

FREMAX



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The replacement of products concerning the braking system requires an expert level of technical knowledge. for the sake of safety, only an expert may carry out diagnostic work on and the repair of these products.

INTRODUCTION

Brakes and safety goes hand in hand!

With this presentation we hope to give you a better understanding of:

- *Fremax brand and the company behind;*
- *Possible damages of the braking system and their root causes;*
- *How we can minimize the chance to damages and therewith unsafe situations;*
- *Why choosing the correct and high quality brake parts is so important.*

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FREMAX BRAND & THE COMPANY BEHIND

*Fremax has been known for **manufacturing** premium quality brake discs and drums for **over 30 years**. These products meet the needs of the most demanding automotive markets worldwide.*

*Over **5 million discs and brake drums per year** are manufactured in the **25.000 m2 plant**, located in Joinville, Santa Catarina State, south of Brazil.*

*All products are developed in compliance with the original design of car makers. Nowadays, the product portfolio is made up of over **1.800 part numbers for 70.000 different applications**.*

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FREMAX BRAND & THE COMPANY BEHIND

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Agile, modern and secure logistics.

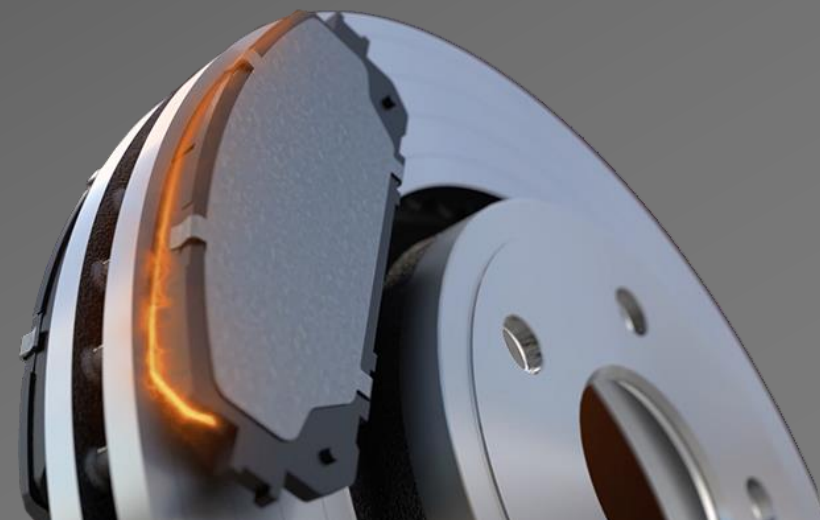
*The plant in **Brazil**, and the distribution centers in **Argentina and the Netherlands** are located strategically near the main harbors, airports and railways in the regions. Fremax ensures **fast delivery of its products to all continents.***



TIPS FOR A GOOD BRAKING PERFORMANCE

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- *The brake fluid and brakes hoses have been checked regularly;*
- *The wheel hubs are clean and with a flat surface;*
- *The bolts can move freely, and must be renewed if necessary;*
- *Springs and other elements are new;*
- *There is no dirt or corrosion on the pistons;*
- *The dust cover is undamaged;*
- *There is no excessive oil (dust collector);*
- *The wheel rims are properly attached;*
- *The torque is correct;*
- *Maintenance work was carried out when it was due;*
- *One's driving style is suitable for the vehicle.*



TIPS FOR A GOOD BRAKING PERFORMANCE

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A brake disc is in good condition when:

- *It has the right thickness (see next sheet for a handy tool!);*
- *The disc is flat - Watch our video here!*

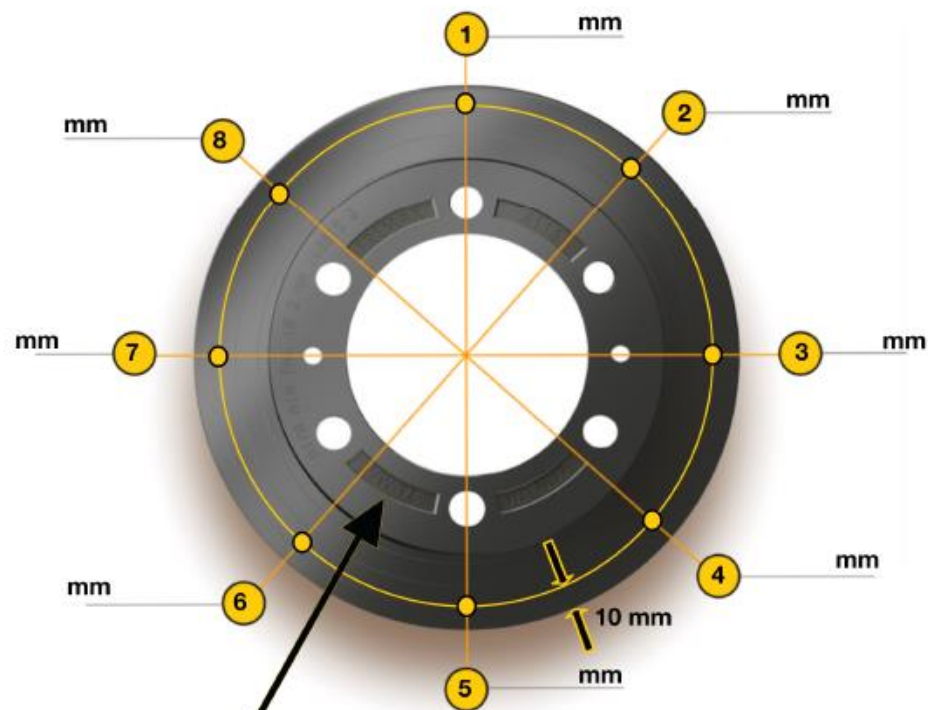
<https://www.youtube.com/watch?v=nFDzLwgF9PY&t=11s>

- *It transfers heat perfectly;*
- *It has no signs of corrosion;*
- *There is no vibration or noise.*

Go for maximum safety!

MEASURING DISC THICKNESS VARIANCE

Measuring Disc Thickness Variance (DTV)



Tool= micrometer screw.
Measure eight evenly spaced radial locations
on the disc 10 mm from the outer diameter.

Calculating DTV	
Max value	mm
- min value	mm
= DTV	mm
Max 0.015 mm allowed	mm

Also check minimum thickness. You'll find
the values on the disc or in our catalogue

Corroded, cracked or worn disc; change in pairs

TIPS FOR A GOOD BRAKING PERFORMANCE

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A new brake pad:

- Does not have any changes in colour;
- Moves smoothly;
- Does not have rough grooves on its surface.

If the caliper is new:

- There is no dirt or corrosion;
- Pistons move smoothly;
- All attached parts are in good condition.

A new brake disc:

- Does not have any rough grooves;
- Has a smooth (even) surface;
- Does not have any significant changes in colour;
- Does not have any blue stains (shaking/vibration).



TIPS FOR A GOOD BRAKING PERFORMANCE

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Clean attachments and new parts will:

- *Prevent failures in the braking system;*
- *Guarantee silent braking;*
- *Extend the life span of brake discs and pads.*

Attachment parts play a very important role. Always use...

- *New screws;*
- *New springs;*
- *New warning cables*

...in order to be able to guarantee long-term working order for all parts.



TIPS FOR A GOOD BRAKING PERFORMANCE

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Always use new spare parts!

Before using any spare parts, clean the cylinder and brake pads.

Repairs will be successful only if the entire braking system has been properly cleaned.

*Note that Fremax brake discs are **READY TO GO!***

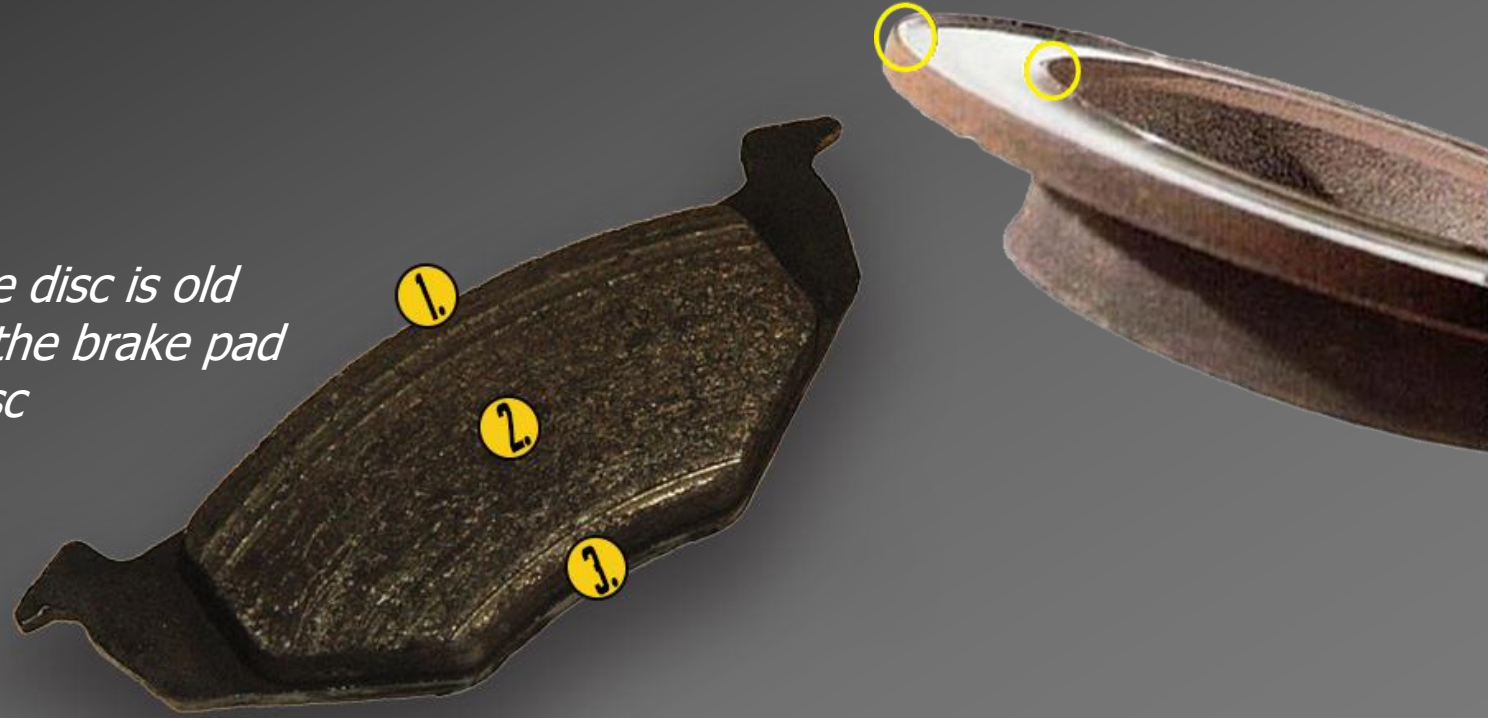
This means that wash up is not necessary before assembling a Fremax brake disc because after the first time braking, the protection will disappear!



GETTING TO KNOW YOUR BRAKE PADS

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1. The edge may be worn out, only if the disc is old
2. Noise is caused by foreign matter on the brake pad
3. Beveling is caused by an old brake disc



Possible consequences:
difficulties in braking such as a squeaky noise, vibrations,
partial overheating, and smoke being emitted.

GETTING TO KNOW YOUR BRAKE PADS

The advantages of good mounted brake pads:

- *Long life span;*
- *Good braking performance;*
- *Good heat distribution;*
- ***Maximum safety!***

***Watch our video for tips and instructions on
How to mount brake pads correctly:***

<https://www.youtube.com/watch?v=u7nljLX2bxY&t=6s>

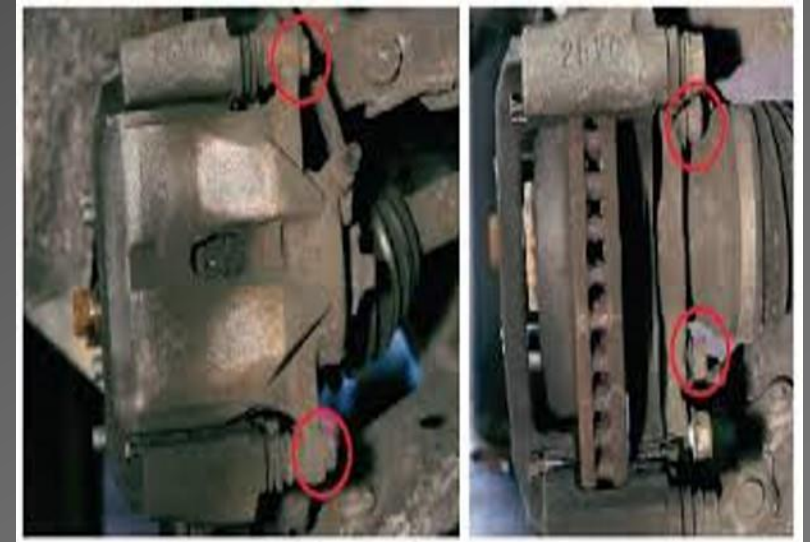


OVERHEATING

Overheating on the brakes is indicated by the following:

- *Bad condition of the brake pad's edge or the disc material;*
- *Corrosion on the edges of the brake pad;*
- *Excessive dirt on or stiffness in the guide bolts;*
- *Stiffness in the pistons;*
- *Bad quality of the brake hoses;*
- *Low level of brake fluid.*

Cause: *a long ride downhill with constant braking or an extreme driving style.*



OVERHEATING

1. Temporary overheating of the brake pads (~ 570 °C)

- The colour of the brake pad near the friction surface has changed;
- This may be caused by a failure of the caliper;
- Or / and an overload caused by an extreme driving style or a long ride downhill without using engine braking.

The brake pad can still be used.

2. Constant overheating of the brake pad (~ 700 °C)

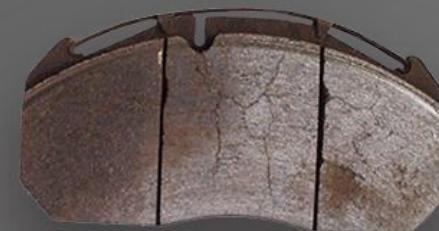
- The colour of the brake pad on the friction surface has changed;
- This may be caused by the same causes as mentioned above (nr. 1).

The brake pad can still be used, but it may be noisy.

3. A burnt brake pad (~ 900 °C)

- The brake pad has a burnt appearance;
- This may be caused by the same causes as mentioned above (nr. 1).

Brake pads and discs must be replaced immediately!



VIBRATION



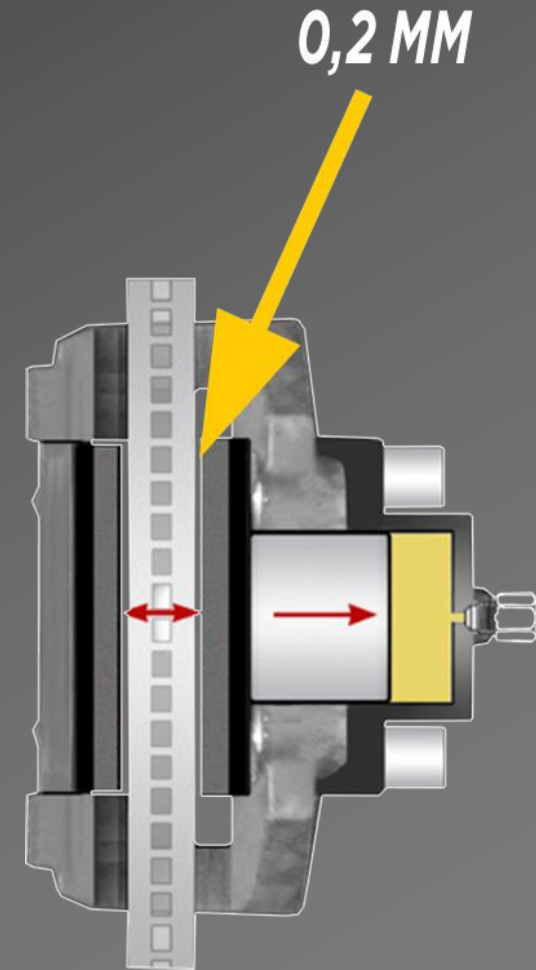
A brake vibration is caused by constant contact between the brake pads and the disc due to the following reasons:

- *The casing is too stiff;*
- *The pistons or brake pads are getting stuck;*
- *The guide bolts are dirty or corroded;*
- *The brake pedal kit is incorrect or the driver constantly places gentle pressure on the brake pedal;*
- *Bad brake fluid and hoses.*

VIBRATION

The best performance is guaranteed if:

- *There is enough room between the brake pads and the disc;*
- *Distance between disc and pad must be 0,2 mm (see illustration);*
- *Parts move smoothly in the casing;*
- *The pistons move smoothly;*
- *The brake pads move smoothly;*
- *The guide bolts are new and clean;*
- *The brake pedal is released.*

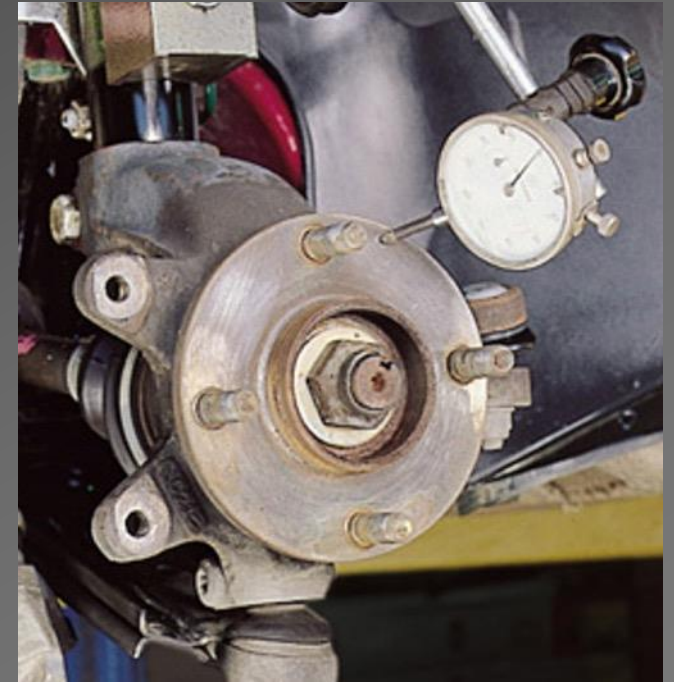


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DISTORTION

If the wheel hubs and / or brake discs are distorted or out of balance, this may result in the following:

- *Bending of the brake discs;*
- *Brake vibration;*
- *A strain on one side of the brake disc;*
- *The unequal distribution of heat;*
- *Quicker wear on the ball couplings;*
- *Quicker wear on the wheel bearings. This effect will manifest itself sooner or later, depending on the extent of any distortion;*
- *A slight distortion after a few kilometers of driving;*
- *Immediate severe distortion.*

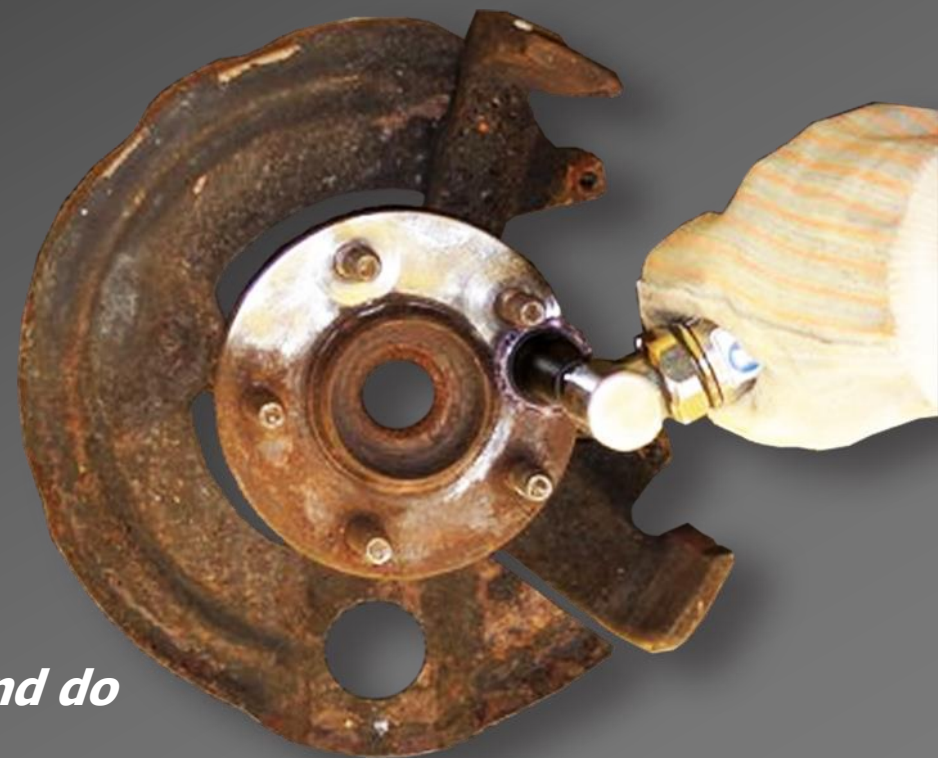


DISTORTION

A clean wheel hub without any distortion will:

- *Prevent any bending in the brake discs;*
- *Prevent any vibration in the brakes;*
- *Guarantee uniform wear across the brake discs;*
- *Guarantee the uniform distribution of heat;*
- *Keep the ball couplings in good order;*
- *Prevent excessive strain on the wheel bearings;*
- *Ensure that the bolts do not run loose.*

The springs on our products are made of stainless steel and do not really need lubricating.



DISTORTION

*In the image we can see copper grease on the wheel hub.
This is unnecessary and dangerous!*

Clean wheel hubs ensure that the bolts do not run loose.

Not cleaning the wheel hub properly could lead in the onset of pedal pulsation and steering wheel oscillation, which occurs when the brake disc rotates along the brake pads and calipers.



WORN OUT BRAKE DISCS & PADS

*In the first image, we can see a **worn out brake disc**. In this case, **do not try to use any new brake pads**. Such use of brake pads will result in the following consequences:*

- The temperature of the brake pad and the disc is higher;*
- Wear is quicker to appear;*
- Braking performance is reduced;*
- The brake pad requires a longer run-in period;*
- The disc may become cracked;*
- Noise.*

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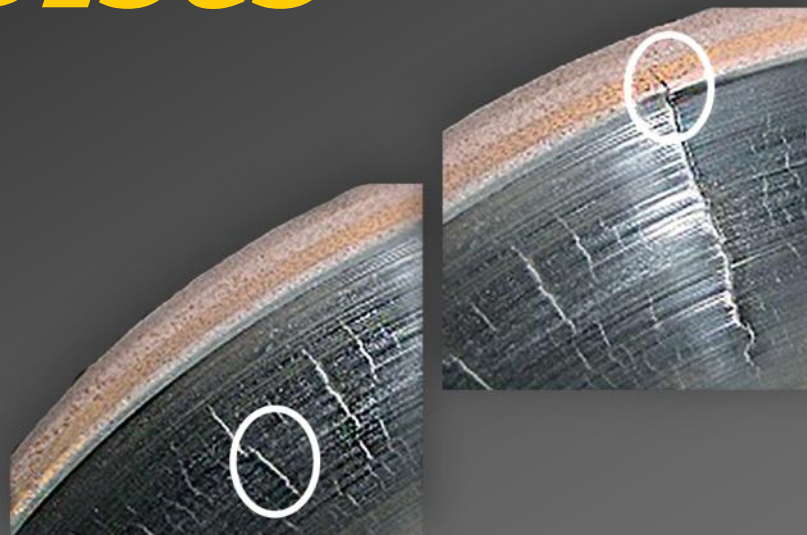
TORN BRAKE DISCS

Large cracks cause the following:

- *The brake disc may shatter;*
- *Very fast wear on the brake pads;*
- *Excessive noise.*

Replace the disc immediately!

*In the case of torn brake discs, it is important to check the prevalence of **brake pistons and brake calipers** if the cracks can be the result of overheating.*

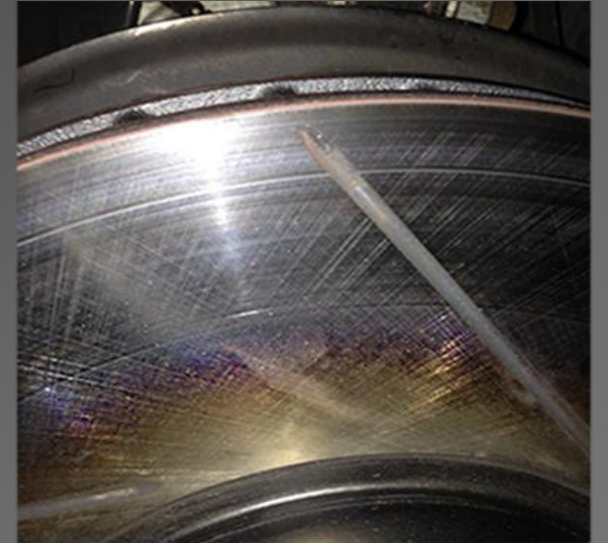


BLUING BRAKE DISCS

*In normal circumstances, a brake disc should be silvery or gray. Excessive temperatures can cause **bluing of the disc**. When blue, **inspect the complete brake system and analyze the driving style of the driver** to avoid the same problem in future.*

What can be the reason?

- *The brake pads are getting stuck;*
- *Bad fluid and hoses;*
- *The guides are corroded or dirty;*
- *The pistons in the brake caliper are stiff;*
- *Some parts (such as the springs) are worn out;*
- *The driver has an extreme driving style;*
- *The vehicle is overloaded;*
- *The driver's foot is lightly depressing the brake pedal;*
- *Driving downhill without using engine braking.*



CORROSION

Corrosion on the brake disc may be caused by the following:

- *If a car is often left for long periods and is not braked very hard;*
- *The vehicle is being used only for driving short distances;*
- *Exposure to salt and humidity;*
- *Brake caliper pistons are corroded;*
- *The piston is stuck in the brake caliper;*
- *Pressure control equipment is not in working order (on the rear axle).*

If only one side of the disc is affected then check **guide needles**, **guide bolts**, or **intermediate components**.



CORROSION

How to prevent corrosion on Brake Discs:

- *Use brakes after regular intervals;*
- *Replace worn out brake calipers;*
- *Repair or replace worn out guide elements;*
- *Replace worn out pressure control equipment;*
- *Drive longer distances after washing your vehicle;*
- *Don't use aggressive cleaning products;*

Don't use brake cleaner on new Fremax brake discs because they are READY TO GO!

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CORROSION

Dirty and corroded caliper attachments cause the following:

- *Overheating of the brakes;*
- *A quicker level of wear in the brake pads;*
- *A squeaky noise when using the brakes;*
- *A build-up of dirt on the wheel rims;*
- *Difficulties in removing or installing brake pads;*
- *Vibration in the braking system.*



BRAKE HOSES

*Small cracks in the brake hose will result in **humidity build-up**. This will lead to a boiling point of the fluid which is as low as it can possibly get, and this will result in **internal corrosion**.*

*Swollen brake hoses may contain pressure and will prevent the proper functioning of the brakes. It is very important to **check the brake hoses every time the brakes undergo maintenance work**;*

If the brake hoses are not checked on a regular basis, wheel cylinders, calipers, ABS, and other hydraulic parts may not function correctly.

Internal damage of the brake hoses** causes a delay in the backflow of the brake fluid. This keeps the brake pads pressed against the brake discs for too long. **The disc becomes hot for too long.



BRAKE HOSES

The new Fremax brake hoses stand out for the following reasons:

- *Very little fluid accumulation;*
- *All metal parts are galvanized;*
- *Low expansion levels which determines the pressure point of the brake pedal;*
- *No use of recycled rubber;*
- *They meet all the requirements for modern vehicles.*

Brake hoses are provided with markings - If you bend the hose from one end to the other and the marking is not visible, then the hose is properly attached.



Let's summarize...

*First of all, never forget that **SAFETY & BRAKES GO HAND IN HAND!***

Identify problems and eliminate them. Then install new brake discs and pads.

REMEMBER:

- *Brake pads must move smoothly;*
- *Always use new spare parts;*
- *Guides must be clean;*
- *Pistons must move smoothly in the brake caliper;*
- *Learn about and improve your driving style;*
- *Only use the braking pedal when needed;*
- *Do not overload the vehicle;*
- *Use engine braking when driving downhill.*



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FREMAX FEATURES

CARBON+

High carbon content alloy ensures better braking performance, improves safety and lifetime for brakes.

READY TO GO

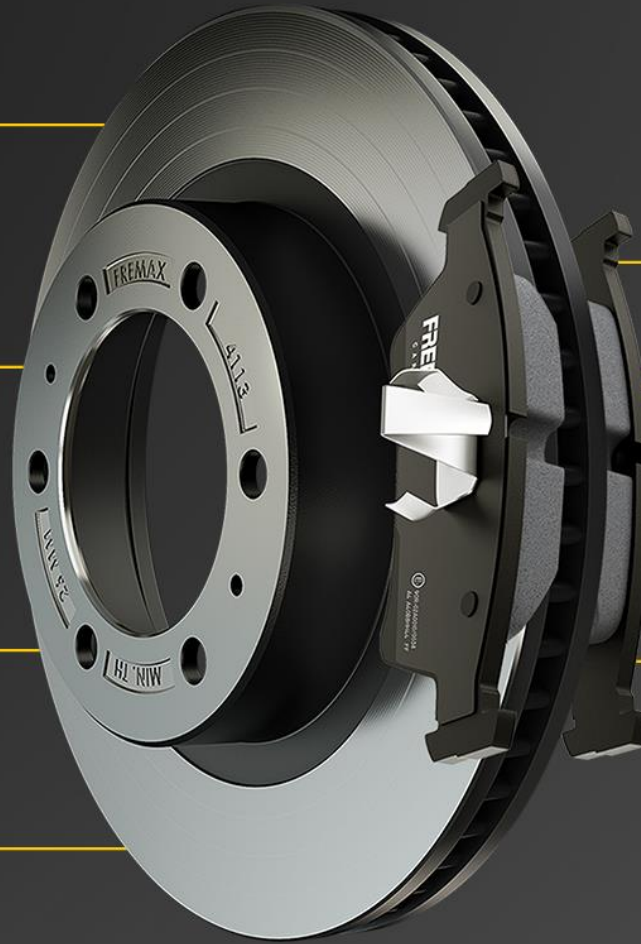
From the box to the car. Wash up not necessary before assembling the part. Special protective oil will not contaminate brake pads, making maintenance easier and faster.

PAINTED CS10

Anticorrosive paint coating on the hat conserves esthetic qualities.

STOP AND GO!

Special finish with concentric grooves allows easy and fast bedding of the brake pads, and excellent friction rate from the beginning.



POSITIVE MOLDING
PRODUCED ACCORDING TO OE HIGH STANDARDS

**ASBESTOS AND
COPPER FREE**

**PREMIUM SHIM
AND PRECISION CUT BACKING PLATES**

SCORCHING

FREMAX

FREMAX FEATURES



*Original equipment manufacturer
for car makers.*



ISO 9001

Fremax brake discs and drums are manufactured according to standard ISO 9001. This certification ensures uniform quality of all products, and safety in the assembly.

ISO TS 16949

Fremax meets all quality requirements in the production of brake discs and drums for worldwide automakers. ISO TS 16949 certification attests: Fremax is the right choice for major automakers.

ECE R90 II

Fremax brake discs and drums efficiency and long life have been approved by the European regulations and have been granted one of the worlds most important certifications. ECE R90 II

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FREMAX FEATURES

***INNOVATIVE
PACKAGING:***



***INNOVATIVE
OPENING SYSTEM***

Easy to open, easy to close.

***ENVIRONMENT-
FRIENDLY***

Made of 100% recyclable material.



FREMAX

FREMAX FEATURES

FREMAX

PERFECT match to
OE Design

OPTIMAL thermal
conductivity

HELP TO PREVENT
brake judder

AVOID BRAKING NOISE
due to better damping
coefficient

HIGHER RESISTANCE
to distortion and
thermal cracking

IMPROVE BRAKING
safety and
performance

MAXIMUM
rotor life

COMPETITIVE

"LIGHTWEIGHT ROTOR"

Reduced plate
thickness, increased
air gap and vane size
not conform to OE
specifications

Brake overheat due
to lower rotor mass

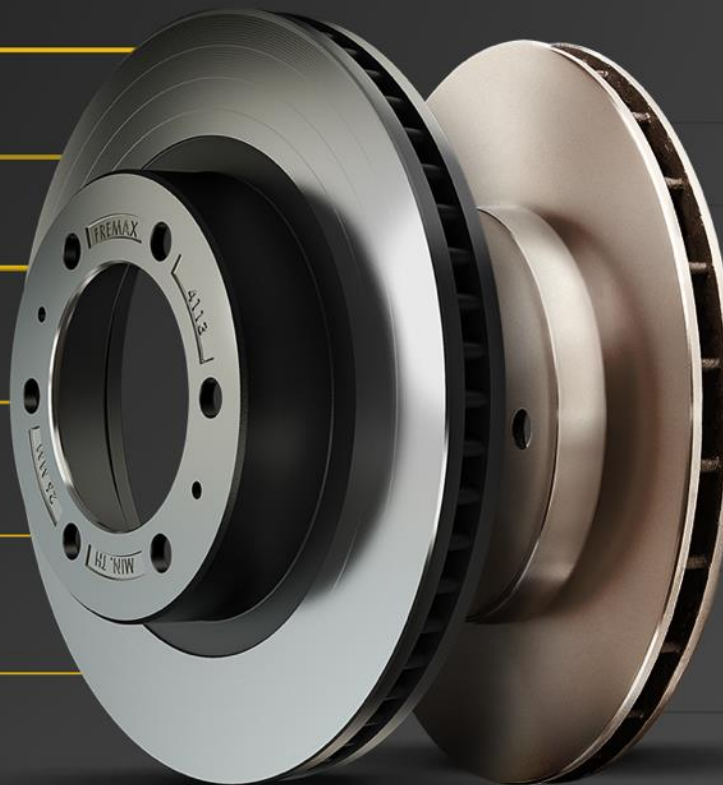
Pedal and steering
wheel pulsation

Leads to brake
system noise due to
reduced weight

Lower mechanical
resistance leading to
distortion, cracking
or total brake rotor
collapse

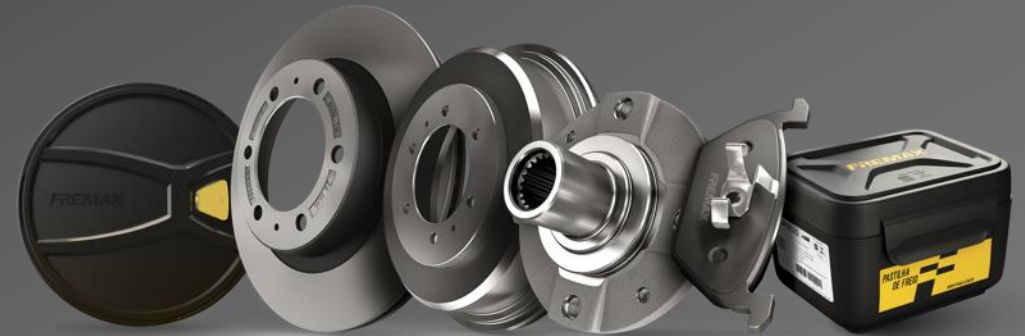
Poor braking
efficiency affecting
overall performance
and safety

Early rotor failure



THANK YOU!

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***VISIT OUR WEBSITE
FOR MORE INFO AND
CONTACT INFORMATION***

WWW.FREMAX.EU