

Condition	Possible Sources	Actions
Brake vibration/shudder occurs when the brake pedal is released	Brake drag	REFER to Symptom Chart: Brake System
Rattling noise	- Caliper guide pins or guide pin bolts - Missing or damaged anti-rattle clips or springs - Loose brake disc shield	- INSPECT the caliper guide pins and guide pin bolts. INSTALL new components as necessary. - INSPECT the brake pads for missing clips or broken springs. INSTALL new components as necessary. - TIGHTEN the brake disc shield bolts to specification. REFER to: Brake Disc Shield (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Disc Shield (206-04 Rear Disc Brake, Removal and Installation).
Squealing noise - occurs on first (morning) brake application	Brake pads	Acceptable condition. Caused by humidity and low brake pad temperature.
Squealing noise - a continuous squeal	Brake pads	INSPECT the brake pads or shoes. INSTALL new components as necessary. REFER to: Brake Pads (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads (206-04 Rear Disc Brake, Removal and Installation).
Squealing noise - an intermittent squeal	Brake pads	Acceptable condition. Caused by cold, heat, water, mud or snow.
Groaning noise - occurs at low speeds with brake lightly applied (creeping)	Brake pads	Acceptable condition.
Grinding/roaring noise - continuous	- Brake pads - Brake disc	INSPECT the brake pads, brake discs and attaching hardware for damage. VERIFY brake components are within specifications. REFER to: Brake Pads (206-03 Front Disc Brake, Removal and Installation). REFER to: Brake Pads (206-04 Rear Disc Brake, Removal and Installation). REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing). INSTALL new components as necessary.

Pinpoint Tests

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.
REFER to: Diagnostic Methods (100-00 General Information, Description and Operation).

PINPOINT TEST A : VIBRATION WHEN BRAKES ARE APPLIED

Normal Operation and Fault Conditions

During moderate to heavy braking, noise from the HCU and pulsation in the brake pedal can be observed. Pedal pulsation coupled with noise during heavy braking or on loose gravel, bumps, wet or snowy surfaces is acceptable and indicates correct functioning of the ABS. Pedal pulsation or steering wheel nibble when the brakes are applied (frequency is proportioned to the vehicle speed) indicates a concern with a brake or suspension component.

Possible Sources

- Brake disc(s)
- Suspension components
- Brake pads

A1 ROAD TEST THE VEHICLE - LIGHT BRAKING

- Road test the vehicle. Warm the brakes by slowing the vehicle from 80 to 32 km/h (50 to 20 mph) using light brake force. At highway speeds of 89-97 km/h (55-60 mph), apply the brake using light pedal force.

Is there a vibration/shudder felt in the steering wheel, seat or brake pedal?

Yes	GO to A4
No	GO to A2

A2 ROAD TEST THE VEHICLE - MODERATE TO HEAVY BRAKING

- Road test the vehicle. At highway speeds of 89-97 km/h (55-60 mph), apply the brake using a moderate to heavy pedal force.

Is there a vibration/shudder?

Yes	GO to A3
No	The concern is not present at this time.

A3 CHECK ABS (ANTI-LOCK BRAKE SYSTEM) OPERATION

NOTE: During moderate to heavy braking, noise from the Hydraulic Control Unit (HCU) and pulsation in the brake pedal can be observed. Pedal pulsation coupled with noise during heavy braking or on loose gravel, bumps, wet or snowy surfaces is acceptable and indicates correct operation of the ABS. Pedal pulsation or steering wheel nibble with the frequency proportional to vehicle speed indicates a concern with a brake or suspension component.

- Road test the vehicle and apply the brakes on a dry, firm surface, then apply the brakes on a wet, snowy or loose surface (such as gravel).

Is the vibration/shudder only present on a wet, snowy or loose surface?

Yes	This is a normal operating condition of the ABS.
No	GO to A5

A4 ISOLATE BRAKE VIBRATION

NOTE: This test step is not applicable to vehicles with drum-in-hat type parking brakes. For vehicles with drum-in-hat parking brakes, proceed to the next test step. For all other vehicles, apply the parking brake to identify if the problem is in the front or rear brake.

- Apply the parking brake to identify if the problem is in the front or rear brake. At highway speeds of 89-97 km/h (55-60 mph), lightly apply the parking brake until the vehicle slows down. Release the parking brake immediately after the test.

Is there a vibration/shudder?

Yes	GO to A7
No	GO to A5

A5 CHECK THE FRONT SUSPENSION

- Check the front suspension.

Are all the suspension components in satisfactory condition?

Yes	GO to A6
No	REPAIR or INSTALL new components as necessary. TEST the system for normal operation.

A6 CHECK THE FRONT BRAKE DISCS

- Inspect the front brake discs.
REFER to: Specifications (206-00 Brake System - General Information, Specifications).
MACHINE or INSTALL new brake discs as necessary. REFER to: Brake Disc Machining (206-00 Brake System - General Information, General Procedures).
REFER to: Brake Disc (206-03 Front Disc Brake, Removal and Installation).
- Road test the vehicle.

Is the vibration/shudder present?

Yes	GO to A7
No	The concern has been repaired.

A7 CHECK THE REAR SUSPENSION

- Check the rear suspension.

Are all the suspension components in satisfactory condition?

Yes	INSPECT the rear brake discs or brake drums. REFER to: Specifications (206-00 Brake System - General Information, Specifications). MACHINE or INSTALL new brake discs or drums as necessary.REFER to: Brake Disc (206-04 Rear Disc Brake, Removal and Installation). REFER to: Brake System (206-00 Brake System - General Information, Diagnosis and Testing).
No	REPAIR or INSTALL new components as necessary. TEST the system for normal operation.

General Procedures

Brake Disc Machining

Repair

NOTE: *On-Vehicle Brake Lathe Training Videos*

1. Vehicle preparation.

□ [Click here to view a video version of this procedure.](#)

2. Mounting the machine.

□ [Click here to view a video version of this procedure.](#)

3. Lateral runout adjustment.

□ [Click here to view a video version of this procedure.](#)

4. Making the cut.

□ [Click here to view a video version of this procedure.](#)

5. Cutting the opposite side.

□ [Click here to view a video version of this procedure.](#)

6. Lathe maintenance.

□ [Click here to view a video version of this procedure.](#)

Repair

NOTE: *On-Vehicle Brake Disc Machining*

NOTE: *Do not use a bench lathe to machine the brake discs. Use an on-vehicle brake lathe only. Read the entire operating manual and/or view the video shipped with the lathe before installing, operating or repairing the lathe.*

NOTE: *Lateral runout and disc thickness variation measurements are not required because correct adjustment of the on-vehicle brake lathe will make sure that these dimensions are within specification.*

1. □ **WARNING:** Service actions on vehicles equipped with electronic parking brakes may cause unexpected parking brake application, which could result in injury to hands or fingers. Put the electronic parking brake system into service mode prior to servicing or removing rear brake components. Failure to follow this instruction may result in serious personal injury.

If a rear brake disc is being machined, activate the EPB service mode.