

# EMISSIONS COMPLIANCE HANDBOOK



# TABLE OF CONTENTS



## INTRODUCTION



### 2 INTRODUCTION



### 3 EMISSIONS COMPLIANCE IN THE UNITED STATES



### 4 VEHICLE EMISSIONS AND EMISSIONS STANDARDS



### 5 LAB TESTING FOR EXHAUST EMISSIONS



### 8 LAB TESTING FOR EVAPORATIVE EMISSIONS



### 9 AFTERMARKET EMISSIONS COMPLIANCE



### 16 THE CARB TEST LETTER



### 17 PRODUCT TESTING IN AN EMISSIONS LAB



### 23 THE LAB REPORT



### 24 R&D AND BASELINE TESTING



### 25 CHOOSING SEMA CERTIFIED-EMISSIONS VS. THE CARB EO



### 26 MARKETING YOUR PRODUCTS USING THE VOLUNTARY LABELING PROGRAM

Dear SEMA Member,

Over the years, SEMA has received many requests from members seeking information about federal and state emissions compliance requirements. If you manufacture emissions-related aftermarket parts for regulated vehicles, the parts will likely need to be tested to confirm that vehicles will still meet applicable clean air standards after the part has been installed. Emissions-related parts are regulated under our nation's clean air laws and are primarily enforced by two government agencies: the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB).

SEMA wants to give you all the tools necessary to comply with the law in a cost-effective manner. That includes explaining the law and providing an option to test your products.

Emissions-related aftermarket parts include any specialty part that interacts with the vehicle's emissions system and changes the performance levels of the equipment being replaced or supplemented. They are commonly called "add-on" or "modified" parts. The product may be "emissions-related" if it is installed anywhere between the air intake and the outlet end of the catalytic converter. The term does not include ordinary replacement parts.

The information contained in this document is intended as a complete guide for any interested party to understand the emissions compliance process and to maximize the probability of a successful compliance experience. SEMA has a staff available to assist members throughout the process. Contact information is provided at the end of this document. We encourage you to contact us with any questions pertaining to the compliance process.

Peter Treydte  
Director of Emissions Compliance, SEMA



# EMISSIONS COMPLIANCE IN THE UNITED STATES

Since the 1960s, auto manufacturers selling vehicles for use on public roads or land in the United States have been required to meet emissions standards. There are two government agencies that regulate vehicle emissions: the United States Environmental Protection Agency (EPA) and the California Air Resources Board (CARB). Both agencies have been given authority to establish and enforce laws pertaining to vehicle emissions. Federally, the body of legislation that provides this authority is the Clean Air Act (CAA). It sets forth regulations which require that all vehicles sold in the U.S. are certified for use on public roads and land. It further stipulates that modifying vehicles in a way that could alter the emissions output of the vehicle is prohibited. California has similar language in the state's Vehicle Code (CVC, specifically sections 27156 and 38391).

Fortunately, there are provisions within both the CAA and the CVC that allow for manufacturers of aftermarket performance products to demonstrate that their products do not have a detrimental effect on emissions. If such a demonstration meets the requirements of these provisions, then a product may be considered legal for sale.

The EPA's position on compliance of aftermarket products is clarified in the "EPA Tampering Policy: The EPA Enforcement Policy on Vehicle and Engine Tampering and Aftermarket Defeat Devices under the Clean Air Act". It states:

"The EPA typically does not take enforcement action for [sale or use of an aftermarket product] if the person engaged in [selling or using the aftermarket product] has

a documented 'reasonable basis' to conclude that the [use of the aftermarket product] does not and will not adversely affect emissions."

The EPA does not have a certification process for such a reasonable basis conclusion; therefore, SEMA has developed SEMA Certified-Emissions, a program that allows manufacturers to have confidence that their products are compliant.



California differs from the federal requirements in that a product may be exempted from the restrictions of CVC 27156 and 38391 by obtaining an Executive Order from the California Air Resources Board, commonly known as a CARB EO. The CARB EO process involves submission of an application and, depending on the complexity and potential impact of the product, either an engineering evaluation or laboratory testing that is similar in nature to the certification testing performed by the automotive manufacturers. A CARB EO satisfies the requirements of EPA's Tampering Policy, so once a CARB EO is obtained, a product may be considered legal for sale in all 50 states. SEMA staff can help you decide whether SEMA Certified-Emissions or a CARB EO is right for you.





# VEHICLE EMISSIONS AND EMISSIONS STANDARDS



Vehicles were first subject to regulation in the U.S. starting with 1966 model year vehicles in California, then nationally with 1968 models. Over the course of time, emissions standards have become tighter, and emissions control technologies have been developed and improved to keep up with the requirements. The following pollutants are currently regulated:

- Non-Methane Hydrocarbons (NMHC)
- Non-Methane Organic Gases (NMOG)
- Carbon Monoxide (CO)
- Oxides of Nitrogen (NO<sub>x</sub>)
- Particulate Matter (PM)
- Formaldehyde (HCHO)

There are two types of regulated vehicle emissions; exhaust emissions and evaporative emissions. Exhaust emissions occur as the vehicle's engine is running, evaporative emissions occur when the engine is not running. Separate standards exist for each. Hydrocarbons are the only regulated pollutant relevant to evaporative emissions. Diesel vehicles are not subject to evaporative emissions standards.

Emissions devices that have been developed to help control the output of these emissions include (but are not limited to):

- Positive Crankcase Ventilation (PCV) Systems
- Catalytic Converters
- Air Injection Systems
- Exhaust Gas Recirculation (EGR) Systems
- Feedback (closed loop) Fuel Systems, including O<sub>2</sub> sensors
- Diesel Particulate Filters (DPF)
- Selective Catalyst Reduction (SCR) Systems (aka Urea Injection)
- Charcoal Canisters
- Hydrocarbon Traps (HCTs)

These devices are generally not dictated by the government agencies; rather, the manufacturers are expected to meet the standards and have chosen emissions device strategies to obtain those goals. One exception to this is the required use of the On-Board Diagnostics (OBD) system. OBD1 was voluntary and did not have a standardized format. OBD2 was first required starting in 1996 and has specific functionality dictated by EPA and CARB. The intent of OBD2 is to ensure that emissions devices are properly functioning,

and to alert the vehicle operator if a system failure occurs. Standardized protocols ensure that all vehicles will report information in terms that are commonly understood by automotive repair facilities.

Regulated vehicles are categorized into different weight classes:

- Highway Motorcycle (HMC)
- Passenger Car (PC)
- Light-duty Truck (LDT)
- Medium-duty Vehicle, chassis dyno certified (MDV)
- Medium-duty Vehicle, engine dyno certified (MDEV)
- Heavy-duty Vehicle (HDE, HDV)
- Off-highway Vehicle (OFMC, ATV, UV, SV, SCAR)

Federal emissions standards have become tighter over time and are referenced in a Tier system (Tier 1, Tier 2, Tier 3). California standards are typically more stringent than the federal standards and follow a similar structure. They are referred to as Low Emissions Vehicle (LEV) standards. Although they do not directly correlate, California's LEV1, LEV2 and LEV3 have a similar structure to the federal Tier system, with near direct alignment between Tier 3 and LEV3.

Within these broader categories are sub-categories. In the federal Tier system there are certification "bins". Vehicles will fall into one of these sub-categories and must meet the standards for its intended bin. California uses different sub-categories:

- LEV1 or LEV2 LEV- Low Emissions Vehicle
- LEV1 or LEV2 ULEV- Ultra-low Emissions Vehicle
- LEV1 or LEV2 SULEV- Super Ultra-low Emissions Vehicle
- LEV2 PZEV- Partial Zero Emissions Vehicle (meets a SULEV tailpipe standard and a Zero Evaporative standard)
- LEV2 ZEV- Zero Emissions Vehicle
- LEV3 LEV160- Vehicle meeting an FTP NMOG+NO<sub>x</sub> standard of .160 grams per mile
- LEV3 ULEV125- Vehicle meeting an FTP NMOG+NO<sub>x</sub> standard of .125 grams per mile
- LEV3 ULEV70- Vehicle meeting an FTP NMOG+NO<sub>x</sub> standard of .070 grams per mile
- LEV3 SULEV30- Vehicle meeting an FTP NMOG+NO<sub>x</sub> standard of .030 grams per mile



# LAB TESTING FOR EXHAUST EMISSIONS

The emissions standards for each of the vehicle classes and emissions categories correlate to various vehicle tests that are performed on a chassis dynamometer (with the exception of some medium-duty and all heavy-duty vehicles, which are engine dyno tested for certification). All the chassis dyno tests used for emissions certification are simulations of real-world driving conditions. They are performed in a temperature- and humidity-controlled environment. Each test follows a pre-defined drive "trace," which describes the target speed for the vehicle during the test. The test operator is expected to follow the trace within a minimal margin of error to complete a valid test.

Testing is conducted using special test fuel that meets specifications dictated by EPA and CARB. This ensures consistency from one test to another.

While each test is performed, the exhaust gases are captured from the tailpipe of the vehicle and a sample of the exhaust gas is stored for analysis at the conclusion of the test. The mass of each pollutant is measured along with the distance traveled during the drive cycle. Thus, the results can be compared to the standards which are expressed in a mass per distance value.

In addition to evaluating emissions, the series of certification tests are also used to determine fuel economy as presented on the window sticker of new vehicles sold in the US. Fuel economy data is based on CO<sub>2</sub> measurements taken during testing.

It should be noted that these certification tests are very different and more refined than typical state "smog-check" tests, even those that are performed on a chassis dyno. While there may be some correlation, it is generally not safe to assume that a vehicle that passes a smog-check test will also pass a certification test.

## FEDERAL TEST PROCEDURE (FTP-75)

The FTP-75 has been the backbone of all emissions certification testing since the 1970s. It simulates city driving with many stops and starts, and includes a maximum vehicle speed of approximately 55 mph. It is performed in an enclosed space (test cell) that is maintained at a temperature between 68° and 86°F and between 25% and 75% humidity. The test is divided into 4 segments:

■ **PHASE 1** starts the test with the vehicle in a temperature-stabilized state resulting from the vehicle being housed in the temperature-controlled environment (68-86°F) for a minimum of 12 hours prior to the test. This ensures that the catalytic converter(s) on the vehicle will be in a "cold-start" condition. Any emissions that occur prior to the catalyst being up to normal operating temperature will pass through the converter and be included in the final emissions measurement. Phase 1 of the FTP-75 is 505 seconds long.

■ **PHASE 2** occurs immediately after the end of Phase 1 and lasts for 864 seconds. It includes more stop and start driving and does not exceed approximately 34 mph.

■ Between Phase 2 and Phase 3 is a 10-minute **Hot Soak** period with the engine OFF. The hood of the vehicle is closed during this time.

■ **PHASE 3** immediately follows the Hot Soak and is identical to Phase 1, the difference being that the engine is warm rather than cold.

The emissions results are weighted, based on the understanding that vehicles will likely have only one cold start in a day's operation. The formula used to evaluate the emissions results is:

**THE FORMULA USED TO EVALUATE THE EMISSIONS RESULTS IS:**

$$\frac{(\text{PHASE 1 MASS} \times 0.43) + (\text{PHASE 2 MASS}) + (\text{PHASE 3 MASS} \times 0.57)}{7.5}$$

## FEDERAL TEST PROCEDURE (FTP-75) (CONT.)

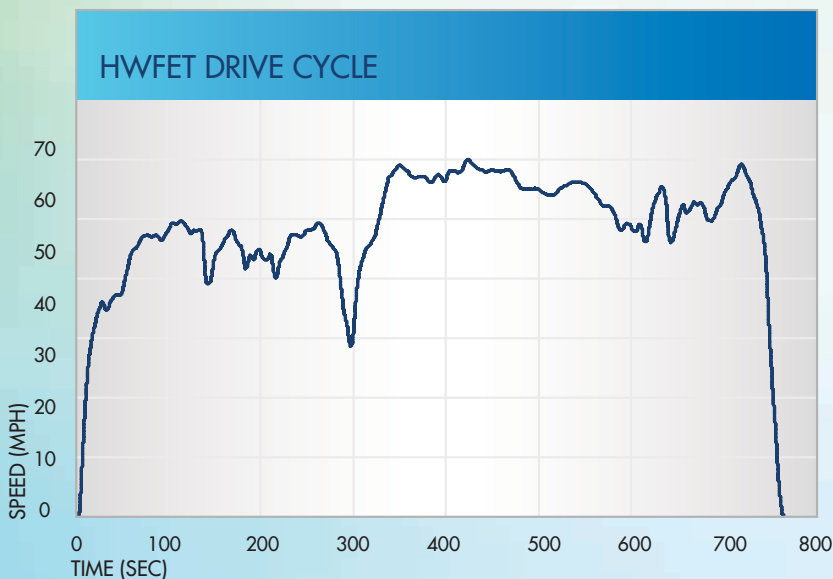
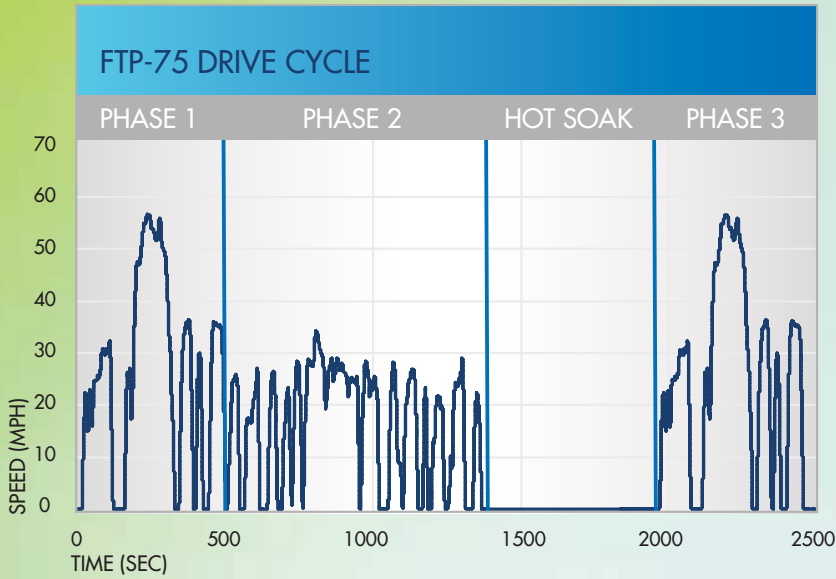
Preparation for a proper FTP-75 for certification purposes includes running a prep cycle on the chassis dyno (Phase 1 and Phase 2), draining the fuel tank and filling it to 40% of its total capacity, loading the charcoal canister to full capacity with butane and keeping the vehicle in the controlled "soak" conditions for 12 to 36 hours.

For R&D purposes, Phase 1 alone (known as a Cold 505) or Phase 3 alone (known as a Hot 505) may be valuable time-saving ways to test a vehicle without running a full FTP-75.

The FTP-75 is used not only to evaluate emissions but also to illustrate the EPA mandated new vehicle window sticker City Fuel Economy value. Fuel economy is typically calculated based on the  $\text{CO}_2$  content in the exhaust gas.

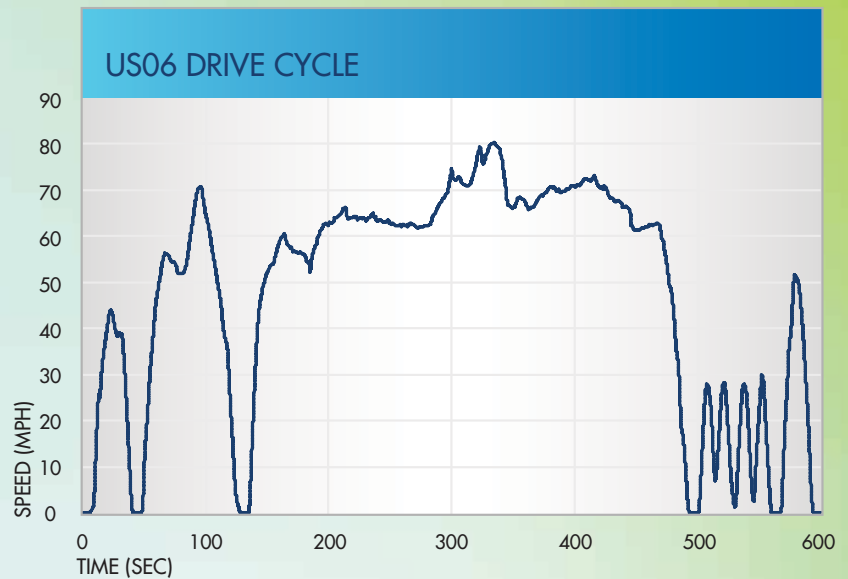
## HIGHWAY FUEL ECONOMY TEST (HWFET)

The HWFET is a simulation of highway driving speeds. It does not include any stops/starts other than to begin and end the test. The average speed is approximately 48 mph with a top speed of around 60 mph. It lasts for 765 seconds and covers a distance of a little more than 10 miles. It utilizes the same environmental conditions as the FTP-75. Preparation for the HWFET is simply completing a HWFET drive trace without measuring emissions. In addition to emissions measurements, the HWFET has historically been the source of the new vehicle window sticker Highway Fuel Economy value.



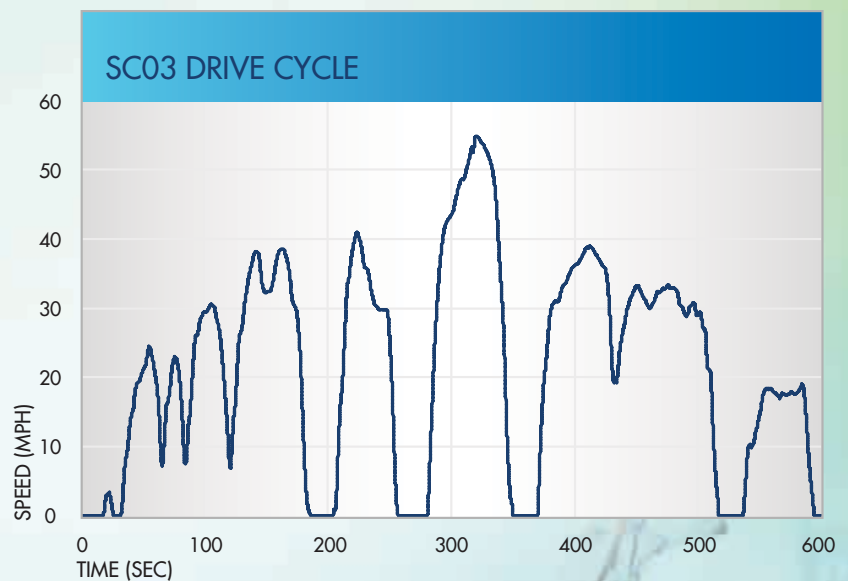
## SUPPLEMENTAL FEDERAL TEST PROCEDURE (SFTP US06)

The US06 was added to the certification testing regimen in 2007 (along with the SC03 and the Cold CO test) to capture data under driving conditions that are more severe than those encountered during the FTP-75. The US06 is approximately 8 miles in length, 600 seconds long and reaches a maximum speed of approximately 80 mph. Driving conditions require more aggressive throttle application than the FTP-75 or the HWFET. Like the HWFET, preparation for the US06 (and the SC03) is simply completing a drive trace without measuring emissions.



## SC03

The SC03 is sometimes referred to as the Air Conditioning test, because it is conducted with the vehicle's air conditioning operational. The SC03 is approximately 3.6 miles in length, 600 seconds in duration and reaches a top speed of about 55 mph. It includes some stopping and starting. The SC03 is intended to be performed in elevated temperature conditions, with the temperature in the test cell controlled at 95°F, however there is an alternative that is allowed (AC2 method) where the testing can be conducted at the same ambient conditions as the FTP-75. When using this method, the final emissions results must be increased by 20%.



## COLD CO TEST

The Cold CO Test uses the same drive trace and preparation procedures as the FTP-75, but is conducted at an ambient temperature of 20°F. California has a variation of the Cold CO Test with an ambient temperature of 50°F.



# LAB TESTING FOR EVAPORATIVE EMISSIONS

In addition to regulating the emissions from vehicles when they are running, EPA and CARB also regulate emissions from the vehicle when it is NOT running, otherwise known as Evaporative Emissions. Evaporative emissions are the result of fuel vaporizing and escaping from the vehicle. Vehicle manufacturers control evaporative emissions through the use of vapor capture and storage systems.

The testing apparatus used for evaporative-emissions evaluation is known as a Sealed Housing for Evaporative Determination (SHED). As the name suggests, it is an enclosure that is large enough to hold a vehicle and that can be sealed. Preparation involves performing Phase 1 and Phase 2 of the FTP, then placing the vehicle in the SHED within 7 minutes of completion of the prep. The vehicle is kept in the enclosure for either 48 or 72 hours and the temperature is cycled between 72-95°F to simulate temperature changes through a 24-hour period. During this cycling, hydrocarbons are measured and then compared to the standard to determine a pass or fail result.

Variations of this test include Resting Loss, Running Loss and Refueling. Diesel vehicles are exempt from Evaporative Emissions regulations.

Full Vehicle SHED Testing evaluates the entire vehicle at the same time. It is time consuming which makes it relatively expensive, and results may be skewed by things unrelated to the fuel system or the engine, such as new tires, cleaning solutions, interior materials or minor fluid leaks. These complexities make full vehicle SHED testing undesirable as a means to evaluate components, such as intake systems or intercoolers. Smaller (mini or micro) SHEDs may be preferred testing devices for components, but test protocols are not specifically determined for certification purposes.

## FULL VEHICLE SHED

*Photo courtesy of Webber EMI*







# AFTERMARKET EMISSIONS COMPLIANCE

The provisions in the Clean Air Act (CAA) and the California Vehicle Code (CVC) that allow for the sale of performance related aftermarket products both require that manufacturers perform due diligence to demonstrate that their products do not have a detrimental impact on the emissions output from a vehicle. This is true for both exhaust and evaporative emissions. Products that fall into this category include (but are not limited to):

- Air intake modifications
- Supercharger or turbocharger kits/modifications
- Electronic tuning devices
- Intercoolers and boost tubes
- Intake manifolds
- Exhaust headers/manifolds
- Turbine outlet pipes
- Cylinder heads
- Fuel system modifications
- Camshafts and rocker arms
- Stroker kits
- Complete engine kits
- Ignition system modifications
- Throttle bodies and throttle body spacers
- Air-oil separators
- Catalytic converters
- Replacement or additional fuel tanks
- Vapor or water injection

In essence, any device that could alter or interact with the airflow through the engine, fuel delivery to the engine or the combustion process will require scrutiny. Manufacturers of aftermarket products have two certification options; SEMA Certified-Emissions, or the CARB EO.

## QUICK FACTS

### **SEMA Certified Emissions (SC-E) Applications**

- SC-E is designed to meet the requirements of the EPA's "Tampering Policy" to show reasonable basis of emissions compliance for 49 States
- SEMA has an in-house Engineering Team that can evaluate applications and assign testing
- SC-E can allow applicants to have flexibility in the test vehicle
- SC-E generally offers the ability to gain a wide range of vehicle coverage with less processing time
- Receive a Certificate of Compliance in as little as two weeks after testing is complete
- Successful SC-E applications can be submitted to CARB as "Fast Track" EO application(s)

### **California Air Resources Board Executive Order (CARB EO) Applications**

- SEMA assists members in the application and testing process for California Emissions Compliance
- Applications are reviewed by CARB Engineers
- CARB issues a test letter that outlines the test vehicle and test sequence
- As of January 1st, 2022, CARB instituted new application procedures that have made the path to California Emissions Compliance more challenging, time consuming, and expensive. The typical project will require at least 3 separate CARB EO applications to complete. Average time to receive a CARB EO can be 6 months to over a year in some cases.

## SEMA CERTIFIED-EMISSIONS

The EPA Tampering Policy clearly identifies what is expected to demonstrate a “reasonable basis” for emissions compliance. It specifically states that a product meets the reasonable basis criteria if emissions testing is done on a properly representative vehicle with the product installed, the test results are within applicable standards and the product is marketed for vehicles that are properly represented by the test vehicle (and **not** vehicles that aren’t).

The emissions testing that is considered acceptable is “generally the same as the testing and documentation required by regulation (e.g. 40 CFR Part 1065\*) for the purposes of original EPA certification of the vehicle...”. The selection of an appropriate “exemplar” vehicle and the proper execution of the testing in a properly equipped laboratory are key elements of a proper reasonable basis determination.

SEMA Certified-Emissions (SC-E) is designed to document a reasonable basis justification as described in the Tampering Policy. The program consists of:

- Submission of product information and desired vehicle coverage to SEMA (the type of information needed is similar to that described here for the CARB application process)
- Review of information by SEMA staff
- Determination of appropriate testing process, when necessary
- Completion of testing at a SEMA Garage location (SoCal or Detroit), or an alternate location recommended by SEMA
- Review of test data and preparation of a “Test Report Justification”
- Issuance of a SEMA Certificate of Compliance (COC)

The document review process is expected to take about 2 weeks before testing, and another 2 weeks once testing is complete. A SEMA Certified COC represents a reasonable basis demonstration for an identified group of vehicles as described in the EPA Tampering Policy.

\*40 CFR Part 1065 refers to the section of the Code of Federal Regulations that describes certification tests for light- and medium-duty vehicles. This testing process is used by the OEMs to certify vehicles for on-road use in the US. All or portions of the required testing is used for both the SC-E and the CARB EO programs.

## THE CARB EO

The process for obtaining a CARB EO is outlined in the CARB document “Procedures for Exemption of Add-On and Modified Parts for On-Road Vehicles/Engines”, adopted June 29, 2021. This version of the procedure replaces a previous version that had not been changed since 1991.

SEMA Staff members are available to assist with the CARB EO application process. They meet regularly with CARB staff to maintain open lines of communication and to ensure a complete understanding of the CARB EO process, with a goal of streamlining in any way possible.

The CARB EO process is centrally focused on submitting an application to CARB that describes the product in question. The process can accommodate a wide variety of product types, from replacement air intake systems to exhaust headers, however, different types of products will require different types of information to be included in the application.

Once an application is submitted to CARB, it will be received by a manager in the Aftermarket Parts (AMP) Division and assigned to a staff engineer for processing. The AMP Division has approximately 15 staff engineers, so assignment may be based on previous application history or product type, with certain engineers having particular areas of focus. Applications should be prepared in such a way as to with certain engineers having particular areas of focus include only one product type, one fuel type, one vehicle manufacturer family, one vehicle weight category, one emissions standards category and one engine configuration. If a product has universal fitment, it is recommended to select a narrow group of vehicles as described above to obtain initial EO coverage, then expand the coverage later.

The CARB engineer will review the application and should respond within 30 days with either an “Accepted for Filing” or “Not Accepted for Filing” status. This will be dependent on whether there was enough information provided in the original application to proceed with processing. This filing status response will usually be accompanied with a request for more information; if the response was “Not Accepted,” the request for information will likely include specific questions related to the missing information.

As the engineer is reviewing the application, he or she will make a determination about whether or not an “engineering evaluation” can be utilized to complete the EO process. This may be possible if the product is not overly complex and sufficient information is provided. Comparative measurements, drawings and photos are useful to support the possibility of an engineering evaluation EO.

If an engineering evaluation is not possible, the CARB engineer will likely require some form of emissions testing to evaluate the product. The required testing will be detailed in the form of a “Test Letter” to the applicant. The Test Letter will specifically define the vehicle that should be

used for product testing and the specific tests that are required. In most cases, this will be some combination of the certification tests described earlier in this document, with some additional verification procedures. The Test Letter should be issued within 45 days of the time that the engineer has received all the necessary information from the applicant.

Typical testing requirements for some common product types are as follows:

TYPICAL TESTING REQUIREMENTS FOR SOME COMMON PRODUCT TYPES ARE AS FOLLOWS: PRODUCT TYPE	OBD FUNCTION	FTP-75	US06	SC03	HP VERIFICATION	BOOST VERIFICATION	EVAPORATIVE
AIR INTAKE SYSTEMS WITH NO OEM SENSORS	X		X				
INTERCOOLER KITS/INTERCOOLER COMPONENTS WITH NO OEM SENSORS	X		X				
AIR INTAKE SYSTEMS WITH OEM SENSORS	X	X	X	X			
INTERCOOLER KITS/INTERCOOLER COMPONENTS WITH OEM SENSORS	X	X	X	X			
FLASH TUNERS/INLINE TUNERS	X	X	X	X	X		
FUEL TANKS/FUEL TANK MODIFICATIONS	X						X
SUPERCHARGER/TURBOCHARGER KITS/MODIFICATIONS	X	X	X	X		X	
PRE-CATALYST EXHAUST COMPONENTS	X	X					
AIR FILTER RAMS	X						
AIR INTAKE KITS FOR VEHICLES WITH NO MAF SENSOR	X						
EXHAUST OR TRANSMISSION BRAKE SYSTEMS	X						
IGNITION COILS	X						
SPEEDOMETER OR WHEEL SPEED ADJUSTERS	X						
THROTTLE BODIES	X						
THROTTLE BODY/CARBURETOR SPACERS	X						

The Test Letter will include a list of automotive testing laboratories that are recognized by CARB to do the required testing. The SEMA Garage Emissions Lab is among those listed. Once testing is complete, the emissions laboratory is responsible for submitting the test data back to the CARB engineer. The engineer will evaluate the data and determine if the product has met the criteria for a passing result. He or she will prepare the EO and send it to the section manager for review. The manager will then submit it to the Branch Chief for signature. Once the EO is signed, it is a legal document and is in force. The EO will be posted on the CARB website to be accessible to the public, but this final step is not necessary for the product to be deemed legal.

## APPLICATION FORMS

CARB has specific application forms for various product types. These forms may be difficult to locate on the CARB website, so contact CARB or SEMA for assistance in locating the proper forms. The form types are:

- Category 1 (only used when an EO has been previously issued)- Part number or name change, model year additions, private label arrangements, extending coverage to subsidiaries and consolidation of existing EOs
- Category 2- Air intake kits or modifications
- Category 3- Engine control module programmers/ signal modifications
- Category 4- Fuel tanks or fuel tank modifications
- Category 5- Intercooler kits, components or modifications
- Category 6- Supercharger/Turbocharger kits or modifications
- Category 7- Pre-catalyst exhaust components
- Category 8- Other low-impact categorized parts (typically requires minimal testing)
- Category 9- Parts not covered by Categories 2-8

The application forms will require (at least) the following information:

- **Company name and address**—The name of the applicant company will appear on the EO when issued. If the applicant is applying for coverage of a product that is private labeled from another company, there is separate space for the manufacturing company to be listed. CARB considers the company with “design

control” to be the manufacturer. Therefore, if your company makes the decisions about the final design of the product, even if you are outsourcing the hardware, you would still be considered the manufacturer.

- **Company phone number**—This information will NOT appear on the EO. It should be a general phone number for the company.
- **Name of the Authorized Representative**- Identify a person that is employed by the applicant company that has technical knowledge of the product and is authorized to speak on behalf of the company.

The name, email address and direct phone number of this person should be included on the application form. If you are utilizing a consultant (such as SEMA), their name can be included on a separate addendum page as an additional authorized contact to speak on behalf of the company in matters related to the application process.

- **Device name**—Include the *specific* product name(s) as they appear in your marketing material. This should match on the application form, your website and installation instructions (if applicable).
- **Purpose of the device**—What does your product do? Provide a simple explanation of why the product exists. It should be specific enough to describe the basic premise of the device but does not need to include detailed advertising information. Example: “The Brand X Supercharger kit increases engine power by adding forced induction to an engine that is naturally aspirated in factory condition.”
- **Operation of the device**—How does your product work? Provide some basic description of the operating principles of the product. If it is helpful, the use of drawings or illustrations is acceptable and encouraged. Example: “The Brand X Supercharger is a belt-driven roots type compressor driven by the crankshaft and produces 10 psi boost. The fuel injectors are replaced with higher flow units to provide sufficient fuel delivery.”
- **Vehicle coverage information**—Provide a list of vehicles that the product will fit. The list should include your product part number and the year, make, model and engine displacement of the range of vehicles that the product fits.

■ Installation instructions/detailed drawings or schematics—Installation instructions will help the CARB engineer understand the full operation of the product and how it may impact emissions. Installation instructions are required to be included in the application submission. If for any reason you do not have installation instructions for the product, inform the CARB engineer. He or she may ask for some alternative information, such as exploded diagrams or a detailed written explanation of the product. These types of information may be useful in completing an engineering evaluation in lieu of testing. Advertising or marketing information may be helpful as well but is not required.

The content of the installation instructions that you submit should be in a final format, one that you would intend to ship with the product with minor final edits. If you make reference to the EO number, you may use a placeholder for the EO number, since at the time that you prepare the instructions the EO number won't yet be finalized. The instructions should contain a step directing the installer to place the EO label in a visible location under the hood.

■ EO label facsimile—Any product that is issued an EO must be accompanied by a label to be affixed under the hood of the vehicle that will indicate to a smog check technician that the vehicle is so equipped. The label must include, at a minimum:

- Manufacturer's name
- Device name (should match the device name in the application)
- CARB EO number

Other information is permissible, but not required, such as manufacturer's address, phone number, web address and the device part number.

You are not expected to have physical samples of the label that will ship with the product at the time of application, since some of the information (CARB EO number) will be unknown until the completion of the EO process. However, a label facsimile (artwork) that demonstrates the label as it would appear must be included with the application.

EXAMPLE:				
BRAND X PN	MAKE	MODEL	ENGINE DESC	MODEL YEAR
SC-12345	DODGE	CHALLENGER, CHARGER	5.7L NA	2009-2019
SC-12345	CHRYSLER	300	5.7L NA	2009-2019
SC-12345	DODGE	MAGNUM	5.7L NA	2009
SC-67890	DODGE	CHALLENGER, CHARGER	6.4L NA	2015-2019
SC-67890	CHRYSLER	300	6.4L NA	2015

Labels are also expected to have adequate under-hood durability and legibility for the life of the vehicle (at least 10 years). You may be asked to provide a material sample of the label that you intend to use or are already using for previously acquired EOs. SEMA recommends providing a material sample or a description of the material with the application, when possible. Materials that have appropriate durability include nylon, polyester or mylar, with a laminate over the ink printing. Paper labels are NOT sufficiently durable.

- **Tune-up label facsimile**—If your product requires any mechanical adjustments that are different than those provided by the manufacturer on the factory emissions/tune-up label, you must also supply a label indicating the changes. This label must also be capable of long-term durability and legibility. Note that this requirement pertains primarily to older vehicles that had mechanically adjustable ignition or carburation systems and is rarely applicable to modern vehicles.
- **List of companies that sell the product under license**—If you have any private-label arrangements for the product to be sold through channels other than those identified by the applicant, they are to be identified in the application.
- **ECU Modification Information**- If your product alters the electronic tuning of the vehicle, either internal to the ECU (reflash) or external (inline device), you must provide information about the modifications by answering a series of questions. This requirement also applies to products for which tuning is a subset of the product, such as an add-on supercharger or turbocharger kit.
- **Supercharger/Turbocharger detail information**- Some additional detail about the design properties of an add-on supercharger or turbocharger kit is required, including detailed vehicle fitment, name of the supercharger/turbocharger manufacturer (if different from the applicant), device model number, description of compressor/turbine, supercharger pulley sizes, boost levels and details about required modifications to engine systems.

- **Signature**—An application requires a signature of the authorized representative. The signature is an acknowledgment that all the information provided is true and accurate, and that to the best of your knowledge, the product will not have an adverse effect on vehicle emissions. It further acknowledges that an EO, if granted, does not constitute a certification or endorsement of the product by CARB.

- **Vehicle coverage list**—As the CARB engineer reviews the application, he or she will need a list of the vehicles that are compatible with the product. It is recommended that this be provided in a spreadsheet format, such as Microsoft Excel. If this is provided by the applicant in the proper format, a significant time savings may be realized by the CARB engineer. This list should contain the following information:

- A header with the company name and device description
- Product part number(s)
- Device name
- Horsepower improvement expressed in percentage increase (this is only necessary for applications involving tuning devices)
- Boost pressure (only necessary for supercharger and turbocharger kits)
- Vehicle makes
- Vehicle models
- Engine description, including displacement and aspiration type
- Fuel type
- Model year (each model year should be listed in a separate row)
- The New Vehicle Certification EO number applicable to the specific vehicle make, model, engine and year model (note: there may be more than one, in which case, each applicable EO should be listed separately)
- Vehicle weight class (PC, LDT, MDV, etc.)
- Test Group

- Evap Group (only necessary for products that include modifications to the intake system or fuel containment portions of the vehicle)
- Emissions category
- Emissions standards and certification values

A significant portion of this information is accessible on the CARB website "On-Road New Vehicle & Engine Certification Program" database, but SEMA has developed a searchable database that can significantly reduce the amount of time necessary to develop a vehicle coverage list.

- For products that affect the intake portion of the vehicle, such as cold-air intake systems and intercoolers, material information about any rubber components along with information about included clamps will be helpful. The CARB engineer will need sufficient data to be able to determine that evaporative emissions will not be impacted by the use of the product. Without sufficient material information, the engineer may need to resort to an evaporative test requirement, which is expensive and difficult, and should be avoided if possible.
- When applying for EO coverage of an exhaust product, such as headers or turbine outlet pipes, include information about the material type, thickness and finish (such as raw, chrome, ceramic coated, etc.).

- Comparative information that demonstrates a size or volume comparison to the stock components may be beneficial for an engineering evaluation. Schematics, drawings and photos may also be helpful. Anything that provides the engineer with an understanding of the function of the product and its comparison to the factory components is useful.

It should be noted that all application information submitted to CARB is considered entirely confidential and applicant information will not be shared with any other party without expressed permission in writing.

It is recommended that the EO application process not be approached in an adversarial manner. CARB is required by law to help with the process but is not required or expected to provide assistance with product development guidance. Designing a product in such a way that it will remain emissions compliant is the responsibility of the applicant.

**Applications may be emailed to  
AMPES@arb.ca.gov.**



## THE CARB TEST LETTER

Once an application has been reviewed by the CARB engineer, if he or she determines that there is not sufficient information available to provide coverage based on an engineering evaluation, testing will be required. The details of the necessary testing will be provided in a Test Letter. Once a Test Letter is received, the applicant has 6 months from the date of the letter to begin the testing.

The Test Letter will contain details on how a product should be tested, including a “worst case” vehicle (or vehicles) that will best represent the full list of vehicles included in the application. The intent behind selecting a worst case is that if the product can demonstrate emissions compliance on the worst-case representation of the vehicle list, then it can be assumed that the product will remain in compliance on all the others in the group as well. Worst case determination is based on the emissions category, comparison of the OEM certification test results to the standards (the closer the cert value is to the standard, the more likely it is to be selected as a worst-case test candidate), the sales volume of the vehicle and the popularity of the vehicle for use of the product.

The Test Letter will also contain details about the test process. This will typically include an OBD2 evaluation (for products applicable to 1996 and later vehicles) and a combination of certification tests (FTP-75, US06, SC03 and HWFET). If the product is primarily a tuning device, a horsepower verification test will also be included. This is done to ensure that the product being tested is functioning as claimed. If the product is a supercharger or turbocharger kit, a maximum boost test will be required to demonstrate that the product produces the amount of boost claimed in the application.

In most cases, the test data will be compared to the emissions standards for that vehicle to determine a pass/fail result. The raw test results for each pollutant are added to a deterioration factor that is adjusted for the vehicle mileage and represents the functional life span of any emissions aftertreatment devices, such as catalytic converters. Diesels that are equipped with a Diesel Particulate Filter (DPF) will also have an Infrequent Regeneration Activity Factor (IRAF) value added to the result to account for the soot load status of the DPF at the time of testing. The final result is then compared to the standard.

In cases that involve very high mileage vehicles, vehicles that are close to or slightly over the standard in factory condition or vehicles that were never chassis certified to begin with, the CARB engineer may require that baseline testing be conducted along with the product test for comparison purposes. In these cases, the modified results must be generally within 10% of the baseline results to be considered passing.

SC-E testing requirements are comparable to CARB's.







# PRODUCT TESTING IN AN EMISSIONS LAB

When it comes time to do tailpipe testing in an automotive testing laboratory, there are a few practices that must be adhered to and others that are recommended for best results.

## TEST VEHICLE

This starts with the test vehicle. If you have been issued a Test Letter, it will identify a very specific vehicle or possibly a narrow range of vehicles that must be used for the product testing. In most cases you will be able to identify the proper vehicle by matching the Test Group information provided in the Test Letter with the Vehicle Emission Control Information (VECI) Label under the hood of the vehicle.

When testing for a CARB EO, whether following a Test Letter or not, the test vehicle should always be one that is certified by the OEM to meet California emissions requirements.

All certified vehicles have a “useful life” during which it is expected that the vehicle will meet the emissions standards with a deterioration factor applied to compensate for the vehicle mileage. A vehicle is considered ready for testing once a minimum of 4,000 miles have been accumulated. This requirement is partially for the protection of the applicant, as vehicles with less than 4,000 miles may deliver inconsistent test results. If a test vehicle has less than 4,000 miles, it is wise to inform the CARB engineer to possibly have this requirement waived.

EXAMPLE OF VECI LABEL

<b>FoMoCo</b>	<b>Ford Motor Company</b> VEHICLE EMISSION CONTROL INFORMATION
Conforms to regulations: 2017 MY	
U.S. EPA: T3B125 LDV	
CA OBD II	Fuel: Gasoline
California: ULEV70 PC	
CA OBD II	Fuel: Gasoline
TWC/HO2S/WR-HO2S/CAC/TC/DFI   No adjustments needed.	
2.3L-Group: HFMXV02.3VJX	
Evap: HFMXR0125NBA	
▽HW7E-9C485-B J B	

## PRODUCT TESTING IN AN EMISSIONS LAB

Test vehicles should be in factory condition, with only the product being tested installed to avoid any possible overlay of effect on emissions results. If the comparison will be against the emissions standards for that vehicle, it is also important that the vehicle be tested with tires that are the OEM specified size. This will ensure that load conditions are consistent with the conditions under which the vehicle was originally certified. It is also a good practice to ensure that the vehicle filters and fluids are in a current service state. Once testing has commenced, servicing the vehicle is not allowed during the test sequence.

The vehicle will be connected to an exhaust sampling system that will gather all the exhaust gas from the vehicle for processing. During testing, the ambient air will also be sampled as a reference, so it is imperative that the exhaust system have no leaks. The exit portion of the exhaust will need to be sealed to the sampling system, so a vehicle's existing tip (or tips) may need to be modified to remove odd shapes that would be difficult to fit a boot over, or that are perforated with vents.

## PRODUCT TESTING IN AN EMISSIONS LAB

SILICONE BOOT OVER EXHAUST TAILPIPES



## OBD SYSTEM FUNCTION VERIFICATION

Virtually all certification testing requires that the OBD system remain fully functional with the aftermarket product installed. This means that there should be no error codes reported and the existing monitors must remain functional and be able to complete a readiness sequence. Therefore, the first part of a test sequence, once a product has been installed on the vehicle, is typically a reset (clear) of the OBD2 system followed by a mileage accumulation of at least 50 miles to allow the monitors to complete their readiness cycle.

A typical OBD monitor list for gasoline vehicles includes:

- Misfire detection
- Fuel System
- Comprehensive Component
- Catalyst
- Evaporative System
- Oxygen Sensor
- Oxygen Sensor Heater
- EGR and/or VVT System

A typical OBD monitor list for diesel vehicles includes:

- Misfire detection
- Fuel System
- Comprehensive Component
- NMHC Catalyst
- NOx Aftertreatment
- Boost Pressure System
- Exhaust Gas Sensor
- PM Filter
- EGR and/or VVT System

Most monitors will set within 50 miles, but for gasoline vehicles, the Evaporative System (Evap) monitor may take longer and may require cold starts and very specific driving conditions to set. For this reason, it is usually considered acceptable to proceed with emissions testing without the Evap monitor set, but it will still be necessary for it to have completed after the emissions testing for the full test set to be complete.

In similar fashion, diesels will often have one or two monitors that take a while to set, particularly the PM Filter and the NMHC Catalyst monitors, even up to or over 1,000 miles. However, unlike gasoline vehicles, and depending on the product type being tested, it is generally NOT advisable to proceed with emissions testing until all the monitors have completed a set routine.

It is a recommended practice to ensure that all the monitors on the vehicle have demonstrated an ability to complete when the vehicle is in its stock condition. A simple check of the OBD system prior to installation of a test product will provide this assurance. Failure to do so could result in significant frustration if a monitor doesn't set after many miles. If a vehicle is unable to set a monitor in its stock condition, it may have an underlying condition, and it may be best to disqualify it as a test candidate.

There are a few high level OBD scan tools available that will provide comprehensive information in a report when connected to the OBD system. Two that are acceptable by CARB are Silver Scan and Autoengenuity. A lab that is recognized by CARB to do testing will most likely be equipped with one or both of these tools to satisfy CARB's requirements for OBD system reporting.

## HORSEPOWER/BOOST VERIFICATION

If the product being tested is an ECU flash tune or an inline tuning module, it will be necessary to complete a performance test that verifies that the product is installed and is performing in the manner that is advertised for the device. This is typically done on a chassis dynamometer. Emissions chassis dynos are not designed to measure horsepower; therefore, this type of test needs to be done on a dyno that is intended for such use. Often this type of work will be performed outside of the emissions laboratory with oversight from the lab staff. Horsepower verification should be done after the OBD clear following product installation and should be followed with an OBD report.

If the product under test is a supercharger or turbocharger, horsepower verification is not necessary because the device can be visually verified, however, a boost verification will be needed to confirm that the system is operating as intended during the emissions test. It is good practice for the boost verification to be done with an external mechanical gauge rather than relying on the reading from an on-board manifold pressure sensor.

## VEHICLE PREPARATION AND TEST SEQUENCE

The first step for any vehicle that will undergo testing is a Road Load Determination. This is a coast down sequence that is performed on the chassis dynamometer to match the dyno load coefficients to the target road load coefficients for that vehicle. This effectively ensures that any vehicle will have the same load conditions placed on it during testing regardless of the location and equipment being used. Thus, test results from one test cell or laboratory to another should be repeatable.

Once the OBD System verification is complete, the vehicle will be brought into the laboratory for test preparation and conditioning and must remain in a conditioned state during the full course of testing. Tailpipe emissions tests are performed in a temperature- and humidity-controlled environment, and the vehicle must be “soaked” in these stabilized conditions for a minimum number of hours prior to the testing.

Since all testing is done on a specified fuel to ensure consistency, the existing fuel in the tank must be drained and replaced with certification fuel (Drain and Fill). Preparation requirements for an FTP-75 include filling the fuel tank to 40% of its capacity. Once a Drain and Fill has been performed, the vehicle must remain in soak for a minimum of 6 hours and a maximum of 36 hours before the next step is performed.

Preparation for an FTP-75 includes a drive cycle on the dyno of the first two phases of the FTP-75, also known as the Urban Dynamometer Drive Cycle (UDDS or FTP-74), followed by a 12- to 36-hour soak to allow the entire vehicle to reach an equalized temperature with the ambient conditions. During this soak period, the charcoal canister must be fully loaded with a butane and nitrogen mixture (gasoline vehicles only). This can be done with the canister on the vehicle if the fill and vent ports are accessible but is usually done by removing the canister and performing the fill in a canister load station. The canister fill process can take anywhere from 4 to 12 hours to complete.

Unlike the FTP-75, preparation for HWFET, US06 and SC03 testing does not involve an ambient stabilized temperature for the vehicle, so it is very common for these tests to be performed directly after an FTP-75. If duplicate testing is being performed (a common requirement for late model vehicles), testing may be followed by a UDDS cycle in preparation for testing the following day.

Prior to any test in which Particulate Mass (PM) is being measured, fresh filters must be weighed and recorded.

**A typical full test sequence will be as follows:**

1. OBD Read and Report, as received
2. Baseline horsepower verification (if required)
3. Product Installation
4. OBD Read and Report, Clear
5. Mileage Accumulation (at least 50 miles)
6. OBD Read and Report, post mileage accumulation (more mileage may be necessary followed by another OBD Read and Report, depending on OBD monitor status)
7. Modified horsepower or boost verification (if required)
8. Drain and Fill
9. Road Load Determination
10. 6-36 hour soak
11. UDDS Prep cycle
12. Drain and Fill
13. 12-36 hour soak (with canister load for gasoline vehicles only)
14. FTP-75
15. HWFET
16. US06
17. SC03
18. UDDS Prep cycle
19. Drain and Fill
20. 12-36 hour soak (with canister load for gasoline vehicles only)
21. FTP-75
22. HWFET
23. US06
24. SC03
25. OBD Read and Report, post-test

This full sequence will vary in length depending on the OBD and mileage accumulation portions of the sequence, but in a best-case scenario can be completed in 4 days.

## EMISSIONS MEASUREMENT AND STANDARDS

During the testing, the following items will be measured:

- Total Hydrocarbons (THC)
- Methane
- Oxides of Nitrogen (NO<sub>x</sub>)
- Carbon Monoxide (CO)
- Carbon Dioxide (CO<sub>2</sub>)
- Particulate Mass (PM)

The emissions that are evaluated vary from test to test. Diesel vehicles have standards for Non-Methane Hydrocarbons (NMHC) which is calculated by subtracting methane from total hydrocarbons. Gasoline vehicles have standards for Non-Methane Organic Gases (NMOG) which are not directly measured but are calculated from NMHC. Standards exist for CO but not CO<sub>2</sub>, but CO<sub>2</sub> is commonly used to evaluate the vehicle's fuel economy. Particulate Mass has historically been a regulated emission for diesel vehicles but has recently been added for gasoline vehicles.

Hydrocarbons in the exhaust are the result of unburned fuel. If NMHC or NMOG are high, it is likely due to a rich condition, or excess fuel on cold start (specific to the FTP-75).

NO<sub>x</sub> may be high as a result of elevated combustion temperatures, which can result from lean fuel mixture conditions or high boost levels. NMHC/NMOG and NO<sub>x</sub> will typically react in an inverse relationship; when one goes high, the other drops. In many cases on Tier3/LEV3 vehicles, NMHC/NMOG and NO<sub>x</sub> standards are combined into a single standard (NMHC+NO<sub>x</sub>, NMOG+NO<sub>x</sub>).

CO will often increase when hydrocarbons increase, but it is rare that CO is high enough to exceed a standard. There are currently no standards for CO<sub>2</sub>, but it can be used to calculate fuel economy, which can be a useful tool.

FTP-75 standards exist for NMHC/NMOG, NO<sub>x</sub>, CO, HCHO (calculated from NMHC) and PM. HWFET standards exist for NO<sub>x</sub>, and occasionally NMHC/NMOG. US06 and SC03 standards exist for NMHC and CO. The US06 is a relatively high load test, so it may be considered the hardest of the tests to pass, apart from the cold start portion of the FTP-75. SC03 and HWFET failures are extremely rare.

## EVAPORATIVE TESTING

The preparation for an Evaporative SHED test includes steps 8 through 14 listed above, with the vehicle placed in the SHED within 7 minutes of completing the FTP-75. The most common test for aftermarket product certification is a 2-Day Diurnal. The vehicle remains in the SHED for 48 hours while the temperature in the SHED is cycled between 72° and 95°F. During this process, hydrocarbons in the SHED atmosphere are measured.





## THE LAB REPORT

Once testing is completed, the laboratory should produce a Test Summary Report that details the test process and results. This report can serve as a “reasonable basis” for the SC-E process and/or can support the issuing of a CARB EO. A complete lab report will contain the following information:

- Description of the test vehicle (make, model, year, VIN, engine description, Test Group and Emissions Category)
- Vehicle mileage, as received
- Tire size, as equipped
- Test fuel description
- Description of the product under test, including part number
- Photos of:
  - Test vehicle
  - VIN Tag
  - VECI Label
  - Tire Information Label
  - Tire size embossed on the drive tire
  - The product installed on the vehicle (if applicable)

- Vehicle Test Weight
- Dyno Target Coefficients
- Dyno Set Coefficients
- Procedure sequence with dates
- OBD Results Summary
- Emissions Results Summary, including Deterioration Factors, Infrequent Regeneration Adjustment Factors (DPF-equipped diesels only), Standards and Pass/Fail indication
- Horsepower or Max Boost data (if applicable)

The Summary Report should be accompanied by OBD reports and individual test reports. These attachments may be in printed or electronic format.





## R&D AND BASELINE TESTING

In some cases, the complexity of the product may warrant some testing prior to entering a certification test process. This is particularly true of products that provide forced induction (superchargers and turbochargers) or that alter the engine tuning. There are some tools and cost savings measures that can make an R&D process more meaningful and manageable.

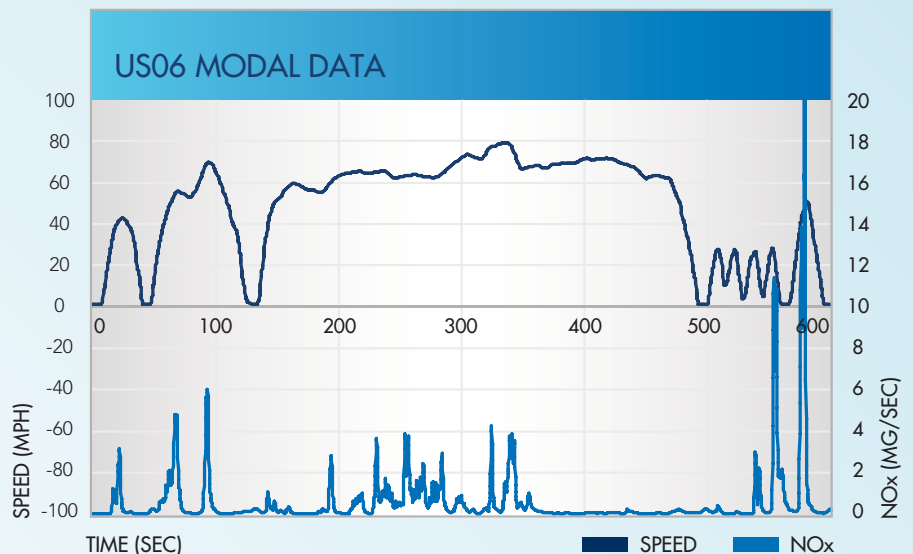
Most failures that occur during an FTP-75 test happen within the first minute of the vehicle operation due to the cold start nature of the test. If this is apparent, then repetitive testing does not need to involve an entire FTP-75 test; the first phase of the test can be run in isolation. This is known as a Cold 505. Running cold 505's vs. the full FTP-75 can save significant time and money. Prep cycles and canister loads are generally going to have minimal impact on the test results, so these can be bypassed as well.

Certification test fuel is rather expensive, usually on the order of \$30/gallon. For iterative testing, you can reach a high level of certainty in the results while testing on pump fuel.

Certification tests only measure the final cumulative result over the course of the test, but when troubleshooting, it is helpful to know what driving conditions contribute to excessive emissions, which may push the final result over the limit. Most labs have the ability to capture modal data, a time-based measurement of emissions output throughout the drive cycle. This information, by itself, can indicate the speed, load and rate of acceleration that coincide with spikes in the emissions trace. When this information is paired with other engine data (captured by a data acquisition system), the likelihood of pinpointing problem areas increases. Note that PM measurements are generally not available in modal data streams due to the filter capture methodology. However, system that measure Particle Number (PN) can deliver modal information.

Some vehicles will produce emissions that are very close to, or even slightly over, the standards in their factory condition. Product testing on such a vehicle may then also be close to or over the standard. In these cases, it is very helpful to know how the vehicle will perform in its original condition. Baseline testing may be quite useful in identifying such conditions and may also be beneficial in supporting a case for baseline comparisons rather than comparison to standards.

EXAMPLE OF MODAL DATA SHOWING NO<sub>x</sub> SPIKES CORRELATING TO ACCELERATION DURING A US06 TEST







# CHOOSING SEMA CERTIFIED-EMISSIONS VS. THE CARB EO

## CHOOSING SEMA CERTIFIED-EMISSIONS VS. THE CARB EO

Both SEMA Certified-Emissions and the CARB EO process result in the certification of a product such that it may be legally sold; SC-E provides 49 state legality (via compliance with the EPA Tampering Policy) and the CARB EO covers all 50 states. The SC-E process is typically faster than the CARB EO and may be able to accommodate products that are not well suited for the CARB EO program.

When the traditional process of submitting a CARB application is followed, it can take up to 75 days to receive a Test Letter. However, there is nothing that prevents an applicant from submitting any amount of test data with an application, and as previously mentioned, providing more data can expedite the process of receiving an EO.

When pursuing an SC-E certification, an applicant can utilize the test data gathered as supporting documentation for a CARB EO. This has become known as a "Fast Track" procedure. Following this process has resulted in a reduction of time required to obtain an EO by as much as 60 days.

It should be noted that in most cases, due to the restrictive nature of the CARB application process, SC-E will be able to provide greater coverage in a shorter amount of time than the CARB EO. Many applicants find it beneficial to obtain a SEMA certification to be able to sell product quickly in 49 states while waiting for the CARB EO process to be completed.

Another consideration is fees. CARB charges:

- \$500 per Category 1 or 8 application
- \$1000 per Category 2-7 or 9 application (or \$500 for companies under 100 employees)

SEMA charges \$500 for an SC-E application or assistance with a CARB application, and \$750 for the combination of an SC-E and CARB EO. SEMA staff can assist applicants in determining the best approach; SC-E, CARB EO or both. A start-up form for any assistance with applications can be accessed at [www.semagarage.com](http://www.semagarage.com).



# MARKETING YOUR PRODUCTS USING THE VOLUNTARY LABELING PROGRAM



In general, the test process for SEMA Certified-Emissions and for obtaining a CARB EO are very similar and are applicable to passenger cars and light- and medium-duty trucks. Off-highway vehicles such as side-by-sides or UTVs are also regulated vehicles, even though they are not intended for street use, and therefore performance products for these vehicles are subject to the same regulations as street-use products. These vehicles can be tested in an automotive emissions lab, and the test requirements are similar to street vehicles. Some product manufacturers have used a disclaimer of “Off-Road Use Only” to avoid emissions testing. This is not a viable disclaimer and causes confusion due to the actuality of regulated off-highway vehicles.

Products that are intended for race use and are never to be used on street-driven vehicles (or non-competition off-road vehicles described above) may be sold as “Race-Use Only” and are not subject to emissions certification by either EPA or CARB. However, both agencies are vigilant to identify products that are sold under this disclaimer but are used on street vehicles. Any product that defeats or removes an emissions device from a vehicle can never be considered legal for street use. Any product that is considered dual use for both track and street should meet the requirements of CARB and/or EPA.


Due to the challenges of properly identifying the emissions-legal status of a product, SEMA has developed a Voluntary Product Labeling program that features color-coded labels for the identification and clarification of emissions-related add-on and modified parts. All products that are installed anywhere between the air intake and the outlet end of the catalytic converter, or that interact with the vehicle’s electronics can be grouped into the four color-coded and numbered categories listed below. Manufacturers are encouraged to use the labeling guidance on product packages, in catalogs—both printed and electronic—and in advertising. This labeling program allows all levels of the distribution chain—from manufacturer to end-user—to be familiar with the legal sale options for each product. It also serves as a demonstration of due diligence to CARB and EPA.



The four categories are:

1


This product is covered under a CARB EO and is legal for sale and use in all 50 states.



Products that have completed the CARB EO process belong in this category. EPA recognizes the CARB EO as a reasonable basis demonstration, therefore products can be considered legal by both CARB and EPA.

2

This product is covered under a SEMA Certified Emissions certification or has otherwise met the requirements of the EPA's Tampering Policy and is legal for sale in states that do not mandate an EO.




This category includes products that have demonstrated a reasonable-basis emissions compliance either through engineering evaluation or testing, but do NOT have a CARB EO. There are a few reasons that a product might be in this category, including (but not limited to):

- Testing has been completed and paperwork submitted to CARB but the EO has not yet been issued.
- The product meets the reasonable basis standard but may not meet CARB's criteria for an EO.
- You have performed testing but have decided not to pursue a CARB EO.

3


This product is not legal for street use on an emissions-controlled vehicle. It may be used on dedicated competition or pre-pollution-controlled vehicles only.



Some products can never be legal for use on pollution-controlled vehicles (both for use on the road and off-road), but they do have a legitimate use on racing vehicles and vehicles that predate emissions regulations. Pre-certification means 1965 and older domestic vehicles in California, 1968 imports in California and both domestic and imports under EPA jurisdiction.

4

This product does not require an EO in California. By nature of its design, it is legal for sale and use in all 50 states. Replacement parts included.



This category includes products that have little or no impact on emissions, such as drop-in air filters or exhaust components downstream of the last emissions component (such as the catalytic converter, DPF or exhaust gas sensors). Also included are devices that plug into the OBD port to monitor information, but do not alter the vehicle's electronics.

It is the responsibility of the product manufacturer to determine the appropriate category for each product, including validation via testing when appropriate. SEMA is available to assist with making the correct determination via the SEMA Garage testing, analysis and consultation.

It is also recommended that the labeling system be utilized to educate distributors and consumers by including information on websites and as printed material to be included with the product. The Voluntary Product Labeling Program is also supported through the SEMA Data electronic cataloging system.

Notwithstanding the foregoing, SEMA is offering this voluntary labeling program as an industry benefit and use of it alone is not a confirmation of a manufacturer's representations nor an explicit or implied endorsement of a manufacturer's product (or determination regarding such) by SEMA.

**SEMA Compliance Center  
staff is available to assist  
with any questions  
you may have.**

**PLEASE FEEL FREE TO  
CONTACT US:**

**Peter Treydte**

*Director of Emissions Compliance*  
petert@sema.org  
909-978-6673

**Dan Ogden**

*Emissions Lab Manager*  
danielo@sema.org  
909-378-4845

**Ian Enderby**

*Emissions Lab Process Specialist*  
iane@sema.org  
909-312-3630

**Stephanie Martinez**

*Emissions Lab Administrator*  
stephaniem@sema.org  
909-978-6728

**Stephanie Herring**

*Compliance Center Supervisor*  
stephanieh@sema.org  
909-378-4855

**Shawn Ranganathan**

*SEMA Certified Engineer*  
abrahamr@sema.org  
(734) 335-9311

