

TEST INFORMATION

FOR THE

***ELECTRONIC DIESEL ENGINE
DIAGNOSIS SPECIALIST (L2) TEST***

- OVERVIEW
- TEST SPECIFICATIONS
- TASK LIST
- SAMPLE QUESTIONS
- INDUSTRY TRAINING RESOURCES

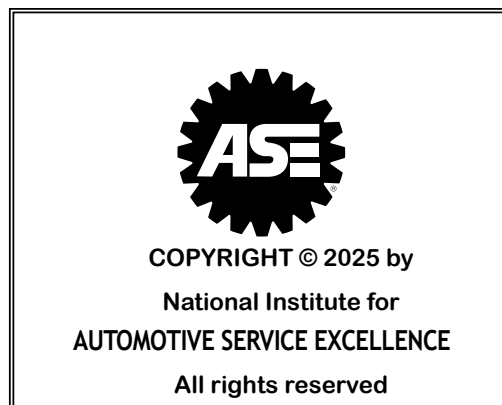


National Institute for
**AUTOMOTIVE
SERVICE
EXCELLENCE**

ELECTRONIC DIESEL ENGINE DIAGNOSIS SPECIALIST (L2) TEST

Contents

<i>Introduction</i>	<u>3</u>
<i>Test Specifications</i>	<u>4</u>
<i>Task List</i>	<u>5</u>
<i>Sample Questions</i>	<u>7</u>
<i>Test Prep & Training Resources</i>	<u>9</u>



INTRODUCTION

IMPORTANT! This guide must be used in conjunction with the *L2 Medium/Heavy Composite Vehicle Type 4 Reference Booklet* (download at www.ase.com/ase-study-guides). The booklet describes a generic diesel vehicle powertrain control system and will be available as a pop-up reference during the test, but familiarizing yourself with the contents beforehand is a key to success. A significant portion of the questions on the test will require you to use this reference.

Use this *Official ASE Study Guide* to prepare for the ASE Electronic Diesel Engine Diagnosis Specialist (L2) Test. This document contains general information, the Test Specification, the Task List, sample questions, and test preparation resources for this ASE test.

The Test Specification in this study guide is determined by working professionals and technical experts and lists the main content covered by the test and the number of test questions devoted to each topic.

The Task List for this test is developed by working professionals and technical experts, and it spells out the technical knowledge and skills required for success on this test. The Task List provides a valuable checklist of what you should know. Every question on the test represents one or more of these tasks, although some tasks may not appear on the version of the test that you see. To improve chances of success, use the Task List to identify weak areas and to select learning resources.

The sample questions show the several types of multiple-choice question formats used on actual ASE test. Some questions have special instructions; those same instructions will appear with similar questions on the ASE tests. If you are a native Spanish speaker, be aware that all ASE tests have a pop-up English-to-Spanish glossary.

ASE certification requires successful completion of the test and documentation of relevant work experience (3 years for the L2 Test). Appropriate vocational training may count toward part of the work experience requirement. Visit www.workexp.ase.com/FormInstr.aspx for more details.

For more information about ASE tests in general and the ASE Certification process, download *ASE Certification: Need to Know* at www.ase.com/ase-study-guides.

How Long are the Tests?

Electronic Diesel Engine Diagnosis Specialist (Test L2)			
Test	Name	Number of questions	Testing time
L2	Electronic Diesel Engine Diagnosis Specialist	55 total/45 scored*	2 hrs/120 mins
L2R	Electronic Diesel Engine Diagnosis Specialist Recertification	45	2 hrs/120 mins

* To gather the performance statistics required for use in the scored section of future tests, each certification test contains 10 questions that are not counted for score. Since you don't know which questions those are, you need to answer every question. The L2 and L2R tests both have the same number of scored questions.

TEST SPECIFICATIONS FOR THE MEDIUM/HEAVY VEHICLE ELECTRONIC DIESEL ENGINE DIAGNOSIS SPECIALIST TEST (L2)

Content Area	Questions in Test	Percentage of Test
A. General Inspection and Diagnosis	4	10%
B. Electronic Engine Controls Diagnosis	18	40%
C. Air Induction Systems Diagnosis	6	13%
D. Fuel Systems Diagnosis	8	18%
E. Emissions Systems Diagnosis	9	19%
Total	45*	100%

*Note: The L2 Certification test will contain 10 unscored questions (55 total questions) included to gather statistics needed for future possible inclusion as scored items. Your answers to these questions will not affect your score, but since you do not know which ones they are, you should answer all questions in the test.

The L2 Certification and Recertification tests both cover the same content areas and have the same number of scored questions. The certification period is 5 years.

TASK LIST

ELECTRONIC DIESEL ENGINE DIAGNOSIS SPECIALIST (TEST L2)

A. General Inspection and Diagnosis (4 questions)

1. Identify engine model and serial number to research applicable vehicle and service information, service precautions, technical service bulletins, and service campaigns/updates; determine needed actions.
2. Verify operational concerns.
3. Determine if problem is electrical/electronic or engine mechanical.
4. Evaluate engine exhaust output (odor, color, quantity, residue, etc.); determine needed actions.
5. Use appropriate diagnostic tools and procedures based on available vehicle data and service information; determine if available information is adequate to proceed with effective diagnosis.
6. Diagnose performance concerns caused by engine cooling system problems.
7. Diagnose performance concerns caused by engine lubrication system problems.
8. Evaluate the integrity of the air induction system.
9. Evaluate the integrity of the exhaust system.
10. Listen for and isolate engine noises; determine needed actions.
11. Inspect and test engine compression brake systems and exhaust brake systems and controls; determine needed action.
12. Diagnose performance concerns caused by drivetrain, tire(s), vehicle configurations or modifications.
13. Diagnose performance concerns caused by vehicle operation and/or operational conditions.
14. Diagnose no-crank, crank but fails to start, extended cranking, and starts then stalls; determine needed action.
15. Diagnose performance concerns caused by engine mechanical problems.
16. Visually inspect wiring harnesses and connectors; check for proper routing, condition, and mounting hardware; determine needed actions.
17. Diagnose surging, rough operation, misfiring, low power, slow acceleration, slow deceleration, derate, and shutdown concerns; determine needed actions.
18. Determine root cause of current, multiple, and/or repeat failures.
19. Clear diagnostic codes; verify effectiveness of repairs.

B. Electronic Engine Controls Diagnosis (18 questions)

1. Inspect and test for missing, modified, or damaged powertrain control components.
2. Check and record diagnostic trouble codes (DTCs), freeze frame/snapshot, and/or operational data; interpret live data; download/save electronic control module (ECM) data (image); determine further diagnosis.
3. Connect diagnostic tool to vehicle. Access appropriate control system, parameters and calibration settings as needed.
4. Determine if a control system problem is electrical/electronic or mechanical.
5. Use diagnostic tool, digital multimeter (DMM), or digital storage oscilloscope (DSO) to inspect or test computerized engine control system sensors, actuators, circuits and electronic control modules (ECM); determine needed actions.
6. Test and confirm operation of electrical/electronic circuits not displayed on diagnostic tools.
7. Diagnose no-crank, cranks but fails to start, extended cranking, and starts then stalls; determine needed actions.
8. Diagnose concerns resulting from failures of interrelated systems (for example: safety, cruise control, security theft deterrent, transmission, electronic stability control, auxiliary power units (APU), and non-OEM installed accessories).
9. Measure and interpret voltage, voltage drop, amperage, duty cycle, frequency, capacitance, and resistance readings using a digital multimeter (DMM) or appropriate test equipment.
10. Inspect, test, repair, and/or replace electrical connectors, pins, harnesses, seals, and locks.

L2 TASK LIST (CONTINUED)

11. Diagnose failures in the data communications bus networks; determine needed actions.
12. Determine root cause of current, multiple, and/or repeat failures.
13. Clear diagnostic trouble codes (DTCs); verify effectiveness of repairs.

C. Air Induction Systems Diagnosis (6 questions)

1. Perform air intake system restriction, pressure, and leakage tests; determine needed actions.
2. Inspect, test and replace intake air temperature, flow, and pressure sensors.
3. Diagnose no-crank, cranks but fails to start, extended cranking, and starts then stalls; determine needed actions.
4. Inspect and test turbocharger(s); inspect and test electronic controls, actuators, and sensors. Inspect, test, and replace wastegate and wastegate controls; calibrate as needed.
5. Inspect and test engine preheater/cold-start aids and controls.
6. Determine root cause of current, multiple, and/or repeat failures.
7. Clear diagnostic codes (DTCs); verify effectiveness or repairs.

D. Fuel Systems Diagnosis (8 questions)

1. Determine if the fuel control system concern is electrical/electronic or mechanical.
2. Check fuel system for air; determine needed repairs; prime and bleed fuel system.
3. Check fuel for contamination and quality; determine needed actions.
4. Inspect and test fuel supply system pressure, restriction, and return fuel rates; determine needed actions.
5. Inspect, adjust, and repair or replace electronic throttle and power take-off (PTO) control components, circuits, and sensors.
6. Inspect, test, and replace high-pressure common rail (HPCR) fuel system electronic and mechanical components.
7. Inspect, test, and replace hydraulic electronic unit injection (HEUI) fuel system electronic and mechanical components.
8. Inspect, test, and replace electronic unit injection (EUI) fuel system electronic and mechanical components.
9. Diagnose no-crank, cranks but fails to start, extended cranking, and starts then stalls; determine needed actions.
10. Determine root cause of current, multiple, and/or repeat failures.
11. Clear diagnostic trouble codes (DTCs); verify effectiveness of repairs.

E. Emissions Systems Diagnosis (9 questions)

1. Perform exhaust system leak test; determine needed actions.
2. Perform exhaust system backpressure and temperature tests (if applicable); determine needed actions.
3. Inspect, test, and repair or replace exhaust aftertreatment system components and controls including: diesel oxidation catalyst (DOC), selective catalytic reduction (SCR), diesel exhaust fluid (DEF), diesel particulate filter (DPF); check regeneration system operation.
4. Diagnose no-crank, cranks but fails to start, extended cranking, and starts but then stalls; determine needed actions.
5. Inspect and test EGR system components, including EGR valve(s), cooler(s), piping, sensors, controls, and wiring.
6. Inspect and test airflow control valves, sensors, and controls.
7. Inspect, test, and replace crankcase ventilation system components.
8. Determine root cause of current, multiple, and/or repeat failures.
9. Clear diagnostic trouble codes (DTCs); verify effectiveness of repairs. □

SAMPLE QUESTIONS

ELECTRONIC DIESEL ENGINE DIAGNOSIS SPECIALIST TEST

Questions 1-3 are to be answered without using the *Medium/Heavy Composite Vehicle Type 4 Reference Booklet*.

1. An engine cranks, but will not start. During diagnosis, the ECM will not communicate with the diagnostic tool. Which of these could be the cause?
 - (A) A failed data link connector
 - (B) A failed engine speed/timing sensor(s)
 - (C) Low supply voltage to the ECM
 - (D) Incorrect diagnostic tool software

Question #1 Explanation:

Option (A) is wrong. While a failed data link connector could cause the diagnostic tool to be unable to communicate with the ECM, it would not result in a no-start condition.

Option (B) is wrong. A failed engine speed sensor or timing sensor(s) could cause the ECM to not operate the injectors, resulting in a no-start problem. However, the loss of the speed/timing signal(s) would not cause a diagnostic tool communication problem.

Option (C) is correct. A low supply voltage to the ECM could result in the ECM shutting down. In this case, the ECM would not operate the injectors or communicate with the diagnostic tool.

Option (D) is wrong. If the diagnostic tool software did not match the ECM being diagnosed, it would result in a loss of communications only.

2. A driver complains of low power.
Technician A says that a leaking intake manifold gasket could be the cause.
Technician B says that a failed boost pressure sensor could be the cause.
Who is right?
 - (A) A only
 - (B) B only
 - (C) Both A and B
 - (D) Neither A nor B

L2 SAMPLE QUESTIONS (CONTINUED)

This question contains the word EXCEPT. Read the question carefully before choosing your answer.

3. A HEUI engine stumbles and lacks power on acceleration. Any of these could be the cause EXCEPT a:
- (A) leaking charge air cooler.
 - (B) plugged air cleaner element.
 - (C) faulty injection pressure regulator.
 - (D) faulty camshaft position sensor.

Questions 4-6 require the use of the *Medium/Heavy Composite Vehicle Type 4 Reference Booklet*. This booklet describes the engine control system and diagnostic parameters referred to in questions 4-6. Review the content of the booklet and refer to it as you answer these questions. The booklet will appear as a pop-up reference during your L2 test.

4. The composite vehicle will start, but will not go above idle speed when the accelerator pedal is applied. This could be caused by an open circuit at:
- (A) connector CA pin 6.
 - (B) connector BH pin 2.
 - (C) ECM pin 261.
 - (D) ECM pin 264.
5. The composite vehicle is being diagnosed for the DTC “Low NOx Conversion.” Which of these could be the cause?
- (A) A short-to-ground at G603
 - (B) An open fuse 64
 - (C) A short-to-power at pin C of the DEF supply pump relay
 - (D) An open at ECM pin 621
6. The composite vehicle has an intermittent “Voltage Below Normal Cylinder 5” diagnostic trouble code. Which of these could be the cause?
- (A) Loose wires at the injector
 - (B) Loose wires at connector BC pin 1
 - (C) An open circuit at ECM pin 231
 - (D) An open circuit at connector BH pin 2

ANSWERS : 1. C 2. C 3. D 4. A 5. D 6. A

ELECTRONIC DIESEL ENGINE DIAGNOSIS SPECIALIST TEST INDUSTRY TRAINING

The training sources listed in this guide are designed to help you sharpen your technical skills in diesel engine fuel systems and driveability diagnostics. Since the L2 test reflects these skills—the more you learn, the better your chances of passing this test.

Please call or write the listed organizations for availability, schedules, and prices. You may wish to check with truck and engine manufacturers, community colleges, tool and equipment suppliers, and technical training organizations for the latest training information. Training resources can also be found on ASE's home page at www.ase.com, the International Automotive Technicians Network (iATN) at www.iatn.net, or the Diagnostics Network at www.diag.net.

CARQUEST

The Training and Certification System (TACS) provides a full scope of training solutions. This includes the ability to setup a career path for instructor-led training, online training, ASE Test Prep Study Guides, Technical Assessments, and more. Visit their website for more information.

Internet: www.ctionline.com

Caterpillar, Inc.

Caterpillar, Inc., Engine Div., Service Training, 501 SW Jefferson Ave., LC2124, East Peoria, IL 61630; Attn: Supervisor, Service Training. Many Caterpillar dealers have on-site training. A fee is charged. For further info, contact the training department of your local Caterpillar dealer.

ConsuLab

Provides running engine trainers, equipped with fully operational exhaust aftertreatment systems, for the transportation market. These engine and aftertreatment systems are equipped with a series of programmable engine faults to enhance student learning by the hands-on teaching by troubleshooting strategy. Train the trainer courses are available for instructors and programs that use ConsuLab products. For further information, visit the website at www.consulab.com. See them also on Facebook, Twitter, Instagram or their YouTube page.

Cummins

Courses conducted at Cummins Distributor Training Centers in the U.S. and Canada. For details on course locations, schedules, and costs, contact nearest Cummins Distributor Training Center, or visit the training website: www.cummins.com/na/sales-and-service/service-training.

Cengage Learning

Provides training textbooks and online, interactive courseware covering many areas of medium/heavy truck repair, including a Preparation Guide for the ASE L2 Test. The online interactive computer program is called Technician Test Preparation (TTP). TTP is designed to help prepare technicians for the ASE tests, including L2. Cengage Learning, 5 Maxwell Drive, Clifton Park, NY 12065, or call (800) 347-7707. Internet: www.cengage.com/training/.

Detroit Diesel & Freightliner Corp.

Daimler Trucks North America service training and Detroit Diesel service technician training programs are offered through the corporate training center and distributors. Training is provided in the areas of overhaul, engine electronic controls, and other vehicle systems. Classes are a combination of web-based and instructor-led courses. For information contact: Detroit Diesel Corp., Box C12, 13400 W. Outer Drive, Redford, MI 48329. Ph: 313-592-5000. Internet: www.demanddetroit.com.

Mack and Volvo Trucks North America, Inc.

Mack Trucks Academy and Volvo Trucks Academy provide service technician training relevant to Mack and Volvo trucks. Training is available to dealer and fleet personnel in several ways:

- Classroom Training—Learn from instructors at one of several facilities in the U.S. and Canada.
- Field Training—Instructors come to your facility.
- Classes on Demand—Get instructor led classes at a time that fits your schedule.
- eLearning—Training materials are available online.

For more information, go to: www.macktrucks.com/parts-and-services/support/customer-training/ OR www.volvotrucks.us/parts-and-services/training/

Motor Age

Training for ASE Certification is a self-study training guide that is updated regularly and contains both technical information and sample questions. For ordering information, write: Motor Age Training, P.O. Box 6310, Duluth, MN 55806. Ph:(800) 240-1968; Internet: www.motoragettraining.com

Navistar, Inc.

International Trucks (Navistar's flagship vehicle brand) conducts training classes on diagnosis/overhaul of MaxxForce diesel engines, brakes, steering, and other vehicle systems. For information, contact your local International Truck Dealer. For locations, go to www.internationaltrucks.com.

Robert Bosch LLC

Provides a selection of training aids and reference material for gasoline and diesel fuel injection systems, starting and charging systems, and antilock braking systems on automotive and heavy duty applications. Technical hands-on training is also available. For more information, visit the Bosch site at www.thegrouptrainingacademy.com/bosch-training/

Standard Motor Products, Inc.

Offers professional technician seminars for popular diesel engines. These include specific topics covering Cummins, Powerstroke, and Duramax diesel engines. Diesel exhaust fluid (DEF) topics are also covered. Engage in actual diagnosis using case studies in the shop to apply what you've learned. An ASE-Certified professional instructor conducts the four-hour seminars during the evening, with a heavy emphasis on diagnostics and troubleshooting. Each seminar includes a workbook for your reference after the class. SMP also offers live, as well as a number of archived, one-hour long webinars. These can be viewed anywhere an internet connection is available, including at home. Internet: www.pts.smpcorp.com

Turbo Training

Provides training solutions for Ford Powerstroke, Navistar Chassis, and automotive applications. Ph: (440) 846-3885; Internet: www.turbotraining.com