

# PROMOTING THE COATING

**Oerlikon Balzers' segment manager, aerospace, Toby Middlemiss explains why the new aerospace era relies on coatings to meet OEM customers' bullish targets.**



**ABOVE:** BALINIT Turbine Pro is said to offer the highest level of erosion and corrosion resistance for compressor blades in turbofan and turboshaft engines

**A**erospace has entered a new era recently with many advances in technology. The major manufacturers have launched new, improved aircraft models which have been received in the market with unprecedented demand. These developments will influence the industry for many years to come, as manufacturers and suppliers begin to ramp up to new manufacturing levels, driving the aerospace industry's development rate. Coatings are now an indispensable element to reach the ambitious goals that have been set.

The market demands longer operating hours and reduced maintenance intervals with more performance and higher fuel efficiency. To achieve these requirements, leading turbofan engine brands have developed a broad range of new technologies, for example geared turbofans with high bypass ratios. Most of these innovations would not be possible without new materials and

surface coatings.

Oerlikon Balzers and Oerlikon Metco are both major coating suppliers to the aerospace industry. Their supply chain offers thin film PVD and PA CVD coatings, as well as plasma thermal spray coatings. As major development partners working with many OEMs, and with vast experience as the technology leaders in surface solutions, they are an integral part of this high-paced development process.

Earlier this year, Oerlikon Balzers launched another new innovative product in the aerospace market: BALINIT Turbine Pro. This coating, developed in close cooperation with industry partners, offers the highest level of erosion and corrosion resistance for compressor blades in turbofan and turboshaft engines. Tested in the field, BALINIT Turbine Pro offers more than four times higher erosion protection than other coatings with minimal fatigue debit (measured at <5% on titanium alloy).

Designed as an integral part of the system, it helps to meet the goal

of fuel efficiency by retaining the surface profile and roughness of components like blades and integral bladed discs. Proven in the harshest of environments, this product offers the lowest cost of ownership to the end user. With new business models within the aerospace industry, such as power by the hour, longer maintenance schedules are required and longer part life is therefore essential. Coatings such as BALINIT Turbine Pro are imperative to achieve this.

## Components in transmissions

Celebrating its 70th birthday earlier this year, Oerlikon Balzers has been coating gear components for over 30 years. This experience helps companies to overcome problems of material wear such as micro and macro pitting which can be accelerated in extreme conditions such as starved lubrication, as is seen in some aerospace conditions. Gear coatings were first used in motorsport as a performance enhancement. In this highly competitive environment, even the smallest gain can make the difference between winning and losing. In motorsport, gears are pushed to the limits (and sometimes beyond) in terms of scuffing and wear. So what could be more obvious than taking motorsport applications as a proving ground for coatings?

BALINIT C, a metal-doped DLC coating, has been proven time and time again to be a leading coating in this field, with excellent wear and scuffing resistance, while at the same time reducing friction. Furthermore, it is suitable for dry lubrication, which additionally increases the load carrying capability of the gear.

Newer developments in Oerlikon Balzers' coating equipment technology have allowed further improvements of this successful coating solution. As with any coating, the preparation of the substrate surface is critical. New finishing processes, developed by Oerlikon Balzers and its development partners, have resulted in even cleaner, smoother surfaces, increasing the core adhesion strength of the coating.

As the technology has been developed, other markets have become interested, such as the aerospace industry, where the many benefits of gear coatings are often used to meet the tightest safety requirements. In this light, the most important development for the aerospace industry has been the increased longevity of the coating and its improved unlubricated running.

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