

TECH ARTICLE # T015

Warping Disc Rotors

Warping is primarily caused by excessive heat, which softens the metal and allows it to be reshaped. The main causes of overheating are: undersized or over machined brake discs, excessive braking (racing, descending hills/mountains), “riding” the brakes, or a “stuck” brake pad (pad touches disc at all times).

Another potential cause of warping is when the disc is overheated and the vehicle is stopped. When keeping the brakes applied, the area where the pads contact the disc will cause uneven cooling and lead to warping.

Several methods can be used to avoid overheating brake discs. Use of a lower gear when descending steep grades to obtain engine braking will reduce the brake loading.

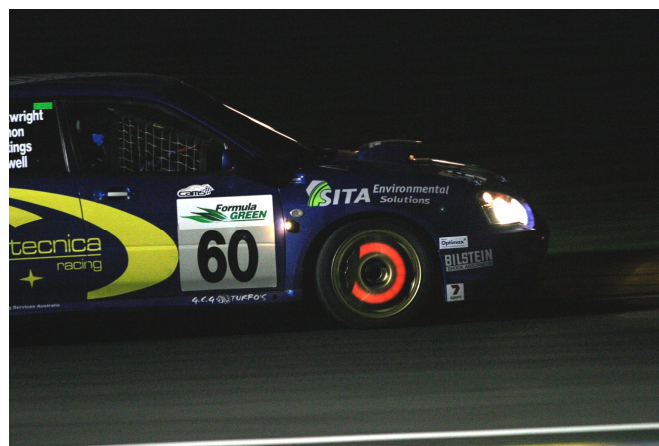
Also, operating the brakes intermittently - braking to slower speed for a brief time then coasting will allow the brake material to cool between applications. Riding the brakes lightly will generate a great amount of heat with little braking effect and should be avoided.

High temperature conditions as found in motor racing can be dealt with by proper pad selection, but at the tradeoff of everyday drivability. Pads that can take high heat usually do best when hot and will have reduced braking force when cold. Also, high heat pads typically have more aggressive compounds and will wear discs down more quickly.

Warping can also be caused by improperly torquing the lug/wheel nuts when putting on a wheel.

Warping will often lead to a thickness variation of the disc (DTV). If it has runout, a thin spot will develop by the repetitive contact of the pad against the high spot as the disc turns. When the thin section of the disc passes under the pads, the pads move together and the brake pedal will drop slightly. When the thicker section of the disc passes between the pads, the pads will move apart and the brake pedal will rise slightly. This change causes pedal pulsation.

The thickness variation can be felt by the driver when it is approximately 0.015mm / 0.0006 inch or greater.



Technical Support
Disc Brakes Australia