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How to Replace Your Front Brakes

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This tech paper will discuss the replacement of the front brake pads and rotors on the C-4 Corvettes. This paper deals specifically with the '84 – '87 model years, and applies generally to the '88 through '96 models. The rear brakes use the same process, so you can use this procedure as a guide for the rear, as well.

General

The disc brake system on the C4 series Corvettes is a well designed, simple to maintain system that uses components that are right off the racetrack. The component parts are designed for very quick service/replacement, and can be easily serviced with very basic hand tools.

The brake pads used on the Corvette are unique to the 'Vette. They are a high performance, semi-metallic pad. You cannot buy a non-performance, non-metallic pad that will fit a C4. Due to this, the pads are a bit more costly than a semi-metallic pad for your Buick Regal. There are two different part number series for the C4: The 1984 through 1987 cars use the early pad. The 1988 through '96 cars use a different, much more costly, pad.

Several different manufacturers supply pads for the 'Vette. Personal preference is a factor in name brand selection, but I have found the Raybestos pads to be well built, well backed (by warranty), readily available, and very well researched and tested by the manufacturer. They offer two grades of pads for the 'Vette: the "PG" series and the "SS," or "Super Stop" series.

The "PG" series is a stock, high performance replacement pad. It will meet or exceed the performance of the GM pads. The "SS" series is a step up from this, and provides superior high-temperature braking performance for continuous or heavy braking applications, such as when autocrossing or very sporty driving. It has been my general experience that the pads designed for high temperature, heavy duty applications tend to be less effective under light, cool braking conditions: they come into their peak effectiveness when hot. For this reason, I prefer the standard, "PG" series for use on cars that are used primarily for around-the-town driving and weekend pleasure. Both the "PG" and the "SS" series come with Lifetime Warranties.

In addition to the pads themselves, the rotors may need attention. Excessive heat can warp a rotor, causing a pulsating brake pedal and pulsating braking performance. Pads worn past their limit, exposing the metal backing, can groove and gouge the rotors. It is my personal preference to NOT turn rotors that are not warped or scored: if the rotor is performing smoothly, is not damaged in any way, and only shows light wear, I prefer to simply replace the pads and leave the rotor alone. This extends rotor life significantly. If you need to have the rotor turned due to a pulsating pedal or other rotor damage, make sure you take it to a reputable machine shop that has good, modern equipment: I've seen many rotors set up and turned by inexperienced people on poorly maintained equipment that results in a rotor that does not run true, or which has a finish which is not conducive to good braking performance or pad life.

Tools Required

Floor jack
Jack Stands (2)
Wheel Lug Wrench
15mm Combination Wrench
17mm Combination Wrench
13/16" Combination Wrench
Large, heavy duty screwdriver
1/2" Drive Torque Wrench
13/16" 1/2" Drive Socket
15mm 1/2" Drive Socket
3/4" 1/2" Drive Socket
5-lb heavy duty hammer

Parts & Prices (front pads)

(Raybestos Brand)

| Year | Series | Part Number | Approx. Price |
|-------------|--------|-------------|---------------|
| 1984 – 1987 | PG | PGD294 | \$54 |
| | SS | SSD294 | \$59 |
| 1988 – 1996 | PG | PGD412M | \$130 |
| | SS | SSD412 | \$145 |

You may also need a bottle of new brake fluid (good to have on hand in any case).

Procedure

Section 1: Replacing Pads Only

1. Raise the front of the car and secure with jackstands.
2. Pop the top off the Master Cylinder and remove about 1/2 of the brake fluid. I have a syringe I use for this, but you can use anything from a spoon to the lid off your bottle of new brake fluid to scoop it out.
3. Remove the front wheels and open the hood.

Now, work one side at a time:

4. Collapse/depress the Caliper Piston: The Piston must be pushed/depressed ALL the way into the Caliper. Many people use a C-clamp to push it in, and this works great if you have one that's big enough. I have found that you can easily do it with a big screwdriver: get the tip of the screwdriver wiggled in between the Inner Brake Pad and the Rotor. Smoothly and slowly pry on the pad to push the Piston into the Caliper. This process will put a mark on the pad (but you're replacing it anyway...), but will not damage the Rotor. As the Piston is pushed in, it will pump brake fluid out of the Caliper and up into the Master Cylinder: keep an eye on the Master Cylinder fluid level to make sure that it doesn't overflow and spill brake fluid all over.

5. The Caliper is attached to the Caliper Mounting Bracket with two bolts: an upper and a lower bolt. Remove the upper bolt using a 15mm box end combination wrench on the bolt. You must also put a 17mm open end combination wrench on the hex head of the Guide Pin located between the Caliper and the Caliper Mounting Bracket to prevent it from spinning. The 15mm bolt may be a bit tight: I usually whack my 15mm box wrench with the hammer to break the bolt loose first. This saves my knuckles...

6. With the upper 15mm bolt removed, the Caliper will simply flip back, hinging around the lower bolt. The brake pads can then be slid right out of their mounting slots in the Caliper Mounting Bracket. Note that the inner and outer pads are different, so keep track of which is which.

If the Rotor is not to be removed for turning, proceed to step 7. If you wish to remove the rotor, go to the next section.

7. Noting which of the new pads are inner and outer pads, simply slip the new pads into the Caliper Mounting Bracket. The pads have a little anti-rattle spring at the top: make sure this spring is centered and leveled.

8. Flip the Caliper back up into position. If the Caliper Piston has been depressed all the way, the Caliper will flip right down over the pads and be in perfect alignment. Make sure the pad anti rattle springs are not cocked, but that they are pushing against the Caliper Housing. If they are, you'll have to push on the Caliper against the spring pressure in order to slip the 15mm Upper Caliper Bolt back into position and engage the threads. Tighten the 15mm bolt to 22-25 ft/lbs torque.

9. Install the wheel. Torque the wheel lug nuts to 100 ft/lbs.

10. Repeat for the opposite side.

11. Once reassembled, and the car is back on the ground, softly and slowly depress the brake pedal several times using short strokes until you can feel the pedal become firm again. This will move the Caliper Piston back out of the Caliper and put the pads into contact with the Rotor. Failure to do this will result in the brake pedal going to the floor the first time you stomp on the brakes! Check and fill your Master Cylinder fluid level. Start the engine, and cycle the brake pedal again to assure that you have a firm pedal. Perform a road test to verify proper operation.

When I did this exercise to test the validity of the steps in this article, the total time to perform steps 1 through 9 was 13 minutes. I did, however, use an impact wrench to do the lug nuts, so I had some "power assist."

Section 2: Removing Rotors

If the rotors need to be removed for replacement or turning, proceed as follows:

1. At step 6 in Section 1 above, break both of the 15mm Caliper Bolts loose with the box wrench & hammer. Remove both of the bolts, and remove the caliper completely. Secure the caliper to the upper Control Arm with a piece of string or wire: do not leave it dangling from its flex line!!

2. Remove the two bolts attaching the Caliper Mounting Bracket to the Spindle. These bolts are metric, but I prefer to use a 13/16" box end combination wrench on them: the 13/16" wrench fits REALLY tight and nice so I don't screw up the bolt heads. And the reason I don't want to risk screwing up the bolt heads is that these bolts are tightened to 133 ft/lbs(!). To break them loose, I give my 13/16" box wrench several good whacks with my heavy duty hammer. Once out, the Caliper Mounting Bracket can be removed, and the rotor simply pulls right off of the Spindle.

3. To re-install, simply slip the rotor onto the Spindle, install the Caliper Mounting Bracket and torque the bolts to 133 ft/lbs. Install the Caliper with the lower 15mm bolt only, and torque this bolt to 22-25 ft/lbs. while providing backup on the 17mm hex with an open-end combination wrench. Return to Section 1 step 7.

This instruction sequence does not deal with brake system bleeding, or with specific servicing of the ABS systems or other related electrical systems.