

Driving Performance Forward: Oerlikon Balzers' S3p Technology Sets a New Benchmark in Motorsport Coatings

In a highly technical session of *Race Industry Now*, Oerlikon Balzers showcased how its latest advancements in surface engineering are transforming high-performance engines and drivetrains across global motorsport. The presentation — “*Driving Performance Forward: S3p Expansion, DLC Gearbox & Engine Solutions*” — featured **Martin Hahn**, Global Product Manager Piston Group & Motorsports; **Dr. Martin Bohley**, Technical Business Development Automotive PVD; and **Dr.-Ing. Emanuel Tack**, Tribology Expert. The discussion was hosted by **Brad Gillie** of *SiriusXM, Ch. 90, Late Shift*.

A New Era for Thin-Film Coatings in Motorsport

Oerlikon Balzers, a global leader in advanced coating technologies, continues to push the limits of friction reduction and wear resistance for high-performance applications. During the webinar, Hahn introduced the company's latest innovation: the **S3p (Scalable Pulsed Power Plasma)** process — a hybrid thin-film coating technology that combines the best attributes of **arc evaporation** and **magnetron sputtering**.

“With S3p, we've taken the advantages of both arc and sputtering technologies — high ionization, dense coatings, and excellent adhesion — and merged them into one powerful system,” said **Hahn**. “This gives us the ability to tailor coatings precisely to each customer's unique requirements.”

Unlike traditional coatings that may require extensive post-treatment to smooth surface irregularities, S3p enables **virtually droplet-free coatings** with superior smoothness and low roughness levels — crucial for components like **piston pins, camshafts, crankshafts, gears, and finger followers**.

Engineering Precision at the Microscopic Level

Dr. Martin Bohley explained that the S3p process leverages high plasma density and adjustable pulse power to achieve a more uniform microstructure. This precision allows engineers to optimize the coating's hardness, adhesion, and tribological properties — improving both performance and reliability under the extreme conditions of racing engines.

“In motorsport, every micron matters,” noted **Dr. Bohley**. “The ability to control plasma parameters and deposition rates means we can fine-tune coatings for minimal friction losses, higher efficiency, and longer component life.”

Dr.-Ing. Emanuel Tack, an expert in tribology, emphasized the critical balance between surface smoothness and lubrication performance. He highlighted how Oerlikon's DLC

(Diamond-Like Carbon) and S3p coatings are engineered to reduce metal-to-metal contact, enabling more consistent performance across thermal cycles and reducing wear on moving parts.

“The smoother the coating, the better the oil film can behave under stress,” said **Dr. Tack**. “That’s where our S3p process truly shines — it keeps the surface integrity even after prolonged use in demanding motorsport environments.”

From Concept to Global Application

Originally introduced in Japan, the S3p process is now being expanded across Oerlikon’s global motorsport network, ensuring that teams in Europe and North America can access the same cutting-edge coating capabilities. This expansion aligns with the company’s broader mission to support **motorsport and high-performance automotive programs worldwide**, from Formula racing to endurance and rally applications.

“We’re scaling up our S3p technology to meet growing demand from motorsport and OEM customers,” Hahn explained. “Our global footprint now allows us to deliver consistent coating quality and performance — wherever our partners race.”

The Future of Coatings in Performance Engineering

The webinar closed with a clear message: surface engineering has become a decisive factor in modern motorsport competitiveness. Through innovations like S3p and advanced DLC solutions, Oerlikon Balzers continues to lead in creating coatings that enable lighter, faster, and more durable engines and transmissions.

As EPARTRADE Founder **Francisque Savinien** summarized during the session, *“This is exactly what Race Industry Now was created for — connecting the world’s top engineers and innovators to share the technologies that drive racing forward.”*

For more information, [watch the full webinar here.](#)