State of California
Air Resources Board

UPDATED INFORMATIVE DIGEST

ADOPTION OF AMENDMENTS TO ONBOARD DIAGNOSTIC SYSTEM REQUIREMENTS FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, MEDIUM-DUTY VEHICLES AND ENGINES, AND HEAVY-DUTY ENGINES; AND ADOPTION OF ENFORCEMENT PROVISIONS FOR HEAVY-DUTY ENGINES

Sections Affected: Adoption of amendments to California Code of Regulations (Cal. Code Regs.), title 13, section 1968.2, which establishes OBD II requirements for 2004 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines, and section 1971.1, which establishes HD OBD requirements for 2010 and subsequent model year heavy-duty engines; and adoption of Cal. Code Regs., title 13, section 1971.5, which establishes enforcement provisions for 2010 and subsequent model year heavy-duty engines.

Background: OBD systems serve an important role in helping to ensure that engines and vehicles maintain low emissions throughout their full life. OBD systems monitor virtually all emission controls on gasoline and diesel engines, including catalysts, particulate matter (PM) filters, exhaust gas recirculation systems, oxygen sensors, evaporative systems, fuel systems, and electronic powertrain components as well as other components and systems that can affect emissions when malfunctioning. The systems also provide specific diagnostic information in a standardized format through a standardized data connector on-board the vehicles.

The Board originally adopted comprehensive OBD regulations in 1989, requiring all 1996 and newer model year passenger cars, light-duty trucks, and medium-duty vehicles and engines to be equipped with OBD systems (referred to as OBD II). The Board has modified the regulation in regular updates since initial adoption to address manufacturers' implementation concerns and, where needed, to strengthen specific monitoring requirements. Most recently, the Board updated the OBD II requirements in 2006 to address several concerns and issues regarding the regulation (Cal. Code Regs., title 13, §1968.2) and enforcement requirements (Cal. Code Regs., title 13, §1968.5). In 2005, ARB adopted Cal. Code Regs., title 13, section 1971.1, which established comprehensive OBD requirements for 2010 and subsequent model year heavy-duty engines and vehicles (referred to as HD OBD).

With this filing, ARB has adopted amendments to Cal. Code Regs., title 13, sections 1968.2 and 1971.1. ARB has also adopted new section 1971.5, Cal. Code Regs., title 13, which establish enforcement requirements for 2010 and subsequent model year heavy-duty engines and vehicles. ARB's Initial Statement of Reasons for the rulemaking was released on April 10, 2009. On May 28, 2009, the amendments and regulations were approved by the Board with modifications. These modifications, which include changes made in response to comments received during the hearing

and the 45-day period prior to it, were made available for public comment in the staff's Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information, released October 20, 2009.

Staff Proposal: In adopting the HD OBD requirements in 2005, the Board directed the staff to continue to follow manufacturers' progress towards meeting the regulation's requirements and to report back should modifications to the requirements be deemed appropriate. Since then, staff has identified areas in which modifications to section 1971.1, will provide for improved monitoring system performance.

The changes include revisions to the HD OBD regulation for diesel engines that relax the malfunction thresholds until 2013 model year for three major emission controls (PM filters, oxides of nitrogen (NOx) catalysts, and NOx sensors) based on the current limits of technical feasibility; delay the monitoring requirements for some catalyst-based components until 2013 to provide further lead time for emission control strategies to stabilize; clarify terms or definitions for several monitors; expand the monitoring requirements for exhaust gas recirculation (EGR) and boost control to cover all types of system architectures; and provide for additional data to be output to a scan tool for use by technicians or ARB staff for diagnosis, repair, and determining compliance.

The changes also include revisions to the HD OBD regulation for gasoline engines that are similar to those adopted in 2006 for light-duty gasoline vehicles. These changes will ensure robust detection of oxygen sensor slow response faults and specific fuel system faults that result in an imbalance from cylinder to cylinder.

Changes to the light- and medium-duty OBD II regulation have also been adopted primarily to harmonize the medium-duty diesel vehicle requirements with the revisions noted above for HD OBD diesel engines to allow manufacturers of both heavy-duty and medium-duty diesel engines to design to and meet essentially the same requirements. Some of the amendments, however, will also apply to light-duty vehicles covered by the OBD II regulation.

Finally, a separate enforcement regulation for HD OBD has been adopted (similar to the stand-alone enforcement regulation for the light- and medium-duty vehicles covered under the OBD II regulation) to define the procedures and criteria staff and manufacturers will be required to use in determining compliance of in-use engines with the HD OBD regulation.

Amendments to the HD OBD regulation include:

- Clarifying storage and erasure of permanent fault codes.
- Adding flexibility to calculate the infrequent regeneration adjustment factors.
- Revising in-use monitoring frequency tracking for the PM filter monitor.
- Revising the definition of "idle" for several tracking requirements.
- Clarifying the definition of "continuous" monitoring for several monitors

- Revising diesel fuel system monitoring requirements for non-common rail systems to allow less frequent monitoring.
- Expanding monitoring for slow response faults in diesel boost pressure control systems to all types of boost control systems.
- Revising the 2010 through 2012 model year malfunction thresholds for the diesel PM filter monitor, the NOx catalyst monitor, and the NOx sensor monitor.
- Delaying some monitoring requirements for catalyzed PM filters and diesel NMHC converting catalysts to the 2013 model year.
- Deleting the monitoring requirement for MIL circuit faults.
- Revising the gasoline fuel system monitoring requirements to add detection of failures caused by an air-fuel ratio cylinder imbalance.
- Revising the gasoline primary and secondary oxygen sensor monitoring requirements to clarify the minimum acceptable monitoring.
- Revising the cooling system monitoring requirements to include monitoring of faults that cause the coolant temperature to drop after the system reaches "warmed-up" temperature.
- Adding specific language for monitoring of emission control strategies.
- Updating the SAE and ISO document references.
- Adding data parameters that manufacturers must output to generic scan tools for diesel vehicles.
- Adding tracking requirements for emission-increasing auxiliary emission control devices (EI-AECD).
- Revising the service information requirements to be consistent with the stand-alone service information regulation (Cal. Code Regs., title 13, §1969) for the 2010-2012 model years.
- Revising the aging requirements and test data collection requirements for certification demonstration testing.
- Adding a requirement that manufacturers will perform in-use compliance testing on their engines as a condition for certification.

Concurrently, as stated, the staff updated the medium-duty vehicle diesel-related requirements in the light- and medium-duty OBD II regulation (§1968.2) to be consistent with the diesel-related amendments to the HD OBD regulation. These changes for medium-duty vehicles include diesel monitoring requirements and diesel-related standardization requirements mentioned above. These changes also include clarification for several monitoring requirements that will apply to light- and medium-duty diesel vehicles. Additionally, in the OBD II regulation, staff is delaying until the 2011 model year the implementation of the gasoline primary oxygen sensor monitoring requirement that requires manufacturers to submit data demonstrating proper calibration and detection of all response rate malfunctions.

Lastly, staff had indicated during the adoption of the HD OBD regulation in 2005 that it intended to develop and implement an HD OBD-specific enforcement regulation similar to that already implemented for light- and medium-duty OBD II (Cal. Code Regs., title 13, §1968.5). Thus, staff adopted detailed procedures (Cal. Code Regs.,

title 13, §1971.5) for in-use compliance and enforcement testing of HD OBD systems installed on 2010 and subsequent model year heavy-duty engines. The regulation sets forth engine procurement and testing procedures that ARB will have to follow for initial determination of possible HD OBD nonconformance. The regulation also sets forth the specific procurement and test procedures to be used for the manufacturer in-use compliance testing that is required as a condition for certification in the HD OBD regulation, the information of which may be used by ARB for enforcement of the regulation. In addition, the regulation sets forth procedures that would be followed by both ARB and manufacturers if, after ARB or manufacturer testing, HD OBD systems of a tested engine group were found to be nonconforming. Among other provisions, the procedures authorize ARB to take remedial action, which may include recall of vehicles in which the nonconforming systems are installed and assessment of monetary penalties against the affected manufacturer. Finally, the regulation details a specific protocol to be followed by the Executive Officer and affected manufacturers in implementing remedial action plans.

COMPARABLE FEDERAL REGULATIONS

In February 1993, the United States Environmental Protection Agency (U.S. EPA) promulgated final OBD requirements for federally certified light-duty vehicles and trucks. (40 CFR Part 86, §§ 86.094-2, 86.094-17, 86.094-18(a), 86.094-21(h), 86.094-25(d), 86.094-30(f), 86.094-35(l), 86.095-30(f), 86.095-35(l); see 58 Fed.Reg. 9468-9488 (February 19, 1993).) The requirements were later amended to require OBD systems on medium-duty vehicles by the 2008 model year. The final rule with the latest modifications of the requirements was signed on November 29, 2005. A central part of the federal regulation is that, for purposes of federal certification of vehicles, U.S. EPA will deem California-certified OBD II systems to comply with the federal regulations. On October 3, 1996, the U.S. EPA formally granted California's request for a waiver regarding the OBD II regulation, as last amended in December 1994,[1] recognizing that the OBD II regulation is at least as stringent in protecting public health and welfare as the federal regulation, and that unique circumstances exist in California necessitating the need for the State's own motor vehicle regulations program.

The federal OBD requirements are comparable in concept and purpose with California's OBD II regulation; however, differences exist with respect to the scope and stringency of the requirements of the two regulations. More specifically, California's current OBD II regulations are generally more stringent than the comparable federal requirements. Under OBD II requirements, manufacturers must implement monitoring strategies for essentially all emission control systems and emission-related components. Generally, the OBD II regulation requires that components be monitored to indicate malfunctions when component deterioration or failure causes emissions to exceed 1.5 times the applicable tailpipe emission standards of the certified vehicle. The regulation also requires that components be

[1] *California State Motor Vehicle Pollution Control Standards; Waiver of Federal Preemption; Decision,* dated October 3, 1996, 61 Fed.Reg. 53371-53372.

monitored for functional performance even if the failure of such components does not cause emissions to exceed the 1.5 times the standard. The federal requirements, in contrast, require monitoring only of the catalyst, engine misfire, evaporative emission control system, and oxygen sensors. Other emission control systems or components, such as exhaust gas recirculation and secondary air systems, need only be monitored if by malfunctioning, vehicle emissions exceed 1.5 times the applicable tailpipe standards. No functional monitoring is required. Historically, virtually every vehicle sold in the U.S. is designed and certified to California's OBD II requirements in lieu of the federal OBD requirements.

In Health and Safety Code sections 43013, 43018, and 43101, the Legislature has expressly directed ARB to adopt emission standards for new motor vehicles that are necessary and technologically feasible and to endeavor to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources in order to accomplish the attainment of the state standards at the earliest practicable date. ARB initially adopted and amended the HD OBD and OBD II regulations to meet those legislative directives.

The U.S. EPA recently adopted OBD requirements for vehicles and engines above 14,000 pounds, which is the weight range for California's "heavy-duty" class. The federal regulation is consistent with ARB's California regulation in almost all important aspects, and while minor differences may exist between these requirements, it is believed that heavy-duty OBD systems can be designed to comply with both the federal and California programs. In fact, U.S. EPA's regulation directly allows acceptance of systems that have been certified to California's HD OBD regulation.