emission

DELETE all references to the particulate emission.

13. Calculation of gaseous emissions

14. DELETE

15. Determination of the gaseous emissions

ADD:

NOTE: Manufacturers may use the raw exhaust gas sampling methods for certification testing through 2004 model year with prior Executive Officer approval.

\* \* \* \*

16. DELETE

Figures and Explanations

Annex A	Calculation of the exhaust gas mass flow and/or of the combustion air consumption
Annex B	Equipment and auxiliaries to be installed for the test to determine engine power
Annex C	Efficiency calculation and corrections for the non-methane hydrocarbon cutter measuring method
Annex D	Formulae for the calculation of the coefficients u, v, w in 13.4
Annex E	Heat calculation (transfer tube)
Annex F	Bibliography

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 Part I of these 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 Part I of these Test Procedures shall apply.

\* \* \* \* \*

5. Torque
6. Intermediate speed
7. Information regarding of the test
8. Modes and weighting factors for test cycles

8.2 DELETE

8.3 Test cycle types C "Off-road vehicles and industrial equipment"

8.3.1 DELETE

8.4 Test cycle type D “Constant”

DELETE all references to D-1 test cycle

8.5 DELETE

8.6 DELETE

8.7 Test cycles type G “Utility, lawn and garden”, typically < 25 hp.

DELETE all reference to G-2 and G-3 test cycles.

ADD:

Note: Manufacturers may use the G-1 test cycle for engines equal to or less than 1.0 liter. Manufacturer must show that the engines tested with the G-1 test cycle have engine characteristics and operating characteristics similar to small off-road equipment engines (less than 25 hp).

\* \* \* \*

Annex A DELETE

Annex B Combined table of the weighting factors

Annex C Bibliography



ISO 8178, RIC Engines - Exhaust emission measurement - Part 5: Test fuels.

1. DELETE and

REPLACE WITH:

1. Scope

This part specifies the calculation of the fuel specific factors and exhaust gas 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 Part I of these Test Procedures 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 Part I of these Test Procedures apply.

\* \* \* \* \*

5. DELETE and REPLACE WITH:

5. Choice of Fuels

Test fuels shall meet the requirements specified in section 25 of Part I of these Test Procedures.

6. DELETE

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

8. Calculation of the Fuel Specific Factors  
Tables

Annex A	Calculation of the fuel specific factors
Annex B	Equivalent non-ISO test methods
Annex C	Organizations capable of providing specifications for commercial fuels
Annex D	Bibliography