



Technical Bulletin

TB5013

July 22, 2003

General Motors Front Brake Pedal Pulsation

2002-1997	Chevrolet Malibu
1999-1997	Oldsmobile Cutlass
2002-1997	Oldsmobile Alero
2002-1997	Pontiac Grand Am

General Motors was experiencing pedal pulsation and vehicle vibration, directly linked to the front end of the car's brake system.

General Motors offers a technical bulletin (00-05-23-002A) to cover this issue. Please see related Inwood Technical Bulletin TB5012.

See the attached document.

Inwood Automotive Products Co., Inc.
Cincinnati, Ohio

www.inwoodauto.com
877-4INWOOD(446-9663)

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Service Bulletin

File In Section: 05 - Brakes

Bulletin No.: 00-05-23-002A

Date: December, 2001



**Subject: Front Disc Brake Pulsation
(New Rotor Run-Out Specification and Correction Method)**

**Models: 1997–2002 Chevrolet Malibu
1997–1999 Oldsmobile Cutlass
1999–2002 Oldsmobile Alero
1999–2002 Pontiac Grand Am**

This bulletin is being revised to update the correction information. Please discard Corporate Bulletin Number 00–05–23–002 (Section 05 — Brakes).

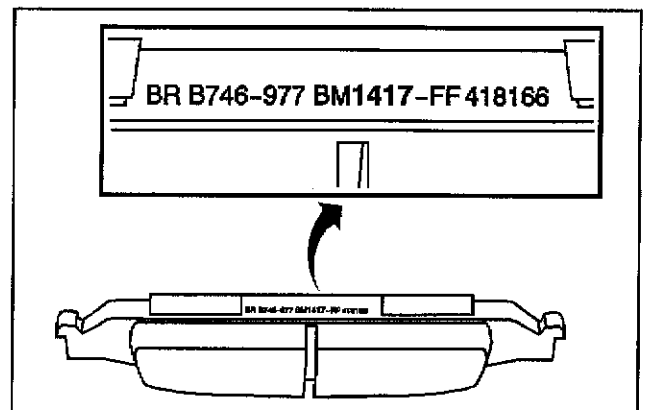
Condition

Some customers may comment on a pulsation condition felt in the brake pedal and/or steering wheel during a brake apply. In some cases, it may be noted that the pulsation condition has reoccurred in 5,000–11,000 km (3,000–7,000 mi) after having had the brakes serviced, tires rotated or any type of servicing that required wheel removal.

Cause

Pulsation is the result of brake rotor thickness variation causing the brake caliper piston to move in and out of the brake caliper housing. This hydraulic "pumping/pulsing" effect is transmitted through the brake system and may be felt in the brake pedal. In severe cases, this condition may also transmit through the vehicle structure and other chassis system components such as the steering column or wheel. The major contributor to rotor thickness variation is excessive lateral run-out of the rotor, causing the brake pads to wear the rotor unevenly over time.

Correction



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Confirm that the brake pads have the number 1417 printed on the edge of the pad backing plate (refer to the illustration). This indicates the correct brake pads have been previously installed. The brake pads contained in Front Pad Kit, P/N 18044437 are the only brake pads that should be used on these vehicles. If the number 1417 is not present, or if the number is not legible, replace the brake pads. If the correct pads were previously installed, verify the brake pad thickness.

If the brake pad friction material thickness is 4.6 mm (0.18 in) or greater, re-use the pads. If the friction material thickness is less than 4.6 mm (0.18 in), install new brake pads contained in Front Pad Kit P/N 18044437.

If the rotor thickness is less than 25 mm (0.98 in), install a new rotor. If rotor thickness is greater than 25 mm (0.98 in), refinish the rotor.

Replace existing front brake rotors and pads, if necessary, with new components indicated in the table following the applicable Service Manual procedures and the service guidelines contained in Corporate Bulletin Number 00-05-22-002.

Important

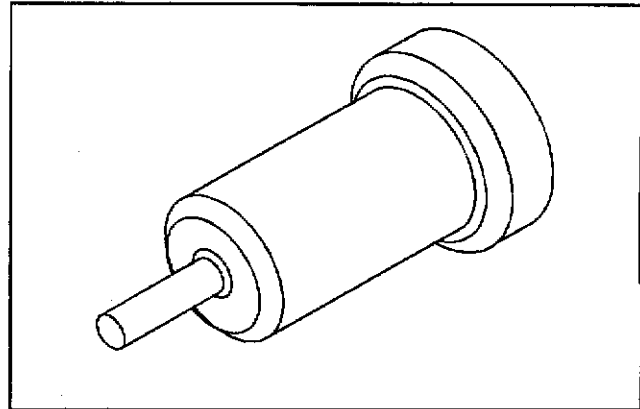
- The brake pad with the wear indicator must be installed in the inner position (against the piston in the caliper). When properly installed, the wear indicator will be pointing up with the caliper installed on the car (Refer to Corporate Bulletin Number 01-05-23-005).
- If the pad with the wear indicator is installed in the outboard position, reduced front brake lining life or interference between the compact spare tire and brake caliper may occur.
- Anytime a new or refinished rotor is installed on a vehicle, the rotor must have .040 mm (.0015 in) or less of lateral run-out. This specification is important to prevent comebacks for brake pulsation and is a tighter specification than specified for other vehicle models.

GM has approved a new technology for the correction of lateral run-out on new or refinished rotors. This new method is called "Brake Align[®]". It will allow the technician to meet the .040 mm (.0015 in) or less requirement for lateral run-out by installing a specially selected tapered correction plate between the rotor and the hub (Reference Corporate Bulletin Number 01-05-23-001).

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

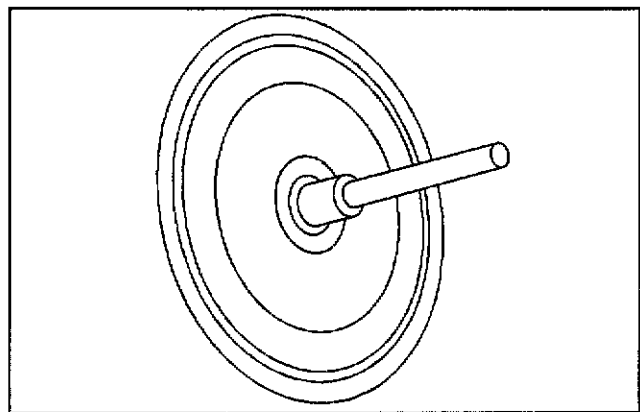
1. Machine the existing rotors on an approved, well-maintained brake lathe to guarantee smooth, flat, and parallel surfaces. Replace the rotors if they do not meet the minimum thickness specification. DO NOT MACHINE NEW ROTORS.

J 42450-A



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J 41013

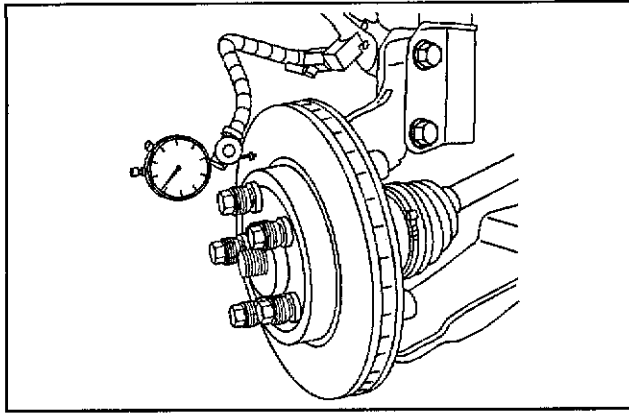


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2. Ensure that all the mating surfaces of the rotor and the hub are clean using the J 42450-A, Wheel Hub Cleaning Kit, to clean around the wheel studs. Use the J 41013, Wheel Hub Resurfacing Kit, to clean the mating surface of the rotor and bearing hub. Mount the new or refinished rotor onto the vehicle hub and secure using Conical Retaining Washers, J 45101-100 and the existing wheel nuts. Do not install the calipers and the wheels at this time.

Tighten

Tighten the wheel nuts in a star pattern to 140 N-m (100 lb ft) using J 39544, Torque Socket or equivalent.



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3. Fasten a dial indicator to the steering knuckle so that the indicator needle contacts the rotor outboard friction surface approximately 12.7 mm (0.5 in) from the rotor's outer edge.
4. Rotate the rotor and measure the total lateral run-out.
5. Based on the measurement taken in the previous step, proceed as indicated below:
 - Lateral run-out LESS than or equal to .040 mm (.0015 in), remove wheel nuts and conical washers and then proceed to Step 11.
 - Lateral run-out GREATER than .040 mm (.0015 in), proceed to the next step.
6. Following procedure below, determine the correct "Brake Align® Correction Plate" that will be required to bring lateral run-out within the specification:
 - 6.1. Rotate the rotor and locate the point on the rotor where the lowest dial indicator reading is indicated and set the dial indicator to zero.
 - 6.2. Rotate the rotor and locate the point with the highest dial indicator reading (rotor "high spot").
 - 6.3. Note the amount and location of the "high spot" on the rotor and mark the closest wheel stud relative to this location.
7. Select the appropriate "Brake Align® Correction Plate" required to compensate for the lateral run-out from the plates listed in the chart below. Verify that the plate selected corrects the run-out specification to within .040 mm (.0015 in) or less.
8. Remove the wheel nuts, conical washers and rotor.

Important: Never attempt to stack two or more Correction Plates together on one hub. Never attempt to re-use a previously installed Correction Plate.

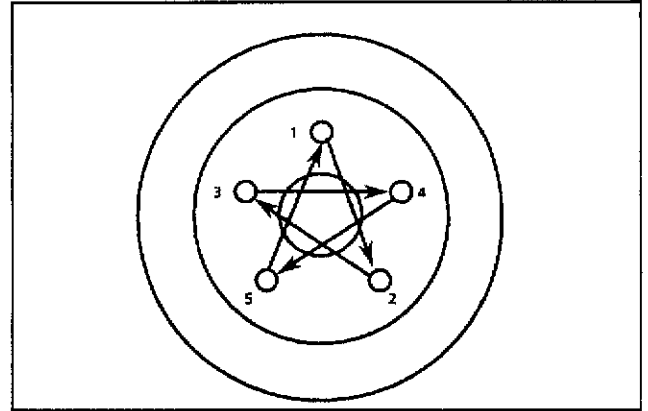
9. Following the Brake Align® procedures and diagram, install the Correction Plate onto the vehicle between the hub and rotor. The V-notch in the Correction Plate is to be installed and aligned with the noted location of the "high spot" on the vehicle hub and marked wheel stud.

10. Install the rotor onto the vehicle with the Correction Plate placed between the hub and the rotor. Be sure to install the rotor onto the hub in the same location as identified in Step 6.3.
11. Re-install the calipers and wheels.

Important: It is critical to follow the procedure below for torquing the wheels. Brake rotors may be distorted if the wheel nuts are tightened with an impact wrench or if this procedure is not followed exactly.

Tighten

Tighten the wheel nuts to 140 N·m (100 lb ft) with a TORQUE WRENCH following the three step method below:



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- Hand tighten all 5 wheel nuts using the star pattern (refer to the illustration).
 - Tighten all 5 wheel nuts to approximately 1/2 specification using the star pattern.
 - Tighten all 5 wheel nuts to 140 N·m (100 lb ft) using the star pattern.
12. Fasten a dial indicator to the steering knuckle so that the indicator needle contacts the rotor inboard friction surface approximately 12.7 mm (0.5 in) from the rotor's outer edge.
 13. Rotate the wheel on the opposite side of the vehicle and confirm that lateral run-out is less than or equal to .040 mm (.0015 in). If run-out is less than or equal to .040 mm (.0015 in), proceed to Step 14. If run-out is greater than .040 mm (.0015 in), remove the wheel and secure the rotor using conical retaining washers J 45101-100 and the existing wheel nuts. Measure run-out following Steps 3 and 4 above to ensure that the right correction plate was selected and properly installed. If run-out is within specification, reinstall the wheel making sure to use the three step tightening procedure in Step 11 and check run-out per Steps 12 and 13. If run-out is still out of specification, index the wheel or install a wheel from another position on the car until the correct run-out specification is achieved.
 14. Road test the car to verify the repairs.

Brake Align® Correction Plates	
Plate Size	Plate P/N
.003 in	411-801-003
.006 in	411-801-006
.009 in	411-801-009

For vehicles repaired under warranty, Brake Align® Run-Out Correction Plates should be submitted in Net Amount at cost plus 40%.

Brake Align® Run-Out Correction Plates are available through the following suppliers:

- Dealer Equipment and Services at 1-800-GM TOOLS
- Brake Align® LLC at 1-888-447-1872 (US dealers only)

Parts Information

Part Number	Description
18060442	Front Brake Rotor
18044437	Front Brake Pad Kit

Parts are currently available from GMSPO.

Warranty Information

For vehicles repaired under warranty, use:

Labor Operation	Description	Labor Time
H0042*	Pads, Front Disc Brake- Replace	1.3 hr
Add A	Machine Rotor (one)	0.5 hr
Add B	Machine Rotor (both)	0.9 hr
Add C	Replace One Rotor	0.1 hr
Add D	Replace Both Rotors	0.2 hr
Add E	Install One Correction Plate	0.1 hr
Add F	Install Both Correction Plates	0.1 hr

*Labor time includes time to check run-out and road test vehicle after repair.

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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