

# What Are Friction Brakes?

A brake is a tool that's main function serves to slow down a mechanical object that is in motion. Brakes are also used to bring mechanical objects to a complete stop. Brakes are used in a large amount of mechanical objects including: cars, trucks, trains, and bikes. They are also used in elevators, chain saws, and roller-coasters.

Although brakes are used in a large variety of items, friction brakes are possibly the most popular of all brakes and tend to be the form of brakes that are used in most kinds of cars.

## How Do Friction Brakes Work?

To better understand how friction brakes work, it can be beneficial to understand what true friction is in the first.

Friction is the measure of how difficult it is for one object to slide over another. In this way, when you engage your friction brakes by putting your foot down on the brakes, you are causing a moving part and a stationary part of the brake to come together. With any friction brake, the kinetic energy of your vehicle is changed almost entirely into heat throughout the friction process.

Through this transfer of kinetic energy, the friction brakes are able to take the energy of your car's movement, turn it into heat, and slow down the force of your car.

## The System Behind Your Brakes

Friction brakes are a part of a hydraulic system that is made up of a fluid-filled cylinder. This cylinder then is attached to a slave cylinder. Your brake pedals are connected to the main cylinder and fluid moves through the interconnected pipes. When you press your foot on the brakes, it sends fluid through the slave cylinders that are located at each wheel. When this fluid arrives at the slave cylinders, it forces the pistons to apply the brakes.

The overall surface area from a combination of all four slave pistons- where the force from you putting pressure on the brake pedal is applied, is larger than the master-cylinder's piston. As a result, the master piston would need to travel a longer distance for the slave pistons to be moved. Each slave piston only needs to move a fraction of the overall distance that the master cylinder would need to move, and this allows them to force the brakes into action, therefore slowing down your vehicle.

Although each wheel has a slave piston attached to it, the rear brakes are created to be less powerful because manufacturers want to prevent your car from locking up and skidding. This is

especially important in harsh weather conditions if you're driving on water-filled roadways or snow.

A large diaphragm is attached to the master-cylinder. When the brakes are not in use, the diaphragm is open and allows air in. When the brakes are pressed, certain valves closed and the pressure from the outside air allows the diaphragm to help the master cylinder in applying the brakes quickly. If you keep pressing on the brake pedal, then the diaphragm will continue to not draw in outside air and the brake pressure will remain consistent.