

Braking Systems



Brake pad fault assessment



Diag & Fit **valeoscope**



Brake pad fault assessment

Valeo catalogues for commercial vehicles

Multi-product catalogues for:



Ford Transit
Ref: 996000



Mercedes Sprinter
Ref: 996001



Renault Traffic
Ref: 996002



Iveco Daily
Ref: 996003



Volkswagen Transporter
Ref: 996004



LCV brake pads quickfinder
Ref: 996005



Heavy-duty optiPACK pads and discs catalogue
Ref: 958300



Heavy-duty brake linings catalogue
Ref: 958400



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*see at the end of the document



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Brake pad fault assessment



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Valeo Techassist can assist you all the way through the following service processes:





- Product information: product data sheets with details not included in the catalogue.
- Common failures: step-by-step failure diagnosis guides.
- Updates about Valeo Service products: access to all Technical Service Bulletins.
- Help through FAQs and the Valeo Service technical hotline.
- Valeo workshop tools: user manuals, service manuals and software updates on Valeo Service tools.
- Online training modules (e-learning) about most modern product technologies.
- Interactive feedback:
 - add your personal feedback to Valeo Service and contribute to future documents.
 - provide satisfaction feedback.

Valeo TechAssist is a web based application, specifically developed for repair workshops, automotive spare parts distributors and technical trainers.

Valeo TechAssist is available online in 10 languages. Logon to the website at www.valeo-techassist.com.

Valeo TechAssist is not only a technical database, but also a learning platform and a forum of information. It covers passenger cars and all Valeo product lines.

The information in Valeo TechAssist is structured in four comprehensive domains:

-  1. Product documentation
-  2. Technical assistance
-  3. Workshop tools
-  4. Technical training



#01



Friction material has cracks, rusty look and/or white edges

OVERHEATING - DENATURING

Cause

- › Excessive temperature due to intense use of brakes
- › High thermal stress due to caliper and/or disc issues
- › Overloaded vehicle
- › EBS* malfunction

Effect

- › Burnt friction material becomes brittle and cracks
- › Very poor brake performance
- › Abnormal and premature wear
- › Detachment of friction material can occur

Corrective actions

- › Investigate causes of overheating (calipers, discs, EBS* and driving - loading factors)
- › Brake pads must be replaced
- › Brake caliper and discs must be checked

*see at the end of the document

#02



Uneven wear-lip groove on inner and/or outer radius

UNEVEN WEAR - DISC LIPS

Cause

- › New brake pads are fitted on excessively worn brake disc (wear lip)
Brake pads are forced to be adapted to disc's irregularities

Effect

- › Decreased braking performance
- › Noise (squealing) & judder while braking
- › Overheating and premature wear of brake pads
- › Detachment of friction material due to shearing force

Corrective actions

- › Brake pads must be replaced
- › Brake discs must be replaced or machined (if within limits)



Thickness difference between inner & outer Caliper's pad

UNEVEN WEAR - WITHIN A CALIPER

Cause

- › Caliper's carrier/slide is stuck
- › Caliper's pistons are stuck
- › Caliper is not able to return to the rest position

Effect

- › Braking imbalance of the related axle
- › Overheating and premature wear of brake pads
- › Decreased braking performance

Corrective actions

- › Brake pads must be replaced
- › Brake calipers must be checked and/or replaced



Thickness difference between calipers of the same axle

UNEVEN WEAR - WITHIN AN AXLE

Cause

- › One caliper is stuck (pistons and/or carrier/slide)
- › One caliper is not able to return to the rest position
- › Brake chamber's malfunction
- › EBS* malfunction

Effect

- › Vehicle imbalance (directional axle)
- › Overheating and premature wear of brake pads
- › Decreased braking performance

Corrective actions

- › Brake pads must be replaced
- › Brake calipers must be checked and/or replaced
- › Brake chambers must be checked and/or replaced

*see at the end of the document



#05



Angular wear on the same brake pad (x, y or x & y axis)

UNEVEN WEAR - TAPERED PADS

Cause

- › Caliper distortion or unaligned pistons
- › Caliper's carrier/slide is sticking
- › Caliper's clearance is excessive
- › Caliper's pads seats are damaged and/or dirty

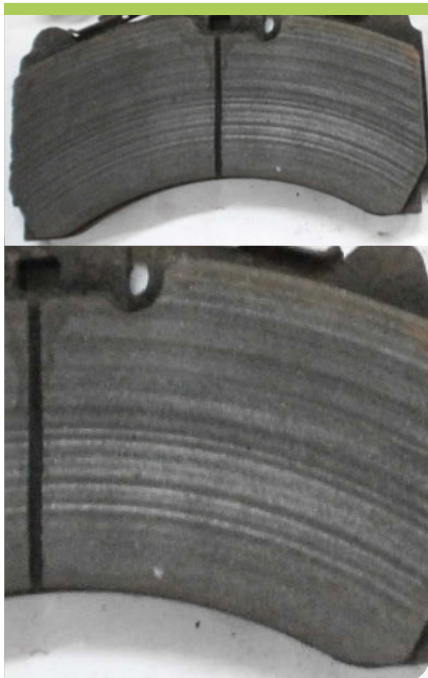
Effect

- › Noise (squealing) while braking
- › Overheating and premature wear of brake pads
- › Uneven braking pressure

Corrective actions

- › Brake pads must be replaced
- › Brake calipers must be checked and/or replaced

#06



Uneven wear / grooves pattern on the brake pad

UNEVEN WEAR - DISC IRREGULARITIES

Cause

- › Disc irregularities (grooves) due to excessive wear

Effect

- › Decreased braking performance
- › Noise (squealing) & judder while braking
- › Incomplete contact between brake pad and disc
- › Overheating and premature wear of brake pads

Corrective actions

- › Brake pads must be replaced
- › Brake discs must be machined (if within limits) or replaced



Partial or full separation due to high thermal stress

DETACHMENT - THERMAL

Cause

- › Intense and/or aggressive use of brakes
- › Excessive vehicle load (overloaded truck)
- › Brake disc and/or caliper malfunction
- › EBS* malfunction

Effect

- › Poor braking performance
- › Noise while braking
- › Brake pad completely damaged

Corrective actions

- › Brake pads must be replaced
- › Brake discs and calipers must be checked
- › EBS*/ABS* must be checked

*see at the end of the document



Partial or full separation due to mechanical reasons

DETACHMENT - MECHANICAL

Cause

- › Uneven wear of brake disc (lip groove)
- › Incorrect fitting could be brake pad clips (tilted installation)
- › Distorted caliper or even wrong caliper application
- › Excessive wobbling inside the caliper

Effect

- › Decreased or incomplete braking performance
- › Noise while braking
- › Brake pad completely damaged

Corrective actions

- › Brake pads must be replaced
- › Brake disc must be checked and/or replaced
- › Caliper must be checked



#09



Localized crumbling of the friction material

EDGE CRUMBLING / BREAK-OFFS

Cause

- › Thermal stress due to sticking caliper
- › Mechanical stress due to bad disc condition (lips)

Effect

- › Even though break off does not pose any safety risk it is recommended to replace brake pads in order to avoid further damage

Corrective actions

- › Brake discs and calipers must be checked & repaired
- › Brake pads replacement is recommended

#10



Small cracks on the friction surface

SURFACE CRACKING

Cause

- › High thermal stress due to sticking caliper
- › High thermal stress due to intense use of brakes

Effect

- › Even though surface cracks do not pose any safety risk it is recommended to replace brake pads in order to avoid further damage

Corrective actions

- › Investigate causes of thermal stress development
- › Brake pads replacement is recommended



#11



Damage on brake pad's seats and friction material

BRAKE PAD WOBBLING

Cause

- › Excessive wobbling inside the housing
- › Damaged / worn calipers' pad seats

Effect

- › Overheating of friction material
- › Noise while braking
- › Premature and tapered wear
- › Detachment of friction material

Corrective actions

- › Brake pads must be replaced
- › Brake calipers must be checked and replaced

#12



Damaged brake pads due to incorrect fitting or application

INCORRECT FITTING

Cause

- › Incorrect fitting (tilted installation)
- › Incorrect or incomplete use of installation accessories
- › Wrong vehicle / caliper application

Effect

- › Brake pad damage
- › Overheating and premature wear
- › Decreased or incomplete braking performance
- › Noise while braking or driving

Corrective actions

- › Brake pads must be replaced according to manufacturer's instructions (fitting diagram, correct brake pad reference)
- › Brake calipers and discs must be checked



#13



Brake pad's friction surface is glazed

SURFACE GLAZING

Cause

- › High periodic overheating for short time periods
- › Over-use of brakes during the initial bedding-in period

Effect

- › Short reduction of braking performance
- › Noise (squealing) & judder while braking

Corrective actions

- › If surface glazing is light, no action is required
- › If surface glazing is heavy, brake pads must be replaced and discs must be checked

#14



Friction surface is contaminated with oil, grease etc.

SURFACE CONTAMINATION

Cause

- › External factors
- › Leakage of collateral parts
- › Contamination during brakes maintenance

Effect

- › Vehicle pulls to one side while braking
- › Decreased braking performance

Corrective actions

- › Investigate contamination cause
- › Brake pads must be replaced



#15



Excessive corrosion inside the brake chamber

BRAKE CHAMBER - CORROSION

Cause

- › Moisture cannot escape from the chamber
- › Torn or damaged rod rubber cover
- › Considerable misalignment of piston's rod

Effect

- › Brake chamber can become no longer functional
- › Possible breakdown of compression spring under load
- › Decreased movement and return ability
- › Brake pad overheating and premature wear

Corrective actions

- › Brake chamber must be replaced
- › Brake pads and discs must be checked and replaced if necessary

#16



Air leakage in the area of diaphragm or clamping band

BRAKE CHAMBER LEAKAGE

Cause

- › Aged or highly worn rubber diaphragm
- › Faulty or rusty clamping band

Effect

- › Possible decrease of braking performance
- › In case of parking chambers, air leakage can cause increased pad overheating and consequently high wear

Corrective actions

- › Brake chamber must be serviced or replaced
- › Brake pads and discs of parking section must be checked and replaced if necessary



Adjusting and clamping mechanisms corrosion

BRAKE CALIPER - CORROSION

Cause

- › Defective cylinder boots allow moisture and particle penetration
- › The vehicle has been used on severe environment conditions

Effect

- › Contamination / rust inside the caliper's mechanism
- › Cylinder mount and spherical cup affected
- › Caliper's movement ability severely restricted
- › Brake pad overheating and premature wear

Corrective actions

- › Brake pads must be replaced
- › Brake calipers must be repaired or replaced



Caliper's guide pins & bushings require maintenance

BRAKE CALIPER - INCORRECT SPECIFICATION

Cause

- › Guide pins & bushings are parts that show normal wear after a period and require maintenance. If a caliper has off specification guide clearance, brake troubles will appear

Effect

- › Unbalanced braking & noise
- › Brake pad overheating and premature wear
- › Tapered brake pads
- › Caliper distortion

Corrective actions

- › Brake calipers must be repaired
- › Brake pads must be replaced
- › Brake disc must be checked



#19



Extreme brake wear due to off-road use

BRAKE CALIPER - OFF-ROAD USE

Cause

- › Driving on gravel / muddy roads can cause dirt/ mud cover, penetration inside the caliper and blocked discs

Effect

- › Brake disc's ventilation cavities blocking
- › Caliper's pistons sticking & corrosion
- › Caliper's carrier/slide sticking & corrosion
- › Brake pad overheating and premature wear
- › Decreased braking performance & noise

Corrective actions

- › Detailed cleaning of caliper & disc
- › Caliper must be repaired or replaced if necessary
- › Brake disc must be checked or replaced if necessary
- › Brake pads must be replaced

#20



Pistons' rubber boots and other sealings are scorched

BRAKE CALIPER - OVERHEATED BOOTS

Cause

- Thermal overloading of brakes due to:
- › Overloaded truck and/or aggressive driving style
 - › Incorrect matching between tractor and trailer
 - › Faulty brake caliper or other associated parts

Effect

- › Moisture / particles penetration inside the mechanism
- › Braking power is gradually decreased
- › Caliper's movement ability is severely restricted
- › Level of brake pad's wear is highly increased

Corrective actions

- › Brake pads must be replaced
- › Brake calipers must be repaired or replaced
- › Brake pads must be replaced



Brake pads are dimensionally modified (grinded)

BRAKE PADS' MODIFICATIONS

Cause

- › Wrong application (caliper - brake pads)
- › Distorted brake caliper
- › Dirt deposits on caliper's carrier
- › Service garage modifications for other reasons

Effect

- › Brake pad damage
- › Overheating and premature wear
- › Premature and abnormal wear
- › Decreased braking performance and noise
- › Brake pad wobbling

Corrective actions

- › Brake pads must be replaced
- › Caliper's application must be checked
- › Caliper's condition must be checked & repaired



EBS* / ABS* malfunctions

EBS* / ABS*

EBS* / ABS* must be periodically checked for correct function. Being an electronically controlled system it has complexity and cabling weaknesses.

EBS* / ABS* is prone to wear over time and react to climate changes. The corrections that EBS* / ABS* carries out are unnoticeable by a driver thus its function monitoring is crucial. A malfunctional or unbalanced EBS* can cause serious problems to any vehicle's brakes. Friction material's overheating and premature wear are the most common effects of EBS* / ABS* problems.

EBS* / ABS* compatibility (versions) between tractor & trailer must always be checked.

*see at the end of the document



Brake pad fault assessment



This document is provided to Valeo clients in an effort to raise awareness of possible problems with brake pads and their relevant mechanisms and to help educate them to recognise and diagnose problems early and take the necessary reparative actions. This presentation is strictly indicative and should not be construed as an assumption of any kind of liability for the use of Valeo products. All brake components must always be serviced in accordance with the official information included in the relevant workshop manual. Maintenance must be carried out in specialized workshops by skilled personnel. Brake damages can occur by aggressive driving style, intense use of brakes, retarder malfunction or non-use, vehicle overloading and harsh initial brake use (no bedding-in period). Brake issues can also occur by incorrect matching between tractor and trailer and consequently inappropriate compatibility between ABS*/ EBS*.

All Valeo brake pads must be checked prior to the mounting in the relevant Valeo braking catalogue

About EBS & ABS systems

*EBS: Electronic Braking Systems

Electronic activation of the EBS* braking components reduces response and build-up times in brake cylinders. This in turn reduces braking distance by several meters, which can be decisive in some situations. The integrated ABS function ensures driving stability and steerability throughout the braking procedure.

*ABS: Anti-Lock Braking Systems

ABS are used to prevent locking of a vehicle's wheels as a result of excessive actuation of service braking system, especially on slippery roads.

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Valeo Service
70, rue Pleyel
93285 Saint-Denis Cedex - France
Tel. : (+33) 1 49 45 32 32
www.valeoservice.com

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