The coating as a design element –
Increased service life due to higher wear resistance
涂层作为设计元素 – 提高耐磨损性能从而延长使用寿命
BALINIT® hard coatings are frequently only employed after completion of product development when it is discovered that there is too much wear (acute problem solving). However, the coating itself is more and more playing a role as a design element during development to achieve improved performance.
BALINIT®硬涂层通常是在产品开发完成后才被应用，届时会发现磨损过多（急性问题解决）。然而，涂层本身在开发过程中的作用越来越大，以达到改进性能的目的。

A recent example of this is the use of the BALINIT® C coating in combination with special pre-treatments designed to increase the load capacity of gears.

BALINIT®涂层在其嵌入线接触区的生产过程中起着重要的作用。例如，当齿轮在高载荷下工作时，涂层可以显著提高其寿命。

Cycles x10^8 to pitting failure
周期x10^8至点蚀失效

800% increased pitting life
800%提高点蚀寿命

BALINIT®C (WC/C) coating, micro-blasting or superfinish increase pitting life. Maximum lifetime is achieved with a combination of super-finish and BALINIT®C on one gear, or microblasting and BALINIT®C when both gears are coated.

BALINIT®C (WC/C)涂层、微喷丸或超精密加工都可提高点蚀寿命。最大寿命在单个齿轮上采用超精密加工和BALINIT®C涂层实现，或当两个齿轮均被涂层时采用微喷丸和BALINIT®C涂层。

MS Microblasting 微喷丸
SF Super Finish 超精密加工
WC/C BALINIT®C coating BALINIT®C涂层

Benefit from high-performance BALINIT coatings
受益于高性能BALINIT涂层!
Contact us now!
立即与我们联系!

Headquarters Balzers

For more information on our coatings, please visit:
www.oerlikon.com/balzers

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Resist 防护

With innovative PVD coating solutions for high-performance precision components
高性能精密零部件的创新PVD涂层解决方案

General Engineering
Oerlikon Balzers' BALINIT coatings boost performance
欧瑞康巴尔查斯BALINIT涂层提升性能

Mechanical engineering components frequently operate under extreme conditions: high loads, high sliding speeds or poor lubricating conditions can lead to wear or excessive friction and thus reduced lifetime and/or efficiency.
机械工程的组件通常在极端条件下运行：高负荷、高滑动速度或不良润滑条件可能导致磨损或过高的摩擦，从而缩短使用寿命和/或效率。

Trust BALINIT® wear protective coatings from Oerlikon Balzers - a global technology leader in hard coatings. BALINIT® coatings provide a wide range of unmatched advantages that push components to peak performance and unmatched reliability.
信任Oerlikon Balzers的BALINIT®耐磨涂层——全球硬涂层技术领域的领导者。BALINIT®涂层提供了广泛的一系列独特优势，推动组件达到最佳性能和 unmatched reliability。

Highest level wear protection
最高等级磨损保护

Equipment for low-friction and wear resistant coatings with Oerlikon Balzers' RS50 coating system
欧瑞康巴尔查斯RS50涂层设备打造低摩擦、耐磨损涂层

To find a proper solution, our Oerlikon Balzers surface engineers are starting with an analysis of the whole tribo-system: the parts and their materials, hardnesses and surface finish, the environment and wear mechanism.
为了找到合适的解决方案，我们的Oerlikon Balzers表面工程师从整体摩擦系统分析开始：部件及其材料、硬度和表面质量、环境和磨损机制。

The analysis results enable Balzers surface engineers to select the appropriate coatings. Experienced job coating centers apply well proven, standardized procedures which are moreover ISO, and in many cases also QS 9000 or NADCAP certified. Sophisticated after-test analyses complete the solution.
分析结果使Balzers表面工程师能够选择合适的涂层。经验丰富的涂层中心应用经过验证且标准化的程序，这些程序通常符合ISO，许多情况下也符合QS 9000或NADCAP认证。复杂而详细的测试后分析完成整个解决方案。

Oerlikon Surface Solutions
欧瑞康表面解决方案

Oerlikon Balzers not only offers PVD- and DLC thin coatings, but also special nitriding solutions. Oerlikon Balzers has e.g. the worlds largest plasma nitrizing equipment for parts up to 40 t weight, 10 m in length and 3 m in diameter.
欧瑞康巴尔查斯不仅提供PVD和DLC薄涂层，还提供特殊的渗氮解决方案。例如，欧瑞康巴尔查斯拥有世界上最大的等离子渗氮设备，适用于重量达40吨、长度10米、直径3米的部件。

Oerlikon Metco, also part of the Oerlikon Surface Solutions segment, is also a leading supplier of thermal spray materials, equipment and job coating service for thick abrasion and erosion resistant coatings such as WC-Coalt or oxides e.g. for turbine blades.
欧瑞康马铁科，作为Oerlikon Surface Solutions的一部分，也是热喷涂材料、设备和涂层服务的领先供应商，适用于厚磨损和侵蚀防护涂层，如WC-Coal或氧化物等，例如用于涡轮刀片。
Main applications of wear-resistant and low-friction BALINIT coatings

耐磨损、低摩擦BALINIT涂层的主要应用

Engines

Motorcycles

Racing

Gears

Roller bearings

Food processing

Hydraulics

Compressors

Sub sea valves

Water- and steam-turbines

Machine tools

Linear guides and ball screw drives

Textile spinning and weaving

Printing

Packaging

Leisure and domestic appliances

Ceramic discs for faucets

Medical instruments

Medical devices

Further applications

更多应用

More decorative coatings & heat treatment by Oerlikon Balzers

更多装饰性涂层及欧瑞康康巴尔查斯热处理

BALTONE

As well as hard and wear resistant coatings, Oerlikon Balzers also offers decorative BALTONE™ coatings in a broad range of colours which are applied using specialized coating machines for very economic decorative treatment.

除了硬质和抗磨涂层，欧瑞康康巴尔还提供装饰性BALTONE™涂层，涂层范围广泛，使用专门的涂层机进行非常经济的装饰性处理。

BALITHERM IONIT

The low temperature heat treatment process creates a wear resistant and durable surface on large components. No harmful chemicals or gases are used in the IONIT process. This means that IONIT is environmentally-friendly and efficient alternative to conventional nitriding methods.

低温离子处理过程在大型部件上创建抗磨和耐用的表面。在IONIT过程中不使用有害化学物质或气体。这意味着IONIT是一种环保和高效的替代传统氮化方法。
Coating properties at a glance

<table>
<thead>
<tr>
<th>Coating material</th>
<th>Process technology</th>
<th>Coating thickness (µm)</th>
<th>Friction against 100% sliding, dry</th>
<th>Coating temperature (°C)</th>
<th>Max. service temperature (°C)</th>
<th>Max. transferable dimensions D x L (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BALINT® C</td>
<td>W.O. Spotter</td>
<td>8 - 12 / 12 - 15</td>
<td>1 - 4</td>
<td>&lt; 250</td>
<td>300</td>
<td>250 x 1,000</td>
</tr>
<tr>
<td>BALINT® DLC</td>
<td>α-SiC, PACVD</td>
<td>-25 - 25</td>
<td>1 - 3</td>
<td>&lt; 250</td>
<td>300</td>
<td>250 x 1,000</td>
</tr>
<tr>
<td>BALINT® DLC STAR</td>
<td>CNa-SiC, PACVD</td>
<td>-25 - 25</td>
<td>2 - 5</td>
<td>&lt; 250</td>
<td>300</td>
<td>250 x 1,000</td>
</tr>
<tr>
<td>BALINT® CVDUR</td>
<td>α-SiC, CVD</td>
<td>-25 - 35</td>
<td>2 - 4</td>
<td>&lt; 250 - 350</td>
<td>350</td>
<td>520 x 666</td>
</tr>
<tr>
<td>BALINT® CNI</td>
<td>CNi, Spotter</td>
<td>18 +/- 3</td>
<td>1 - 20</td>
<td>&lt; 250</td>
<td>700</td>
<td>250 x 1,000</td>
</tr>
<tr>
<td>BALINT® CROMA PLUS</td>
<td>CNi, Arc</td>
<td>25 +/- 3</td>
<td>4 - 10</td>
<td>250 / 300</td>
<td>700 x 1,450</td>
<td>600 x 1,200</td>
</tr>
<tr>
<td>BALINT® A</td>
<td>TiN, Arc</td>
<td>30 +/- 3</td>
<td>1 - 4</td>
<td>250 / 400</td>
<td>700 x 1,450</td>
<td>600 x 1,200</td>
</tr>
<tr>
<td>BALINT® ALCRONA PRO</td>
<td>AlN, Arc</td>
<td>36 +/- 3</td>
<td>2 - 6</td>
<td>&lt; 350</td>
<td>1,000</td>
<td>700 x 1,450</td>
</tr>
<tr>
<td>BALINT® DYLIN</td>
<td>α-SiC, PACVD</td>
<td>-25 - 20</td>
<td>1 - 3</td>
<td>180 - 220</td>
<td>300</td>
<td>350 x 900</td>
</tr>
<tr>
<td>BALINT® DYLIN PLUS</td>
<td>α-SiC, PACVD</td>
<td>-17 - 23</td>
<td>1 - 3</td>
<td>180 - 220</td>
<td>350</td>
<td>350 x 900</td>
</tr>
<tr>
<td>BALINT® DYLIN PRO</td>
<td>α-SiC, PACVD</td>
<td>-15 - 20</td>
<td>1 - 3</td>
<td>180 - 220</td>
<td>350</td>
<td>350 x 900</td>
</tr>
</tbody>
</table>

All given data are approximate values, they depend on application, environment and test condition.

Harness the main advantages of carbon-based coatings: low friction and low sliding wear

碳基涂层的主要优势：低摩擦和低滑动磨损

Coating description and recommended applications
涂层介绍以及应用推荐

**BALINT® C**: The standard coating for sliding and rolling elements under poor lubrication conditions, countersnare seizure and galling (e.g. roller bearings, gears).

**BALINT® C**: 适用于润滑不良条件下滚动和滑动部件的涂层，防止锁死和咬合（例如滚柱轴承，齿轮）。

**BALINT® DLC**: Harder than BALINT® C and therefore used to withstand higher levels of abrasive wear and high sliding speeds. Standard for diesel injection, engine valve train and piston pins.

**BALINT® DLC**: 比BALINT® C更硬，因此可用于承受更高水平的磨料磨损和高速滑动。适用于柴油喷射，发动机阀门系统和活塞销。

**BALINT® DLC STAR**: Tribological performance like DLC, but enhanced with a very ductile CrN base layer for additional high loads.

**BALINT® DLC STAR**: 类似DLC的摩擦学性能，但通过添加非常延展的CrN基底层为额外的高载荷提供增强。

**BALINT® CAVIDUR**: Very hard and smooth DLC coating. The standard for highly loaded racing parts such as camshafts and finger followers.

**BALINT® CAVIDUR**: 非常坚硬和光滑的DLC涂层。适用于高度负载赛车部件如凸轮轴和指状跟随器。

**BALINT® CNI**: Chromium nitride is very ductile and highly oxidation resistant and is therefore used in high temperature applications requiring high wear resistance (e.g. piston rings, exhaust valves).

**BALINT® CNI**: 铬氮化合物非常延展和高氧化物耐性，因此用于需要高耐磨损性能的高温应用（例如活塞环，排气阀）。

**BALINT® CROMA PLUS**: Similar to CNI with higher hardness and a special top layer for reduced friction.

**BALINT® CROMA PLUS**: 与CNI类似，具有更高的硬度和减少摩擦的特殊顶层。

**BALINT® A**: The historical first coating for tools and components, impressive golden color. Used therefore in long-lasting specification industries such as aerospace or for colouring and designation purposes.

**BALINT® A**: 历史上的第一层涂层，具有令人印象深刻的金色。因此用于耐久的规格行业如航空航天或着色和标识。

**BALINT® ALCRONA PRO**: Extremely oxidation resistant and therefore used in high temperature and abrasive environments (e.g. for turbocharger parts or exhaust valves).

**BALINT® ALCRONA PRO**: 极端氧化耐性，因此用于高温和磨料环境（例如涡轮增压器部件或排气阀）。

**BALINT® DYLIN**: Silicon-enriched DLC coatings for lower friction, higher corrosion resistance and good release properties (e.g. plastic moulds).

**BALINT® DYLIN**: 含硅的DLC涂层，具有更低摩擦，更高耐腐性和良好释放性能（例如塑料模具）。

Experimental method

1. Ball, non-rotating diameter 3mm
2. Test ring, diameter 10mm

Test conditions

- F = 30 N
- V = 0.3 m/s
- Dry contact

Pin-on-disc test to compare friction and wear of materials

Wear track (30x) of nitrided ring, exhibits heavy galling after 150 m sliding distance

Wear track (30x) of BALINT® C coated ring exhibits only slight running in (wear depth approx. 0.2 mm) after 2000 m sliding distance

BALINT® C, virtually no wear

几近没有磨损