

# 10:02-65

Issue 1 en-GB

# **Checking the brakes**

3
3
4
4
5
9
12
12
13
15

# Wheel

### Tools

Number	Designation	Illustration	Tool board
587 121	wheel hoist trolley		

### Removing the wheel

- 1. Lift and support the vehicle on axle stands.
- 2. Release the parking brake
- 3. Use wheel hoist trolley 587 121 and remove the wheel.

### Fitting the wheel

- 1. Lift the wheel into position using wheel hoist trolley 587 121 and tighten it.
- 2. Tighten the wheel nuts to 650 Nm.
- 3. Apply the parking brake.
- 4. Remove the axle stands and lower the vehicle.



# **Disc brakes**



Work on the brake system may only be carried out by personnel with sufficient training and knowledge for the task. If problems arise, contact your supervisor for assistance.

When working on the brake system, it is important to follow the instructions in order to avoid accidents and injury.

It is also important to use the correct components when carrying out work on the brakes. A brake system which fails due to faulty components can have disastrous consequences on the road.

# Checking the brake pads

## Specifications

Brake disc, thickness	Minimum brake pad lining thickness	
>40 mm	2 mm	
37-40 mm	4 mm	

The brake caliper position indicates the wear of the brake disc and the brake pads.

### Version 1



Check dimension A.

Dimension varies with wear from 75-95 mm. If the dimension is greater than 85 mm (50% wear) the wheel must be removed and the brake linings checked more thoroughly. At 95 mm the brake linings are worn out.

### Version 2



358 290

Check dimension A.

The dimension varies with wear from 115-135 mm. If the dimension is greater than 125 mm (50% wear) the wheel must be removed and the brake linings checked more thoroughly. At 135 mm the brake linings are worn out.

## Checking with the wheel removed

1. Measure the brake pad lining thickness between the brake disc and the brake pad backing plate using a vernier caliper.



- 2. If the brake pads show signs of uneven wear, check the slide functions of the disc brake caliper or whether there is dirt between the pressure plates and the brake pads.
- 3. Measure any wear edge on the disc and add it to the brake pad thickness.



4. Renew the brake pads if you think that they may wear out before the next planned maintenance event.

# Checking the brake discs

### **Specifications**

New brake disc	45 mm
Minimum permissible brake disc thickness	37 mm

### Checking brake disc thickness

- 1. Drive the vehicle until normal operating temperature for the brakes is achieved.
- 2. Use wheel hoist trolley 587 121 and remove the wheel.
- 3. Remove the brake pads



4. A wear edge may have formed on the outer circumference of the disc. Measure on the inside using spacers, e.g. two nuts.

#### Note:

Remember to subtract the thickness of the nuts from the measured value.

5. Renew the brake disc if there is a risk that it will wear down to 37 mm before the next maintenance event.



### Checking brake discs for cracks

Maximum permissible 40 mm length of cracks

Maximum permissible 1.5 mm width of cracks

Check that cracks on the brake disc do not exceed permitted levels. Cracks up to a maximum of 40 mm in length are permitted, provided that they do not reach the edge. If the cracks are wider than 1.5 mm, the disc must be ground or replaced. After grinding, the thickness of the disc must not fall below 40 mm.



### **IMPORTANT!**

Brake discs with a prohibited crack formation must be replaced.



Permissible crack formation



### Prohibited crack formation

# **Drum brakes**



Work on the brake system may only be carried out by personnel with sufficient training and knowledge for the task. If problems arise, contact your supervisor for assistance.

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It is also important to use the correct components when carrying out work on the brakes. A brake system which fails due to faulty components can have disastrous consequences on the road.

# Checking the brake shoes

### **Specifications**

Brake lining	Minimum thickness	
Standard	8 mm	
Oversize	10 mm	

### Checking using wear indicator

The brake slack adjusters are fitted with a wear indicator. When the brake linings are new, the gauge needle points towards the front of the vehicle (1) and when the linings are worn, it points straight down (2).

When the gauge needle is in the "7 o'clock position" ("5 o'clock position" on the other side of the vehicle), brake lining measurement must be carried out via the inspection hatch as described below.



# Checking by measurement via inspection hatch



Secure the wheels of the vehicle using chocks in front of and behind the wheels.

- 1. Release the parking brake.
- 2. Slide the inspection hatch to the side and remove it from the brake shield.

 Measure the thickness of the brake lining between the wear surface and the brake shoe. The thickness must not be below the values specified above. The brake lining has an indicator stripe (A). The general rule is that the brake lining wear must not go below the indicator stripe.



### **IMPORTANT!**

Check the function of the wheel brake if the brake lining thickness differs by more than 3 mm on the same axle.





Measure between the brake lining wear surface and the brake shoe as indicated by the arrows.

# Checking the brake drums

### Tools

Number	Designation	Illustration	Tool board
87 368	puller screw		AM1, D3, B1, AD1
587 121	wheel hoist trolley	AT Tr	



### Removing the brake drum

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Secure the wheels of the vehicle using chocks in front of and behind the wheels.

- 1. Use wheel hoist trolley 587 121 and remove the wheel.
- 2. Wheels with spring brake chambers: Unscrew the release bolt in the spring brake chamber so that the brake drum can be rotated manually.
- 3. Adjust the slack adjuster so that there is maximum clearance between the brake shoes and the brake drum.
- 4. Remove the fixing bolts between the brake drum and hub.



5. Check through the hole in the brake drum whether the puller screw can make contact with the hub flange. If the flange is machined as illustrated, use the procedure on the next page to remove the brake drum.



Machined hub

6. Fit 3 puller screws 87 368 and pull off the brake drum. Use a lifting device on the brake drum.



7. Screw 3 lifting eyes with M12 thread into place instead of puller screws. If the lifting eyes lack thread furthest in, use spacing washers. Tighten the lifting eyes and use a slide hammer to tap off the brake drum.



### Visual check of the brake drum

The considerable heat release generated during braking may cause certain changes in the wear surface of the brake drum. Figure A shows a wear pattern with measurable scratches and minor hard spots due to overheating. A wear pattern featuring measurably deep scratches, a fine meshed network of evenly spread thermal cracks (cracking) such as single minor hard spots, is not justification for replacing the brake drum.

#### **Figure A**



Brake drum with hard spots due to overheating

Figure B shows the same brake drum after an additional 700 instances of normal braking from 70 to 0 km/h with a fully laden vehicle. The figures show that braking without overheating causes the hard spots to partially disappear and that brake drum wear pattern improves.

#### **Figure B**



*The same brake drum after a further 700 instances of braking.* 

Figure C shows a wear pattern with marked crack formation in the hard spots. This must be taken into consideration. Heat tension in the material rapidly deepens crack formation of this kind. The material has been transformed in the hard spots in such a way that it has lost its strength and become distended. A hard spot forms a bump in the wear surface of the brake drum. During braking, there is considerable overload on the hard spots in the brake drum; these overheat, and the resulting shrinkage stresses generate rapid crack growth.

#### **Figure C**



Figure D shows brake drum wear surface after an additional 700 normal braking instances. Crack formation is now so deep that there is considerable risk of the drum breaking.

#### **Figure D**



When assessing if the brake drums should be renewed, see the following examples.

Figure E Borderline case. This brake drum may be acceptable after grinding.

#### **Figure E**



Figures F and G Replace and scrap brake drums like these. Do not lathe or grind.

#### **Figure G**



Worn or oval brake drums and drums with hard spots that do not have marked crack formation may undergo lathing or grinding.

### Figure F



### Fitting the brake drum

- 1. Fit the brake drum.
- 2. Screw the brake drum to the hub and tighten the screws to 15 Nm.
- 3. Fit the wheel.
- 4. Tighten the wheel nuts to 650 Nm.
- 5. Set the brake slack adjuster.