

oerlikon
balzers

With BALINIT, efficiency and productivity are in top form.

BALINIT在顶级成型中实现高效、高产

Optimal wear protection solutions for your punching and forming tools.

冲压和成型模具的最佳耐磨解决方案



Metal Forming



Upgrade your tools to a new quality level.

With BALINIT.

通过使用BALINIT,您的模具将会提升到一个全新的质量水平

In production, stamping and forming tools are exposed to extreme forces and, consequently, subject to wear. You can minimise the wear of your tools, however, with BALINIT® hard coatings by Oerlikon Balzers. As a global

在生产过程中, 冲压和成型模具暴露于极端的压力下, 因此难以免于磨损。但是, 通过使用欧瑞康巴尔查斯的BALINIT® 硬质涂层可以最大程度化减少您的模具磨损。作

technology leader in PVD coatings, we can offer you significant advantages with our BALINIT® coating solutions that will boost the efficiency, cost-effectiveness, and ecological soundness of your applications.

为PVD涂层全球科技领导者, 我们可以通过BALINIT®涂层解决方案给您带来绝对性的竞争优势, 它不仅可以提高您应用的效率、增加成本效益同时还可以维护生态平衡。

Extreme coating hardness

涂层硬度极高

Protection against abrasive wear
抗磨损保护

No dimensional changes of functional surfaces
功能表面无任何尺寸变化

Low coefficient of friction, high thermal stability

低摩擦系数, 高热稳定性

Prevention of adhesive wear
预防粘着磨损

No cold welding
无冷焊

No heat checking
无热裂纹

Reduced lubricant consumption
减少润滑剂消耗

High wear resistance, very good sliding properties

高耐磨性、优秀的滑动性能

Improved forming
改善成型

Greater dimensional accuracy across longer runs
在较长时间的运行中拥有更高的尺寸精度

Fewer drawing passes
缩短拉伸阶段

Improved surface and cut quality

提高表面和剪切质量

No micro-welding, scoring, and rough sheared edges
无微焊、细纹和粗糙的剪切边缘

Better dimensional stability despite tighter manufacturing tolerances
更小的公差范围内确保更好的尺寸稳定性

Lower tool costs due to extended service life

延长使用寿命, 降低工具成本

Improved ecological footprint due to environmentally friendly low-metered lubricant use

少量使用保护环境的润滑剂, 维护生态平衡

Reduced production costs due to less machine downtime and higher cycle frequencies

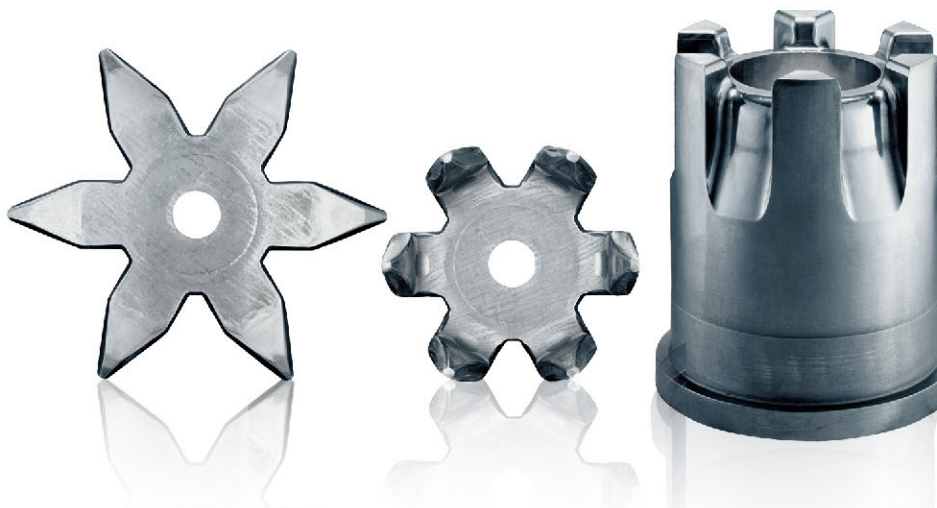
减少停机时间, 提高周期频率 从而降低生产成本

Perceptibly less after-machining due to higher workpiece quality

更好的工件表面质量可以显著减少后续的加工

BALINIT® for punching and forming: Greater productivity, efficiency, and process reliability with an optimised ecobalance

经BALINIT®涂层的冲压和成型模具: 提升生产力、提高效率和确保工艺稳定性



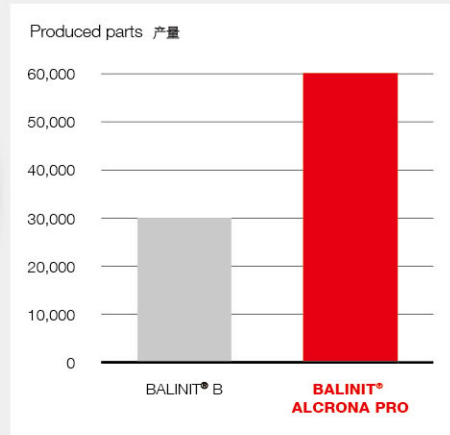
Rely on outstanding performance.

出色的涂层性能



BALINIT® ALCRONA PRO: Extrusion of screw heads

BALINIT® ALCRONA PRO: 螺丝头挤压



Tool 模具

Extrusion punch (HSS \varnothing 10mm)
挤出模 (高速钢 \varnothing 10mm)

Workpiece 工件

Screw heads, steel 1.5526 (30MnB4)
螺丝头, 钢1.5526 (30MnB4)

Challenge 挑战

BALINIT® B / Untreated:
Cold welding, heat checking, and thus shorter tool life

BALINIT® B / 未涂层:
冷焊、热裂纹和较短的模具寿命

The solution: BALINIT® ALCRONA PRO

- Tool life doubled

- Reduced unit costs

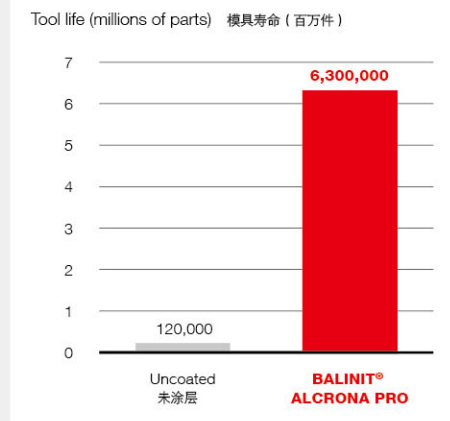
解决方案: BALINIT® ALCRONA PRO

- 模具使用寿命翻倍

- 降低单位成本

BALINIT® ALCRONA PRO: Fine blanking of safety parts

BALINIT® ALCRONA PRO: 安全部件精冲



Tool 模具

Punch and die
冲压模

Workpiece 工件

Latch part for seat belts,
Steel 1.7225 (42 CrMo4)
安全带锁扣, 钢1.7225 (42 CrMo4)

Challenge 挑战

Uncoated: Microwelds, scoring, rough cut surfaces; requires much more frequent regrinding of the tool

未涂层: 微焊、细纹、粗糙的切面; 需要对模具进行频繁的重磨

The solution: BALINIT® ALCRONA PRO

- More than 50-fold increase of tool life

- Perceptibly better surface and cut quality

- Clearly lower need for aftermachining

解决方案: BALINIT® ALCRONA PRO

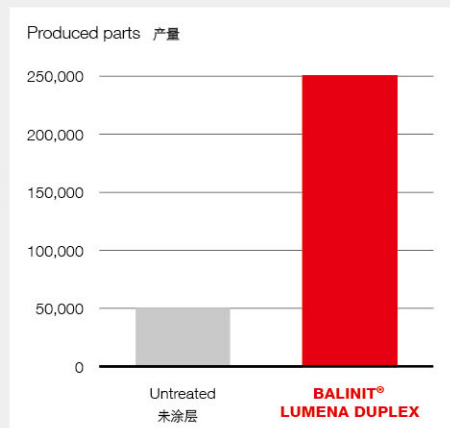
- 延长50倍以上模具寿命

- 更出色的表面和剪切质量

- 显著地减少后续加工

BALINIT® LUMENA DUPLEX: Sheet metal forming of B-pillars

BALINIT® LUMENA DUPLEX: B柱金属钣金成型



Tool 模具

Sheet metal forming die
金属钣金成型模

Workpiece 工件

B-pillar, automobile chassis,
B柱, 汽车底盘
980 MPa,
T=2mm

Challenge 挑战

Untreated: extreme abrasive wear and surface pressure due to high material strength, especially at the drawing radii
未涂层: 高强度钣金材料导致的极端磨粒磨损和表面压力, 特别是在拉伸半径区域

The solution: BALINIT® LUMENA DUPLEX

- 5-fold increase in parts production

- Increased wear resistance thanks to BALINIT® LUMENA

- Greater compressive strength due to DUPLEX treatment

解决方案: BALINIT® LUMENA DUPLEX

- 产量提升5倍

- 使用BALINIT® LUMENA涂层后提高耐磨性

- 经DUPLEX处理后可以提高抗压强度



Coating properties at a glance.

涂层性能一览表

	BALINIT® B	BALINIT® FUTURA NANO	BALINIT® HARDLUBE	BALINIT® D	BALINIT® LUMENA	BALINIT® ALCRONA PRO	BALINIT® C	BALINIT® TRITON
Coating material 涂层材料	TiCN	TiAlN	TiAlN + C/C	CrN	TiAlN	AlCrN	WC/C (a-C:H:W)	DLC (a-C:H)
Microhardness (HV 0.05) 维氏硬度	3,000	3,300	3,000 ¹⁾	1,750	3,400	3,200	1,000 / 1,500	> 2,500
Coefficient of friction against steel (dry) 对钢的摩擦系数 (干)	0.3	0.30 - 0.35	0.15 - 0.20	0.35	0.30 - 0.35	0.35	0.1 - 0.2	0.1 - 0.2
Coating thickness per (µm) 涂层厚度	application-dependent 取决于具体应用							
Residual stress (GPa) 残余应力	-4,0	-1.3 / -1.5	-1.7 / -2.0	-1.5 / -2.0	-1.1	-3.0	-1.0	
Max. service temperature (°C) 最高适用温度	400	900	800 ¹⁾	700	900	1,100	300	350
Coating temperature (°C) 涂层生成温度	450	200 - 450	450	200 - 450	450	< 500	< 250	160 - 260
Coating colour 涂层颜色	blue-grey 蓝灰	violet-grey 紫灰	dark grey 深灰	silver-grey 银灰	violet-grey 紫灰	bright grey 亮灰	anthracite 煤灰色	black 黑色
Coating structure 涂层结构	Multilayer, graded 多层结构	Nano-structured 纳米结构	Multilayer, lamellar 多层片状结构	Monolayer 单层	Nano-structured 纳米结构	Monolayer 单层	Lamellar 片状结构	Monolayer 单层

1) relative to TiAlN 相对于TiAlN

Application recommendations:

推荐应用:

	Punching 冲压		Forming 成型		
	Blanking 下料加工	Fine blanking 精冲	Sheet metal 钣金成型	Bulk forming 体积成型	Warm forming 温成型
Non-alloyed steel 非合金钢	B, AP	B, AP	B, L	B, F, AP	L, AP
Steel < 500 N/mm ² 钢<500 N/mm ²	B, AP	B, AP	B, L	L, AP Ad	L, AP Ad
Steel > 500 N/mm ² 钢>500 N/mm ²	F, AP Ad	F, AP	L, AP Ad		L, AP Du
Steel > 1100 N/mm ² 钢> 1100 N/mm ²	F, AP Ad	F, AP	L, AP Du		L, AP Du
Stainless steel 不锈钢	HL, AP+C	HL, AP+C	HL, AP+C	HL, AP+C	L, AP Du
Titanium alloys 钛合金	F	F	L	F	L, AP
Aluminium alloys 铝合金	HL, T	HL, T	HL, AP+C	HL, AP+C	L, AP
Copper, brass, bronze 铜、黄铜、青铜	F, AP	F, AP	D, AP	D, AP	D, AP
Zincd sheets 镀锌钢板	F, AP	F, AP	HL, AP+C		

B = BALINIT® B

D = BALINIT® D

C = BALINIT® C

F = BALINIT® FUTURA NANO

L = BALINIT® LUMENA

AP = BALINIT® ALCRONA PRO

HL = BALINIT® HARDLUBE

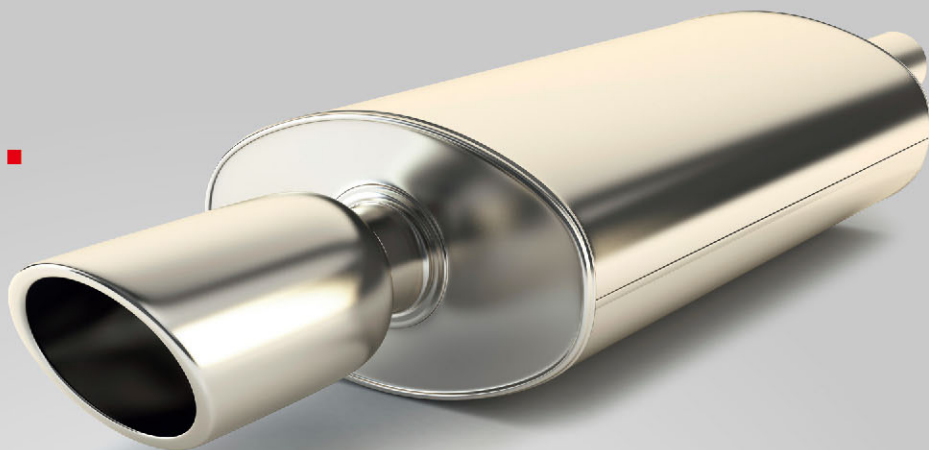
T = BALINIT® TRITON

Ad = ADVANCED Series

Du = DUPLEX treatment

Save up to 86% of costs in production.

生产中节约 86%成本



When forming stainless steel, untreated tools quickly approach their limits. The series production of heat shields, for instance, will stop at about 2000 produced parts due to cracks in the tool surface. However, with BALINIT®

当不锈钢成型时，未涂层的模具很快就达到它们的极限。譬如批量制造防热罩时，当生产到2000件的时候会因为模具表面出现裂纹而不得不停止生产。使用BALINIT®

ALCRONA PRO and BALINIT® C, you can extend the life of the forming tool as much as tenfold, which saves up to 86% of costs.

ALCRONA PRO和BALINIT® C涂层后，模具寿命可以延长十倍左右，同时节省86%的成本。

Production of Heat shields 防热罩生产	Untreated 未涂层	BALINIT® ALCRONA PRO BALINIT® C
Tool costs (EUR) 模具费用 (欧元)	10,000	11,080
Tool life (Number of formed parts) 模具寿命 (生产数量)	2,000	20,000
Tool cost per produced part (EUR) 每件产品模具成本(欧元)	5.00	0.55
Production per minute (No. of parts per min.) 每分钟产量 (生产的数量/分钟)	20	20
Production costs per minute (EUR/min.) 每分钟生产成本 (欧元/分钟)	4	4
Production costs per part (EUR) 每件产品生产成本 (欧元)	0.20	0.20
Costs of machinery downtime 机器停机费用	0.02	0.00
Subsequent machining costs (EUR) 后续维护费用	0.02	0.00
Extra cost per part (EUR) 每件产品其他费用 (欧元)	0.04	0.00
Total production costs per part (EUR) 每件产品总生产成本 (欧元)	5.24	0.75

The bars merely illustrate the correlations among the individual cost factors and do not relate directly to the bottom-line sum.
以上数据只是体现了相关的单个成本因素，不能直接代表最终总成本。

86%
cost savings
成本节省86%

Benefit from optimised wear-protection solutions for punching and forming tools. Contact us now!

冲压和成型模具的最佳磨损保护解决方案。
即刻联系我们！

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