If you don't give me a good brake I will fade away.....

Ever feel your brakes fade? It isn't a fun feeling, especially when you really need them. Last month I talked about the chassis, the basic foundation for a well performing car. What must be next is brakes and suspension. I am going to concentrate on the brakes but believe it or not suspension has almost as much importance in stopping than your brake pads themselves. Even the chassis has a lot to do on how well you stop. In fact if you really think about it almost every aspect of your car has a direct correlation to how well you stop or slow down, even the engine and transmission. Lets stick to the brakes for now, otherwise Mary Jean would have to give me the entire *Mustang Times*, and I don't think that will happen.

Brake fade—what is it, and why does it happen? Organic brake linings are basically composed of glue and a strengthening material. This used to be asbestos; but today different materials are used because asbestos is a health hazard. When the linings get hot, the glue softens and starts to melt and the linings get slick. In this situation the brake pedal feels firm but reduces stopping ability. The other cause is when the brake fluid boils and then the brake feels spongy. This condition is worsened when there are contaminants in the fluid, such as water, which most types of brake fluids are prone to absorbing to varying degrees. For this reason brake fluid replacement should be included in your standard maintenance.

Stock disc brake pads are fine for the average driver. However, the driving enthusiast looking to enhance their car's brake performance has several other choices. Compared to stock brake pads, performance brake pads generate more friction and work in a broader range of temperatures while reducing the possibility of brake fade at higher temperatures. High performance brake pads developed for "sport" and "track" continue to work in an even higher range of temperatures and further reduce the possibility of brake fade.

When it comes to brake convenience and comfort, brake dust, noise and wear become the key items. As standard brake pads wear, brake dust is released as the friction material carbonizes at temperatures found in everyday braking. Road and Sport brake pads are formulated to run cleaner because they resist carbonizing until over 1000° F, so in normal street driving, dust is significantly reduced.

Another popular addition to a high performance brake system are sport disc brake rotors that are dimpled, drilled or grooved to reduce brake fade by helping eliminate gasses from the surface film that are often released during heavy braking. All brake pads contain some organic materials. As these organic materials overheat, they revert to gases that may cause the brake pads to lose some of their contact with the rotor, essentially aquaplaning away from the rotor on a film of gases.

NOTE: Sport disc brake rotors will produce some additional noise. It's not uncommon to hear a whirring noise as the brake pads rub over the dimples, drill holes and grooves while driving. While some noise will remain, its level will become less noticeable as the rotors and pads break in.

Brake system upgrades are a popular performance enhancement. Whether it's to improve the appearance of your vehicle after installing open-spoke wheels to improve stopping ability on the track, or to shorten stopping distance for safety's sake, many brake upgrades result in a larger brake system rotor or caliper, or both. While looking good and filling out the space behind the spokes of your wheels, these larger brake system components pose a challenge to the wheel fitment. Original equipment wheels installed at the factory were not designed with larger brake components in mind, and rarely allow sufficient clearance in diameter and behind the spokes for a performance brake upgrade. The increased diameter of the brake rotor will often dictate using larger diameter wheels, sometimes as much as 2-3-inches larger. Because the caliper is often changed as part of the upgrade, consideration must be given to the size and shape of the new caliper, which will encroach on the space directly behind the spokes or face of the wheel. The combined shape of the new rotor and caliper create a profile, which must be measured and compared to the space behind the wheel to determine if sufficient clearance exists. But it's important to remember that larger wheel diameter alone does not assure clearance around the brake components. It's the combination of diameter and profile, or shape of the wheel itself, that determine how much room is available for larger brake components.

Are calipers with more pistons really better?

A single piston caliper has a limited lining surface area. E.g. If the inner pad on a sliding caliper, overhangs the piston by an excessively large amount, then the pad back plate may bend when high pressure is applied to the brakes. Multi piston calipers allow larger lining surface area without excessive overhanging of the pad. Multi piston calipers can usually be designed to provide greater stiffness, which results in improved pedal feel.

So this is a case were bigger is better, the larger the mass of the rotor, the larger the pads, and the more pistons, equates to better heat dissipation firmer brakes and much less if no fade.

One last note to all early Mustang drivers—remember the special requirements for drum brakes when it rains or you go through a puddle. For those of us who drove back when drums were common, without even thinking we knew to dry off our brakes when coming out of a puddle. What should not be a surprise is that the younger crowd doesn't know about that lost art in drying off your brakes. To people who never drove with front drums, you need to drag your brakes for a few seconds to dry them off after going through a puddle, if not you will find out you don't have brakes when you need them the most. Disc brakes have a constant friction between the pad and the rotor; drums have no contact until you apply the brakes. So before you take your first drive with drum brakes, ask the advice from someone who has driven with drums. It may save your life or someone else's.

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