EVAP System Lesson – How It Works

Objective: Understand how the EVAP system stores and burns fuel vapors, identify components, and diagnose common faults.

1. What Is the EVAP System?

EVAP stands for Evaporative Emission Control System. Its purpose is to prevent fuel vapors from escaping into the atmosphere by storing and routing them into the engine to be burned.

2. Main EVAP Components

1. Fuel Tank
2. Gas Cap
3. Charcoal (Carbon) Canister
4. Purge Valve (Solenoid)
5. Vent Valve (Solenoid)
6. EVAP Lines and Hoses
7. Fuel Tank Pressure Sensor
8. Engine Control Module (ECM)

3. EVAP System Flow Illustration

Fuel Tank → Fuel Vapors → Charcoal Canister → Purge Valve → Engine Intake Vent Valve allows fresh air into the system during operation

4. How the EVAP System Works

1. Engine Off: Fuel vapors form and are stored in the charcoal canister.
2. Engine Running: ECM opens the purge valve when conditions are correct.
3. Combustion: Vapors are drawn into the intake and burned.

5. Purge Valve vs Vent Valve

Purge Valve: Controls vapor flow into the engine and is normally closed.

Vent Valve: Allows fresh air into the system and is normally open.

6. EVAP Self-Test (Leak Test)

The ECM seals the system and monitors pressure to detect leaks using the fuel tank pressure sensor.

7. Common EVAP Problems

1. Loose or faulty gas cap
2. Cracked or disconnected EVAP hoses
3. Stuck purge valve
4. Faulty vent valve

8. Common EVAP Trouble Codes

1. P0440 – EVAP system fault
2. P0442 – Small leak detected
3. P0455 – Large leak detected
4. P0457 – Gas cap loose or missing
5. P0443 – Purge valve circuit fault

Summary

The EVAP system prevents fuel vapor emissions by storing and burning vapors. Most EVAP issues are caused by leaks, not failed parts.