

# Air Check Virginia

## Understanding OBDII Monitors

[www.deq.virginia.gov/mobile/mobobdm.html](http://www.deq.virginia.gov/mobile/mobobdm.html)

### What is a Monitor?

The On-Board Diagnostic (referred throughout this website as OBDII) system keeps tabs on a vehicle's performance through the use of "Monitors." A monitor is a specific type of test that the OBDII system performs on a certain component or subsystem of the vehicle. There are two types of monitors:

**Continuous:** These monitors run all the time as long as the key is turned on and/or the engine is running. There are three continuous monitors that every OBDII equipped vehicle has, they are the Comprehensive Component Monitor, The Fuel Monitor and the Misfire Monitor.

**Non-Continuous:** These monitors require certain conditions such as speed, acceleration/deceleration, fuel level, ambient and other conditions to be met in order for the monitor to run its testing sequence. If the specific conditions are not met, then the monitor will not perform its tests and cannot report as to whether or not there are any problems. Non-continuous monitors include the Catalyst, Heated Catalyst, Evaporative System, Secondary Air System, Air Conditioning (A/C) System, Oxygen (O2) Sensor, Heated O2 Sensor and Exhaust Gas Recirculation (EGR) System.

Not all vehicles have all of these monitors. If a vehicle is not equipped or not designed with a certain monitor, that monitor is known as "Unsupported." Unsupported monitors do not affect the results of the emissions inspection.

Scroll down to see a description of each monitor used by the OBDII system.

### Monitor Status or "Readiness"

In order for a monitor to perform its testing function, specific conditions must be met. These conditions are collectively called a "Drive Cycle" and can include starting the vehicle when it is cold, running it until it is at normal operating temperature, driving at different speeds, and then turning the vehicle off and possibly repeating these sequences. Some monitors only need one complete Drive Cycle to perform their test; some monitors may require more than one Drive Cycle.

If the Drive Cycle's requirements are not met, then the monitor cannot run its test. If the monitor cannot run its test, then it cannot provide a determination as to whether or not there is a problem with the components or subsystems that are tested by that monitor. In addition, there may be a malfunction(s) that could prevent the monitors from running to completion even if the drive cycle procedures are followed. In this case, the cause(s) must be identified and corrected in order for the monitor tests to be successfully completed.

Each supported monitor can be either "ready" or "not ready."

Ready Indicates that the required Drive Cycle has been completed and the associated tests have been performed.

Not Ready Indicates that the required Drive Cycle has not been run to completion; therefore the monitor has not tested the associated system(s).

### Monitors and the OBDII Inspection

During the OBDII inspection process, the emissions inspection analyzer asks the vehicle's OBDII system to provide the status of all of its OBDII monitors. If there are too many monitors that indicate "Not Ready," the analyzer will reject the vehicle from testing. For most 1996 to 2000 model year vehicles, up to two (2) monitors are allowed to be in a "Not Ready" condition. For most 2001 and newer model year vehicles, only one monitor is allowed to be in a "Not Ready" condition. If more than the allowed number of monitors are "not ready," the vehicle will be rejected from testing. In addition, if the vehicle failed the initial emissions inspection for a "catalyst related" diagnostic trouble code, then the catalyst monitor must be "ready" in order to complete the re-test, regardless of the normal allowance of not-ready monitors.

If the vehicle is not ready to be tested – that is, if it has been rejected from testing due to more than the allowed number of monitors being "not ready" – it will need to be driven in order to meet the necessary Drive Cycle(s) for the monitors that are reported as "Not Ready." Information regarding specific Drive Cycles and what conditions are needed to meet the requirements of certain monitors may be available from your vehicle manufacturer, repair shops, aftermarket publications or the internet.

**Note:** Monitors will reset to "Not Ready" when electrical power to the OBDII system is removed such as when the battery is disconnected, goes dead or is replaced. The monitors can also be reset by a person using an OBDII scanner that can plug into the Data Link Connector. Through the use of the OBDII scanner, a person can clear or remove any Diagnostic Trouble Codes (DTC's) - but by doing this, the vehicle's Readiness Monitors are automatically reset to "Not Ready. Of course, any problems that have not been repaired will cause the OBD II system to store the DTC's again after the monitors run. As discussed earlier, if too many monitors are "Not Ready," the vehicle will be rejected from testing. Again, some malfunctions could prevent the monitors from completing – the cause(s) will have to be identified and corrected in order to allow completion of the monitor(s).

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## Monitor Descriptions

Below are the basic OBDII monitors and the components and subsystems that they monitor.

Remember, not all vehicles have all of these monitors. If a vehicle is not equipped with or not designed to have a certain monitor, that monitor is “Unsupported.” Unsupported monitors do not affect the results of the emissions inspection.

**Misfire:** This monitor looks for any engine misfires. A misfire is when the air/fuel mixture in the engine’s cylinder does not ignite. This condition can cause damage to the vehicle’s engine and/or catalytic converter. In the case of a severe misfire condition, the OBDII system will cause the Malfunction Indicator Lamp to flash indicating a serious threat of damage to the catalytic converter. In the case of a flashing Malfunction Indicator Lamp, the operator should reduce speed and seek diagnostic and repair services as soon as possible.

**Fuel System:** This monitor constantly checks the amount of fuel that is used by the engine. Through the use of an oxygen sensor(s), the OBDII system can determine if more or less fuel is needed. This fuel adjustment is performed many times a second and helps to maximize fuel economy and minimizes harmful emissions.

**Comprehensive Component:** This monitor is looking at all of the various switches and sensors that are involved with engine management. It looks for voltage readings, resistance readings, and other conditions. The monitor records readings from the vehicle’s components and compares them with programmed values that reflect what the readings should be. If they differ by a certain amount, then that component is determined to be suspect.

**Catalyst** (also know as catalytic converter): This monitor uses the readings from oxygen sensors located before and after the catalyst(s) to determine the efficiency of the catalyst. [Click here](#) to learn more about the catalyst.

**Heated Catalyst:** Some vehicles may have an electrically heated catalyst. This heater helps warm up a cold catalyst faster so that it can start working sooner which leads to earlier reduction of harmful emissions. This monitor will check to make sure that the catalyst heater is working.

**Evaporative System:** This monitor works to ensure that the Evaporative System is kept in a condition to minimize the release of gasoline vapors. [Click here](#) to learn more about the Evaporative System.

**Secondary Air System:** Some vehicles are equipped with a secondary air system, or air injection system. The air injection system is designed to place extra oxygen into the exhaust stream to reduce exhaust pollutants. This monitor checks the components, switches, and solenoids that are part of the air injection system. [Click here](#) to learn more about the Secondary Air System.

**A/C (Air Conditioning) System:** In some older vehicles, this monitor was intended to monitor the vehicle’s air conditioning system if it had the older “R-12” style of refrigerant. Since R-12 is harmful to the ozone layer of the earth’s atmosphere, a leaking air conditioning system needed to be repaired as soon as possible. Several years ago, R-12 was banned from use; therefore, this monitor will show up as “Not Supported” on most newer vehicles.

**O2 (Oxygen) Sensor:** The O2 Sensor Monitor watches for the performance of the vehicle’s oxygen sensors. Oxygen sensors are used to fine tune the amount of fuel that is used by the engine. These adjustments are made several times a second and have a direct impact on fuel economy and emissions reductions. When an oxygen sensor goes bad, the vehicle will usually begin to use more fuel than it needs to, thereby increasing the amount of harmful emissions.

**Heated O2 (Oxygen) Sensor:** Some oxygen sensors include an electric heater to help them warm up quicker and to begin operating faster. This monitor ensures that the heater circuit of the oxygen sensor is working properly. Since not all vehicles have a heated oxygen sensor, some vehicles will show this monitor as “Not Supported.”

**EGR (Exhaust Gas Recirculation) System:** Many vehicles are equipped with an EGR system. This emissions control system is designed to reduce nitric oxide tailpipe emissions by reducing the temperature inside the engine’s combustion chamber. [Click here](#) to learn more about the EGR System. This monitor checks the components of the EGR system to ensure that it is working properly and that there is sufficient flow of exhaust gas through the system.