

Original brake pads – the safe choice



COMPARATIVE TESTS

WHAT TO LOOK OUT FOR WHEN CHOOSING BRAKE PADS
FOR KNORR-BREMSE DISC BRAKES

KNORR-BREMSE



PUTTING SAFETY FIRST WITH KNORR-BREMSE

- A manufacturer with a core competence in safety-critical systems and components
- The market leader in air disc brakes
- Highest standards of safety and quality
- Recognition of the importance of genuine service solutions

CONTINUOUS IMPROVEMENT: ProTecS®

- Precise calibration of spring force
- Minimized noise emissions
- Reduced deformation of pad holder
- Optimized brake pad guidance
- Secure retention of pad spring
- No risky re-use of springs
- Protection against abrasion caused by dirt
- Retrofittable to older vehicles

KNORR-BREMSE PARTNERS FOR DISC BRAKE PADS:

JURID® by Honeywell, TMD Friction, Federal Mogul, ITT.

EXTENSIVE TEST PROGRAM FOR BRAKE PADS

Working closely with our OE customers, we have developed a program that puts brake pads through extensive and rigorous testing for safety and value for money. This test program is regularly updated, drawing on our technical expertise as a manufacturer of over 24 million disc brakes, and on the know-how and experience of our customers. Only disc brake pads that have successfully passed the complete test program are approved by Knorr-Bremse.

THE TEST PROGRAM COMPRISES:

- Vibration Test
- Wear Test
- Performance Test

Inside this leaflet you can read about how so called cheaper, non OE approved suppliers performed in our latest tests. All tests were performed under standardized, equal conditions.

VIBRATION TEST

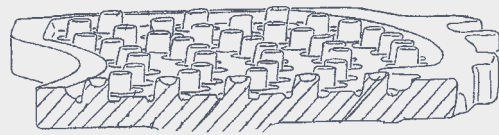
The vibration test assesses the fatigue strength of the friction material/backing plate connection, and of the brake pad hardware such as pad holder springs and pad retainers - whether these use the classical system or ProTecS®. Knorr-Bremse-approved pads must be able to withstand a minimum of 1,290,000 load changes. The test is designed to simulate vibration exposure over the brake pad's lifetime – under all conditions, including rough road operation. Five products from so-called cheaper suppliers were put through the vibration test.



Vibration test setup: stationary (left) and during test (right)

MECHANICAL RETENTION:

On brake pads where the friction material is simply bonded to the backing plate, the bonding agent may fail, causing the friction material to come away from the backing plate. All Knorr-Bremse-approved pads use mechanical retention systems, which ensure that the friction material is held securely to the backing plate even at high temperatures and high levels of vibration!



Example of a Knorr-Bremse approved backing plate

VERDICT

The vibration test identified pad holder springs and pad retainers as posing the biggest safety risk. For almost all the brake pads tested, the service life of these components was inadequate. If a retainer breaks, the braking performance is affected and there is a real risk of a brake pad falling off onto the road and possibly causing an accident



Many of the pad retainers and springs supplied with non approved brake pads were found to be deficient in terms of quality and service life.

PAD J

One entire half of the brake pad dropped off after just 40,000 load changes!

PAD L

After 420,000 load changes, both pad holder springs broke. Later in the test, the pad retainer became deformed and broke.

PAD M

After 340,500 load changes, the outer pad holder spring broke. Later in the test, the pad retainer broke.

PAD R

After 75,000 load changes, both pad holder springs broke. Later in the test, the pad retainer broke.

PAD X

This pad is supplied without pad holder springs. Since brake pads can only be securely fitted using customized pad holder springs, a vibration test could not be performed for this product.

WARNING:

Reuse of old pad holder springs and pad retainers poses a safety risk!

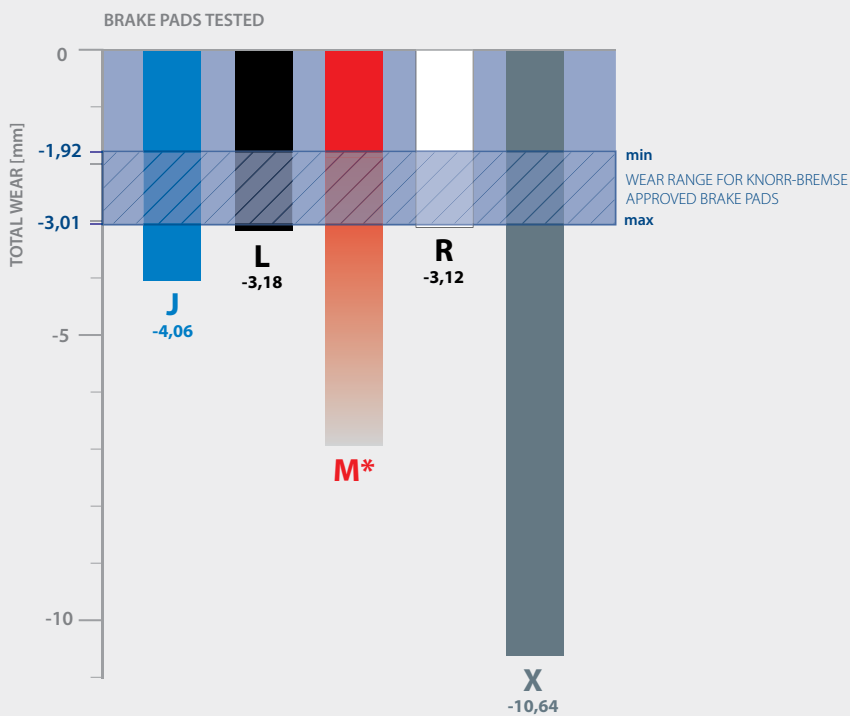
WEAR TEST

On a test rig, simulated braking is performed at varying brake disc temperatures (from 100°C to 500°C). This allows brake pad performance to be measured under a wide range of operating conditions and driving situations. At the end of the test, brake pad wear in mm is measured.

VERDICT

The wear recorded on Knorr-Bremse approved brake pads after testing at all temperature levels lay within the range 1.92 to 3.01 mm.

Caution: Much greater wear was recorded on some supposed “bargain” brake pads.



TEST RESULTS for simulated
braking manoeuvring (from 60 to 10 km/h).

*Test was terminated after the 300°C temperature test, since friction material was completely worn down.

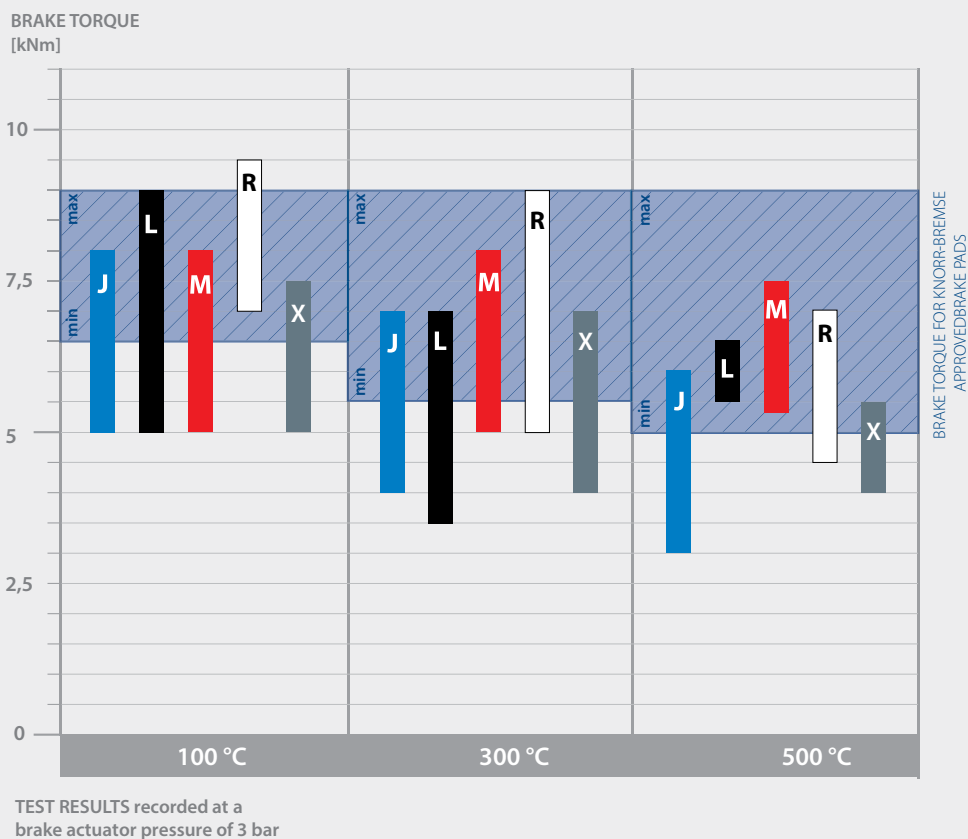
PERFORMANCE TEST

This test was carried out to determine the performance (braking torque) of the brake pads in relation to temperature, speed and actuator pressure. As with the wear test, this was repeated at different temperature levels.

**These test results have important practical implications:
the greater the brake torque, the shorter the stopping distance.**

VERDICT

This test clearly demonstrates the shortcomings of „cheap“ non approved brake pads. The recorded minimum and maximum torque values for these pads were in some cases well below the range for Knorr-Bremse approved brake pads. In practical terms, this translates into longer stopping distances and increased accident risk.



Ask your dealer specifically for Knorr-Bremse-approved brake pads. Or contact your nearest Knorr-Bremse representative direct. You can find the address at www.knorr-bremseCVS.com

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Note: If service work is carried out on a vehicle based on information provided herein, it is the responsibility of the workshop to ensure the vehicle is fully tested and in full functional order before the vehicle is returned into service. Knorr-Bremse accepts no liability for problems caused as a result of appropriate tests not being carried out.

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KNORR-BREMSE PARTNERS FOR DISC BRAKE PADS:



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