

TECH ARTICLE # T004

DTV - Disc Thickness Variation

Disc thickness variation (DTV) is caused by disc-brake pads wearing the brake rotors, at their point of maximum run-out, through continual light rubbing whilst the brakes of the vehicle are not applied, thus wearing two relatively thinner areas of the rotor - one on each rubbing face - at diametrically opposite points.

If sufficient thickness variation is generated - in the region of 10/20 μm the vehicle will judder when the brakes of the vehicle are applied. The precise threshold varies from model to model being dependent upon the general compliance built into the vehicle's braking, suspension and steering systems. The brake judder experienced due to DTV is termed cold judder since it does not depend on the distortions of the brake rotor and/or resin deposition from the face of the rotor during high thermal inputs. The brake pads touch the brake rotor in the off brakes mode due to:

1. Rotor run out
2. Brake calliper design

Rotor Run-out

The installed values of rotor run-out depend upon many factors associated with the design and build quality of the vehicle such as the squareness of the rotor-hub interface, the fastening of the rotor to the hub, the machining accuracy and deflation of the stub axle, the type of wheel bearings that are used etc.

Typical values of installed rotor run-out encountered in passenger cars are shown in the table below.

Type of vehicle	Typical Run-out value
Small family car	100 microns (0.10 mm)
Medium family car	80 microns (0.08 mm)
Luxury car	50 microns (0.05 mm)

When the vehicle is in use the dynamic loading produced when accelerating and cornering can increase the values of run-out dramatically, and values of up to 2mm have been recorded in extreme cases.

Technical Support
Disc Brakes Australia.