

New ARB On-Board Diagnostics (OBD) II Requirements

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Regulatory History

- Adopted in 1989, revised in 1991, 1993, 1994, and 1996
- Further revisions were adopted in April 2002
- Latest revisions apply to 2004 model year

Reasons for Latest Revisions

- Keep pace with vehicle technology
- Areas for improvement identified
- Proper OBD II performance is critical for I/M
- Stronger enforcement needed

Categories of Revisions

- Technical monitoring requirements
- Revisions affecting I/M and repair technicians
- Compliance and enforcement strengthening

Catalyst Monitoring

- Currently, only catalyst HC conversion efficiency monitored
- Newer tailpipe standards (LEV II) require 75% NOx reduction from old standards (LEV I)
- Monitoring for HC and NOx conversion efficiency will be phased in on 2005-2007 model year vehicles

“Cold Start Strategy” and Secondary Air System Monitoring

- Most (~80%) emissions occur at cold start
- Many emission control components and strategies affect catalyst warm-up
- Monitoring of these components previously allowed after warm-up
- Beginning in 2006-2008, monitoring will be required during the warm-up

Additional Monitoring Revisions

- Diesel catalyst and particulate matter (PM) trap monitoring required beginning in 2004/2007
- Variable valve timing (VVT)
 - Monitoring to 1.5 x standard
- Most changes required for 2005 and newer vehicles.

Monitoring “Thresholds”

- Several monitors calibrated to “1.5 x standard”
- Lowest tailpipe standard in California known as “SULEV”
 - HC and NO_x levels around 1/10 of typical 2002 vehicle
- Revised SULEV threshold to “2.5 x standard”
 - Accounts for current emission measurement technology
 - Allows same levels of individual component deterioration as ULEV I
 - Three manufacturers selling SULEVs meeting these thresholds

Changes that affect the I/M program

- Connector location further constrained
- Bulb check more consistent
- Readiness codes more consistent
- Access to VIN electronically
- Single communication protocol in the future
- More data available at the time of inspection

Changes that affect repair techs

- Doubled the data available through a scan tool
- Scan tool data update rate 10-50 times faster than current
- Increased usage of generic fault codes
- Pending fault code storage and erasure more consistent
- Data to more easily set readiness codes following repairs

OBD II Compliance and Enforcement

Three Major Improvements

- Increase in required testing
- Standardized method for measuring in-use performance
- OBD II-specific enforcement procedures

Testing to verify proper performance

- Increased number of high mileage vehicles required to be tested prior to certification
 - Tests the 5-10 “major” monitors calibrated to 1.5 x standard
- Production Vehicle Evaluation (PVE) testing
 - Three parts
 - Uses actual production vehicles
 - Required in the first six months of production

PVE Testing Part 1

Standardized Requirements

- Simulates an OBD I/M test and verifies:
 - Proper communication
 - Car outputs valid data
- Uses “Gold Standard” engineering equipment to ensure compatibility with I/M test equipment
- Required each year on every make and model beginning in 2005

PVE Testing Part 2

Monitor Verification

- Thorough testing required on 2-6 vehicles per manufacturer per year from 2004 on
- Every single diagnostic tested (~150)
- Faults implanted to make sure every diagnostic correctly identifies faults
- Catches problems early and quickly

PVE Testing Part 3

Monitor Performance

- Testing of 15 vehicles per year per representative make/model (15-300 vehicles per manufacturer)
- Must collect data showing how often monitors are operating on in-use vehicles
- Data reported back to ARB
- Helps identify “hard to run” monitors

Monitoring Frequency

- Standardized method to measure frequency
- Software tracks how often monitoring occurs and how often car is driven
- Manufacturers must meet a minimum frequency on in-use vehicles
- Minimum frequency equates to detection within two weeks for most drivers

Enforcement Regulation

- Adopted separate OBD II enforcement regulation
- Details test procedures, pass/fail criteria, and guidelines for remedial action (e.g., recall)
 - Even requires mandatory recall in limited cases where the problem is very serious
- Applies to 2004 and subsequent model years
- Provides ARB with significantly improved enforcement authority to pursue correction of cars

Summary

- Technical revisions keep pace with future vehicle technology
- Feedback from I/M programs has led to several changes to improve OBD I/M testing
- Refinements will help technicians repair vehicles in an I/M scenario
- Stronger enforcement provisions show ARB is committed to making sure the OBD II program remains successful