Error sources and testing

Workshop checklist for brake judder

	OK	Not OK	Remark
Move the front axle onto the roller dynamometer and build up approximately 1.5 kN of brake pressure. Torque fluctuations should not exceed 0.1 kN per axle side. If the value is higher, there is an error on this side.			
Move the rear axle onto the roller dynamometer and build up approx. 1.0 kN of brake pressure. Torque fluctuations should not exceed 0.1 kN per axle side. If the value is higher, there is an error on this side.			
Press and release the brake pedal 3 times firmly on the lifting platform. Do the wheels turn freely afterwards?			
If the wheels do not turn freely, loosen the relevant bleed valve to determine if there is residual hydraulic pressure.			
Check wheel bearing play (it should not be noticeable).			
Check the condition of the tires (concentricity, heel-and-toe wear, bumps, damage, wear pattern).			
Check suspension play (tie rod ends, control arm and axle beam bearings) on a vibratory plate stand or use an ATE suspension tester. Wiggling by hand or in the lifted position of the vehicle is not always meaningful.			
In the case of front axle drive shafts, check the axial mobility in the gearbox-side mounting.			
Do not make any steering movements on the friction ring of the brake disc!			
The inner contact surfaces of the rims must be absolutely clean and flat. If a centering ring is present, then make sure that it is correctly seated in the rim.			
The outer bearing surfaces of the brake discs for the rims must be absolutely clean, with no rust and grease.			
Visual assessment of the brake disc (rust, scoring, overheating).			
Check brake for clearance when cold and warm.			
Check the ease of movement of the brake pads in the caliper frame or caliper shaft.			
Check the wear pattern of the worn pads (one-sided or diagonal wear of the pads).			
For pistons with a shoulder in the ring surface, the piston position of 20° must be adhered to (ATE brake piston gauges).			
The ring surface of the brake piston (which presses on the brake pad) must be rust-free.			

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	OK	Not OK	Remark
After having been pumped out about 2/3 of the way beforehand, can the brake pistons be pushed back evenly and easily over the entire range with an even amount of force (bleeder nipple open and bleeder bottle attached)?			
Depending on the caliper design, the guide bolts from the caliper must slide effortlessly and evenly over the entire area (check individual bolts by hand) and also when the caliper is assembled without the pads in place. If the caliper holder is distorted, they are not aligned and will tilt during operation.			
Heavily worn-in guideways from the brake caliper holder prevent the brake lining from being released after applying the brakes.			
The rubber guide bushes should be replaced every 80,000 to 100,000 km on ATE fist-type caliper brakes.			
The locating holes of the guide bushes in the caliper housing (ATE fist-type calipers) must be free of corrosion.			
Check the lateral run-out of the brake disc (in assembled condition). A max. of 0.05 mm is permissible, measured at the friction ring 10 mm from the outer circumference inwards.			
Check thickness variation of the brake disc (see page 61). Permissible is max. 0.02 mm (for BMW applies 0.01 mm), measured on the friction ring 10 mm from the outer circumference inwards at 8 evenly distributed points (approx. 45º distance).			
In the case of run-in brake discs, the inner contact surfaces for the wheel hubs must be free from all dirt, grease, deposits and corrosion.			
The wheel hubs must be metallically bright, without rust, deposits and grease. Treat wheel hubs with spray oil only!			
Check lateral run-out of the wheel hub. The determined value should not be greater than 0.01 mm (measured on the largest diameter of the contact surface).			
Check the flatness of the wheel hub with a straight edge ruler.			
Depending on the brake system, when installing the brake caliper on the brake caliper anchor plate, ensure that the installation position of the guide bolt(s) is correct (disc inlet or disc outlet) and that you adhere to the greasing specifications of the manufacturer. Incorrect greases result in the swelling of the rubber materials. No guide bolt used with ATE original guide bushes should be greased.			
After assembly, tighten the wheels according to the vehicle manufacturer´s torque settings and specifications.			
Adhere to the vehicle manufacturer’s brake run-in specifications.			