

# 1995 - 2002 Corvette: Service Bulletin: Warranty Admin. - Brake Rotor Warranty Service Procedure

**Number:** 00-05-22-002A

**Subject:** Brake Rotor Warranty Service Procedure

**Model Year:** 1995-2002 Passenger Cars and Light Duty Trucks

This bulletin is being revised to add model years, change the service category and update the information. Please discard Corporate Bulletin Number 00-05-22-002 (Section 05 - Brakes).

This bulletin outlines GM's standard procedures and guidelines for brake rotor service and brake wear. Brake rotor service to correct scoring or pulsation is covered by the GM New Vehicle Limited Warranty unless there is evidence of the vehicle being subject to severe use.

## **Important**

Certain conditions may apply to individual vehicles regarding specific repairs which differ from those outlined in this bulletin. For information regarding lateral runout correction, refer to Corporate Bulletin Number 01-05-23-001, Brake Align System for Brake Rotor Lateral Runout Correction. For other conditions, refer to those specific repairs in applicable bulletins.

Original equipment rotor surfaces are ground to ensure smooth finish and parallelism between mounting and friction surfaces. New rotors **SHOULD NOT** be resurfaced before installation. When rotor turning is necessary, it is essential that you use a high quality brake lathe. Rotors, when remounted on the hub, should have less than .055 mm (.002 in) lateral runout. Brake rotors should only be turned when one of the following rotor surface conditions exist:

1. Severe scoring -- depth in excess of 1.5 mm (0.060 in).
2. Pulsation concerns from:

- 0. Lateral runout in excess of .055 mm (.002 in).
- 0. Thickness variation in excess of 0.025 mm (0.001 in).
- 0. Excessive corrosion on rotor braking surfaces.

Rotors are not to be resurfaced in an attempt to correct the following conditions:

- 0. Noise/squeal
- 0. Cosmetic corrosion
- 0. Routine pad replacement
- 0. Discoloration/hard spots

### **Explanation of Brake Rotor Warranty Service Procedure**

- 0. Rotor refacing during normal pad replacement is not necessary.
- 0. Rotor refacing for cosmetic corrosion is unnecessary. Clean up of braking surfaces can be accomplished by 10-15 moderate stops from 62-75 km/h (35-40 mph) with cooling time between stops.
- 0. Rotor service is ineffective in correcting brake squeal and/or premature lining wear out and should not be used to address these conditions unless specifically directed by a service bulletin.
- 0. When installing new rotors, DO NOT reface them. If a new rotor has more than .055 mm (.002 in) lateral runout when properly mounted on the hub, it may be machined using an approved on-car lathe or follow correction plate procedure found in Corporate Bulletin Number 01-05-23-001.

0. Ensure bearing flanges and rotor mounting surfaces are free of corrosion when installing rotors to prevent inducing lateral runout. Use Kent Moore tool J-42450A to clean the corrosion around the wheel studs.
0. Always mark the position of the rotor on the hub before removal and reinstall the rotor in the same position. Rotors with perceived hard spots or discoloration should not be serviced. These conditions are normal. Installation of new rotors does not require pad replacement. Do not replace pads unless their condition requires it. It is not necessary to replace rotors in pairs. Rotors may be replaced individually. However, caution should be exercised, as a variance in surface finish may cause a brake pull condition.
0. A torque limiting socket or torque wrench must be used to insure that the wheel nuts are tightened to specification. This should be done in 3 steps using the star pattern:

1. Hand tighten all 5 lug nuts using the star pattern.
2. Tighten all 5 nuts to approximately  $\frac{1}{2}$  spec. using the star pattern.
3. Tighten all 5 nuts to full spec. using the star pattern.

0. Never use lubricants or penetrating fluids on wheel studs, nuts or mounting surfaces. Wheel nuts, studs and mounting surfaces must be clean and dry.

## **Brake Service Techniques**

1. Clean and lubricate all metal-to-metal contact points (i.e. caliper to

- knuckle, pad to knuckle, etc).
2. Clean and lubricate slide pins, if applicable.
  3. Set correct clearances (i.e. caliper to knuckle, etc), if applicable.
  4. Clean rotor and hub mounting surfaces. Use Kent Moore tool J-42450 to clean around the wheel studs.
  5. Verify lateral runout of the rotor with a dial indicator (rotor held on hub with 3 or more wheel nuts and washers).

### **Important**

Refer to the appropriate Service Manual for more specific procedures.

## **Pulsation**

### **Important**

Brake pulsation is often caused by factors outside customer control. In these instances, the repair is covered under the GM New Vehicle Warranty.

Brake pulsation concerns may result from two basic conditions:

0. Pulsation is caused by brake rotor thickness variation. Thickness variation causes the piston in the brake caliper to "pump" in and out of the caliper housing. This "pumping" effect is transmitted hydraulically to the brake pedal.
0. Thickness variation on a new rotor will be virtually undetectable. But if the rotor (as installed on the vehicle) has lateral runout, it is likely that thickness variation will develop. Pulsation caused by thickness variation will develop on new vehicles when the tolerances of the hub and rotor stack up with lateral runout in excess of .055 mm (.002 in). Pulsation that is the result of excessive lateral runout usually develops in 4800-11300 kilometers (3000-7000 miles). Thickness variation can be induced when uneven torque is applied to wheel nuts (lug nuts). Improper wheel tightening after tire rotation, spare tire usage, brake

inspection, etc. can be the cause of pulsation. Again, it usually takes 4800-11300 kilometers (3000-7000 miles) after this event for the condition to surface. The owner or driver does not usually make the connection between the service event and the awareness of the pulsation. The proper usage of torque wrenches and/or torque sticks (torque limiting sockets) will greatly reduce or eliminate the pulsation conditions after wheel service events. The improper use of impact wrenches on wheel nuts greatly increases the likelihood of pulsation after wheel service.

GM highly recommends the use of on-car brake rotor turning as a method of eliminating the stack up of lateral runout which is a potential source of brake pulsation. GM has identified superior equipment through testing and evaluation. The \*Pro-Cut PFM900 or Hunter OCL360 will consistently deliver machined rotors that meet GM specifications (lateral runout less than .055 mm (.002 in) and are the only on-car brake lathes that are currently recommended by GM. The use of this on-car rotor turning technology has proven to significantly reduce the repeat occurrences of brake pulsation. If on-car brake rotor turning equipment is not available, refer to Corporate Bulletin Number 01-05-23-001 for brake rotor lateral runout correction procedure.

\*We believe these sources and their equipment to be reliable. There may be additional manufacturers of such equipment. General Motors does not endorse, indicate any preference for or assume any responsibility for the equipment from this firm or for any such items which may be available from other sources.

The following are examples of pulsation conditions and reimbursement recommendations:

1. If a customer noticed the condition after 4800-11300 kilometers (3000-7000 miles) and it gradually got worse, normally the repair

would be covered. The customer may tolerate the condition until it becomes very apparent.

2. If a customer indicated they had wheel service, ask who performed the service. Then:
  0. If a dealer performed the service, consider paying for the repair and then strongly reinforce the use of torque sticks at that dealer. Two common size torque sticks cover 90% of all GM products. Each technician needs to use torque sticks properly every time the wheel nuts are tightened.
  0. If the customer had the wheel service done outside of our dealer network, normally GM would not offer any assistance.

Customer assistance concerning brake pulsation and brake wear should always take into account the individual circumstances on a case by case basis. The recommendations mentioned previously should only be used as a general guide. **REMEMBER THAT CUSTOMER SATISFACTION IS CRITICAL TO GM AND THAT OFTEN IT IS IN GM'S BEST INTEREST TO SATISFY AND EDUCATE THE CUSTOMER CONCERNING FUTURE BRAKE SERVICE.**

### **Rotor Grooving**

Excessive grooving can be caused by foreign material in contact with the rotor, but most often rotor grooving is the result of normal brake wear. Do not resurface rotors for light grooving. Resurface rotors only when grooves of 1.5 mm (0.060 in) or deeper are present.

A dime may be used to determine disc brake groove depth. Place a dime in the groove, with Roosevelt's head toward the groove. If the dime goes into the groove beyond the top of his head, the groove exceeds 1.5 mm (0.060 in) and the rotor should be serviced. In Canada, if any portion of the letters of

"Canada" are covered, the rotor should be serviced. If the groove is too narrow for the dime to be inserted, it is not a cause for concern.

### **High Pedal Effort**

Follow the Service Manual diagnostic procedures for this condition. Service (replace or resurface) rotors if they have been recently resurfaced. The surface finish may be out-of-specification.

### **Lightly Rusted Rotors**

Light surface rust on rotor braking surfaces is often cosmetic and can be eliminated during a few normal driving stops. Rusting may occur when a vehicle is not driven for extended periods. Rotors with surface rust on unsold new cars can usually be burnished clean by performing 15 moderate stops from 62-75 km/h (35-40 mph) with cooling time between stops.

### **Facts About Brake Noise**

Brake noise is normal and differences in loading, type of driving, or driving style can make a difference in brake wear on the same make and model. Depending on weather conditions, driving patterns and the local environment, brake noise may become more or less apparent.

Brake noise is caused by a "slip stick" vibration of brake components. While intermittent brake noise may be normal, performing 3-4 aggressive stops may temporarily reduce or eliminate most brake squeal. If the noise persists, a brake dampening compound may be applied to the back of each pad. Use Permatex Disc Brake Quiet #126hb, or equivalent. Also, clean and lubricate all metal-to-metal contact areas between pads, pad guides, caliper and knuckles with a thin layer of high temperature silicone grease. This allows parts to slide freely and not vibrate when moving relative to each other.

The following noises are characteristic of all braking systems and are unavoidable. They may not indicate improper operation of the brake system.

### **Squeak/Squeal Noise**

- 0. Occurs with front semi-metallic brake pads at medium speeds when light to medium pressure is applied to the brake pedal.
- 0. Occasionally a noise may occur on rear brakes during the first few stops or with cold brakes and/or high humidity.

### **Grinding Noise**

- 0. Common to rear brakes and some front disc brakes during initial stops after the vehicle has been parked overnight.
- 0. Caused by trace corrosion on the metal surfaces during vehicle non-use. Usually disappears after a few stops.

### **Groan Noise**

A small groan may be heard when stopping quickly or moving forward slowly from a complete stop. This is normal.

### **Brake Wear**

Several factors impact brake lining wear and should be taken into account when reviewing related issues.

The following are conditions that may accelerate brake lining wear:

- 0. Heavy loads
- 0. High temperatures
- 0. Towing
- 0. Mountainous terrain
- 0. City Driving
- 0. Aggressive driving

## 0. Driver braking characteristics (left foot)

The following are conditions that may extend brake lining wear:

- 0. Light loads
- 0. Highway driving
- 0. Conservative driving
- 0. Level terrain

GM bulletins are intended for use by professional technicians, NOT a "do-it-yourselfer". They are written to inform these technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, DO NOT assume that the bulletin applies to your vehicle, or that your vehicle will have that condition. See your GM dealer for information on whether your vehicle may benefit from the information.

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