

How are gasoline and diesel engines different?

Excerpt from Auto Upkeep

Engine Components

The basic parts in a four-stroke engine include intake valves, exhaust valves, pistons, connecting rods, engine block, cylinder head(s), crankshaft, camshaft(s), and oil pan (*Figure 1.10*).

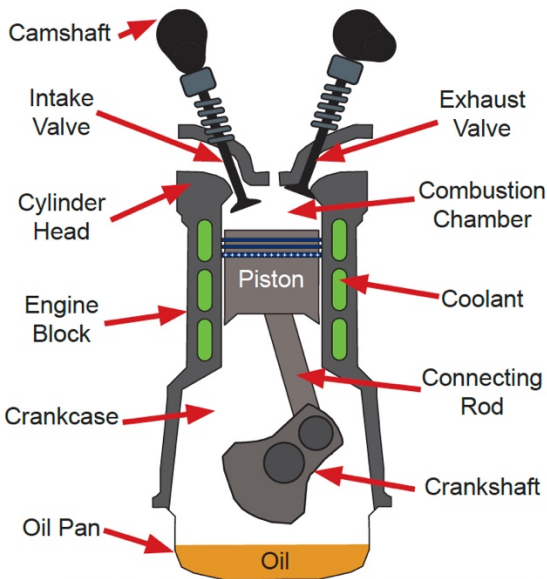


Figure 1.10 Dual Overhead Camshaft (DOHC) Engine

Four-Stroke Engines

The four-stroke internal combustion engine (also known as the Otto cycle, named after Nikolaus Otto) is the most common type used in automobiles. In a four-stroke engine the piston makes reciprocating (back and forth or up and down) movements to convert the chemical energy of fuel into mechanical energy of motion (kinetic energy).

Spark Ignition. Spark ignition (SI) engines are fueled by gasoline, propane, natural gas, or a gasoline/alcohol blend. A spark plug ignites the air-fuel mixture. The four-strokes of the spark ignition engine (*Figure 1.11*) are intake, compression, power (combustion), and exhaust. To complete the four strokes, the crankshaft makes two revolutions. **Gasoline direct injection (GDI) engines**, now becoming popular, will be explained in Chapter 11.

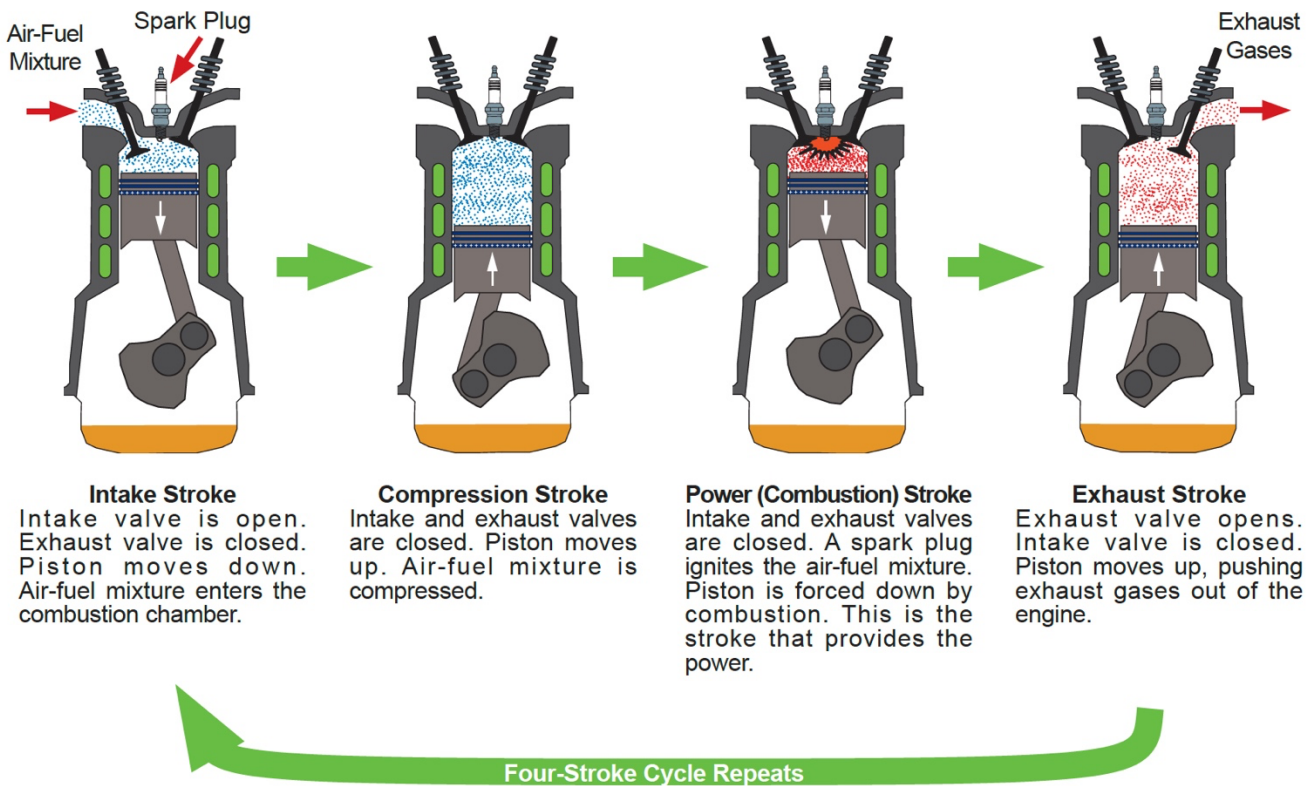


Figure 1.11

*Four-Stroke Spark Ignition Engine
Compression Ratio Commonly 8:1 to 12:1*

Compression Ignition. Compression ignition (CI) engines are fueled by diesel. The four-strokes of the compression ignition engine (*Figure 1.12*) are similar to the spark ignition engine, except fuel is not mixed with air in the intake system. Instead diesel is injected directly into the combustion chamber or indirectly into a swirl (precombustion) chamber. Once in the combustion chamber, the diesel combusts spontaneously from the high pressure and heat. CI engines do not use spark plugs.



Tech Tip



ICE Requirements

For efficient combustion to occur in an internal combustion engine (ICE), there needs to be the correct air-fuel mixture, sufficient compression, and an ignition source (heat or spark). These three things must function properly to achieve engine efficiency and minimize emissions.

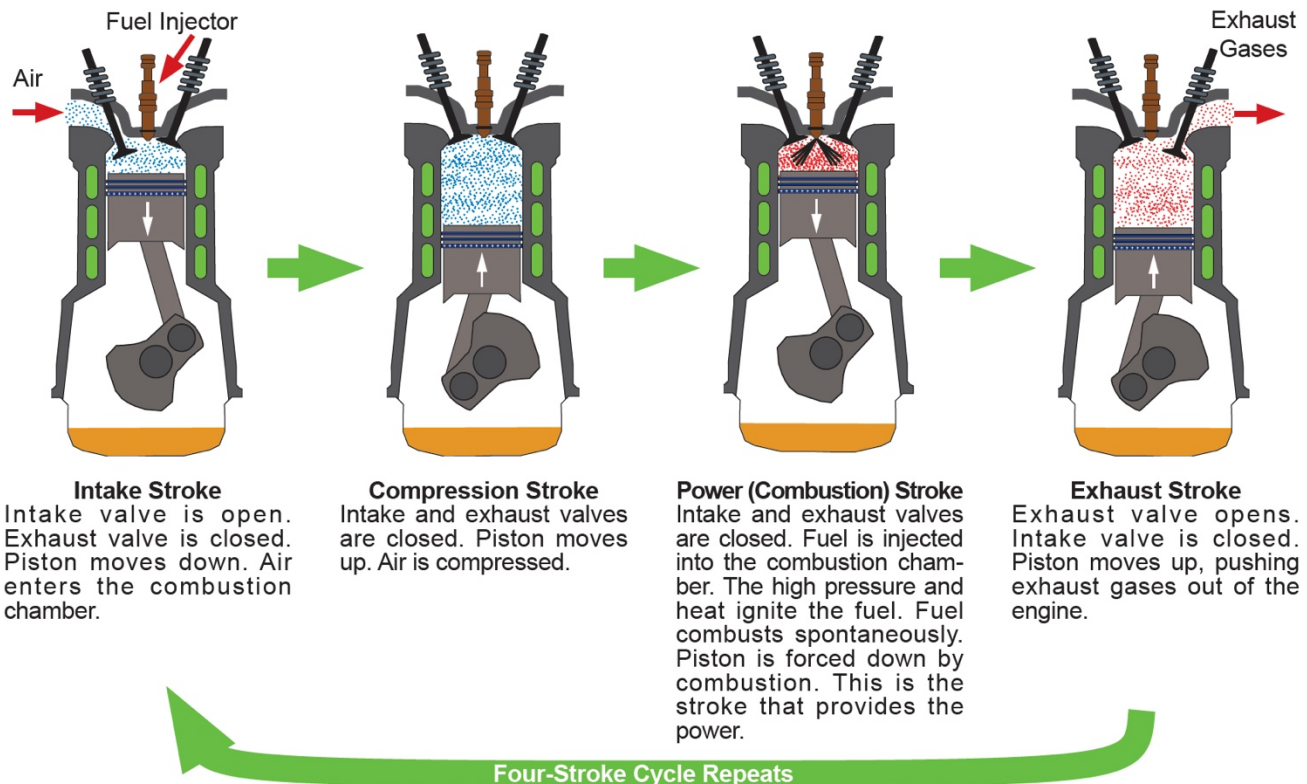


Figure 1.12

Four-Stroke Compression Ignition Engine (Direct Injection Diesel)
Compression Ratio Commonly 16:1 to 20:1

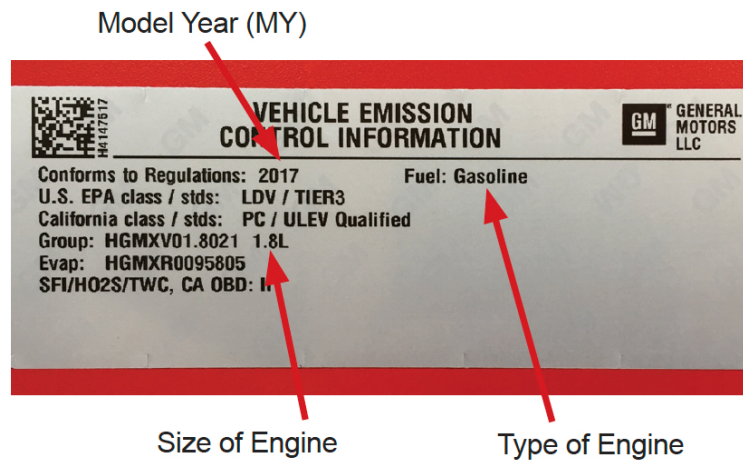
Study Questions

1. What are the strokes in a four-stroke internal combustion engine?
2. During which strokes are the intake and exhaust valves closed?
3. How are gasoline and diesel engines different?
4. What three things are needed for efficient combustion to occur in an engine?

Activity

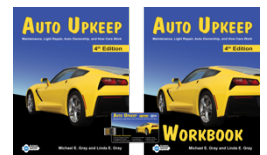
Gasoline and diesel vehicles have a vehicle emission control information (VECI) sticker under the hood. This sticker indicates the year of pollution standards conformance, which is also the model year (MY).

Example Vehicle Emission Control Information (VECI) Sticker



- ✓ Open the hood on your vehicle. If unsure how to open the hood, refer to the owner's manual.
- ✓ Locate the VECI sticker under the hood.
- ✓ Look on the VECI sticker to determine the model year (MY).
- ✓ Look on the VECI sticker to determine the size (e.g., 1.8 L) and type (e.g., gasoline or diesel) of engine in your vehicle.
- ✓ Record your findings.

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