

California Environmental Protection Agency
AIR RESOURCES BOARD

**CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR
2001 AND SUBSEQUENT MODEL
PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES**

Adopted: August 5, 1999
Amended: December 27, 2000
Amended: July 30, 2002
Amended: September 5, 2003 (corrected February 20, 2004)
Amended: May 28, 2004

NOTE: The amendments to this document are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions compared to the test procedures as amended September 5, 2003 and corrected February 20, 2004.

**CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES
FOR 2001 AND SUBSEQUENT MODEL
PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES**

The provisions of Subparts B, C, and S, Part 86, Title 40, Code of Federal Regulations, as adopted or amended on May 4, 1999 or as last amended on such other date set forth next to the 40 CFR Part 86 section title listed below, and to the extent they pertain to exhaust emission standards and test procedures, are hereby adopted as the “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles,” with the following exceptions and additions.

**PART I: GENERAL PROVISIONS FOR CERTIFICATION AND IN-USE
VERIFICATION OF EMISSIONS**

[No changes]

**PART II: CALIFORNIA EXHAUST AND PARTICULATE EMISSION TEST
PROCEDURES FOR PASSENGER CARS, LIGHT-DUTY TRUCKS AND
MEDIUM-DUTY VEHICLES**

This part describes the equipment required and the procedures necessary to perform gaseous and particulate exhaust emission tests (40 CFR Part 86, Subpart B); cold temperature test procedures (40 CFR Part 86, Subpart C); the California 50°F test procedure; the development of reactivity adjustment factors; and the supplemental federal test procedure (40 CFR Part 86, Subpart B) on passenger cars, light-duty trucks and medium-duty vehicles.

**A. 40 CFR Part 86, Subpart B - Emission Regulations for 1977 and Later Model Year
New Light-Duty Vehicles and New Light-Duty Trucks; Test Procedures.**

100.1 General applicability.

- 86.101 General applicability. October 6, 2000.
- 86.102 Definitions. March 5, 1980.
- 86.103 Abbreviations. March 5, 1980.
- 86.104 Section numbering, construction. September 21, 1994.
- 86.105 Introduction; structure of subpart. September 21, 1994.

100.2 Equipment and Facility Requirements.

- 86.106-00 Equipment required; overview. October 22, 1996.
- 86.107-98 Sampling and analytical system, evaporative emissions. August 23, 1995.
- 86.108-00 Dynamometer. October 22, 1996.
- 86.109-94 Exhaust gas sampling system; Otto-cycle vehicles not requiring particulate emission measurements. June 30, 1995.

- 86.110-94 Exhaust gas sampling system; diesel-cycle vehicles, and Otto-cycle vehicles requiring particulate emissions measurements. June 30, 1995.
- 86.111-94 Exhaust gas analytical-system. September 30, 1994.
- 86.112-91 Weighing chamber (or room) and microgram balance specifications. June 5, 1991.

100.3 Certification Fuel Specifications.

- 86.113-94 Fuel Specifications. February 18, 2000.
- 86.113-04 Fuel Specifications. February 10, 2000.
- 86.113-07 Fuel Specifications. January 18, 2001.

100.3.1 California Certification Gasoline Specification.

Add the following subparagraph which reads: Gasoline having the specifications listed below may be used in exhaust and evaporative emission testing as an option to the specifications referred to in §86.113-94(a)(1) and in §86.113-04(a)(1). If a manufacturer elects to utilize this option, both exhaust and evaporative emission testing shall be conducted by the manufacturer with gasoline having the specifications listed below, and the Executive Officer shall conduct exhaust and evaporative emission testing with gasoline having the specifications listed below.

| California Certification Gasoline Specifications | | |
|---|--|------------------------------------|
| Fuel Property^(a) | Limit | Test Method^(b) |
| Octane (R+M)/2 | 91 (min) | D 2699-88, D 2700-88 |
| Sensitivity | 7.5 (min) | D 2699-88, D 2700-88 |
| Lead | 0-0.01 g/gal (max); no lead added | §2253.4(c), title 13 CCR |
| Distillation Range: | | §2263, title 13 CCR ^(c) |
| 10% point | 130-150 °F | |
| 50% point ^(d) | 200-210 °F | |
| 90% point ^(e) | 290-300 °F | |
| EP, maximum | 390 °F | |
| Residue | 2.0 vol. % (max) | |
| Sulfur | 30-40 ppm by wt. | §2263, title 13 CCR |
| Phosphorous | 0.005 g/gal (max) | §2253.4(c), title 13 CCR |
| RVP | 6.7-7.0 psi | §2263, title 13 CCR |
| Olefins | 4.0-6.0 vol. % | §2263, title 13 CCR |
| Total Aromatic Hydrocarbons | 22-25 vol. % | §2263, title 13 CCR |
| Benzene | 0.8-1.0 vol. % ^(f) | §2263, title 13 CCR |
| Multi-substituted Alkyl Aromatic Hydrocarbons | 12-14 vol. % ^(g) | |
| MTBE | 10.8-11.2 vol. % | §2263, title 13 CCR |
| Additives | Sufficient to meet requirements of §2257, title 13 CCR | |
| Copper Corrosion | No. 1 | D 130-88 |
| Gum, washed | 3.0 mg/100 mL (max) | D 381-86 |
| Oxidation Stability | 1000 minutes (min) | D 525-88 |
| Specific Gravity | Report ^(h) | |
| Heat of Combustion | Report ^(h) | |
| Carbon | Report wt. % ^(h) | |
| Hydrogen | Report wt. % ^(h) | |

^(a) The gasoline must be blended from typical refinery feedstocks.

(b) ASTM specification unless otherwise noted. A test method other than that specified may be used following a determination by the Executive Officer that the other method produces results equivalent to the results with the specified method.

(c) Although §2263, title 13, CCR refers to the temperatures of the 50 and 90 percent points, this procedure can be extended to the 10 percent and end point temperatures, and to the determination of the residue content.

(d) The range for interlaboratory testing is 195-215° F.

(e) The range for interlaboratory testing is 285-305° F.

(f) The range for interlaboratory testing is 0.7-1.1 percent by volume.

(g) “Detailed Hydrocarbon Analysis of Petroleum Hydrocarbon Distillates, Reformates, and Gasoline by Single Column High Efficiency (Capillary) Column Gas Chromatography,” by Neil Johansen, 1992, Boulder, CO.

(h) The fuel producer should report this fuel property to the fuel purchaser. Any generally accepted test method may be used and shall be identified in the report.

100.3.2 Certification Diesel Fuel Specifications.

100.3.2.1 Certification Diesel Fuel Specifications for the 2001-2006 Model Years.

Amend subparagraphs §86.113-94(b)(2) and (b)(3) and ~~§86.113-07(b)(2) and (b)(3)~~ as follows:

(b)(2) Except as noted below, petroleum fuel for diesel vehicles meeting the specifications referenced in 40 CFR §86.113-94(b)(2) ~~and in §86.113-07(b)(2)~~, or substantially equivalent specifications approved by the Executive Officer, shall be used in exhaust emission testing. The grade of petroleum fuel recommended by the engine manufacturer, commercially designated as “Type 2-D” grade diesel, shall be used. The petroleum fuel used in exhaust emission testing may meet the specifications listed below, or substantially equivalent specifications approved by the Executive Officer, as an option to the specifications in 40 CFR §86.113-94(b)(2) ~~and in §86.113-07(b)(2)~~. Where a manufacturer elects pursuant to this subparagraph to conduct exhaust emission testing using the specifications of 86.113-94(b)(2) ~~and in §86.113-07(b)(2)~~, or the specifications listed below, the Executive Officer shall conduct exhaust emission testing with the diesel fuel meeting the specifications elected by the manufacturer.

| California Certification Diesel Fuel Specifications for the 2001-2006 Model Years | | |
|--|---------------------|-----------------------------------|
| Fuel Property | Limit | Test Method ^(a) |
| Natural Cetane Number | 47-55 | D 613-86 |
| Distillation Range | | §2282(g)(3), title 13, CCR |
| IBP | 340-420 °F | |
| 10% point | 400-490 °F | |
| 50% point | 470-560 °F | |
| 90% point | 550-610 °F | |
| EP | 580-660 °F | |
| API Gravity | 33-39° | D 287-82 |
| Total Sulfur | 0.01-0.05 wt. % | §2282(g)(3), title 13, CCR |
| Nitrogen Content | 100-500 ppmw | §2282(g)(3), title 13, CCR |
| Total Aromatic Hydrocarbons | 8-12 vol. % | §2282(g)(3), title 13, CCR |
| Polycyclic Aromatic Hydrocarbons | 1.4 wt. % (max) | §2282(g)(3), title 13, CCR |
| Flashpoint | 130 °F (max) | D 93-80 |
| Viscosity @ 40°F | 2.0-4.1 centistokes | D 445-83 |

^(a) ASTM specifications unless otherwise noted. A reference to a subsection of §2282, title 13, CCR, means the test method identified in that subsection for the particular property. A test method other than that specified may be used following a determination by the Executive Officer that the other method produces results equivalent to the results of the specified method.

(b)(3) Diesel fuel representative of commercial diesel fuel which will be generally available through retail outlets shall be used in service accumulation.

100.3.2.2 Certification Diesel Fuel Specifications for the 2007 and Subsequent Model Years. Amend subparagraphs §86.113-07(b)(2) and (b)(3) as follows:

(b)(2) Except as noted below, petroleum fuel for diesel vehicles meeting the specifications referenced in 40 CFR §86.113-07(b)(2), or substantially equivalent specifications approved by the Executive Officer, shall be used in exhaust emission testing. The grade of petroleum fuel recommended by the engine manufacturer, commercially designated as “Type 2-D” grade diesel, shall be used. The petroleum fuel used in exhaust emission testing may meet the specifications listed below, or substantially equivalent specifications approved by the Executive Officer, as an option to the specifications in 40 CFR §86.113-07(b)(2). Where a manufacturer elects pursuant to this subparagraph to conduct exhaust emission testing using the specifications of 86.113-94(b)(2) and in §86.113-07(b)(2), or the specifications listed below, the Executive Officer shall conduct exhaust emission testing with the diesel fuel meeting the specifications elected by the manufacturer.

| California Certification Diesel Fuel Specifications For the 2007 and Subsequent Model Years | | |
|--|---------------------|-----------------------------------|
| Fuel Property | Limit | Test Method ^(a) |
| Natural Cetane Number | 47-55 | D 613-86 |
| Distillation Range | | §2282(g)(3), title 13, CCR |
| IBP | 340-420 °F | |
| 10% point | 400-490 °F | |
| 50% point | 470-560 °F | |
| 90% point | 550-610 °F | |
| EP | 580-660 °F | |
| API Gravity | 33-39° | D 287-82 |
| Total Sulfur | 7-15 ppm | §2282(g)(3), title 13, CCR |
| Nitrogen Content | 100-500 ppmw | §2282(g)(3), title 13, CCR |
| Total Aromatic Hydrocarbons | 8-12 vol. % | §2282(g)(3), title 13, CCR |
| Polycyclic Aromatic Hydrocarbons | 1.4 wt. % (max) | §2282(g)(3), title 13, CCR |
| Flashpoint | 130 °F (max) | D 93-80 |
| Viscosity @ 40°F | 2.0-4.1 centistokes | D 445-83 |

^(a) ASTM specifications unless otherwise noted. A reference to a subsection of §2282, title 13, CCR, means the test method identified in that subsection for the particular property. A test method other than that specified may be used following a determination by the Executive Officer that the other method produces results equivalent to the results of the specified method.

(b)(3) Diesel fuel representative of commercial diesel fuel which will be generally available through retail outlets shall be used in service accumulation.

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