Wear and damage characteristics on brake cylinders

Component:	**Spring-loaded diaphragm brake cylinder**
Damage pattern:	**Corrosion in the brake cylinder**

Findings:
The picture shows a spring-loaded diaphragm brake cylinder of a disc brake. A striking feature is the misalignment of the piston that protrudes out of the screw-on surface towards the brake calliper. When opened for assessment, the brake cylinder reveals corrosion to the compression spring, piston and housing cover.

Cause:
No drainage hole was opened on this brake cylinder. This means the moisture that enters the cylinder with the inflow of atmospheric air was unable to escape and gave rise to corrosion on the components. The piston shown in the left hand picture is slightly misaligned.

Repercussions:
The slight misalignment of the piston is unproblematic. However, if the misalignment is considerable then the piston rod will press into the gap between the spherical cap and the brake calliper and become jammed the brake would no longer be fully actuated or fully released.
A heavily corroded compression spring can break under load and damage both the diaphragm and the boot.
This would result in moisture penetrating the brake calliper leading to corrosion and associated stiffness with a loss of braking power. Furthermore, the broken fragments of the spring can prevent the return movement of the piston and thereby impair the release of the brake.

Remedial action:
With brake cylinders, it is essential to make sure that the lowest drainage hole is opened. The other holes must remain closed. Brake cylinders are only allowed to be serviced and repaired in an appropriately equipped specialist workshop. For reasons of safety, never open spring-loaded accumulators!

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Information sticker for removing the drain plug

All BPW brake cylinders are equipped with an information sticker

BPW · THE QUALITY FACTOR

Component:	**Spring-loaded diaphragm brake cylinder**
Damage pattern:	**Leakage in the area of the clamping band**

Findings:
This spring-loaded diaphragm brake cylinder is losing air in the area of the clamping band for the service brake section.

Cause:
Diaphragms are wearing parts and subject to an ageing process. After several years of operation, leaks can result in the clamping area of the diaphragm and the clamping band, leading to a gradual pressure loss.

Repercussions:
In spite of the leak, there is no reason to expect sudden total failure of the brake cylinder and therefore of the wheel brake. The air only escapes slowly. The drop in reservoir pressure is made good when the vehicle is driven. If the vehicle is parked up for a long time, however, all the pressure in the service brake system can escape and require re-establishing. The parking brake system will thus remain activated for longer.
If the operating pressure drops whilst the vehicle is being driven, the driver will be made aware of the pressure loss by a warning device. This warning must be respected because a major pressure loss will lead to the trailer brakes being activated automatically. The vehicle must not continue to be driven in this case.

Remedial action:
Defective brake cylinders must be renewed. We recommend using genuine parts.

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Component:	**Brake cylinder**
Damage profile:	**Brake cylinder mounting face torn out due to loose screw connection**

Findings:
The screw fixing studs of the brake cylinder are torn out. Signs of a fatigue fracture can be seen on the fracture surfaces of the brake cylinder.

Causes:
Brake cylinders are able to handle running gear movements and road bumps without damage. In the case of poor road conditions or during off-road use, impacts can be transmitted to the brake cylinder, which can ultimately lead to fatigue fractures in the housing. This process is accelerated in particular if the screw connections on the brake chamber bracket are loose. Defective shock absorbers can also result in extremely high axle accelerations, which can result in the damage profile indicated.

Repercussions:
The movement of the piston rod pushes the brake cylinder away from the brake chamber bracket, instead of controlling the slack adjuster and brake camshaft. This cylinder is no longer able to operate the brake.

Remedial action:
Damaged parts must be renewed. It is recommended that genuine components be used.
When driving on poor road surfaces and off-road, the firm seating of the screw connection, as well as the condition of the brake cylinder and the chamber bracket must be regularly checked.
Vehicle owners and vehicle operators are obliged to comply with the stipulations of the vehicle manufacturer for Off-road use and to have the vehicles regularly maintained and repaired by a specialist workshop.

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