



PAGID

BRAKE SYSTEMS

**COPPER-FREE
BRAKE PADS**



BUSINESS SIMPLIFIED.
www.hella-pagid.com

PRIORITY: BETTER BRAKES

The strategic HELLA PAGID concept is so successful since it meets customer and car driver expectations on so many different levels. You already know: our products comply with the OE quality norms and fulfil the highest safety, quality, and sustainability standards. While it is clearly important, it's not everything. We aspire to always be one step ahead of the market. Our intensive dialogue with the automotive industry provides the foundation. We can thus enter consumer preferences and empirical industry values concerning brake, wear and comfort behaviour directly into the further and new developments of our brand products.

Faster than the market

We have already proven on many occasions that we can recognise current trends faster than others while generating innovative solutions at the right time. A strong foundation to this future-oriented dynamic are our company research and development centres, which conceive of innovations, test them thoroughly and put them to test under the hardest field conditions.

On the basis of those test results, we determine central specifications applied at our global manufacturer companies, in Germany, France and England for example.

This manner of proceeding allows us to guarantee to drivers and partners of the entire HELLA PAGID assortment products the latest generation and excellent quality standards. This is a win-win for everyone. Especially when new know-how and regulations require a change of direction regarding the nature of products.





COPPER METAL WITH TOP QUALITIES?

Copper is relatively soft, easily formable and workable and tough. These and other characteristics quickly turned this semiprecious metal into a favourite when engineers were looking for a low met, asbestos-free brake pad, thus seeking a new main component to the friction material.

And indeed, copper meets the high demands almost optimally. It reduces the wear of surfaces, avoids noises and vibrations and contributes to friction stability. This explains why the thus-equipped brake pads have been used in Europe, North and South America and Asia for decades.

However: the end of the "copper era" has long since been initiated. And there are good reasons for this.

The downside of the material

The negative side of copper always comes to the fore when tiny, often cupriferous particles of this friction material come off the brake pad while braking. Those enter the air, the street and, eventually, the groundwater. This is unavoidable but has negative consequences for the environment.

The reason: a relatively high copper content in water can cause harm to salt and fresh water organisms, such as fish and mollusks.



COPPER PROHIBITED BY LAW

Due to the reasons previously stated and prompted by the environmental agencies, US-states California and Washington have passed a law also known as "Better Brake Rules" regarding the environmental friendliness of disc brake pads, drum brake pads and brake shoes in vehicles.

It forces manufacturers of friction materials sold in the USA to register their products. Furthermore, they will soon require a leaf symbol indicating the brake pad's copper content.

Our pads and coatings feature such a leaf symbol on all product labels. According to the law from 2010, the copper percentage of brake pads must not exceed 5% by 2021 (B). Until 2025, all break pads sold in the USA must be completely copper-free in order to meet the requirements of California and Washington (N).



A: No heavy metals
"A" and/or black leaf: more than 5% copper content relative to total weight



B: Some copper content
"B" and/or two black leaves: copper content between 0.5 and 5% relative to total weight



N: Copper free
"N" and/or three black leaves: copper content below 0.5% relative to total weight.

AHEAD OF MARKET REQUIREMENTS

The new legal situation in the USA poses challenges to the manufacturers of brake pads. For it is not enough to merely reduce the copper content or to remove copper completely, since this would result in an unacceptable step backwards regarding brake performance. It is therefore necessary to find a substitute meeting the same extremely high requirements regarding safety and comfort.

Thinking differently. Daring new ways.

During this phase, the continuous information exchange with the car industry was instrumental. A treasure trove of advanced knowledge that our own company research and development centres used when starting their work. Engineers and technicians were faced with an extremely complex development process, as the friction material of the brake pads mixes more than 25 different materials. Also, there is no single material that can replace copper.

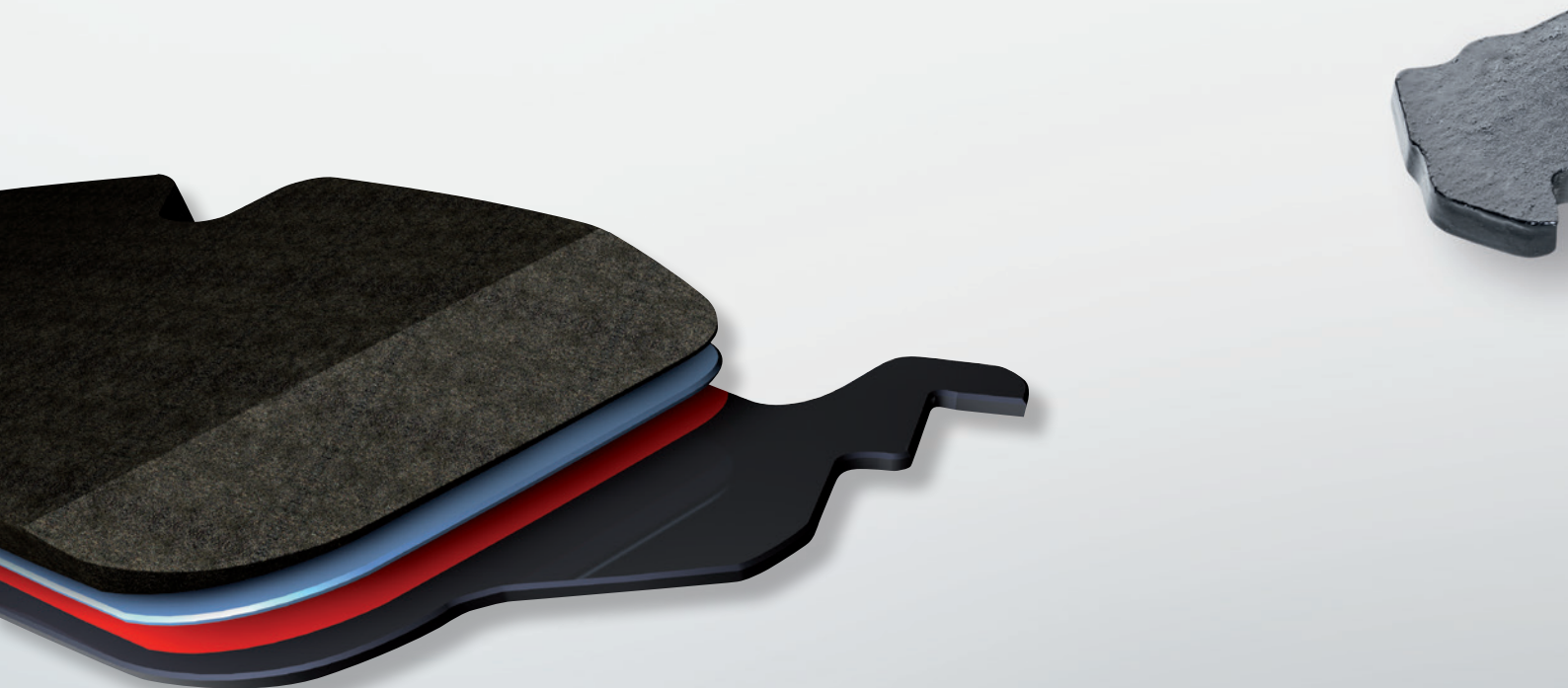
Only following extensive experiments and various field tests, was it possible to develop a friction material out of various metal sulfides, minerals, abrasive materials, fibres, ceramic particles and graphite types. It succeeds in providing the copper-free brake pads with the same excellent wear and friction characteristics as the cupriferous ones.

Environmentally-friendly safety

It is a success that pleases the environment, relieves the situation of the automotive industry while satisfying the US-American agencies. But above all, it was a strong performance by our team, whose successful work ensures once again a decisive competitive advantage to our customers while confirming HELLA PAGID as an important player in shaping our future.

One step ahead

The current HELLA PAGID portfolio already offers a broad range of copper-free and/or copper-reduced brake pads featuring the leaf symbol (N). This range is being continuously expanded, aiming at offering solely copper-free brake pads already prior to the law's coming-into-effect in the year 2025.





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Subject to technical and price modifications
Printed in Germany