

# Excessive wheel flange runout can lead to brake pulsation

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## Technical tip

The components of the front end suspension work together as a team. One weak item in the link can cause problems with other components and with wheel end system performance. The front suspension must work together to provide support for acceleration force, gravitational force, cornering and brake forces to provide smooth and safe operation. The quality of the parts is also important to maintain the functionality of support for related parts.

One of these links in the suspension group is the correlation between the wheel hub or wheel hub assembly and the brake rotor. The hub assembly is often called the nucleus of the wheel end and is very important in providing secure and reliable operation of the vehicle.

A familiar occurrence is the development of brake disc thickness variation (DTV) over time. DTV is caused by uneven wear of the brake rotor around the pad contact faces. The development of this uneven wear is strongly influenced by the runout of the brake rotor, which in turn is primarily defined by the runout of the hub flange face that mounts to the rotor. If the wheel hub unit runout is high, brake rotor DTV happens quickly. Once this variation reaches 20 microns or more brake pulsation or judder occurs when the brakes are applied. Brake pulsation is easily perceived by the vehicle driver and is the primary source of customer dissatisfaction with brake system performance. If not corrected this can lead to reduced brake system performance and can cause excessive pressure on the hub assembly and lead to premature failure. Even if no immediate failure is noticed for the wheel hub assembly or other braking components the wheel flange runout should be checked.

Because the components of the vehicle work together, a poorly manufactured hub assembly could be the cause of the DTV. Rotor runout measurements and wheel flange runout should be checked to insure the quality of both components. See Fig 1 and 2. The rotor runout relies on the interface of the rotor and hub assembly. Typical rotor runout, as measured

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with the rotor mounted on the hub unit, should not exceed 80 microns. Some value line hubs can reach or exceed this limit just on the flange face itself, not considering the contribution to runout that also comes from the rotor. Therefore brake disc runout on assemblies utilizing value line hubs may be up to 5 times the recommended maximum when they are brand new! You may also have to spend additional time indexing the hub and rotor trying to eliminate DTV.

SKF hub assemblies provide the tightest lateral runout in the market to eliminate any concern with DTV. Choosing premium parts provide the safest choice for your vehicle.



*Fig. 1 Rotor runout*



*Fig. 2 Wheel flange runout*

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