BALINIT® LUMENA
Productivity in forming
Challenges
Today, high-strength to ultra-high-strength sheet steel has become the standard in crash-relevant automotive structural parts. When such components are processed, the high-strength characteristics of the metal result in significant stresses on the tool surface, particularly in highly loaded radius zones. In many cases, this causes premature tool failure. Similar problems are encountered in cold solid forming operations. With high degrees of metal deformation, the fatigue load of the base material is often exceeded, and this too, can lead to tool failure. Additionally, cold welding on the tool is often a problem. The consequences are increased maintenance and a deterioration of the surface quality of the part.

The solution
These problems can be solved with BALINIT® LUMENA. The TiAIN coating with minimised residual stress significantly reduces abrasive wear in forming tools. The cold welding problem is largely diminished by the chemical composition of the coating. Cleaning intervals are extended and at the same time, product quality is improved.

The BALINIT® LUMENA coating has the following features:
- High hardness
- An optimised hardness to residual compressive stress ratio
- High abrasive wear resistance
- Improved chemical and thermal resistance
- Reduced coefficient of friction
- High achievable coating thicknesses (comparable with CVD)

BALINIT® LUMENA: Fulfils the toughest requirements in forming

<table>
<thead>
<tr>
<th>Properties of BALINIT® LUMENA</th>
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<tr>
<td>Coating material</td>
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<tr>
<td>Microhardness (HV 0,05)</td>
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<td>Coefficient of friction against steel (%)</td>
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<td>Max. working temperature (°C)</td>
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<td>Coating colour</td>
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A comparison of our environmentally friendly PVD coatings with the CVD or TD coatings used so far in forming applications reveals that BALINIT® LUMENA delivers better or equivalent results – without the risk of tool distortion that can occur due to the high process temperatures involved in the application of CVD and TD coatings.

**Applications:**
- Forming of high-strength sheet steel in the automotive industry (for instance bumpers, longitudinal members, side-impact protectors)
- Cold solid forming of steering and drive elements, transmission parts, etc.
- Sheet metal forming (clutches, etc.)
- Hydroforming
- Aluminium profile extrusion

**Sizing**

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<th>Parts [1,000]</th>
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<tr>
<td>TD</td>
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**Deep drawing**

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**Bending**

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**Tool:** Bending mandrel
**Workpiece:** Material DIN 1.2379 (~AISI D2), 61 HRC
**Benefit:** The BALINIT® LUMENA coating dramatically reduces cold welding.
BALINIT® LUMENA: Enhances the reliability and life of your tools

**Sheet metal forming**

| Tool: Forming die DIN 1.2379 (~AISI D2), 60 HRC Bumper DIN 1.6938 (Si60MnC1P-V) 9036 sheet thickness 2.8 mm
| Workpiece: Bumper, DIN 1.8998 (S680MC/CP-W 800)
| Benefit: Monthly maintenance effort was reduced by 75 %.

**Sheet metal forming**

| Tool: Forming die DIN 1.2379 (~AISI D2), 62 HRC Bumper DIN 1.0965 (S900MC/MS-W 1200)
| Workpiece: Bumper, DIN 1.0965
| Benefit: PVD coatings are much more cost-effective than CVD coatings.

Locations of Oerlikon Balzers

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Further coating centres:
- Argentina, Austria, Brasil, Canada, China, Czech Republic, France, Germany, Hungary, Indonesia, Italy, Japan, Korea, Liechtenstein, Mexico, Poland, Portugal, Romania, Spain, Switzerland, Turkey

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