

Causes of brake judder

Brake judder has many causes, and it can even be hot or cold. What are some of the causes of brake judder? Juratek provides some good advice on how to diagnose the cause of brake judder, and how to avoid it happening in the first place.

Hot brake judder

Whenever you bring two surfaces into contact, and at least one of them is moving at high speed, the result will be friction. This friction creates heat, which is transmitted to other parts of a car's braking system.

Brake discs are usually made of cast iron, and when they get hot it naturally expands and distort. When they are cool, they return to their original shape. Brake discs are designed to handle this and can operate in temperatures up to around 500°C.

If the brake discs exceed the normal operating temperature "Hot" Brake Judder can sometimes be the consequence.

What causes excessive heat?

The most common cause is abuse. Brakes are designed to withstand high temperatures, and cool down quickly, if you hit them hard several times in quick succession however, this can cause a phenomenon known as 'brake fade', which is when the brakes get so hot they fail to work effectively.

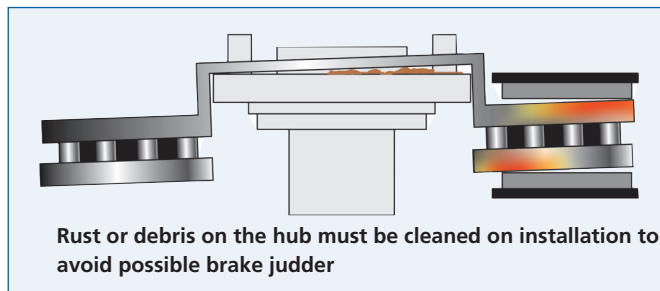
Repeated heavy use of your brakes might also cause the discs to turn blue. Once these marks appear, it means the disc has been permanently damaged and will need to be replaced.

Another cause could be brake caliper binding, causing the brake pad to remain in

Cold brake judder

Incorrect Fitting

Cold brake judder is almost always a direct result of a fitting problem between brake disc and hub. Brake discs and hubs are manufactured to strict tolerances. Any rust, or other debris that can cause fitting issues, needs to be removed prior to installation.



If a disc is installed with excessive levels of radial run out, the consequence is very light continuous contact between the pad and disc at diametrically opposite points on the disc face in the "brakes off" condition.

With increasing mileage, this results in a progressively larger localised variation in the thickness of the disc (DTV – Disc Thickness Variation). When the brakes are applied, this causes a pulsation to be felt through the brake pedal and steering wheel. To ensure this does not occur, follow these steps:

1. Clean the hub of rust or debris.
2. Then check the hub for run-out using a dial gauge.

3. Install the new disc and then check using a dial gauge mounted close to the outer radius of the disc; the installed value of radial run out should not be greater than 100 microns, and ideally not more than 70 microns.

Poor Manufacturing

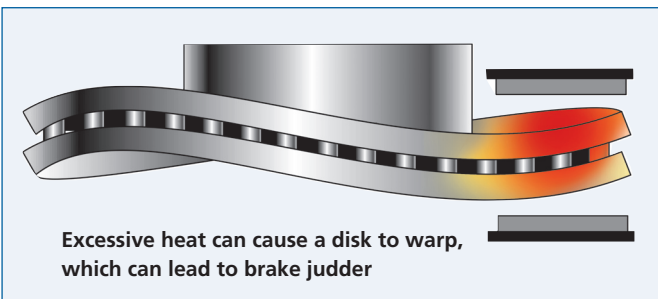
Poorly manufactured brake discs can also cause brake judder. This will be detected immediately on fitting but most reputable brake disc manufacturers are now manufacturing to the strict regulations imposed by UN ECE R90:02, which in part covers the way a disc is manufactured, and the composition of the material used.

Discs are manufactured to the strict geometric tolerances imposed by this regulation. In addition, the non-braking surfaces of discs can be coated with corrosion resistant paint. The braking surface is not coated though, because the coating would act as a lubricant between the brake disc and pad and would impair braking performance.

Quality brake pads are also required to avoid brake judder. The initial bedding in stage of the brake pads is important for a long and trouble free life for the pads. During bedding in, some friction material from the pad is distributed across the face of the brake disc. Too little heat during bedding in keeps the material from transferring evenly to the rotor face. Overheating during bedding in can cause the brakes to generate uneven pad deposits due to the material breaking down and sticking to the disc, causing a Stick/Slip situation. Once this has happened, heavy braking will lead to uneven heat build-up due to the uneven distribution of friction material across the disc, with high-spots heating excessively in comparison to the rest of the disc.

Fitting kits for new pads are also important. They often include bolts, caliper clips and wear leads. As these components corrode or wear over time, they can cause the pads to become loose in the caliper. So, it is essential to change these at the same time as the brake pads.

In summary, the issue of brake judder, which is often blamed on a warped disc, is almost never a fault of the product and in most cases is caused by either excessive heat or poor preparation and fitting.



firm contact with the disc even when not braking. Heat will steadily increase, and can eventually get so hot the brake disc may crack if rapidly cooled.

