State of California
Air Resources Board

UPDATED INFORMATIVE DIGEST

ADOPTION OF REVISIONS TO MALFUNCTION AND DIAGNOSTIC SYSTEM REQUIREMENTS AND ASSOCIATED ENFORCEMENT PROVISIONS FOR 2004 AND SUBSEQUENT MODEL YEAR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES AND ENGINES (OBD II)

Sections Affected: Adoption of title 13, California Code of Regulations (CCR) section 1968.2 to supersede the general OBD II requirements as set forth in title 13, CCR section 1968.1 for 2004 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines; and adoption of title 13, CCR section 1968.5 to supersede the general enforcement procedures as set forth in title 13, CCR sections 2100-2149, as they apply to OBD II-related enforcement, and section 1968.1(i) for 2004 and subsequent model year model year passenger cars, light-duty trucks, and medium-duty vehicles and engines.

Documents Incorporated by Reference:

International Standards Organization[1] (ISO) 9141-2, "Road vehicles – Diagnostic Systems – CARB Requirements for Interchange of Digital Information," February, 1994.

ISO 14230-4, "Road vehicles – Diagnostic systems – KWP 2000 requirements for Emission-related systems," June, 2000.

ISO 15765-4, "Road Vehicles – Diagnostics on Controller Area Network (CAN) – Part 4: Requirements for emission-related systems," December, 2001.

Society of Automotive Engineers[2] (SAE) Recommended Practice J1850, "Class B Data Communication Network Interface," May, 2001.

SAE Recommended Practice J1930, "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms – Equivalent to ISO/TR 15031-2:April 30, 2002," April, 2002.

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[1] Copies of ISO documents are available through ISO by mail at Copyright Manager, ISO Central Secretariat, 1 rue de Varembe, 1211 Geneva 20 Switzerland; by phone at +41 22 749 0111; by fax at +41 22 734 1079; or by e-mail at iso@iso.ch.

[2] Copies of SAE documents are available through SAE by mail at SAE Customer Sales and Support, 400 Commonwealth Drive, Warrendale, PA 15096-0001, U.S.A.; by phone at 724-776-4970; by fax at 724-776-0790; by e-mail at publications@sae.org; or by website at http://www.sae.org.

SAE Recommended Practice J1939, APR00-"Recommended Practice for a Serial Control and Communications Vehicle Network" and the associated subparts included in SAE HS-1939, "Truck and Bus Control and Communications Network Standards Manual", 2001 Edition.

SAE Recommended Practice J1962, "Diagnostic Connector – Equivalent to ISO/DIS 15031-3:December 14, 2001," April, 2002.

SAE Recommended Practice J1978, "OBD II Scan Tool – Equivalent to ISO/DIS 15031-4:December 14, 2001," April, 2002.

SAE Recommended Practice J1979, "E/E Diagnostic Test Modes – Equivalent to ISO/DIS 15031-5:April 30, 2002," April, 2002.

SAE Recommended Practice J2012, "Diagnostic Trouble Code Definitions – Equivalent to ISO/DIS 15031-6:April 30, 2002," April, 2002.

Speed Versus Time Data for California's Unified Driving Cycle, December 12, 1996.

Air Resources Board (ARB) Manufacturers Advisory Correspondence (MAC) No. 99-06, "Certification of Direct Ozone Reduction Technologies," December 20, 1999.

ARB Mail-0ut #95-20, "Guidelines for Compliance with On-Board Diagnostics II (OBD II) Requirements", May 22, 1995.

EMFAC2000 "Public Meeting to Consider Approval of Revisions to the State's On-Road Motor Vehicle Emissions Inventory: Technical Support Document, Section 7.1, 'Estimation of Average Mileage Accrual Rates from Smog Check Data,'" May 2000.

Background: Section 1968.1 was originally adopted by the Board on September 12, 1989, requiring manufacturers to implement second generation on-board diagnostic systems on new motor vehicles. The regulation was first implemented beginning with the 1994 model year, and requires that essentially all new 1996 and later model year passenger cars, light-duty trucks, and medium-duty vehicles and engines be equipped with OBD II systems. The section specifically requires monitoring of engine misfire, catalysts, oxygen sensors, evaporative systems, exhaust gas recirculation (EGR), secondary air systems, fuel systems, and all electronic powertrain components that can affect emissions when malfunctioning. The regulation also requires OBD II systems to provide specific diagnostic information in a standardized format through a standardized serial data link on-board the vehicles.

In 1989, when initially adopting section 1968.1, the Board directed the staff to provide an update within two years on the progress of manufacturers in designing and implementing monitoring systems to meet the OBD II requirements. It further directed the staff to propose any modifications to the regulation that were deemed necessary based on industry progress to date. On September 12, 1991, the staff reported to the Board and proposed a number of modifications to address manufacturers' implementation concerns, to clarify misunderstood regulatory language, and to enhance the effectiveness of the requirements in some areas. The Board considered further amendments to the OBD II regulations on July 9, 1993, in response to a Petition from Ford Motor Company. At the Hearing, the Board adopted amendments to provide limited compliance relief to manufacturers that attempt in good faith to meet the requirements in full but are unable to certify a fully compliant system.

Another update on manufacturers' progress towards meeting the OBD II requirements was held on December 8, 1994. Again, the Board adopted modifications to the regulation to address manufacturers' implementation concerns, strengthen specific monitoring requirements, and clarify regulatory language. The Board last adopted amendments to section 1968.1 on December 12, 1996, to improve and clarify the monitoring requirements where needed, to add new monitoring requirements, to improve the availability of service information, and to address some issues associated with the implementation of OBD II into Inspection and Maintenance (I/M) programs. By this time, manufacturers and ARB staff had gained considerable experience with OBD II systems, which had, in the great majority of instances, been working reliably in-use to detect emission-related malfunctions.

In addition, at the time that the OBD II regulation was initially adopted, the ARB envisioned that the regulation would be enforced under the general enforcement procedures set forth in title 13, CCR sections 2100-2149, with reference to the provisions of section 1968.1(i). Manufacturers have been on notice since the initial adoption of the OBD requirements that the ARB staff would enforce the OBD II regulation after its effective date, and that appropriate remedies, including recall, would be ordered for noncompliance.

Since the Board last adopted amendments to section 1968.1 in 1996, staff and manufacturers have identified areas in which modifications would provide for improved monitoring system performance. Thus, the ARB adopted sections 1968.2 and 1968.5, title 13 CCR to supercede the current OBD II and enforcement regulations for 2004 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines. The ARB's Initial Statement of Reasons for the rulemaking was released on March 8, 2002. On April 25, 2002, the regulations were approved by the Board with modifications. These modifications were made available for public comment in the staff's Notice of Public Availability of Modified Text, released October 10, 2002 (Mail-Out MSCD #02-11). Additional modifications to the regulations were made available

for public comment in the staff's Second Notice of Public Availability of Modified Text, released on January 15, 2003 (Mail-Out #MSC 03-01).

The Regulations: The staff specified that section 1968.2 supersedes section 1968.1 for 2004 and subsequent model year model year passenger cars, light-duty trucks, and medium-duty vehicles and engines. While most of the monitoring requirements in section 1968.1 are being carried over into section 1968.2, the regulation reflects substantial editing and reorganization to provide improved clarity. The regulation also includes new requirements that apply explicitly to 2004 and subsequent model year vehicles as well as reflects the increased use of certain new or existing emission control technologies. These requirements will further increase the effectiveness of OBD II systems in detecting emission-related malfunctions. Among the new or modified requirements are:

- Catalyst system monitoring of oxides of nitrogen (NOx) conversion efficiency in addition to the current requirement for hydrocarbon (HC) conversion efficiency (section 1968.2(e)(1)).
- Revisions to the misfire monitoring requirements to clarify when manufacturers are allowed to disable misfire monitoring (section 1968.2(e)(3)).
- Revisions to the evaporative system monitoring requirements to allow greater flexibility for manufacturers in detecting larger-sized leaks (section 1968.2)(e)(4)).
- Revisions to require secondary air system monitoring for proper airflow during vehicle warm-up (section 1968.2(e)(5)).
- Continuous monitoring for oxygen sensor circuit faults (section 1968.2(e)(7)).
- Increased frequency of rationality monitoring for input comprehensive components (section (e)(16)).
- Expansion of monitoring requirements to include emission sources, such as fuel-fired passenger compartment heaters and on-board reformers (section (e)(17)).
- Specific monitoring requirements for Variable Valve Timing (VVT) systems (section 1968.2(e)(13)), cold start emission reduction strategies (section 1968.2(e)(11)), air conditioning system components (section (e)(12)), and direct ozone reduction systems (section 1968.2(e)(14)).
- New monitoring requirements for diesel vehicles to address emissions resulting from catalyst system malfunctions (section 1968.2(e)(1.5)) and particulate matter trap malfunctions (section 1968.2(e)(15)).
- Allowance for SULEV applications to use a malfunction criterion of 2.5 times, instead of 1.5 times, the applicable FTP standards wherever the latter criterion is required in section 1968.2(e) (section 1968.2(e)(18)).
- A standardized methodology for determining the frequency of monitor operation during in-use driving and a minimum operating frequency for most non-continuous monitors (section 1968.2(d)(3.2)).

- Requirements to improve the availability of diagnostic information to repair technicians to assist them in effectively diagnosing and repairing vehicles (section 1968.2(f)).
- Modifications to existing standardization requirements to assist the implementation of OBD II into the I/M program (section 1968.2)(f)).
- New requirements for post-assembly line testing of production vehicles to verify compliance with the requirements of section 1968.2 (section 1968.2(j)).
- Other minor clarifications to improve the regulation.

Finally, after more than eight years of experience in implementing and enforcing OBD II requirements, the ARB adopted section 1968.5, which details in-use enforcement provisions that apply specifically to OBD II systems that conform to the OBD II regulation, section 1968.2. More specifically, section 1968.5 supersedes the general enforcement procedures as set forth in title 13, CCR sections 2100-2149, as they apply to OBD II-related enforcement, and section 1968.1(i) for 2004 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines. The enforcement provisions will better address and identify the special circumstances involved in in-use testing and the issuing and implementing of remedial orders to correct any identified deficiencies that are unique to OBD II systems.

To address these objectives, the regulation includes detailed procedures for in-use enforcement testing of OBD II systems installed on 2004 and subsequent model year vehicles. In addition, the regulation sets forth procedures that would be followed by the ARB if, after such testing, OBD II systems of a tested vehicle group were found to be nonconforming. Among other things, the procedures authorize the 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 on-board diagnostic requirements for federally certified vehicles. (40 CFR Part 86, sections 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(I), 86.095-30(f), 86.095-35(I); see 58 Fed.Reg. 9468-9488 (February 19, 1993).) The requirements were last modified with a final rule published on December 22, 1998 (63 Fed.Reg. 70681-70697). A central part of the federal regulation is that, for purposes of federal certification of vehicles, the 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,[3] 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 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, as mentioned in the above summary. 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. However, the regulation also requires that components be monitored for functional performance if the failure of such components does not cause emissions to exceed the 1.5 times the standards threshold.

The federal requirements, in contrast, require monitoring of the catalyst, engine misfire, evaporative emission control system, and oxygen sensors. Other emission control systems or components, such as EGR and secondary air systems, need only be monitored if by malfunctioning, vehicle emissions exceed 1.5 times the applicable tailpipe standards. This also applies to after-treatment devices on diesel applications, such as catalyst systems and particulate matter traps.

With the adoption of section 1968.2, ARB staff is specifying that OBD II be applied to the next generation of low emission vehicles, and thus, in general, will be going even further in making the OBD II regulation more stringent relative to federal requirements. For example, the OBD II regulation requires catalyst system monitoring of NOx conversion efficiency, which federal regulations do not require.

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