

SALT LAKE COUNTY HEALTH DEPARTMENT

# Emissions Technician Study Guide



**“To promote and protect community and  
environmental health.”**



AIR QUALITY BUREAU

# Table of Contents

The Clean Air Act.....	1
Air Pollution .....	1
The Salt Lake County Emissions Program .....	1
Vehicle Emissions Technical Center .....	2
Emissions Inspection Stations .....	2
Emissions Technicians.....	3
Vehicles Requiring an Emissions Inspection.....	3
Vehicles Not Requiring an Emissions Inspection (Exempt Vehicles).....	3
Vehicle Idling Limitations .....	4
Types of Emissions Inspections.....	4
Two-Speed Idle Inspection (TSI).....	4
On Board Diagnostics Inspection (OBDII).....	4
OBDII Readiness .....	5
Visual Inspection .....	5
The Engine.....	6
The Four-stroke cycle .....	6
Warning Signs and Diagnosis.....	7
Engine Changes and Kit Vehicles.....	8
Emissions Gasses.....	8
Hydrocarbons (HC).....	8
Carbon monoxide (CO) .....	8
Nitrogen oxides (NOx) .....	8
Carbon dioxide (CO <sub>2</sub> ) .....	8
Oxygen (O) .....	9
Emissions Control Devices .....	9
EGR (Exhaust Gas Recirculation) .....	9
PCV (Positive Crankcase Ventilation).....	9
AIR (Air Injection Reaction) .....	10
EVAP (Evaporative Emissions Control System).....	10
Catalytic Converter .....	11
MIL (Malfunction Indicator Lamp) or (Check Engine Light).....	11
DPF (Diesel Particulate Filter).....	12
SCR (Selective Catalyst Reduction) .....	12
Emission Control Information Labels.....	13

Vehicle Emission Control Information (Non-Diesel vehicles).....	13
Vehicle Emission Control Information (Diesel vehicles) .....	14
Emissions Components Specific to Diesel Vehicles.....	14
Common Acronyms .....	15
Glossary of Terms.....	16

# Emissions Technician Training Guide

## The Clean Air Act

The Clean Air Act requires EPA to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. Amendments to the Clean Air Act directed states that could not meet air quality standards toward establishment of Inspection/Maintenance (I/M) Programs. Salt Lake County was unable to meet the required standards and chose to implement an I/M emissions inspection program on April 1, 1984.

[Click here to learn more about the Clean Air Act](#)

## Air Pollution

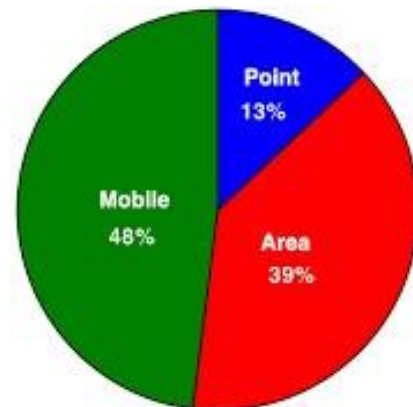
Air pollution comes from many different sources that can be put in three different categories. They are point, area, and mobile sources.

Point sources are mainly large industrial operations like refineries, mills, or factories.

Area sources are smaller and include things like gas stations, commercial buildings, homes, and even fire pits and barbecue grills.

Mobile sources are mainly cars, trucks, buses, and other mobile vehicles and equipment. Mobile sources generate about half of the pollution in the air.

Many of the pollutants generated are made up of fine particulate matter which includes (PM10 and PM2.5). PM10 is made up of particles with diameters that are generally 10 micrometers and smaller, and PM2.5 is fine particles with diameters that are generally 2.5 micrometers and smaller (About 30 times finer than a human hair). These are easily inhaled and carried throughout the body. Research indicates that exposure to this type of pollution can increase the risk of respiratory illness and premature death from heart or lung disease.



## The Salt Lake County Emissions Program

The Salt Lake County emissions inspection program operates under the direction of the Salt Lake County Health Department. It was created to improve air quality, protect public health, find polluting vehicles and have them fixed.

Vehicles that fail the emission inspection emit higher levels of harmful pollutants than they were built to produce. This contributes significantly to the air pollution we frequently experience in the Salt Lake valley. The pollutants in the exhaust negatively affect human health, plants and animals.

Failing vehicles should be diagnosed by a certified automotive technician to determine the cause of failure. Recommended repairs should then be made toward the diagnosed problems. All repairs should be made to manufacturer's specifications.

## **Vehicle Emissions Technical Center**

The Vehicle Emissions Technical Center is operated by the Salt Lake County Health Department Air Quality Bureau. Its functions include educating and assisting the public with emissions related issues, training emissions technicians, and ensuring that emissions inspections are performed correctly.



**Air  
Quality  
Bureau**

The Technical Center offers certificates of waiver for failing vehicles if certain conditions are met. This makes it possible to register the vehicle while making repairs. Waivers are a one-time certification for the vehicle and are valid only until the next time registration is due.

The Vehicle Repair Assistance Program is also available for vehicle owners that financially qualify for assistance with emissions related repair expenses. Vehicle owners desiring a waiver or repair assistance should call the technical center and make an appointment to discuss their options.

[Click here for Salt Lake County Air Quality and Vehicle Emissions information](#)

## **Emissions Inspection Stations**

Emissions inspection stations shall be permanent buildings where inspections can be done properly and safely. A station permit may be obtained through the Salt Lake County Health Department by submitting a permit application, paying all applicable fees, passing a site inspection and complying with all provisions of the permit. Station permits must be renewed annually. Emissions stations will be required to obtain a department approved gas analyzer, an emissions control systems application guide and any equipment necessary to perform an emissions inspection safely and correctly.

To ensure compliance, a periodic audit of each emissions station and each technician will be performed by a department representative. As part of the audit the auditor shall verify that the inspection equipment is operating correctly, perform a gas audit and leak check of the analyzer, examine inspection records and other required reports and forms to see that inspections are performed in compliance with department policies and procedures. Upon

completion of the audit, the auditor will report the results to the station manager.

[Click here to see a list of emissions inspection stations in Salt Lake County.](#)

## **Emissions Technicians**

All aspects of an official emissions inspection are performed by certified technicians. Technician certification requires passing a written qualification exam and attending the technician training course. The course includes classroom lecture, a lab exercise and a final exam. Upon satisfactory completion, each technician will receive a certificate, a user name and a password which will be used to log in to the emissions analyzer in the station where they are currently employed. Technicians may be certified in more than one station. Technician permits must be renewed annually.

## **Vehicles Requiring an Emissions Inspection**

The following vehicles are required to have an emissions inspection in Salt Lake County:

- 1968 and newer non-diesel powered vehicles.
- 1968 and newer diesel powered vehicles with a gross weight rating greater than 14000 pounds.
- 1998 and newer diesel powered vehicles with a gross vehicle weight rating less than 14000 pounds.

Vehicles that will be registered in Salt Lake County are required to have an emissions inspection annually or biennially depending on the model year. Proof of ownership is not required to have a vehicle inspected.

## **Vehicles Not Requiring an Emissions Inspection (Exempt Vehicles)**

The following vehicles are exempt from the emissions program requirements:

- The first two model year vehicles and any vehicle exempted the by the biennial inspection requirements
- 1967 and older non-diesel and 1997 and older light and medium duty diesel model year vehicles
- All agricultural implements of husbandry and any motor vehicle that qualifies for registration as a farm truck
- All motorized vehicles not designed for, or licensed to operate on the highway

- Any motorcycle or motor-driven cycle, including vehicles which operate with an engine normally used in a motorcycle
- Any vehicle that operates exclusively on electricity
- Any vehicle being sold for the first time that has a valid Manufacturer's Statement of Origin (MSO)
- Vehicles registered in a non-I/M testing county

## Vehicle Idling Limitations

Salt Lake County Health Regulation #22 states the following:

“No owner or operator of a motor vehicle shall allow or permit such vehicle to remain in an idling mode or condition for a period of time exceeding two (2) minutes.” (Section 4.1.1)

[Click here for Salt Lake County Health Regulation #22](#)



## Types of Emissions Inspections

### Two-Speed Idle Inspection (TSI)

The TSI inspection is used for measuring exhaust gasses. The inspection is performed by putting a probe in the tail pipe and measuring various exhaust gasses at idle and at around 2500 RPMs. Maximum allowable levels are set for hydrocarbons (HC) and carbon monoxide (CO) at both RPM ranges. If any of the maximum levels are exceeded, or required emissions control devices are tampered or missing, the vehicle will fail the emissions inspection.

The following vehicles require a TSI inspection:

- 1968 – 1995 non-diesel powered vehicles
- 1996 and newer non-diesel powered vehicles with a gross vehicle weight rating over 8500 pounds.

### On Board Diagnostics Inspection (OBDII)

The OBDII system consists of several components. They include the PCM or on-board computer, all engine and transmission sensors that relay information to the PCM, all emissions control devices, the MIL or “check engine light”, and the Diagnostic Link Connector (DLC).

OBDII inspections electronically collect emissions related data from the vehicle’s computer. They are performed by connecting the OBD cable to the Data Link Connector (DLC) in the

vehicle. Always make sure the vehicle is completely off before connecting the OBD connector. The emissions analyzer collects information about each of the emission components and their performance. If any of the components are not functioning properly, the check engine light will turn on and a diagnostic trouble code will be set. The inspection must be performed even if the check engine light is on. There are three possible outcomes for an OBDII inspection: PASS, FAIL and NOT READY.

## **OBDII Readiness**

Readiness monitors will be reset to NOT READY if any of the following happens:

- The vehicle battery is disconnected for any reason
- A repair scanner is used to clear Diagnostic Trouble Codes (DTC)
- Battery voltage drops below a pre-determined voltage

When an OBDII vehicle is READY to be inspected, it means that all enable criteria have been met for each of the monitors. If the MIL is off and no DTCs are present, 1996 through 2000 model year vehicles can pass with as many as 2 readiness monitors set at “NOT READY”. 2001 and newer model year vehicles are only allowed to have 1 readiness monitor set at “NOT READY” in order to pass. If more than 2 monitors are set at “NOT READY”, the vehicle does not fail, it is simply not ready to be inspected. A vehicle will fail if any devices are marked Tamper/Fail on the device check screen and/or the MIL is on and DTCs are present.

The following vehicles require an OBDII inspection:

- 1996 and newer non-diesel powered vehicles
- 1998 and newer diesel powered vehicles with a gross vehicle weight rating (GVWR) less than 14,001 pounds.

1968 to 1995 non-diesel vehicles that fail the initial emission inspection are entitled to 1 free re-inspection at the same I/M station that performed the initial inspection within 30 days. 1996 and newer non-diesel, or 1998 and newer light or medium duty diesel vehicles that do not pass the initial OBD inspection are entitled to up to 2 free re-inspections at the same I/M station that performed the initial inspection within 30 days.

## **Visual Inspection**

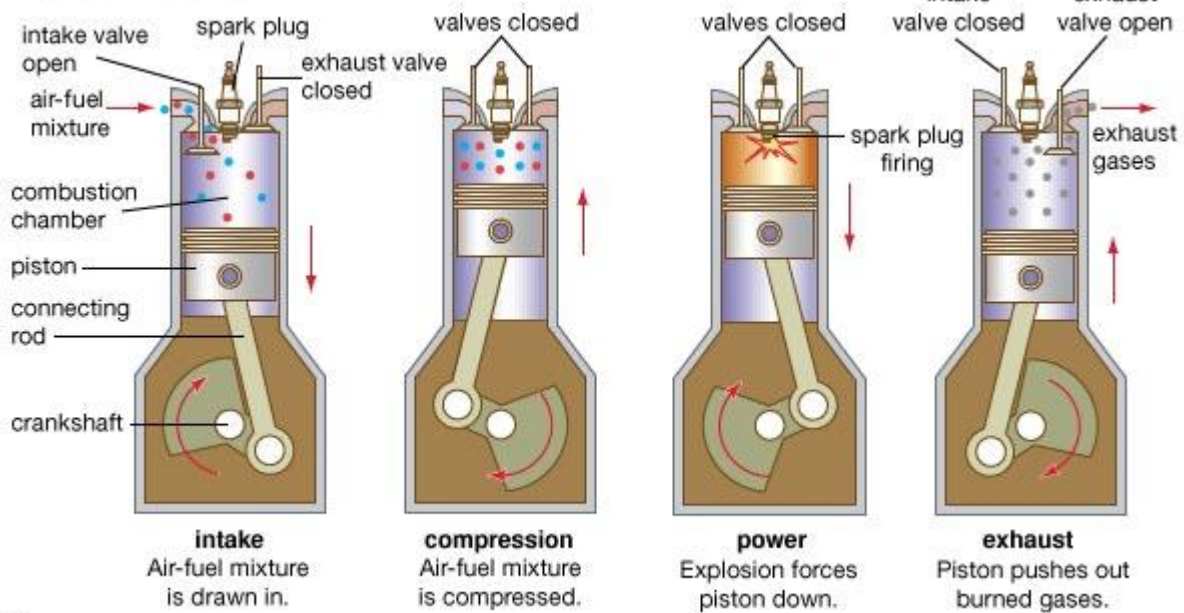
As part of the inspection process, the technician will determine which emissions devices the vehicle was originally equipped with and visually identify each one on the vehicle. A list of required devices can be found under the hood on the Vehicle Emissions Control Information (VECI) label, or in the applications guide each emissions station is required to have. The visual inspection screen on the analyzer will list the possible devices for the vehicle. Select “Pass” if the device is required and present, “Tamper/Fail” if the device is required but not present or has been modified or tampered, or “N/A” if the device is not required.



# The Engine

The 4-stroke engine is an internal combustion engine used in most automobiles. The 4 cycles in a 4-stroke engine are explained below.

## Four-stroke cycle



## The Four-stroke cycle

Intake stroke. The intake stroke is when the piston is moving down as the fuel and air mixture is entering the cylinder.

Compression stroke. The compression stroke takes place after the intake stroke. The piston is now moving up in the cylinder and is compressing the air fuel mixture which is used to make the explosion that takes place when the spark plug fires at the end of the compression cycle.

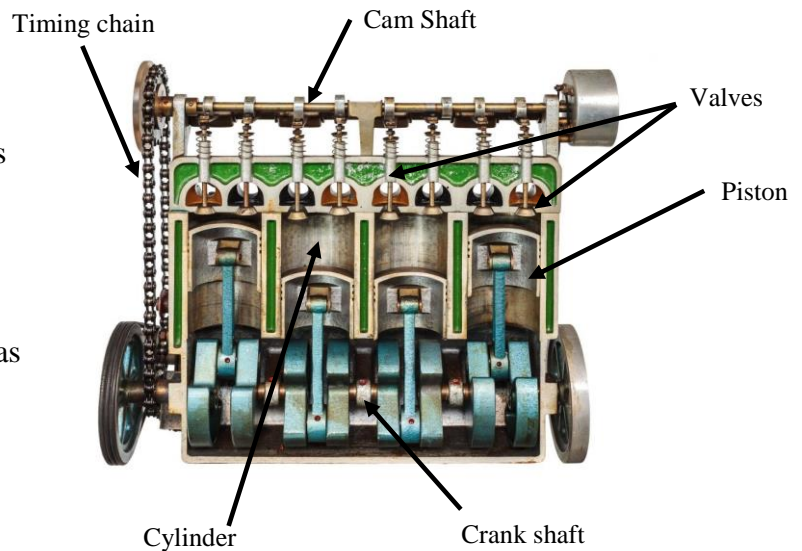
Power Stroke. The power stroke takes place after the spark plug ignites the compressed air fuel mixture. This causes the piston to move down with great force which provides the engine with power.

Exhaust stroke. The exhaust stroke is the final stroke of the series. The piston is moving back up and is pushing the burned air/fuel mixture out of the cylinder through the exhaust valve and out the tailpipe.

Some other components of the engine that tie these 4 cycles together are the crank shaft, cam shaft, and the timing chain or belt.

The crank shaft is the connecting shaft for all the pistons. Each rotation causes every piston to go up and back down at slightly different times. It rotates 2 times for each 1 time the cam shaft rotates.

The cam shaft controls the opening and closing of the intake and exhaust valves as the engine cycles. There are 2 cam shaft lobes to each cylinder, one moving the intake valve and the other moving the exhaust valve.



The timing chain connects the crank shaft to the cam shaft keeping the top half and the bottom half of the engine synchronized so that the valves are open at the right time for each cycle of the 4-stroke process. These components all work together to provide the firing order for each cylinder.

[Click here to learn more about gasoline powered internal combustion engines](#)

## Warning Signs and Diagnosis

Blue smoke, this indicates that the engine is burning oil. This can be caused by many factors. Some examples are bad piston rings or worn valve guides.

Black smoke, indicates that the engine is running rich (burning too much fuel) or high in HC (hydrocarbons) and CO carbon monoxide).

White smoke, indicates that the engine is burning water or antifreeze/coolant. This would most likely be caused by a bad head gasket which could also cause the engine to have poor compression in one or more cylinders. For example, if you have 2 cylinders next to each other both with poor compression the most likely cause is a bad head gasket.

Oil leaks, are an indication that a gasket or seal is no longer able to keep the oil inside the engine. For example, if you have a leak in the rear of the engine, it could be caused by the crank shaft seal, intake manifold gasket or possibly the oil pan gasket.

There are many causes for the warning signs above. A thorough diagnosis would be the best way to determine the cause of the problem and best repair strategy.

## **Engine Changes and Kit Vehicles**

Kit vehicles and vehicles with an engine other than the original, must have all emissions control systems required for the new engine. They must also be equally or more effective in controlling emissions as those systems originally manufactured on the vehicle. Upon passing an inspection at the Vehicle Emissions Technical Center, vehicles with engine changes may be issued an Engine Change Verification Form and a Salt Lake County Vehicle Emission Control Information (VECI) label. The vehicle could then be inspected at any permitted emissions inspection station in Salt Lake county. The Inspector would be required to call the technical center and verify that the kit vehicle or engine change vehicle had been authorized for inspection in that station.

## **Emissions Gasses**

There are 5 major gasses produced by the internal combustion engine. In the section below, we will discuss each one.

### **Hydrocarbons (HC)**

Hydrocarbons are molecules primarily made up of hydrogen and carbon atoms. HC is sometimes referred to as “unburned fuel”. Hydrocarbons are produced when a vehicle is running lean, or has any type of misfire, and all the fuel in the cylinders doesn’t get burned during the combustion process. Hydrocarbons contribute to ground-level ozone formation leading to risk of damage to the human respiratory system. They also combine with other particulate matter in the air to form visible smog.

### **Carbon monoxide (CO)**

Carbon monoxide is made up of carbon and oxygen. It is produced by the incomplete combustion of fuel when the air/fuel mixture is rich. When inhaled, carbon monoxide causes oxygen deprivation in the body. It is colorless, odorless, tasteless and toxic. It is a health hazard and is difficult to detect without specialized equipment.

### **Nitrogen oxides (NO<sub>x</sub>)**

Nitrogen oxides form when nitrogen and oxygen bond together at high temperatures during the combustion process. NO<sub>x</sub> contributes to the formation of ozone and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) in the air. NO<sub>x</sub>, ozone and particulate matter have all been associated with lung damage and respiratory problems.

### **Carbon dioxide (CO<sub>2</sub>)**

Carbon dioxide is a natural byproduct of the combustion of fossil fuels. It can be measured to determine how complete the combustion process has been. It is also considered to be a greenhouse gas. Greenhouses gasses block heat energy from leaving the planet and contribute to global climate change.

## Oxygen (O)

Oxygen by itself is not a problem, but it can be combined with other molecules, like carbon or nitrogen, to produce harmful gasses.

**Warning** – Emissions gases are harmful! When operating a vehicle indoors, use adequate ventilation or an exhaust removal system.

[Click here for more information about vehicle emissions gasses](#)

## Emissions Control Devices

### EGR (Exhaust Gas Recirculation)

The EGR system recirculates exhaust gasses for a more complete burn. The exhaust gasses help to keep the combustion chamber cooler which lowers the generation of NO<sub>x</sub>. Below are some examples of EGR valves.



### PCV (Positive Crankcase Ventilation)

The PCV system is a one-way system used to vent blow-by gasses from the crank case and control pressure build up.



## AIR (Air Injection Reaction)

The primary function of "Air Injection Reaction" is to promote the burning of any unburned HC and CO remaining in the exhaust, after the initial combustion process, by pumping air directly into the exhaust stream. The additional burning also helps to "light off" the catalytic converter and bring it to working temperature faster. Below are some examples of AIR pumps.

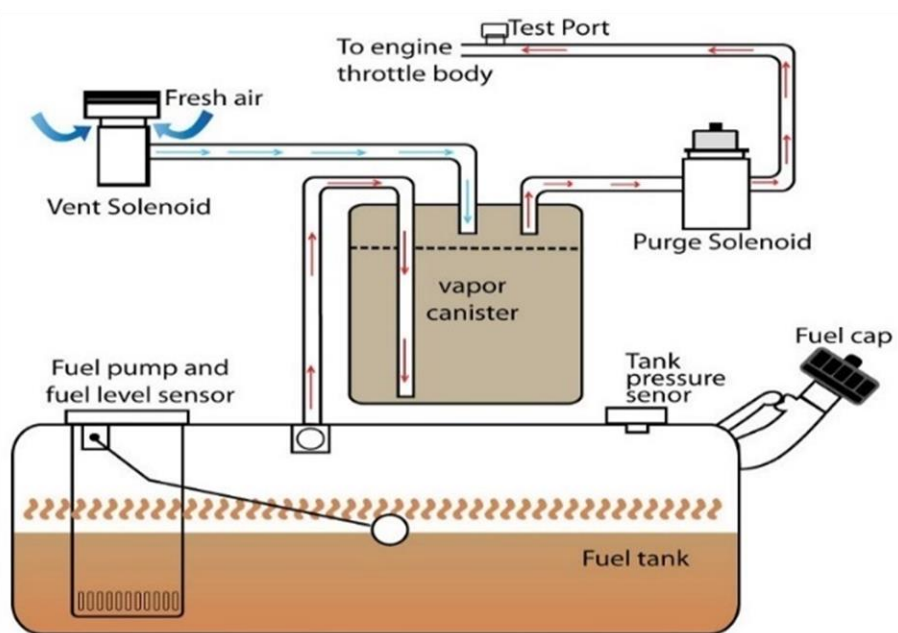


## EVAP (Evaporative Emissions Control System)

The EVAP system prevents gasoline vapors from escaping into the atmosphere from the fuel tank and fuel system. The EVAP system usually requires no maintenance.

As seen in the diagram, fuel vapors from the tank are captured in the vapor canister and mixed with fresh air. They are then sent to the throttle body or intake manifold and burned with fuel in the combustion process.

EVAP system leaks, faulty solenoids or loose gas caps can turn on the check engine light and prevent a vehicle from passing an OBD II emissions inspection.





## Catalytic Converter

The catalytic converter is an emissions control device that converts exhaust gasses, like HC, CO, and NOx, to less harmful gasses through a redox reaction (an oxidation and a reduction reaction). Automotive catalytic converters are used with internal combustion engines fueled by gasoline, CNG, diesel fuel and other unleaded hydrocarbon based fuels. Many vehicles have more than one catalytic converter. Below are two examples of catalytic converters and a chart showing their effectiveness.



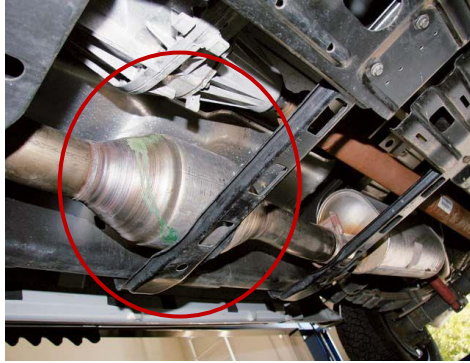
## MIL (Malfunction Indicator Lamp) or (Check Engine Light)

The MIL is a light on the vehicle's instrument panel dedicated to emissions related failures. The MIL will illuminate when the key is on but the engine is off. It should turn off when the engine is started unless there is an emissions related problem in which case it will remain illuminated. The MIL may be a Check Engine, Service Engine Soon, or an International Standards Organization (ISO) symbol as seen below.



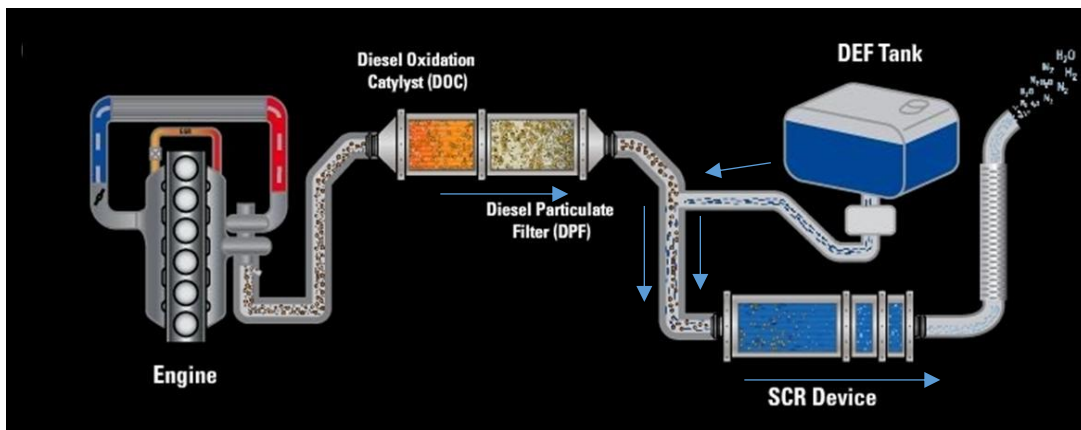
## DPF (Diesel Particulate Filter)

The DPF is a device designed to remove diesel particulate matter or soot from the exhaust gas of a diesel engine. The DPF can also be called a PTOX (Periodic Trap Oxidizer). Below are examples of Diesel Particulate Filters.



## SCR (Selective Catalytic Reduction)

Selective Catalytic Reduction (SCR) is an emissions control system that injects a liquid reducing agent through a special catalyst into the exhaust stream of a diesel engine. The liquid is usually automotive-grade urea, otherwise known as Diesel Exhaust Fluid (DEF).

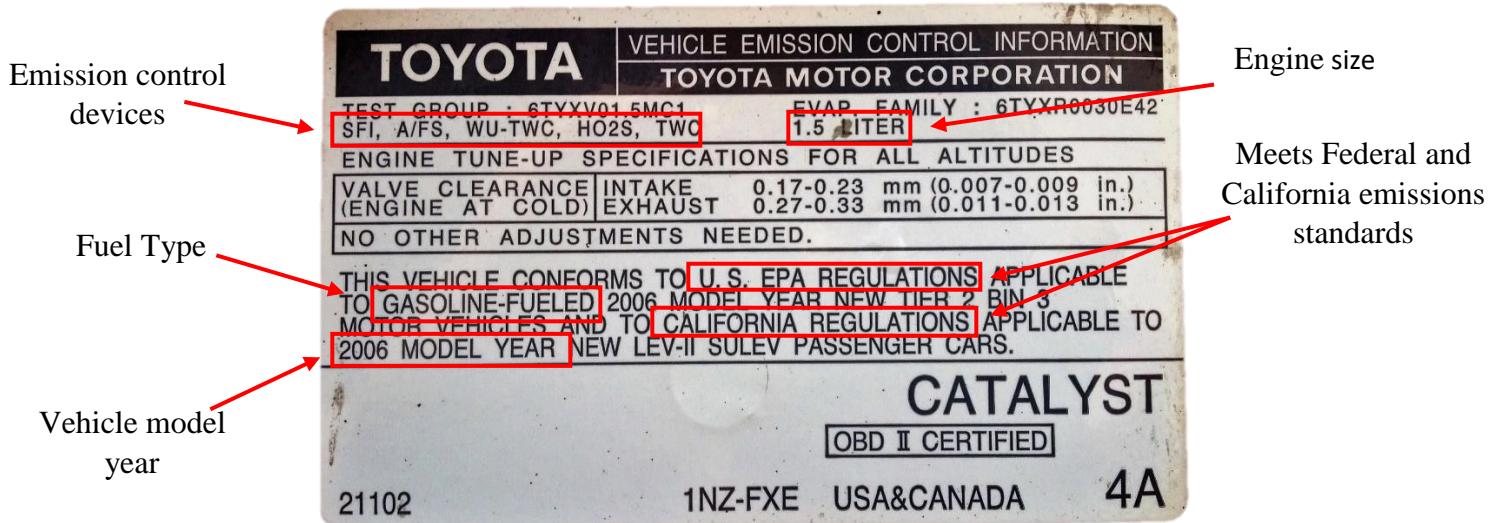


The diagram above shows diesel exhaust fluid injected into the exhaust after it has passed through the catalyst and DPF. The exhaust fluid mixes with the gasses then passes through the SCR device, is converted to nitrogen N<sub>2</sub> and water H<sub>2</sub>O, then is emitted out the tail pipe.

## Emission Control Information Labels

A VECI (Vehicle Emission Control Information) label is usually found on the underside of the hood or somewhere in the engine compartment. The illustrations below show VECI labels for non-diesel and diesel powered vehicles and important information for emission inspecting.

### Vehicle Emission Control Information (Non-Diesel vehicles)



The emission control devices list shows this vehicle has two catalytic converters. It has one WU-TWC (warm-up three-way catalytic converter) and a regular TWC (three-way catalytic converter).

The fuel type will be listed on the VECI label.

The model year is important to know because changes in design can happen from year to year.

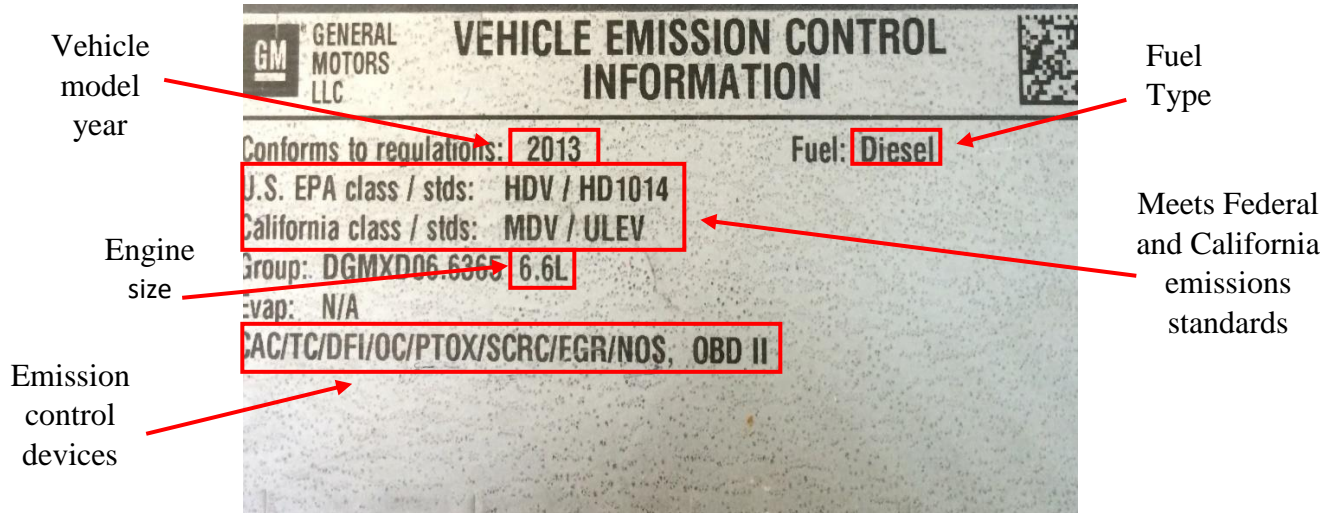
This can affect the required emission devices and other things.

The engine size is also shown. This is important to know because several engines could have been available for the same model year vehicle, but each may have different emissions control devices.

It is also important to know if the vehicle meets federal emissions standards or if it meets the more stringent California emissions standards. This will affect which emissions devices are needed on the vehicle and their quality.



## Vehicle Emission Control Information (Diesel vehicles)



### Emissions Components Specific to Diesel Vehicles

This vehicle has one OC (Oxidizing catalytic converter). Emissions from diesel engines cannot be treated with the three-way catalytic converter. An oxidizing catalytic converter is used to convert the combustion pollutants hydrocarbon (HC) and carbon monoxide (CO) into carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O) by an oxidation process.

The PTOX (Periodic Trap Oxidizer) also known as the DPF (Diesel particulate filter) is a device designed to remove diesel particulate matter or soot from the exhaust gas of a diesel engine. The DPF is usually located behind the catalytic converter. Sometimes it may be combined with the catalytic converter making it appear that only one large device is in the exhaust line.

The SCRC (Selective catalyst reduction catalyst) or SCR (Selective catalyst reduction) is better known as the Urea system. Selective catalytic reduction is used to reduce the amount of NO<sub>x</sub> released into the atmosphere. Diesel exhaust fluid from a separate tank is injected into the exhaust pipeline, where the aqueous urea vaporizes and decomposes to form ammonia and carbon dioxide. Within the SCR catalyst, NO<sub>x</sub> is chemically changed into water (H<sub>2</sub>O) and nitrogen (N<sub>2</sub>), then released through the exhaust.

## Common Acronyms

AIR (Air Injection Reaction)

DEF (Diesel Exhaust Fluid)

DLC (Data Link Connector)

DPF (Diesel Particulate Filter) Same as PTOX

EGR (Exhaust Gas Recirculation)

EVAP (Evaporative Emissions Control System)

FEC (Fuel Evaporative Control)

FNR (Fuel Neck Restrictor)

GVWR (Gross Vehicle Weight Rating)

I/M (Inspection/Maintenance)

MIL (Malfunction Indicator Lamp)

OBDII (On-Board Diagnostic System)

OC (Oxidizing Catalyst)

PCV (Positive Crankcase Ventilation)

PTOX (Periodic Trap Oxidizer) Same as DPF

SCR (Selective Catalyst Reduction) Same as SCRC

SCRC (Selective Catalyst Reduction Catalyst) Same as SCR

TSI (Two Speed Idle)

TWC (Three Way Catalyst)

VECI (Vehicle Emission Control Information)

## Glossary of Terms

“Air Injection Reaction system” or “AIR” - A system for providing supplementary air into the vehicle's exhaust system or cylinder head(s) to promote further oxidation of HC and CO gases and to assist catalytic reaction.

“Catalytic Converter” - A post-combustion device that oxidizes HC and CO gases and/or reduces oxides of nitrogen gases.

“CO” - Carbon monoxide.

“CO<sub>2</sub>” – Carbon dioxide

“Cutpoints” - The maximum allowable concentration of carbon monoxide (CO), and hydrocarbons (HC) for a given weight, class, and model year of a motor vehicle, as determined by the Department, consistent with federal and state authority, using an approved exhaust gas analyzer system.

“Data Link Connector” (DLC) - The multi-pin diagnostic connection port for automobiles, trucks, and motorcycles used to interface a scan tool with the control modules of a given vehicle and access on-board diagnostics.

“Diagnostic Trouble Code” (DTC) - Diagnostic Trouble Codes are codes that the car's OBDII system uses to notify you about an issue. Each code corresponds to a fault detected in the car. When the vehicle detects an issue, it will activate the corresponding trouble code and turn the MIL on.

“Evaporative Control System” or “EVAP” - An emissions control system that prevents the escape of fuel vapors (HC) from the fuel tank, air cleaner or carburetor float bowl and stores them in a charcoal canister to be burned in the combustion chamber.

“Exhaust Gas Recirculation system” or “EGR” - An emissions control system that recycles or recirculates a portion of the exhaust gases back to the engine combustion chambers to reduce the formation of oxides of nitrogen.

“Gross Vehicle Weight Rating” (GVWR) - The total combined weight the vehicle, including all passengers, fuel, fluids and cargo.

“Heavy Duty Diesel” - Any diesel-powered vehicle with a gross vehicle weight rating (GVWR) of 14,001 pounds or greater.

“HC” - Hydrocarbons.

“Inspection” - A vehicle emissions inspection measuring TSI emissions levels, opacity and/or OBD status, and visually verifying the presence and apparent operability of emissions control systems to ensure that motor vehicles in Salt Lake County are complying with the Vehicle Emissions Inspection/Maintenance Program.

“Malfunction Indicator Light” or “MIL” - A light on the vehicle’s instrument panel dedicated to emissions related failures. The MIL may be a Check Engine, Service Engine Soon, or an International Standards Organization symbol.

“Not Ready” - The vehicle has not completed the associated self-test for the monitored system and is not ready to return test results for those monitored systems. It does not mean that the vehicle has failed the inspection.

“NO<sub>x</sub>” – Nitrogen oxides

“On-board Diagnostics” or “OBD” or “OBD II” - An electronic monitoring and fault detection system installed by the manufacturer on a motor vehicle to monitor and control the vehicle’s emission controls and engine/transmission operation.

“Particulate Matter” (also called particle pollution) - The term for a mixture of solid particles and liquid droplets found in the air that are so small they can be inhaled and cause serious health problems.

“Positive Crankcase Ventilation System” or “PCV” - An emissions control system which returns crankcase vapors and blow-by gases to the combustion chamber.

“Two Speed Idle” or “TSI” - Testing a vehicle’s tail pipe emissions during an inspection for hydrocarbons (HC) and carbon monoxide (CO) using the analyzer at curb idle and 2500 RPM.

“TWC” or “Three Way Catalytic Converter” – An emissions control device that converts three harmful pollutants to less harmful gasses through an oxidation/reduction process. It converts carbon monoxide to carbon dioxide, nitrogen oxides to nitrogen and oxygen, and hydrocarbons to carbon dioxide and water.

“Vehicle Emissions Inspection/Maintenance Program” or “I/M Program” - The program operated by the Salt Lake County Health Department to ensure that motor vehicles are not emitting excessive amounts of air pollution in Salt Lake County.