

COMMON CUSTOMER CONCERNS**Brake Roughness**

Brake roughness is defined as vibration felt in the:

- seat
- steering wheel
- brake pedal

during normal brake application.

Normal Roughness

Some customers may interpret normal ABS operation as a brake roughness symptom. Normal ABS operation includes:

- Pulsation in the brake pedal. This condition is normal, and indicates proper functioning of the vehicle's anti-lock brake system (ABS).
- This pulsation is felt if traction is lost at one or more wheels while braking:
 - During panic conditions.
 - On loose gravel.
 - When the tires are unloaded on uneven road surfaces.
 - On a wet or snowy road.
- The ABS is releasing and reapplying the brakes to prevent wheel lock up.

Abnormal Roughness

Abnormal brake roughness may be caused by:

- Loose or missing wheel hub bolts.
- Damaged wheel bearings.
- Wheel or tire imbalance/uneven wear.
- Foreign materials, rust, or scratches on braking surfaces or wheel hubs.
- Damaged brake pads or shoes.
- Grease or fluid on pads or shoes.
- Poorly lubricated sliding parts.
- Lining material transfer.
- Brake rotor runout.
- Wheel hub runout.
- Disc thickness variation.
- Out-of-round brake drums.
- Uneven lug nut torque.