

BALINIT[®] LUMENA
Productivity in forming
提升成型的生产力



BALINIT® LUMENA: Fulfil the toughest requirements in forming

BALINIT® LUMENA: 满足成型的最高要求

Challenges 挑战

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.

现如今，高强度及超高强度的钢板变成了碰撞相关的汽车结构件的标准配置。在加工这样的零部件的过程中，钢板的高强度特质会在模具表面产生极大的压力，尤其是在高负荷的转角区域。在很多情况下，这将导致工具失效。同样的问题也会出现在冷体积成型操作中。由于金属的高度变形，导致基础材质超疲劳负荷，这也将造成工具失效。此外，在模具上经常出现冷焊的问题。这些问题导致了模具维护成本的增加和工件表面质量的下降。

The solution 解决方案

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

BALINIT® LUMENA可以解决这些问题。TiAlN涂层具有非常低的残余应力，从而显著降低成型模具的摩擦性磨损。涂层的化学成分在很大程度上减少了冷焊的问题。模具的清洁间隔延长了，同时，产品质量也提高了。

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涂层特点

- 高硬度
- 优化硬度与残余压应力的比率
- 高耐磨性
- 改善化学稳定性和阻热性
- 降低摩擦系数
- 可实现较高涂层厚度（与CVD涂层相比）



Properties of BALINIT® LUMENA BALINIT® LUMENA涂层特性

Coating material 涂层材料	TiAlN
Microhardness (HV 0,05) 微硬度	3,400
Coefficient of friction against steel (dry) 对钢摩擦系数 (干)	0.30 - 0.35
Max. service temperature (°C) 最高适用温度	900
Coating colour 涂层颜色	violet-grey 灰紫色

BALINIT® LUMENA: Cost-effective, optimised forming processes

BALINIT® LUMENA: 低成本, 高收益, 优化成型工艺

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.

到目前为止, 把我们环保的PVD涂层与CVD、TD涂层在成型工艺上的应用作比较, 发现BALINIT® LUMENA 给出了一个更佳的或者相同的结果——但是, 它避免了由于高工艺温度所造成的工具变形的风险, 而这种风险存在于CVD和TD涂层的应用中。

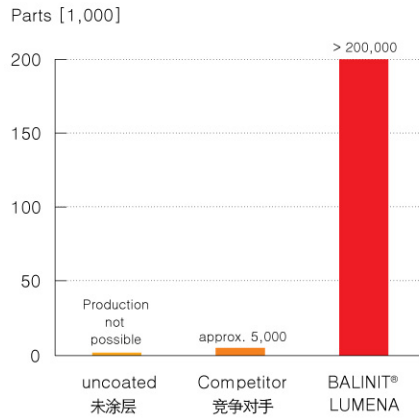
Applications:

- 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

应用:

- 汽车制造业中的高强度钣金成型 (例如: 保险杠, 车架纵架, 侧面碰撞保护)
- 转向, 驱动部件, 传动装置等的冷体积成型
- 钣金成型 (离合器, 等)
- 液压成型
- 铝型材挤压

Sizing 定型



Tool: Mandrel, Ø 120 x 250 mm
Steel DIN 1.3343 (~AISI M2)
62 HRC

Workpiece: Material DIN 1.0511 (~AISI 1040)
thickness 10 mm
6 strokes/min
Lubrication MQL oil mist

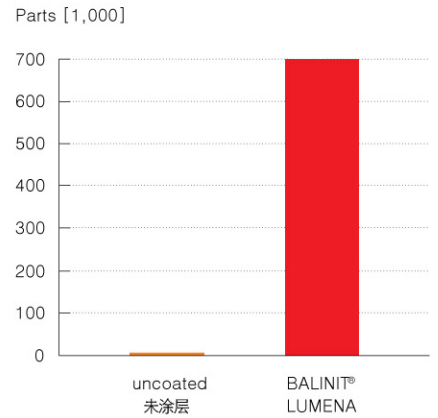
Failure criterion: Cold welding

工具: 心轴 Ø 120 x 250 mm
钢 DIN 1.3343 (~AISI M2)
62 HRC

工件: 材料 DIN 1.0511 (~AISI 1040)
厚度 10 mm
6 次/分
油雾冷却润滑

失效原因: 冷焊

Deep drawing 深度拉伸



Tool: Die, DIN 1.2379 (~AISI D2)
61 HRC

Workpiece: Material DIN 1.0489
(H280LA/H300)
sheet thickness 5 mm

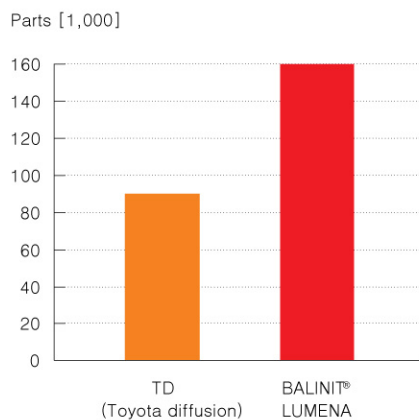
Benefit: Without coating, only 50 parts could be produced.

工具: 模具, DIN 1.2379 (~AISI D2)
61 HRC

工件: 材料 DIN 1.0489
(H280LA/H300)
厚度 5 mm

优势: 在无涂层处理下, 只能制造 50个部件

Bending 折弯



Tool: Bending tool
DIN 1.2379 (~AISI D2), 61 HRC

Workpiece: Structural part
material JIS SAPH 370, 3.2 mm

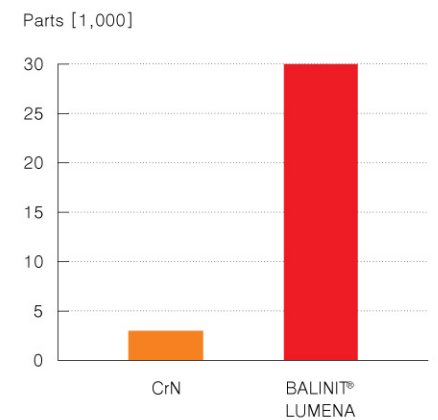
Benefit: Reduced cold welding
significantly improved part quality.

工具: 折弯模具
DIN 1.2379 (~AISI D2), 61 HRC

工件: 结构件
材料 JIS SAPH 370, 3.2 mm

优势: 减少冷焊, 从而显著提高部件质量

Bending 折弯



Tool: Bending mandrel
DIN 1.2379 (~AISI D2), 61 HRC

Workpiece: Tubes, DIN 1.4401 (~AISI 316)
thickness 1.5 – 1.75 mm

Benefit: The BALINIT® LUMENA coating dramatically reduces cold welding.

工具: 折弯心轴
DIN 1.2379 (~AISI D2), 61 HRC

工件: 钢管, DIN 1.4401 (~AISI 316)
厚度 1.5 – 1.75 mm

优势: BALINIT® LUMENA 涂层显著减少冷焊

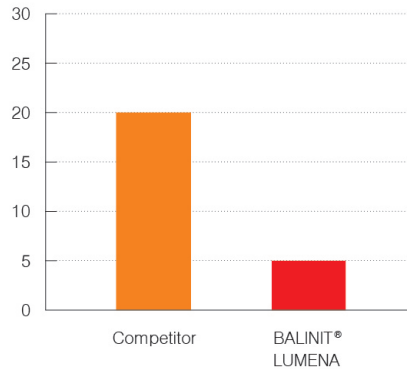


BALINIT® LUMENA: Enhances the reliability and life of your tools BALINIT® LUMENA: 增加模具的可靠性和寿命



Sheet metal forming 钣金成型

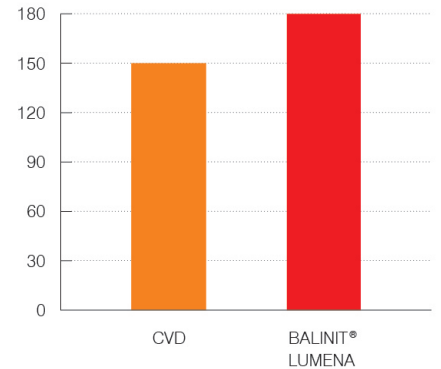
Monthly maintenance (hours) 每月维护 (小时)



Tool:	Forming die DIN 1.2379 (~AISI D2), 60 HRC
Workpiece:	Bumper, DIN 1.8998 (S680MC/CP-W 800) sheet thickness 2.8 mm
Benefit:	Monthly maintenance effort was reduced by 75 %.
工具:	成型模具 DIN 1.2379 (~AISI D2), 60 HRC
工件:	保险杠, DIN 1.8998 (S680MC/CP-W 800) 厚度 2.8 mm
优势:	每月的维护时间减少75%

Sheet metal forming 钣金成型

Parts [1,000]



Tool:	Forming die DIN 1.2379 (~AISI D2), 62 HRC
Workpiece:	Bumper DIN 1.0965 (S900MC/MS-W 1200) sheet thickness 3.0 mm
Benefit:	PVD coatings are much more cost-effective than CVD coatings.
工具:	成型模具 DIN 1.2379 (~AISI D2), 62 HRC
工件:	保险杠 DIN 1.0965 (S900MC/MS-W 1200) 厚度 3.0 mm
优势:	PVD涂层比CVD涂层性价比高

Locations of Oerlikon Balzers 欧瑞康巴尔查斯分布

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Fax +1 205 884 1211
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Further coating centres:

其他涂层中心:

Argentina, Austria, Brasil, Canada,
China, Czech Republic, France,
Germany, Hungary, Indonesia, Italy,
Japan, Korea, Liechtenstein, Mexico,
Poland, Portugal, Romania, Spain,
Switzerland, Turkey
阿根廷, 澳大利亚, 巴西, 加拿大,
中国, 捷克, 法国,
德国, 匈牙利, 印度尼西亚, 意大利,
日本, 韩国, 列支敦石墩, 墨西哥,
波兰, 葡萄牙, 罗马尼亚, 西班牙,
瑞士, 土耳其

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