Press release

85 % less CO_2 with new brake pad technology and significantly reduced fine particle emissions.

LF GmbH & Co. KG revolutionizes the market for friction pads with LIQFRIC®

Leverkusen, 7 November 2022.

The focus of the CO_2-friendly innovation driver is on the development and manufacturing of friction materials for the automotive industry (brake pads and clutches) and other industrial applications. With the Industry 4.0 concept, high-performance products are manufactured in an almost CO_2-neutral manner, with a drastic reduction in the area of critical fine particle emissions PM_{10}. In addition, the partnership with a well-known recycling company allows the controlled return of used friction linings to the material cycle.

LIQFRIC® is ready!

The company is currently in the pre-series development phase for original equipment manufacturers in order to be able to offer series solutions in the growth market with constantly increasing demand in the classic and new segment (e-mobility). In the second step (from 2025 / 26), the sustainability of the products will be realized in small to medium-sized production batches for original equipment manufacturers and the aftermarket by achieving energy savings of up to 85 %. Local manufacturing reduces transportation costs and dependence on international markets.

With an alternative manufacturing concept, brake pads can already be produced on the presses installed throughout the industry and thus significant energetic improvements can be achieved in the short term on proven existing manufacturing equipment, but with a lower savings potential in comparison to the non-press method.

Core competence: Development of liquid friction compounds

Launched as a start-up in 2016, the scale-up company has now positioned itself for market entry. The timely realization is to take place after a round of financing with investors. Our main focus is sustainability. The company mission statement describes the 6 main advantages:

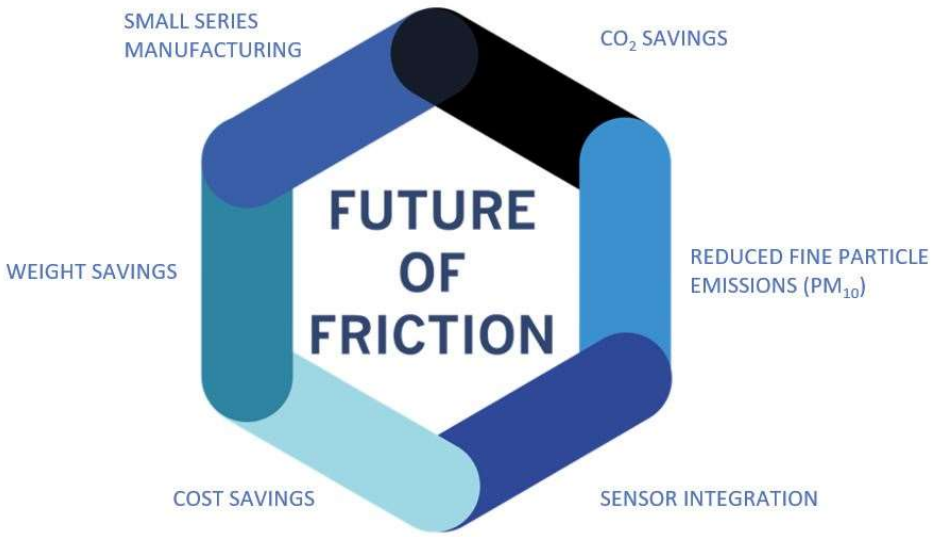
LF GmbH & Co.KG
Innovationspark
Marie-Curie-Straße 8
51377 Leverkusen

Phone: +49 214 313 830 30
Fax: +49 214 313 830 39
Mail: info@liqfric.com
Web: **www.liqfric.com**

Sitz Leverkusen
AG Köln HRB 31873
Steuer Nr.: 230/5753/3105
USt.-ID. Nr.: DE 305 923 107

Persönlich haftende Gesellschafterin:
LF Verwaltungs-GmbH, HRB 87146
Geschäftsführung: Dr. Ute Wittig
Dr. Roman Milczarek

VR Bank eG Bergisch Gladbach-Leverkusen
IBAN DE28 3706 2600 2902 6120 10
BIC GENODED1PAF
Beirat: Dr. H. G. Paul, R. Scholl



1. CO_2 savings

Production-related process temperatures and their sequence within the manufacturing process of the friction pads dictate a high thermal energy requirement for the production of brake pads.
The Multiple heating and cooling cycles for the brake pads and especially the steel backing plates alone require a lot of energy.
Due to our low hardening- and process temperatures, up to 85 % of the process energy currently required for phenolic-bonded brake pads can be saved.
In the case of sinter metallic friction pads, this value improves considerably since the process temperatures there are significantly higher.

2. Reduced fine particle emissions (PM_{10})

A study with a well-known project partner demonstrated that the abrupt increase in emissions of ultrafine particles from inorganic friction materials only occurs at significantly higher temperatures than with phenolic resin-bound materials and that the total emissions can be reduced by up to 35 %.

3. Sensor integration

Due to the systemically high pressures and temperatures occurring in the production of brake pads, it was previously not possible to integrate sensors into the friction pad. The LIQFRIC® casting process allows the integration and encapsulation of sensors. This enables a status control feature, and the static and dynamic behavior of brake pads can be analyzed. This also opens up the possibility of monitoring wear status for the first time (preventative maintenance). A large number of sensors can be integrated, including, for example, proof of authenticity via NFC, which can prevent product piracy.
These sensors are the next evolutionary step to enable the Internet of Cars (IoC).

4. Cost savings

On the one hand, the use of energy for the production of the brake pad in large series manufacturing is significantly reduced by the savings in the press hydraulics, the cross-linking temperatures and the process design. On the other hand, the upstream mixing processes require less effort, so that overall lower production costs are incurred in the steady state.

5. Weight savings

The average density of the LIQFRIC® friction materials is significantly lower than the density of conventional organic pads. This results in geometry-dependent average weight savings of approx. 15 % for a classic pad with a backing plate. The company is currently developing solutions to further optimize these weight savings.

6. Small series manufacturing

Press tools for the production of friction pads and their quick availability are another topic where the LIQFRIC® technology offers advantages. Due to the pressureless manufacturing process, the production of expensive, complex steel-based tools can largely be dispensed with for small series or prototypes. Therefore, prototypical friction linings and their geometric variations can inexpensively be made available in a very timely manner.

In the TechFounders Pitch 2022, the company prevailed over 350 other applicants

"Since the foundation of our company, we are committed to support the global race to zero CO_2 emissions with our materials development." – Dr. Roman Milczarek at TechFounders Pitch

Conclusion

Reduced energy consumption – 85 % CO_2 reduction – significantly less particle emissions PM_{10} – IoT-capable – high-performance – approaching serial production – controlled return through a closed, sustainable recycling concept

About LIQFRIC® (LF GmbH & Co. KG)

LF GmbH & Co. KG develops the LIQFRIC® technology with a competent core team of specialists from all relevant areas: Research and development, technology, design and plant manufacturing, finance, marketing and communication.
Tailor-made, high-temperature-stable friction materials for automotive-, rail-, clutch- and industrial applications have been created since 2016.
The company is involved in development projects and cooperations with important players in the brake- and clutch industry in Europe and especially in Germany.

Dr. Roman Milczarek

- *11.07.1958
- 1978: High-school diploma
- 1978 – 1983: Studies in math, physics and chemistry at *Universität Kaiserslautern*, Germany
- 1983: Master in chemistry
- 1984 – 1986: Preparation of dissertation at *MPI für Kohlenforschung*, Germany
- 1986: PhD in organometallic chemistry at *Universität Kaiserslautern*, Germany
- 1987 – 1988: Postdoc ANU, Canberra Australia
- 1988 – 2002: Various managerial positions at *Metallgesellschaft*
- 2002 – 2016: Various managerial positions at *TMD Friction Group*
- 2017 – now: CTO, COO, Co-owner LF GmbH & Co. KG

Contact

LF GmbH & Co. KG
Dr. Roman Milczarek
Innovationspark Leverkusen
Marie-Curie-Straße 8 | 51377 Leverkusen
+49 214 313 830 30 | info@liqfric.com

For more information please visit our website: www.liqfric.com

Downloads

Pictures and downloads can be found at: www.liqfric.com/press

- FAQ
- Company brochure
- Joint study conducted by FZD, IUTA, Daimler AG and LIQFRIC® on the topic of *Reduction of PM_{10} emissions through inorganic friction pads*
- Images in printing quality