



Subject: Reading rotor wear patterns and rotor failures

Vehicle Involved: All

Condition: Rotor looks to have “hot spots” on surface, flaking or exhibits pulsation

Background: Majority of rotors are full cast with the same metal on both sides of the rotor. Friction material has changed greatly over the last 15 years in the aftermarket with ceramic brake pads being the leading material for vehicles in US and Canada. Understanding the behavior of these materials can help reduce rotor failures and warranty. Ceramic brake pads lay a transfer material to the rotor surface and use this coating through adhesion to slow the vehicle down. Semi-metallic brake pads use abrasion to slow the vehicle down and wear rotors down quicker. If the brake system has lateral runout through the hub assembly being worn or the hub/brake rotor not being perfectly parallel than the friction material transfer will happen unevenly across the rotor eventually leading to thickness variation (See Figure 1). This can also occur from improper wheel nut torque, piston binding or sticking sliders. The buildup of the transfer film on different sections of the rotor leads to thickness variation which can lead to two outcomes. The first is especially in areas of road salt use (including along the coast of bodies of salt water) can break down that transfer film allowing the moisture to creep behind the transfer layer and brake rotor. This causes it to bubble and eventually flake (See Figure 2 and 3). Typically this occurs on the inboard side of the brake rotor quicker due to lack of airflow with brake backing plates and vehicle aerodynamics. The second outcome from being above minimum specification for lateral runout leading to thickness variation is pedal pulsation. Check your repair procedure for specification on torque, lateral runout and minimum brake rotor thicknesses when installing brake rotors.

Figure 1



Figure 2



Figure 3

