



PEDAL FADE, PAD FADE AND HEAT

Brake fade can occur in two ways, and both are caused by excessive heat. Pedal fade is the result of the fluid boiling in the calipers. It is characterized by the pedal feel getting spongy and traveling closer to the floor, giving the feel that the brakes need bleeding. Pad fade occurs when the friction between the pad and rotor is lost as a result of the pad temperature exceeding its peak operating temperature. The pedal feel remains firm, but the car is just not slowing down no matter how hard you push on the pedal.

Pedal fade can often be restored simply by flushing the old fluid out of the system and replacing it with new high temperature fluid. Once fluid has boiled, it no longer has the ability to resist boiling or aeration. The damaged fluid must be completely flushed from the system and replaced with new fluid. Old fluid that has gradually increased its moisture content over time will also boil at a much lower temperature than when it was new. Brake bleeding and topping off the reservoirs with fresh fluid should be part of every pre-race maintenance program. For severe duty and endurance events, the system should be completely filled with fresh fluid from an unopened container on race day. This simply decreases the amount of time the fluid is exposed to air and decreases the amount of moisture that will be absorbed by the fluid. If pedal fade reoccurs with new fluid, then a better grade fluid must be used or steps must be taken to isolate the brake pad heat from the fluid in the calipers.

Fixing pad fade can be as simple as backing off the brakes long enough to allow them to cool. However, the cause of the pad fade must be carefully considered. The operating temperature range of the pad should be the first consideration. Correcting the problem may only require installing the next higher heat range pad compound. If the vehicle is already equipped with a high temperature pad, the next consideration must be brake rotor size and cooling.

It is the brake rotor's job to absorb then dissipate the heat caused by applying the brakes and to keep that heat out of the brake pads. The brake rotor must have the proper vane configuration and placement with enough mass, surface area and wall thickness to effectively manage that heat and keep the pads from overheating. In some



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cases, a larger or heavier rotor may be necessary. It may also be necessary to install or increase the cooling duct system to provide additional air flow to the rotor. In any case, the system must be configured to effectively manage the brake heat or the consequential fade problems will continue to occur.

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