An ingenious combination: The BALINIT DUPLEX Series!
The ideal solution for more efficiency and productivity.
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® DUPLEX 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:

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

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

- Reduces mechanical material fatigue
  - e.g. crack formation due to cyclical loading

- Reduces plastic deformation
  - e.g. when yield stresses are exceeded due to extreme pressure

- Reduces abrasive wear
  - due to nitride layer and improved supporting effect

- Lower tool costs due to increased tool service life

- Lower production costs due to less machine downtime and better workpiece quality

- Lower maintenance costs due to longer maintenance intervals and less associated expenditure

**The BALINIT® DUPLEX-Series**
For high-level productivity and manufacturing process reliability
Demonstrably first class: The performance of the BALINIT DUPLEX Series.

**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

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

<table>
<thead>
<tr>
<th></th>
<th>BALINIT® ALCRONA PRO DUPLEX</th>
<th>BALINIT® LUMENA DUPLEX</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>900 °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:

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<th>BALINIT® LUMENA DUPLEX</th>
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<tbody>
<tr>
<td>Sheet metal forming Tensile strength &gt; 500 N/mm²</td>
<td>♦ ♦</td>
<td>♦ ♦ ♦</td>
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<tr>
<td>Massive forming</td>
<td>♦ ♦</td>
<td>♦ ♦ ♦</td>
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<tr>
<td>Hot forming</td>
<td>♦ ♦ ♦</td>
<td>♦ ♦</td>
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</tbody>
</table>
Take advantage of our high-performance BALINIT DUPLEX Series. Drop us a line or give us a call now!

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