

Diesel Master Course (Updated!)



This course is designed to instruct the technician description and operation of the diesel engines found on Ford, GM and Dodge trucks. The diesel engines which are covered are the Dodge Cummins 5.9L CR and the 6.7L. The GM Duramax 6.6L, Ford Powerstroke 6.0L and the 6.4L. Emphasis will be placed on the use of service information, the scan tool, programming procedures. The use of SCR (Select Catalyst Reduction on newer trucks brings need to discuss and instruct on operation and repair. Emphasis will be placed on the technician to follow a diagnostic strategy.

Course Objective: Given the training, service information and tools, the technician will repair and diagnose Powerstroke, Duramax and Dodge Cummins diesel drivability complaints. Information provided will aid the technician the ability to follow a diagnostic strategy.

Length of course: Five days

The five day course will start with discussion on networks. Have scan tool communication issues? In this portion of the training, we will discuss CAN network and identifying the 16 pin OBD II connector and PIN checks. Wiring diagrams are analyzed and testing is performed on vehicles.

The Powerstroke 6.0L will be introduced and comparisons from the older 7.3L will be discussed. This section of the course will include teardown and demonstrations.

The topics on the Powerstroke 6.0L are:

- *G2 Injector operation, what is stiction? Fuel pressure and aeration checks.
- *High pressure oil system, the plumbing, isolating leaks, diagnosing.
- *The fuel injection module (FICM), programming and diagnostics using the scan tool and IDS.
- *Engine design, heads, head gasket issues, diagnosing, engine lower end components.
- *Turbocharger, how the variable vane turbocharger functions, design and teardown. Diagnosis and repair.
- *Use of service information
- *Demonstrate use of IDS scan tool
- *Role play diagnostic techniques and review case studies.

The course will continue discussion on the piezoelectric common rail fuel injection. This common rail system was introduced on the Powerstroke 6.4L. Instruction will cover the components and tests to perform with the scan tool and tools recommended.

www.powertraintraining.com for all your Diesel training needs.

The course will continue with the following subsystems of the Powerstroke 6.4L:

- *Sequential Turbocharging system. Discuss the differences between the low pressure and the high pressure variable vane turbochargers. Tests and diagnosis will be covered.
- *After treatment Systems 101. This portion of the course will cover the emission reduction that takes place in the Diesel Oxidation Catalyst (DOC) and the Diesel Particulate Filter (DPF). There will be extensive discussion on regeneration issues. The instructor will cover the operation of the exhaust temperature sensors and the pressure differential sensor. Diagnostic strategies will be viewed.
- *Engine design and repair. We will have an engine on hand to tear down and review all the components.
- *Electronic Controls- APP, ECT, and various pressure sensors will be discussed and their diagnostics will be shown using the multimeter and the IDS scan tool. Key on engine off (KOEO) and key on engine running tests (KOER) will be performed on a live vehicle.

The course will move on to the Duramax 6.6L engines. There are several versions of the Duramax starting with the LB7 and the following are LLY, LBZ, LMM and an overview of the newer LGH and the LML.

Instruction on the Duramax families will entail the following:

- *Which are the Duramax engines? LB7, LLY, LBZ, LMM, LGL and LML.
- *Common rail fuel injection system used, components and diagnosing.
- *Engine design and differences, key items to know when repairing this engine, disassembly
- *procedures, checks and assembly. Review key components.
- *Cooling system issues. Instructor will demonstrate common mistakes technicians make with the cooling system, proper repair and filling.
- *Turbocharger operation- Early wastegate Borg-Warner to the variable nozzle Garrett style will be explained and we will review common diagnostic checks.
- *Programming and the use of service.gm.com. Confirming the latest updates and learn how to program using the scan tool.
- *Service information review. Know how to use the service information from GM and other service information providers. Diagnose diagnostic trouble codes properly.
- *Network diagnosis, review the CAN system and the GMLAN how they are set-up.
- *Instruct common procedures to follow when diagnosing these diesel engines.
- *Review use of Tech 2 and Tech 2WIN scan tools. Discuss aftermarket scan tools such as the Snap On Verus.

The last portion of the course will cover the Dodge Cummins 5.9L and the 6.7L Common rail engines. The Dodge ram equipped with common rail injection on both the 5.9L and the 6.7L have brought issues to technicians. Technical information and procedures are available in this course. The 5.9L with CR

www.powertraintraining.com for all your Diesel training needs.

(common rail) was introduced in 2003. The use of a high pressure fuel system is diagnosed by system to make an accurate assessment on what failed. The low pressure, and return system are checked and procedures are explained. The Cummins 6.7L is also instructed along with additional emission controls and electronics.

Topics that are also covered are:

- *Turbocharger diagnosing, identifying the 5.9L vs 6.7L .Compare the wastgate Holset with the variable nozzle found on the 6.7L. Instruct on procedures to check boost and turbo actuator testing. Discuss common issues found with both systems.

- *Cummins 5.9L wiring inspection and PIN checking at the ECM connector are demonstrated.

- *EGR system on the 6.7L is viewed. This includes the issues such as carbon sticking and use of scan tool data are taught and demonstrated.

- *After treatment system , the diesel oxidation catalyst (DOC) and the diesel particulate filter operation and regeneration strategies will be instructed.

- *Cooling system refill procedures and tests to perform when coolant consumption is an issue.

- *How to program and ensure a correct diagnosis for ECM replacement.

- *Review Injector wiring and tests to perform when a short or open diagnostic trouble code is set.

- *How to retrieve SKIM codes and explain the role they play when you program an ECM.

*******Technicians attending need to bring a laptop or tablet
which has access to Internet Explorer*******

Tools and scan tools will be on hand to use on vehicles and engines. You are welcome to bring your scan tool should you have any questions. The course will have technicians using the service information and completing worksheets and discussions which will cover various case studies that will aid in refining the diagnostic process.

Course fee: \$1850.00

This fee includes all materials, continental breakfast and lunch for all 5 days of training, Dinner is on your own. Hotel is not included. We will provide pickup and drop off to and from the Cannery Hotel and the airport which has a special rate for all attendees.

About the instructor:

Tony Salas is an Automotive and Diesel Specialist with more than 20 years of experience teaching diesel diagnostics and repair. He has provided contract training for General Motors Fleet and Commercial as well as AC Delco. His training experience includes GM 6.5 and Duramax 6.6L, Ford Powerstroke and various other topics. His experience includes instruction in the post-secondary level where he developed curriculum and taught for the community college in Las Vegas, NV. He also taught classes at the Toyota Urban League Automotive Training Center. Tony holds an associate degree in Automotive and Diesel technology. He is an ASE master technician and holds a teaching credential from Cal State Long Beach. He currently operates Powertrain Performance LLC as a service and repair facility as well as a training provider and training consultant.

www.powertraintraining.com for all your Diesel training needs.