

Automotive Engines Theory and Servicing

Ninth Edition

Automotive Engines Theory and Servicing

Ninth Edition
James D. Halderman



Chapter 9

Vehicle Identification
and Emission Ratings

ALWAYS LEARNING

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved

PEARSON

OBJECTIVES

- 9.1** Discuss the parts of a vehicle, and differentiate between front-wheel drive and rear-wheel drive.
- 9.2** Explain vehicle identification, vehicle safety certification label, and the VECI label.
- 9.3** Discuss emission standards in the United States.
- 9.4** Explain calibration codes and casting numbers.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved

PEARSON

PARTS OF A VEHICLE

- The names of the parts of a vehicle are based on the location and purpose of the component.
 - Left side of the vehicle
 - Right side of the vehicle
 - Front and rear

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved

PEARSON

FRONT-WHEEL DRIVE VERSUS REAR-WHEEL DRIVE (1 OF 2)

- Front-wheel drive (FWD) means that the front wheels are being driven by the engine, as well as turned by the steering wheel.
- Rear-wheel drive (RWD) means that the rear wheels are driven by the engine.
 - If the engine is in the front, it can be either front or rear-wheel drive.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

FRONT-WHEEL DRIVE VERSUS REAR-WHEEL DRIVE (2 OF 2)

- A front engine vehicle can also drive all four wheels (4WD) or all-wheel drive (AWD).
- If the engine is located at the rear of the vehicle, it can be rear-wheel drive or four-wheel (AWD) drive.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

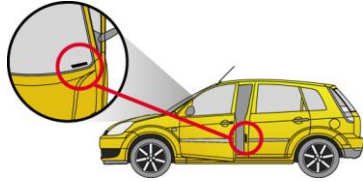
VEHICLE IDENTIFICATION

- All service work requires that the vehicle, including the engine and accessories, be properly identified.
- The most common identification is the make, model, and year of the vehicle.
 - Make: e.g., Chevrolet
 - Model: e.g., Trailblazer
 - Year: e.g., 2007

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

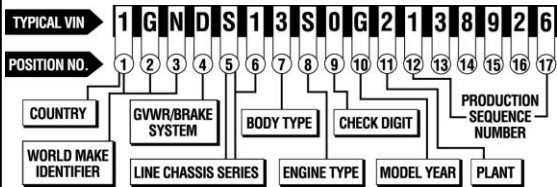
FIGURE 9-1 The vehicle identification number (VIN) is visible through the base of the windshield and on a decal inside the driver's door.



Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

FIGURE 9-2 A typical VIN showing the information that is represented.



Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

VEHICLE SAFETY CERTIFICATION LABEL

- A vehicle safety certification label is attached to the left side pillar post on the rearward-facing section of the left front door.
 - This label indicates the month and year of manufacture as well as the:
 - Gross vehicle weight rating (GVWR)
 - Gross axle weight rating (GAWR)
 - Vehicle identification number (VIN).

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

VECI LABEL (1 OF 2)

- The vehicle emissions control information (VECI) label under the hood of the vehicle shows informative settings and emission hose routing information.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

VECI LABEL (2 OF 2)

- The VECI label usually includes the following information.
 - Engine identification
 - Emissions standard that the vehicle meets
 - Vacuum hose routing diagram
 - Base ignition timing (if adjustable)
 - Spark plug type and gap
 - Valve lash
 - Emission calibration code

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

EMISSION STANDARDS IN THE UNITED STATES (1 OF 3)

- In the United States, emissions standards are managed by the Environmental Protection Agency (EPA) as well as some U.S. state governments.
- Some of the strictest standards in the world are formulated in California by the California Air Resources Board (CARB).

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

EMISSION STANDARDS IN THE UNITED STATES (2 OF 3)

- TIER 1 AND TIER 2
 - TLEV—Transitional Low-Emission Vehicle.
 - LEV—(also known as LEV I)—Low-Emission Vehicle.
 - ULEV—(also known as ULEV I).
 - ULEV II—Ultra-Low-Emission Vehicle.
 - SULEV—Super-Ultra-Low-Emission Vehicle.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

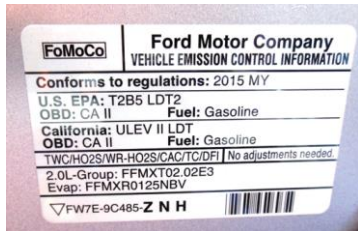
EMISSION STANDARDS IN THE UNITED STATES (3 OF 3)

- ZEV—Zero-Emission Vehicle.
- ILEV—Inherently Low-Emission Vehicle.
- AT-PZEV—Advanced Technology Partial-Zero-Emission Vehicle.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

FIGURE 9-3 This vehicle emission control information (VECI) decal indicates this vehicle meets both national EPA Tier 2, Bin 5 (T2B5) and California (ULEV II) emission standards.



Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

TIER 3 STANDARDS

- What is Tier 3 designed to do?

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

EUROPEAN STANDARDS

- Europe has its own set of standards that vehicles must meet, which includes the following tiers:
 - Euro I (1992–1995)
 - Euro II (1995–1999)
 - Euro III (1999–2005)
 - Euro IV (2005–2008)
 - Euro V (2008+)

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

CALIBRATION CODES

- Calibration codes are usually located on powertrain control modules (PCMs) or other controllers.



FIGURE 9-4 A typical computer calibration sticker on the case of the controller. The information on the sticker is often needed when ordering parts or a replacement controller.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

CASTING NUMBERS

- Whenever an engine part such as a block is cast, a number is put into the mold to identify the casting.



FIGURE 9-5 Engine block identification number cast into the block is used for identification.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

SUMMARY (1 OF 2)

- The front, rear, left, and right side of a vehicle are as viewed from the driver's seat.
- The VIN is very important as it includes when the vehicle was built, as well as the engine code and many other details about the vehicle.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON

SUMMARY (2 OF 2)

- The VECI label under the hood needs to be checked by the technician to service the vehicle.
- Other vehicle information that the technician may need for a service or repair include calibration codes, casting numbers, and emissions rating.

Copyright © 2018, 2015, 2011 Pearson Education, Inc. All Rights Reserved.

PEARSON
