

On-Board Diagnostic (OBD) Readiness Criteria

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California's Clean Truck Check OBD Readiness Information

On-Board Diagnostic (OBD) systems are self-diagnostic systems incorporated into the computers of vehicles that monitor virtually every component that can affect vehicle emissions. If a problem with an emissions-related component is detected, the OBD system illuminates a warning lamp on the vehicle instrument panel to alert the driver and also stores information about the detected malfunctions to aid any needed repairs.

For these OBD systems to accurately monitor and detect emissions related problems, the vehicle must be operated a sufficient amount of time for the system to complete a full diagnostic monitoring cycle of each component it is monitoring. Once this occurs, the OBD system is in a ready state to accurately determine whether a vehicle has an emissions related performance issue or not. If a vehicle's OBD system has been reset or recently cleared, also referred to as "code clearing," it will take time and operation to bring the vehicle's OBD system back into a fully ready state. Often a reset of the OBD system happens when the battery is disconnected or a scan tool is used to perform a code clearing.

The Clean Truck Check OBD readiness testing requirement is an adjustment for some vehicle owners. Understanding this, the program will ease into this OBD readiness requirement ramp up as the program matures. Until this time, the program will establish minimum operation thresholds that will increase in stringency until these full readiness requirements are achieved.

Current OBD testing Readiness Criteria

The current minimum operation threshold for a Clean Truck Check test submission is for the vehicle to have at least **five (5) Warm-Up Cycles (WUCs) since "codes cleared"**.

An OBD test submitted to the Clean Truck Check that does not meet this minimum operation threshold will get a Not Ready (not passing) test result and will not meet the emissions compliance testing requirements.

Clean Truck Check Background

Vehicles subject to OBD testing

- Heavy-duty (Gross Vehicle Weight Rating \geq 14,000 lbs.) diesel vehicles and diesel hybrids with 2013 and newer model year engines.
- Alternative fuel (e.g., natural gas) and alternative fuel hybrid heavy-duty vehicles with 2018 and newer model year engines

OBD system purpose

- Monitors the effectiveness of the Emission Control Systems (ECS)
- Identifies ECS in need of repair
- Notifies driver when problems occur
- Helps technicians diagnose and repair
- Encourages the design of robust and durable ECS

Getting ready for the Clean Truck Check OBD test


Things to do to have your best chance at passing the Clean Truck Check OBD test:

- If your Malfunction Indicator Light is on, get your vehicle repaired as soon as possible.
- Don't wait. Do the OBD test early in the compliance window so there will be time to fix any issues and re-test your vehicle, if necessary, by the compliance deadline.
- Avoid clearing codes. OBD systems require a lot of vehicle operation to be able to complete the emission control system Monitor checks. A vehicle that has not been operated enough will fail the compliance test. Code clearing can occur when:
 - Disconnecting the battery
 - Using an improperly installed kill switch that disconnects power to the OBD system (it is OK if the kill switch just cuts power to accessories/lights/etc.)
 - Using an OBD scan tool to clear codes
- Please ensure the test results appear in your CTC-VIS account when getting your vehicle(s) tested. If the test results do not show up within five minutes after completing the test, you may need to:
 - re-test your vehicle.
 - unplug other devices connected to the diagnostic port.
 - verify the communication between the vehicle and the OBD test device.
 - ensure the internet connection is stable.
- If the results still do not appear after multiple attempts during your emissions compliance testing, please email us at hdim@arb.ca.gov.

Core elements of the Clean Truck Check OBD test:

- Malfunction Indicator Light (MIL) status and associated diagnostic trouble codes (DTCs)
- Monitor Readiness
- Operation Since codes Cleared (OSC)
- Permanent Diagnostic Trouble Codes (PDTCS)

MIL status

The OBD scan device communicates with the vehicle's on-board computer about faults known as DTCs. If a DTC is currently causing the MIL () to be commanded ON, there is an emissions related issue with the vehicle. Thus, the vehicle will fail the test

Monitor readiness

An OBD system stores information that indicates if it is "ready" for a compliance test. A vehicle is not ready (and cannot pass a compliance test) if it has not had enough operation since the OBD memory was last cleared (also known as a "code clear"), and thus has not had sufficient time to complete a full diagnostic assessment to determine if an emissions related issue exists.

A code clear can occur if a fault has recently been repaired, or if a vehicle recently has had a dead, disconnected, or replaced battery. It does not necessarily mean that anything is wrong with the vehicle - it simply means that the vehicle hasn't had a chance to run all its self-diagnostics to confirm that it is ready for compliance testing. The vehicle will need to be driven more before it can be tested.

Vehicle OBD systems have many components and operations that are monitored. These elements are categorized into Monitor groups. The chart below is a somewhat generic consolidated list of Monitors. The actual Monitor components within a Monitor group may vary between vehicle manufacturer, engine manufacturer, fuel type, model year, and communication protocol. Below are examples of readiness Monitor groups.

Typical Readiness Monitor Groups for Diesel Vehicles

Misfire

Fuel System

Comprehensive Components

Diesel Oxidation Catalyst

NOx/Selective Catalyst Reduction Aftertreatment

Boost Pressure

Exhaust Gas Sensor

Particulate Matter Filter

Exhaust Gas Recirculation / Variable Valve Timing

Typical Readiness Monitor Groups for HD Alternative Fuel Vehicles

Misfire

Fuel System

Comprehensive Components

Catalyst

Heated Catalyst

Evaporative System

Secondary Air

Oxygen Sensor

Heated Oxygen Sensor

Exhaust Gas Recirculation / Variable Valve Timing

Based on tests performed to date in Clean Truck Check, most vehicles have all Monitors ready at the time compliance tests are performed and submitted to CARB. However, vehicles that have had codes cleared recently will have multiple Monitors not ready (incomplete).

Operation Since codes Cleared (OSC)

OBD systems store information regarding vehicle operation since the diagnostic trouble codes were last cleared. Most vehicles have OSC for:

- Warm-Up Cycles (WUC) since cleared
- Distance travelled, in km, since cleared
- Engine run time, in minutes, since cleared

Almost all vehicles in Clean Truck Check track WUCs. If a vehicle does not track WUCs, a CARB-certified OBD scan device will next look for distance traveled, and if that is not tracked then finally to engine run time. Readiness criteria will therefore be applied to only one OSC variable provided by an individual vehicle, and vehicles that do not have at least a minimum level of OSC for that variable will have a test result of Not Ready. As they are phased in, the criteria thresholds for these variables will become more stringent over time.

Vehicle operation needed for Monitors to be ready

Heavy-duty diesel vehicles require regular operation to complete readiness. For example, based on OBD data already submitted to the Clean Truck Check, dozens of Warm-up Cycles, thousands of miles, and hundreds of hours of engine run time are required for all Monitors to be ready. That is why it is essential to be proactive and repair emissions-related problems ASAP and to avoid clearing codes if at all possible.

Permanent Diagnostic Trouble Codes

What are Permanent Diagnostic Trouble Codes?

Permanent Diagnostic Trouble Codes (PDTCs) are very similar to regular Diagnostic Trouble Codes (DTCs). However, unlike regular DTCs, they cannot be reset by disconnecting the vehicle's battery or cleared using an OBD scan device. The only way to clear a PDTc is to fix the underlying problem with the vehicle that originally caused the PDTc to set, and then allow the vehicle sufficient drive time to re-run the Monitor that identified the problem in the first place. When the Monitor runs without identifying a problem, the PDTc will clear itself.

Why are PDTCs being included in the Clean Truck Check Program?

Unplugging the vehicle's battery or using a scan device to "clear codes" are techniques sometimes used to clear OBD information from a vehicle that has an illuminated MIL in an attempt to hide the fact that the vehicle is malfunctioning. Without the consideration of PDTCs, some of these vehicles can incorrectly pass a Clean Truck Check compliance test, which can have a dramatic impact on air quality and decrease the program's effectiveness. Although the use of readiness indicators reduces the chances of passing a Clean Truck Check compliance test with an active DTC, PDTCs can further ensure emission control systems are working correctly.

How are PDTCs going to be used as part of a Clean Truck Check compliance test?

Upon implementation, vehicles that have a PDTC stored in the OBD system will fail the Clean Truck Check OBD test regardless of whether the malfunction indicator light is illuminated. If a PDTC is stored, it indicates that the OBD system has not yet successfully verified that a previously detected emissions-related malfunction is no longer active.

Are there circumstances under which a PDTC will not cause a vehicle to fail a Clean Truck Check compliance test?

Yes. PDTCs will be ignored if the vehicle meets or exceeds a reasonable amount of vehicle operation since its OBD information was last cleared. OSC criteria specifically for PDTCs (as opposed to general OSC criteria discussed above) will begin in September 2024 at a low level and will be ramped up as the program continues to roll out.

What is a warm-up cycle?

A warm-up cycle means driving a vehicle so that the engine coolant temperature rises by at least 40 degrees Fahrenheit after the engine is started and reaches at least 140 degrees Fahrenheit for diesel engines (160 degrees for natural gas engines).

Why will PDTCs be ignored when the vehicle has completed a reasonable amount of operation since the codes were cleared?

Once a vehicle's OBD system has completed its self-diagnostic tests, the PDTC should either set the MIL on if the fault still exists or clear itself if the fault has been repaired. As the Clean Truck Check program ramps up, operation limits are being established to minimize impacts on business operations to vehicle owners who are still getting used to the program and trying to comply, but may be having trouble getting specific Monitors to run to completion and ready for testing. The minimum operation thresholds will continue to ramp up over time as vehicle owners get used to these testing requirements and the scheduling and performance of these tests gets incorporated into fleet operation plans.

Note: The information above is not all-inclusive and does not replace or supersede any of the CTC Regulations.

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