Compressed Natural Gas Vehicle (F1) Test

National Institute for
AUTOMOTIVE
SERVICE
EXCELLENCE

ASE Compressed Natural Gas Vehicles (F1) Test

Contents

Introduction

Use this *Official ASE Study Guide* to prepare for the Compressed Natural Gas Vehicles (F1) Test. This document contains general information, the Test Specification, 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 an 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. See www.ase.com/spanish for information.

ASE certification requires successful completion of the test and documentation of relevant work experience. Appropriate vocational training may count toward the work experience requirement. Visit 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?

CNG Vehicles Tests		Number of Questions	Testing Time
F1	Compressed Natural Gas Vehicles	65 total/55 scored*	90 mins
F1R	Compressed Natural Gas Vehicles Recertification	28	45 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. You must have passed the corresponding CERTIFICATION once to be eligible for the shorter RECERTIFICATION test.

Test Specifications and Task List
Compressed Natural Gas Vehicle (Test F1)

	Content Area	Questions in Test	Percentage of Test
A.	Pre-Service Vehicle Inspection	5	9%
B.	CNG System Equipment Inspection	8	15%
C.	Leak Testing and Repairs	6	11%
D.	Emissions and Performance Verification	11	20%
E.	System Diagnosis, Maintenance, and Repair	16	29%
F.	General Cylinder Safety and Maintenance	9	16%
	Total	55	100%

Note: All CNG vehicle testing, service, and repair should be performed using vehicle and component manufacturer's guidelines and current NFPA 52 and/or local safety standards.

A. Pre-Service Vehicle Inspection (5 questions)

1. Inspect vehicle integrity including serviceability, alterations, and applicable emissions and safety standards.
2. Analyze vehicle/system performance; determine needed actions.
3. Inspect CNG cylinder(s) condition and expiration/end-of-life date; inspect CNG cylinder(s) shields/covers and determine needed actions.
4. Inspect for proper mounting of compressed natural gas cylinders and fuel system components.
5. Inspect for location, condition and compliance of venting system(s).

B. CNG System Equipment Inspection (8 questions)

1. Inspect fuel storage cylinders and system components.
2. Inspect fuel storage system brackets, isolators, reinforcements, and fasteners.
3. Inspect regulator assembly(ies) and coolant lines.
4. Inspect underhood fuel delivery system components.
5. Inspect system wiring.
6. Inspect electrical and electronic components.
7. Inspect fuel system gauges.
8. Inspect fuel lines, clamps, filters, and fittings.
9. Inspect valves, pressure-relief devices, venting systems, lines, fittings, and fasteners.
10. Inspect fuel fill receptacle(s) and check valve(s).
11. Verify/inspect required labels.
12. Complete system documentation as required.
13. Inspect defueling receptacle as required.

F1 Task List (continued)

C. Leak Testing and Repairs (6 questions)

1. Check for low- and high-pressure system leaks; repair as needed.
2. Pressurize cylinders with CNG.
3. Check for coolant leaks; repair as needed.
4. Check venting system integrity; repair as needed.

D. Emissions and Performance Verification (11 questions)

1. Check regulator(s) pressure(s); determine needed repair.
2. Verify control module(s) (ECM/PCM) calibration.
3. Check operation of electronic components.
4. Check operation of fuel gauge; determine needed repairs.
5. Perform emission tests; make repairs and document where applicable.
6. Road test vehicle for acceptable driveability; check starting/restarting abilities.
7. Check manual and automatic fuel changeover operation (bi-fuel vehicles).
8. Check fuel system for abnormal noises.
9. Verify gaseous fuel management operation.

E. System Diagnosis, Maintenance, and Repair (16 questions)

Note: The following tasks apply to both bi-fuel and dedicated CNG vehicles.

1. Interpret and verify operational complaint; determine needed repair.
2. Visually inspect gaseous fuel system components; determine needed repairs.
3. Retrieve and interpret Diagnostic Trouble Codes (DTC) using appropriate diagnostic equipment/scan tool.
4. Diagnose driveability and emissions problems related to the ignition system; determine needed repairs.
5. Diagnose driveability and emissions problems related to fuel and air induction systems and exhaust systems; determine needed repairs.
6. Diagnose driveability and emissions problems related to electronic engine controls; determine needed repairs.
7. Check vacuum/electrical/electronic component operation; determine needed repairs.
8. Check gaseous fuel delivery system pressures and component operation; determine needed repairs.
9. Remove and/or replace fuel lines, manual and electrical valves, fittings, and pressure relief devices.
10. Defuel CNG system.
11. Check for signs of fuel contamination; inspect, replace and/or service fuel system filters as required.

F. General Cylinder Safety and Maintenance (9 questions)

1. Visually inspect fuel storage cylinder(s), shields, and mounting.
2. Remove and replace cylinders; defuel according to recommended procedures; replace shields, brackets, and hardware as required.
3. Handle and store cylinders in accordance with recommended procedures.
4. Interpret cylinder label information; determine necessary action.
5. Inspect pressure relief devices (PRD) and related hardware; determine necessary action.
6. Inspect condition and operation of cylinders/tank valves; determine necessary action.
7. Decommission cylinders according to recommended procedures. □

Sample Questions
Compressed Natural Gas Vehicle (Test F1)

1. The ignition firing voltage on a bi-fuel vehicle is being checked. During testing, a technician observes the voltage is higher when operating on CNG as compared to operating on gasoline. Which of these could be the cause?

* (A) The air/fuel mixture is leaner when operating on CNG.
(B) The air/fuel mixture is richer when operating on CNG.
(C) The air/fuel mixture is leaner when operating on gasoline.
(D) The air/fuel mixture is richer when operating on gasoline.

2. Which of these should be used to check the fuel line connections after a compressed natural gas system repair?

(A) Nitrogen
(B) Propane
* (C) Non-ammonia soap
(D) Carbon dioxide

3. After installing a new CNG fuel tank, the technician finds that the vehicle will not accept fuel. Which of these could be the cause?

(A) A pinched O-ring on the receptacle line
* (B) A failure to open the manual lock-down valve(s)
(C) An open circuit on the in-tank solenoid valve
(D) A short-to-ground in the solenoid wiring harness

4. A hoop-wrapped Type-2 cylinder shows evidence of stress corrosion cracking. What should the technician do?

(A) Nothing, stress corrosion cracking is normal
(B) Repair the area using an approved coating
(C) Note the damage on the inspection form
* (D) Remove the cylinder from service

F1 Sample Questions (continued)

5. A bi-fuel vehicle with the valve shown is in for a routine coalescent filter change.
   Technician A says that the valve should be closed to stop gasoline flow to the engine.
   Technician B says that the valve should be closed to stop CNG flow from the tank.
   Who is right?

   (A) A only
   * (B) B only
   (C) Both A and B
   (D) Neither A nor B

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

6. A dedicated CNG vehicle has a no-start condition. All of these could be the cause EXCEPT:

   (A) no ignition source.
   * (B) high-ethanol gasoline.
   (C) no fuel pressure.
   (D) low battery voltage.

Test Prep & Training Resources

Taking an ASE certification test doesn't have to be a high stress challenge. The ASE website contains test preparation and training information tailored to your specific needs. Visit www.ase.com and use the "Test Prep & Training" tab. We've loaded this section of our website with plenty of information to help boost both your knowledge and your confidence—two of your most important tools as a test-taker.

Official ASE Practice Tests
The easy way to try your hand at taking ASE-style certification exams, without the stress and high stakes of the real thing. www.ase.com/official-ase-practice-test-program

Study Guides
Free, step-by-step guides to help you understand what's involved in each test—including sample questions and suggestions for further preparation. www.ase.com/ase-study-guides

ASE Testing Demo
Are you new to ASE testing or has it been a few years? The demonstration at www.ase.com/free-test-drive will show you how the test platform works, so you'll feel right at home with the testing format.

Community Colleges and Technical Training Schools
Get instructor-led, hands-on training at schools accredited by the ASE Education Foundation. www.aseeducationfoundation.org/find-a-program

ATMC for more training options
The ASE Training Managers Council is a professional organization of individuals responsible for the development and delivery of training in the auto and truck industries. The ATMC administers the ASE Accredited Training Provider of Continuing Automotive Service Education program. A list of ASE accredited training providers can be found at www.atmc.org.

Other test prep and training programs
Many test-takers have used aftermarket test prep and training programs and found them helpful. Please note that ASE has neither reviewed nor approved the content of these programs and providers.