



Technical Bulletin: How to Combat Brake Noise

Defining Brake Noise: Primary vs. Secondary

NOISE (n.)
Vibration at a frequency and volume heard by the human ear.

Primary Noise – Audible and certainly irritating, occurs over a few seconds of time. These noises include squealing and high pitch grinding. These noises typically occur when you apply light / medium pressure to the pedal and/or at a “medium” rate of speed (10 - 40mph). Primary brake noise is caused by vibration, and ALL brake systems vibrate. Most of the time, the inherent vibration frequencies are either beyond audible ranges of the human ear, or not loud enough. For most applications, the original equipment manufacturer (O.E.M.) is forced to use noise suppression shims or gaskets.

[Note: If O.E.M.’s designs were *perfect*, they wouldn’t need noise suppression shims. They would design the complete system (knuckle, caliper, rotor, pad, drum, shoe, wheel) so that any vibration was absorbed and not cause noise. To do this it would take a significant amount of time and money for every design. So, every O.E.M. has casa-by-case issues/problems with brake noise.]

These noise suppression countermeasures either move the vibration frequency (noise) out of audible range, or “deaden” it all together (decrease the volume). For this discussion, we will be focusing on what our customer complains about, the vibration that is heard, we call brake **NOISE**.

Secondary Noise – Occurs sporadically or during repeatable driving situations. Such as a creak, clunk, or short grind when you first apply the pedal driving forward or backward. These noises are sometimes other problems that have nothing to do with the brake system

Sources of.....

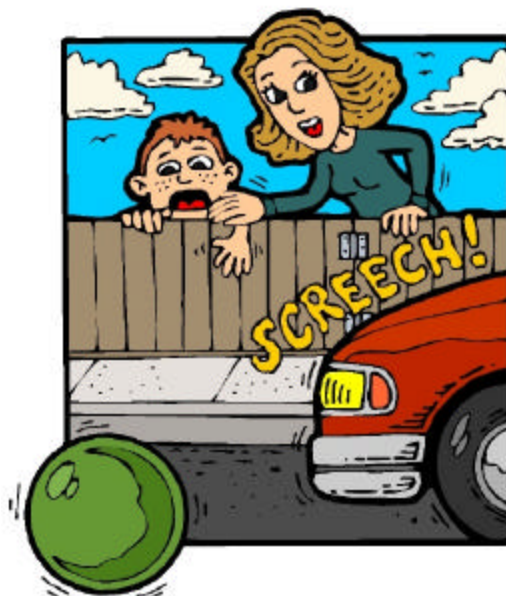
Primary Noise – High pitch squeal or grind.

- 1) “Lot-Rot”: A collection of rust on the rotors. What’s interesting about “Lot Rot” is that the rust builds up where the pad isn’t covering the rotor. So, if you remove the pads you’ll notice a “clean” area. Lot-Rot can occur to any rotor. The classic cases are when a vehicle sits for more than one (1) week. Lot-Rot is a typical problem for OEMs because the vehicles are stationary for long periods after manufacturing. Few cases of Lot-Rot occur after wet weather and the rotors have drops of water on the surface. To countermeasure Lot-Rot an abbreviated BURNISH is suggested. The worst case, which will cause vibrations & noise, is if the vehicle is driven aggressively right out of the parking lot. The rust is then “bedded” into the friction/rotor causing a change in surface hardness, decreasing performance and causing primary noise.

- 2) Glazing: Overheating or cooking the resins in the friction material. This destroys the integrity of the friction composite, causing a hardened surface nearest the rotor. The hardened surface then propagates the vibration causing noise. Glazing typically occurs from improper burnish or overworking the pads. It can also occur during repeated aggressive stops (highway traffic), or trailer towing in traffic and down hills.
- 3) Friction contamination: Oil or grease contaminating the system causing loss of friction grip and creating problems at other corners of the car. Example: A loss in braking power in the left rear will require the front pads to do more work. In turn, the front pads may glaze easier or excessively wear.
- 4) Bent/broken hardware: Pad mis-alignment can cause uneven pressure across the brake pad, which will lead to chatter, uneven wear, and noise. Bent or broken clips, springs, or shims, don't allow the parts to do the job they are designed to do. Dust/splash shields can sometime become bent or misaligned, then causing what "sounds" like brake noise, but is just the metal rubbing against the rotor or drum.
- 5) Inherent bad O.E.M. design: Both Chrysler and GM have published service bulletins stating "brake noise is normal during the burnish". This indicates that both manufacturers have "sensitive" brake systems designs and are prone to primary brake noise.

Secondary Noise – Clunk, creak, or short grind.

- 1) Broken or wrong part application: Correct fitment is a must. If the parts are "shifting" around in their mounted locations, secondary noise and possibly part failure may occur.
- 2) Bad Installation: Again, fitment is important. If a guide or spring was install backwards or bent in the process, sloppy fitment will be the cause of noise. Proper guide lubrication will also eliminate any "binding" or sticking of the parts.
- 3) Non-brake system part failure: Parts such as suspension bushings, tie rods, ball joints, or splash shields. If any of these parts are broken, worn, or bent, they could be sources of noise in the wheel area.





Combat Noise Checklist

TITAN-EX
SEVERE DUTY DISC BRAKE PADS

CERAMAX
ADVANCED ECONOMIC FRENCH BELL BRAKE PADS

INTIMIDATOR

INTIMIDATOR PLUS

- Interview the Customer
 - Driving habits? Vehicle usage?
 - What are the problem symptoms? Performance, noise, pedal feel?
 - When and where does the problem occur?
- Inspect Complete Vehicle
 - Previous repairs? Crash/Accident?
 - Broken suspension? Bushings? Splash shields?
- Inspect Brake System
 - Brake fluid condition or color?
 - Even friction wear on the left or right side of car?
 - Condition of rotor/drum, O.E.M. spec? Blued? Cracked?
 - Current fitment of parts?
- Service Bulletins
 - Refer to attached contact list.
 - www.inwoodauto.com offers a few on our website.
- Replace or Service Braking System Components
 - This includes the rotor, the brake drum, calipers, master cylinder and wheel cylinders.
 - Check original equipment (O.E.) minimum thickness
 - Resurfacing is a MUST, if not new part. Best defense against brake noise!
 - Non-directional finish and wash with soap and water.
- Assembly of New / Serviced parts
 - Clean parts. Wire brush oxidation/rust & dirt build-up.
 - Lubricate all contact points. Pad guides, caliper guides, spring ends, pivot points.
 - Install all hardware. New springs, guides, and clips.
- Test Drive & Burnish the New Friction
 - Twenty (20) seconds between each stop.
 - Distance should be twice (2x) as the normal braking distance.
 - Ten (10) stops from twenty-five (25) m.p.h.
 - Five (5) stops from forty (40) m.p.h.
 - Two (2) moderate decelerations from sixty (60) to forty (40) m.p.h.
 - Steps to completed by vehicle owner:
 - Five (5) stops from thirty-five (35) m.p.h.
 - Five (5) gentle decelerations from sixty (60) to zero (0) m.p.h.

Possible Technical Service Bulletin Sources

Acura	800-382-2238, 2
BMW	Contact Dealership
Buick	Contact Dealership
Cadillac	800-333-4CAD
Chevrolet	800-950-2438
Daimler-Chrysler	800-992-1997 or 800-426-6451
Dodge	800-439-7694
Ford Motor Co.	800-392-3673
G.M.C. Truck	800-GMC-TRUCK
Honda	800-999-1009
Hyundai	800-633-5151
Infiniti/Nissan	800-826-6500
Isuzu	Contact Dealership
Jeep	Daimler-Chrysler
Kia	Contact Dealership
Land Rover	Contact Dealership
Lexus	Contact Dealership
Lincoln	800-521-4140
Mazda	Contact Dealership
Mercedes-Benz	800-FOR-MERCEDES
Mercury	800-446-8888
Pontiac	Contact Dealership
Porsche	Contact Dealership
Saab	Contact Dealership
Saturn	Contact Dealership
Subaru	866-428-2278
Toyota	800-331-4331, 3, 3
Volkswagen	800-544-8021 www.vw.ddsLtd.com
Volvo	800-258-6586 www.volvotechinfo.com

All information was taken from various magazines (i.e. Motor Trend, Car & Driver, Automobile).