

**Media Release****Oerlikon Balzers unveils latest innovation: BALIQ CARBOS - beyond Diamond-Like-Carbon (DLC)**

Oerlikon Balzers, Liechtenstein, August 29, 2019 – **Oerlikon Balzers, a leading supplier of surface technologies, has developed new amorphous hydrogen-free carbon (a-C) coatings, BALIQ CARBOS and BALIQ CARBOS STAR, which deliver an exceptional combination of high hardness, low friction and low roughness for applications with extreme contact pressures and sliding velocities.**

The BALIQ CARBOS and BALIQ CARBOS STAR coatings are very versatile and best utilised in applications with high contact pressure combined with sliding velocities, such as in all high-performance motorsport vehicles specifically for applications such as the camshaft, piston pins, valves, lifters and finger followers. The coating is also used within the general industries' market for applications such as weaving reeds, valve plates and valve stems and in pneumatic valves.

**The coating technology of tomorrow**

In a proprietary process developed by Oerlikon Balzers, BALIQ CARBOS and BALIQ CARBOS STAR coatings are applied utilising Scalable Pulsed Power Plasma (S3p), which combines the advantages of the arc evaporation and sputtering methods. Arc evaporation is known for producing dense coatings with high adhesion. Sputtering, a conventional coating technology where atoms are ejected from a target or source material to be deposited on a substrate, is known for high levels of smoothness.

The result is a hydrogen-free DLC coating that delivers the benefits of low friction carbon coatings with the smoothness achieved by sputter- or PACVD-applied coatings without additional polishing treatments.

**New dimensions in hardness, durability and smoothness**

The S3p technology also generates a high fraction of tetrahedral bonds (50-60%) to a hardness up to 40 GPa (indentation hardness,  $H_{IT}$ ). In comparison, typical DLC coatings achieve hardness levels in the range of 20-30 GPa and only 10-15 for WC/C coatings. The coatings exhibit three times lower abrasive wear than a 20 GPa hard DLC coating as measured by a calo test.

The coating process operates at a relatively low temperature, below 200 degrees Celsius as compared to up to 350 degrees for other DLC coatings, which enables its application to a much wider selection of substrates, including aluminum and steel.

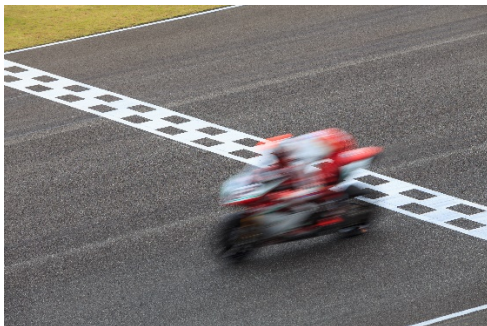
For applications that require maximum load bearing capacity, BALIQ CARBOS STAR provides even higher tribological performance. This modified coating provides the required surface hardness and significantly improves resistance in high load bearing applications.

Because maximum load bearing capacity also depends to a large extent on the substrate, an additional chromium nitride-based layer is added to BALIQ CARBOS STAR to resist extreme loadings when using softer substrates like stainless steel and titanium – or substrates that are subject to continuous knocks.

For more information please visit the [BALIQ CARBOS](#) and [BALIQ CARBOS STAR](#) websites



BALIQ CARBOS delivers an exceptional combination of high hardness, low friction and low roughness for applications with extreme contact pressures and sliding velocities.



High friction and wear are the most demanding challenges in applications such as racing car engines. When drivers push their racing cars to their limits, critical components need to deliver maximum performance withstanding extreme loads.

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**About Oerlikon Balzers**

Oerlikon Balzers is one of the world's leading suppliers of surface technologies that significantly improve the performance and durability of precision components as well as tools for the metal and plastics processing industries. Extremely thin and exceptionally hard coatings, marketed under the BALINIT and BALIQ brand names, reduce friction and wear. The BALITHERM brand opens up a broad range of heat treatment services, whereas BALTONE comprises coatings that are available in a full range of elegant colours, perfectly suited for decorative applications. BALIMED ThinFilm coatings, with wear-resistant, biocompatible, antimicrobial and chemically inert properties, have been developed especially for medical applications. Under the BALIFOR technology brand the company has introduced technologies which provide tailor-made solutions for the automotive market, while ePD allows the metallisation of plastic parts with a chrome look.

Worldwide, more than 1'100 coating systems are in operation at Oerlikon Balzers facilities and its customers. Equipment engineering and assembly of Balzers' systems are processed in Liechtenstein, in Langenthal (Switzerland) and in Bergisch Gladbach (Germany). Oerlikon Balzers operates a dynamically growing network of more than 100 coating centres in 35 countries in Europe, the Americas and Asia. Oerlikon Balzers is – together with Oerlikon Metco and Oerlikon AM – part of the Surface Solutions Segment of the Switzerland-based Oerlikon Group (SIX: OERL).

**About Oerlikon**

Oerlikon (SIX: OERL) engineers' materials, equipment and surfaces and provides expert services to enable customers to have high-performance products and systems with extended lifespans. Drawing on its key technological competencies and strong financial foundation, the Group is sustaining mid-term growth by executing three strategic drivers: addressing attractive growth markets, securing structural growth, and expanding through targeted mergers and acquisitions. A leading global technology and engineering Group, Oerlikon operates its business in two Segments – Surface Solutions and Manmade Fibers – and has a global footprint of more than 10 500 employees at 175 locations in 37 countries. In 2018, Oerlikon generated CHF 2.6 billion in sales and invested around CHF 120 million in R&D.