An ingenious combination: The BALINIT DUPLEX Series!

The ideal solution for more efficiency and productivity.

Metal Forming
BALINIT DUPEX Series: The groundbreaking combination of nitriding and BALINIT coatings.

BALINIT DUPEX系列：渗氮和BALINIT涂层的开创性结合。

Heavy-use forming tools must be able to withstand extreme loads and at the same time be productive and efficient while remaining process reliable for manufacturing. This is why you should trust Oerlikon Balzers, a worldwide leader in technology for wear-protection solutions. The BALINIT® DUPEX Series is the groundbreaking result of two wear-protection solutions that have been combined: On the one hand, nitriding, a thermochemical diffusion method; on the other, the wear-resistant PVD coating that has proven itself around the world under the brand name BALINIT®. Together, they yield advantages that are decisive for the success of your forming tools and, in turn, for your demanding manufacturing process: both the nitrogen and the hard carbide layer are almost purely compressive and do not affect the machine tool in the same way as the mutually intensified fretting and contact fatigue.

Nitriding 滲氮
Increases the surface hardness
Creates a homogeneous hardness profile
Increases compressive strength
Improves hot hardness

Reduces mechanical material fatigue
例如，循环荷载导致裂纹产生

Reduces plastic deformation
例如，当应力超过屈服强度

Lower tool costs due to increased tool service life
由于使用寿命提高使得工具成本降低

Lower production costs due to less machine downtime and better workpiece quality
停机时间减少以及工件质量提高生产成本降低

BALINIT® coatings BALINIT®涂层
Extreme hardness
High thermal stability
Protection against abrasive wear
Low chemical reactivity

BALINIT® DUPEX系列
For high-level productivity and manufacturing process reliability
带来高水平的生产力和生产流程的稳定性

由于渗氮和PVD涂层的结合，性能得到显著提高。
Demonstrably first class:  
The performance of the BALINIT DUPLEX Series.  
经验证一流的：BALINIT DUPLEX系列的性能。

**BALINIT® LUMENA DUPLEX:**  
Sheet metal forming of hinges

**Tool:**  
Deep-drawing die, tool steel K340

**Tool dimensions:**  
180 x 180 x 120 mm

**Workpiece:**  
Hinge of high-strength steel (5 mm plate thickness)

**Challenge:**  
Untreated: Cold welding after 500 cycle

**The solution:**  
**BALINIT® LUMENA DUPLEX**
- Reduces cold welding
- Higher workpiece quality
- Moderate wear only after 100,000 cycles

**Tool:**  
拉伸模，模具钢 K340

**Tool dimensions:**  
180 x 180 x 120 mm

**Workpiece:**  
高强钢铰链（5 mm 板厚）

**Challenge:**  
未涂层：打500次后易发生冷焊

**解决方案：**  
- 冷焊减少
- 工作面质量提高
- 打100,000次后略有磨损

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*Take advantage of the outstanding coating properties for your heavy load forming tools!*

为了您的高负载成型模具，请使用完美性能的涂层！

<table>
<thead>
<tr>
<th></th>
<th><strong>BALINIT® ALCRONA PRO DUPLEX</strong></th>
<th><strong>BALINIT® LUMENA DUPLEX</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coating material</td>
<td>AlCrN</td>
<td>TiAlN</td>
</tr>
<tr>
<td>Max. service temperature</td>
<td>&gt; 1,100 °C</td>
<td>600 °C</td>
</tr>
<tr>
<td>Micro hardness (HV 0.05)</td>
<td>3,200</td>
<td>3,400</td>
</tr>
<tr>
<td>Coefficient of friction</td>
<td>0.35</td>
<td>0.30 - 0.35</td>
</tr>
<tr>
<td>DUPLEX process temperature</td>
<td>480 °C</td>
<td>480 °C</td>
</tr>
<tr>
<td>Coating colour</td>
<td>Light grey</td>
<td>Violet grey</td>
</tr>
</tbody>
</table>

*Application recommendations:*

**应用推荐：**

<table>
<thead>
<tr>
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<th><strong>BALINIT® LUMENA DUPLEX</strong></th>
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</thead>
<tbody>
<tr>
<td>Sheet metal forming</td>
<td><strong>++</strong></td>
<td><strong>++</strong></td>
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<tr>
<td>Tensile strength &gt; 500 N/mm²</td>
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<td></td>
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<tr>
<td>Massive forming</td>
<td><strong>++</strong></td>
<td><strong>++</strong></td>
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<tr>
<td>Hot forming</td>
<td><strong>+++</strong></td>
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Take advantage of our high-performance BALINIT DUPLEX Series. Drop us a line or give us a call now!
使用高性能的BALINIT DUPLEX系列。
请通过以下方式联系我们！