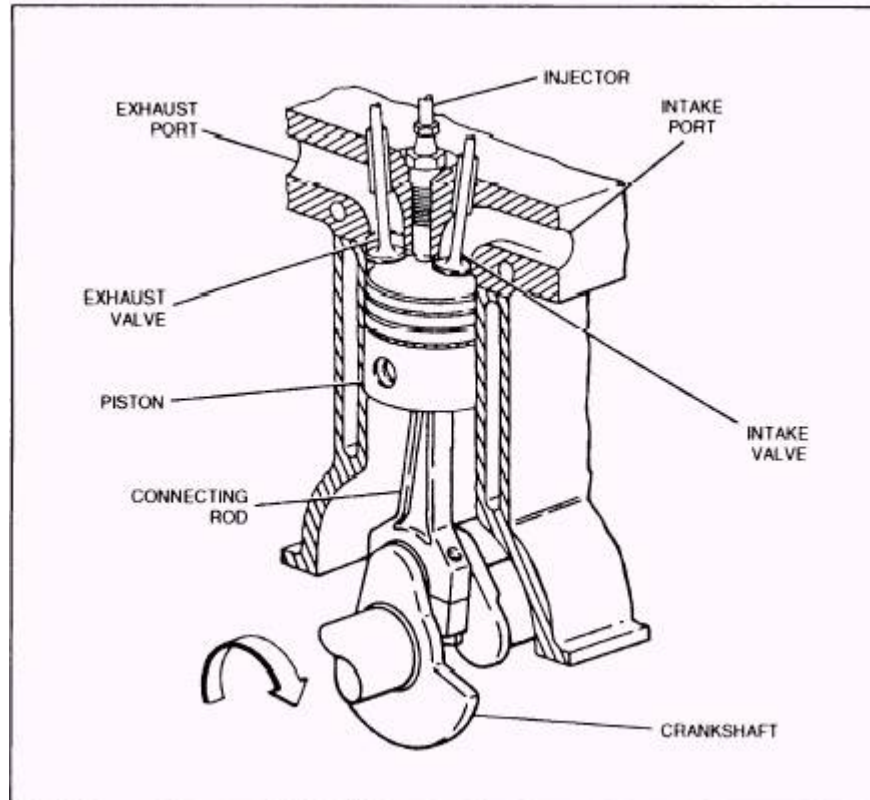


## Four-Stroke Diesel Engine

The four-stroke diesel engine is similar to the four stroke gasoline engine. They both follow an operating cycle that consist of intake, compression, power, and exhaust strokes. They also share similar systems for intake and exhaust valves.

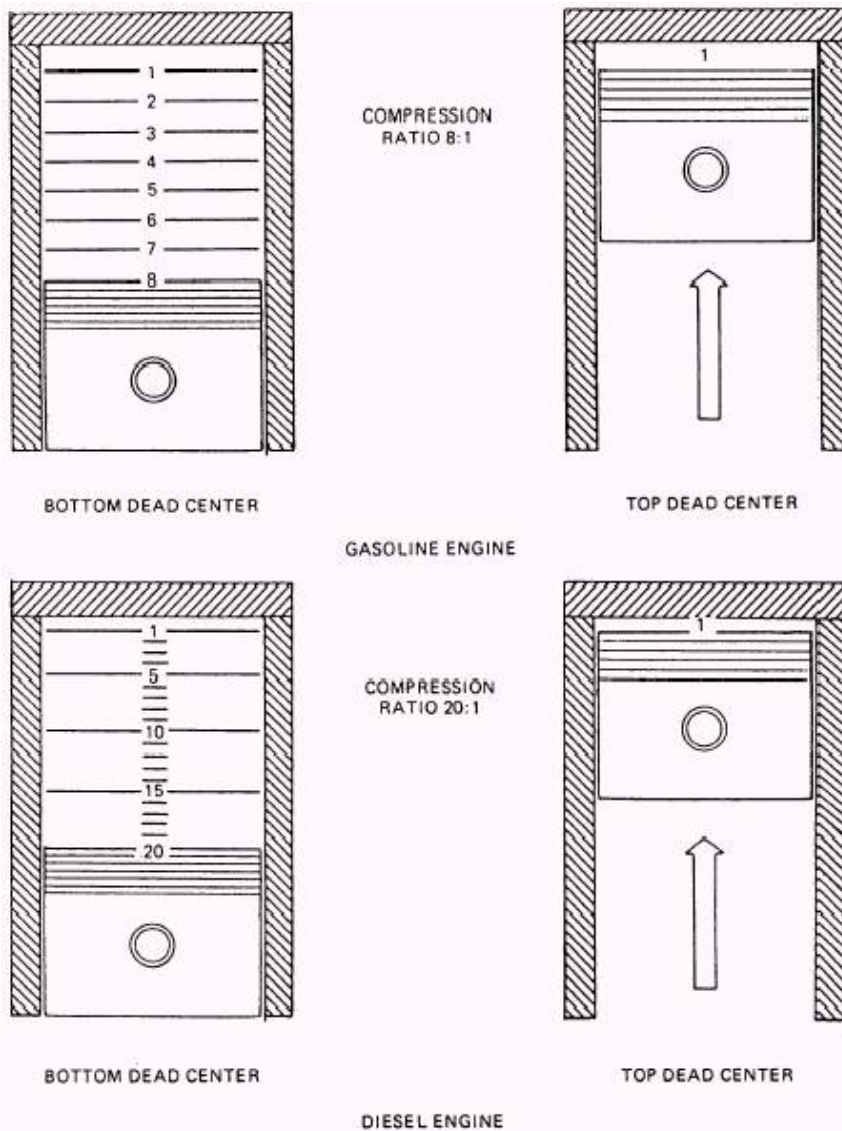


The primary differences between a diesel engine and a gasoline engine are as follows:

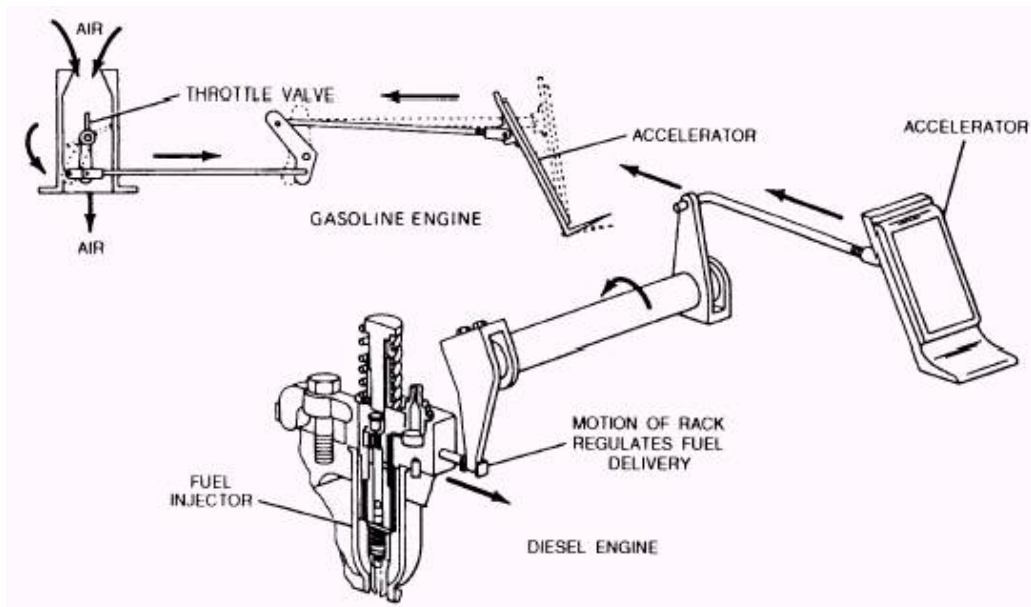
- The fuel and air mixture is ignited by the heat generated by the compression stroke in a diesel engine versus the use of a spark ignition system on a gasoline engine.
- The fuel and air mixture in a diesel engine is compressed to about one twentieth of its original volume, while in a gasoline engine the fuel and air mixture is only compressed to about one eighth of its original volume. The diesel engine must compress the mixture more tightly to generate enough heat to ignite the fuel and air mixture. The contrast between the two engines is shown in figure 1-7.
- The gasoline engine mixes the fuel and air before it reaches the combustion chamber. A diesel engine takes in only air through the intake port. Fuel is put into the combustion chamber directly through an injection system. The air and fuel then mix in the combustion chamber.
- The engine speed and the power output of a diesel engine are controlled by the quantity of fuel admitted to the combustion chamber. The amount of air is constant. On the gasoline engine, the speed and power output is regulated by limiting the air and fuel mixture entering the engine.

A diesel engine is much more efficient than a gasoline engine, such as the diesel engine does not require an ignition system due to the heat generated by the higher compression, the diesel engine has a better fuel economy due to the complete burning of the fuel, and the diesel engine develops greater torque due to the power developed from the high-compression ratio.

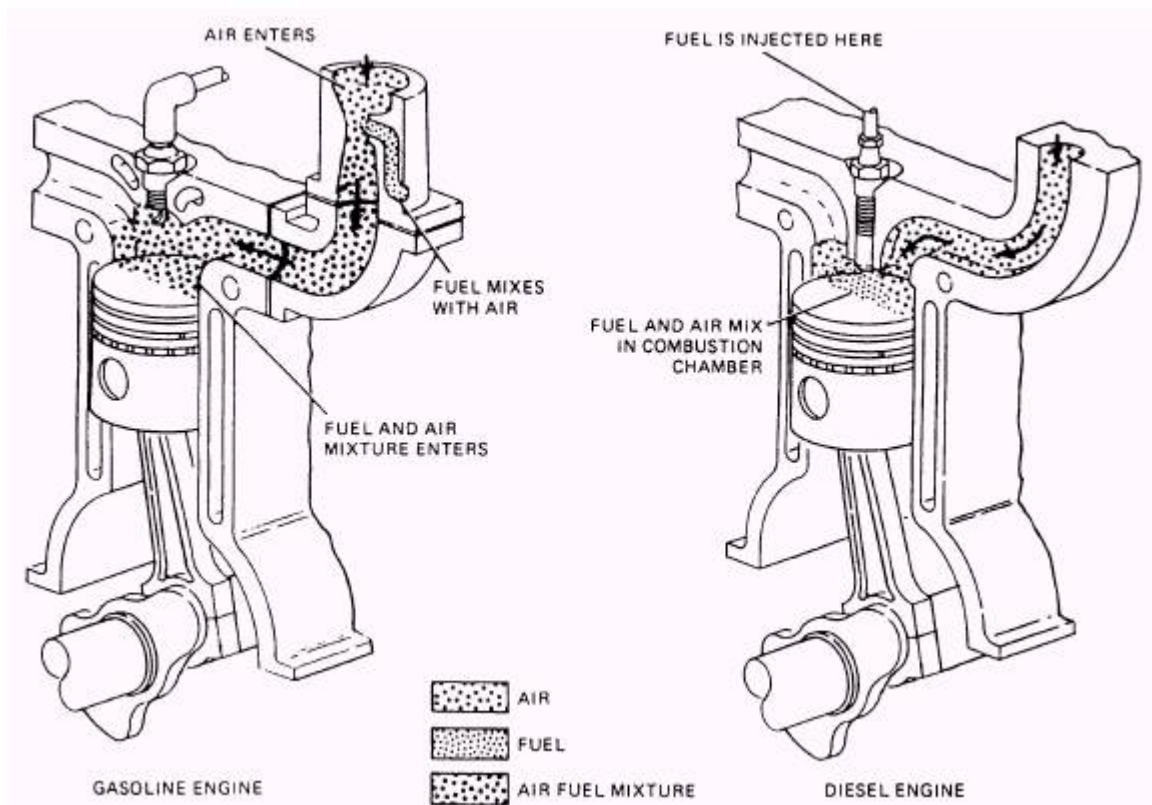
**Diesel and gasoline engines compression strokes:**



**Power regulation in diesel and gasoline engines:**



## Diesel and gasoline engines intake strokes:



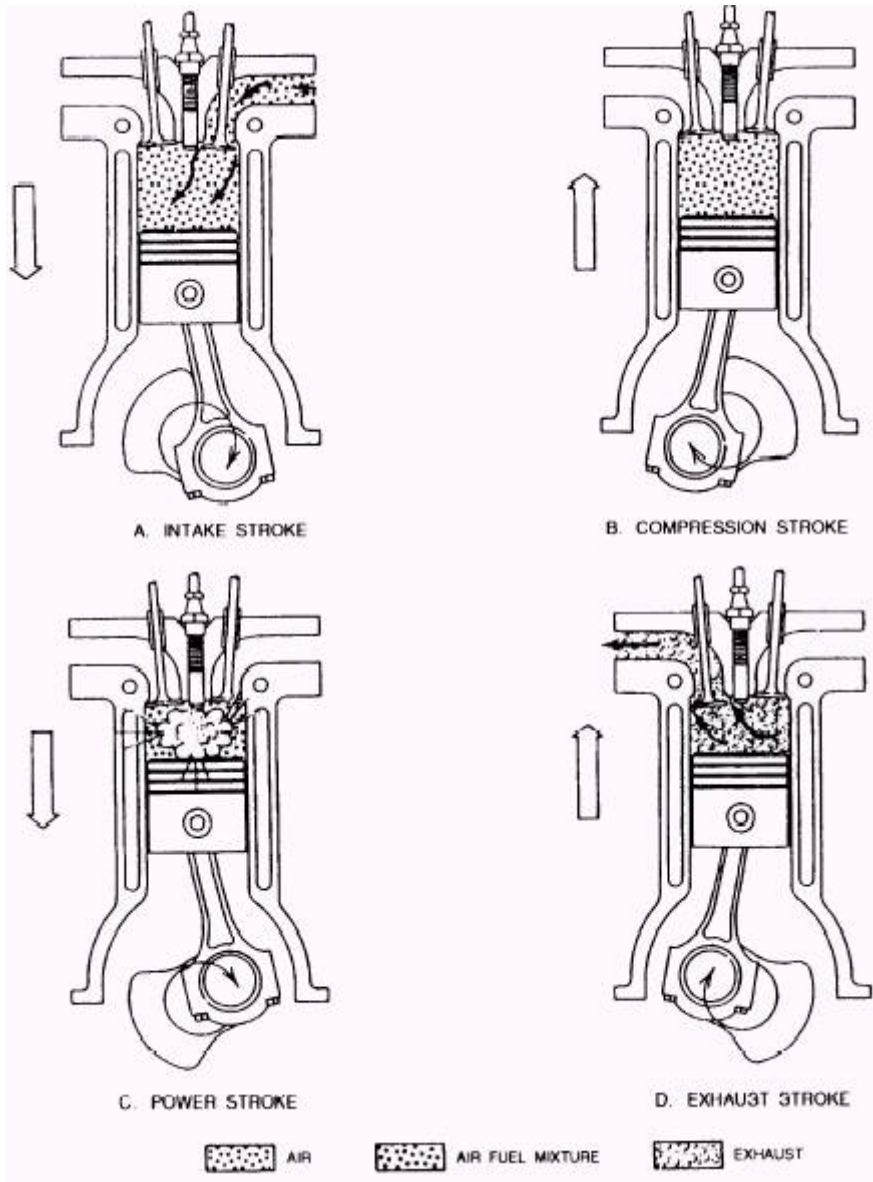
## Diesel Engine Strokes

**Intake Stroke:** The piston is at top dead center at the beginning of the intake stroke, and, as the piston moves downward, the intake valve opens. The downward movement of the piston draws air into the cylinder, and, as the piston reaches bottom dead center, the intake valve closes.

**Compression Stroke:** The piston is at bottom dead center at the beginning of the compression stroke, and, as the piston moves upward, the air compresses. As the piston reaches top dead center, the compression stroke ends.

**Power Stroke:** The piston begins the power stroke at top dead center. The air is compressed to as much as 500 psi and at a compressed temperature of approximately 1000°F. At this point, fuel is injected into the combustion chamber and is ignited by the heat of the compression. This begins the power stroke. The expanding force of the burning gases pushes the piston downward, providing power to the crankshaft. The diesel fuel will continue to burn through the entire power stroke (a more complete burning of the fuel). The gasoline engine has a power stroke with rapid combustion in the beginning, but little to no combustion at the end.

**Exhaust Stroke:** As the piston reaches bottom dead center on the power stroke, the power stroke ends and the exhaust stroke begins. The exhaust valve opens, and, as the piston rises towards top dead center, the burnt gases are pushed out through the exhaust port. As the piston reaches top dead center, the exhaust valve closes and the intake valve opens. The engine is now ready to begin another operating cycle.



Reference:  
<http://www.tpub.com>