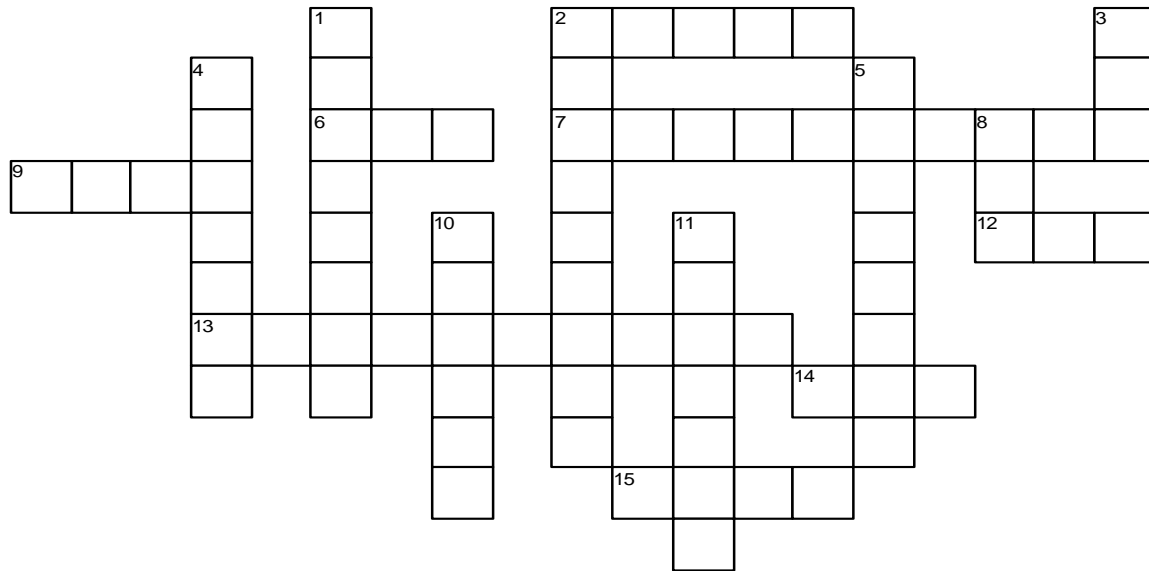


## Advanced Engine Performance Diagnosis 8<sup>th</sup> Edition

### Chapter 27

#### Emission Control Devices Operation and Diagnosis (Part 1)



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#### ACROSS

- 2 \_\_\_\_\_ valves: One-way valves used in the air-injection system to prevent exhaust gases from flowing back into the air pump or other components.
- 6 A type of catalytic converter that reduces hydrocarbons, carbon monoxide, and nitrogen oxides simultaneously.
- 7 \_\_\_\_\_ pump: A type of air pump used in older emission control systems to inject air into the exhaust.
- 9 A type of air pollution caused by the reaction of sunlight with pollutants like hydrocarbons and nitrogen oxides.
- 12 \_\_\_\_\_ converter: A smaller catalytic converter used in addition to the main converter to further reduce emissions.
- 13 The process by which molecules, such as fuel vapors, adhere to the surface of a material, often used in emission control systems like the charcoal canister.
- 14 A system that injects air into the exhaust to help reduce emissions by oxidizing pollutants.
- 15 Smog \_\_\_\_\_: Another term for the air-injection pump, which helps reduce emissions by injecting air into the exhaust system.

#### DOWN

- 1 A substance that increases the rate of a chemical reaction, such as the reaction between pollutants and oxygen in a catalytic converter, without being consumed in the process.
- 2 \_\_\_\_\_ converter: A device that uses a catalyst to reduce harmful emissions from the engine by converting pollutants like hydrocarbons, carbon monoxide, and nitrogen oxides into less harmful substances.
- 3 An abbreviation for the air-injection reaction, a system that injects air into the exhaust to help reduce emissions.
- 4 \_\_\_\_\_ EGR: An electronic exhaust gas recirculation (EGR) system that uses \_\_\_\_\_ controls to recirculate exhaust gases and reduce nitrogen oxide emissions.
- 5 A layer inside the catalytic converter that contains the catalyst materials and increases the surface area for chemical reactions.
- 8 \_\_\_\_\_ test: A diagnostic test that involves tapping components to detect loose connections or faulty parts.
- 10 A chemical element used in catalytic converters to help store oxygen, which is used to oxidize harmful pollutants in the exhaust gases.
- 11 A precious metal used in catalytic converters to reduce nitrogen oxide emissions.