

# The benchmark in plastics processing.

## 塑料加工的基准

Our wear-reduction solutions for greater productivity and efficiency in injection molding and extrusion.

我们提供降低磨损的解决方案，  
使您的注塑模具和挤出模具更加多产、高效。



**Plastics**



# Injection molding and extrusion at its best.

## With BALINIT by Oerlikon Balzers.

### 通过欧瑞康巴尔查斯的BALINIT，您的注塑模和挤出模处于最佳状态。

The mold surface plays a crucial role in injection molding and extrusion: The better its quality, the greater the productivity and efficiency of the manufacturing process. You can reliably attain this objective with innovative BALINIT® wear protection

模具的表面状态对注塑模和挤出模来说，是非常关键的：表面质量越高，制造生产的生产力和效率越佳。通过硬涂层技术领导者欧瑞康巴尔查斯BALINIT® 耐磨损

solutions by Oerlikon Balzers – a technology leader in hard coatings. BALINIT® coatings push your molds to peak performance and offer you numerous advantages in plastics processing.

解决方案，您将能达到这一目标。BALINIT® 涂层让您的模具拥有最佳性能，并在塑料加工过程中为您带来许多优势。

#### Extreme coating hardness

涂层硬度极高

Superb protection against abrasive wear

抗磨损的极佳保护

Protection of mold against discoloration when using aggressive masterbatches

当使用高活性色母粒时，保护模具，以防着色

#### Ceramic material – low coefficient of friction

陶瓷材料—低摩擦系数

Prevents adhesion, e.g. sticking of melt

预防粘连，例如：溶解粘连

Protection against seizure of moving mold parts – even when operated dry

即使在干式操作时，也能够防止移动模具配件的咬合

Reduction of sticking due to inert surface technology

减少因惰性表面技术所造成的粘连

#### Brilliant surface quality

出色的表面质量

Improved mold filling and demolding

改善模具充型和脱模

BALINIT® coatings afford longer protection against surface deposits

BALINIT®涂层提供更长的预防表面沉积的保护

Improved corrosion resistance of amorphous carbon coatings

改善非晶碳涂层的耐腐蚀性

#### Reduction of tool costs due to longer tool life, less scrap, and shorter cycle times

增加工具使用寿命、减少报废量、缩短周期时间，从而降低成本

#### Reduction of production and unit costs due to less machine downtime and improved part quality

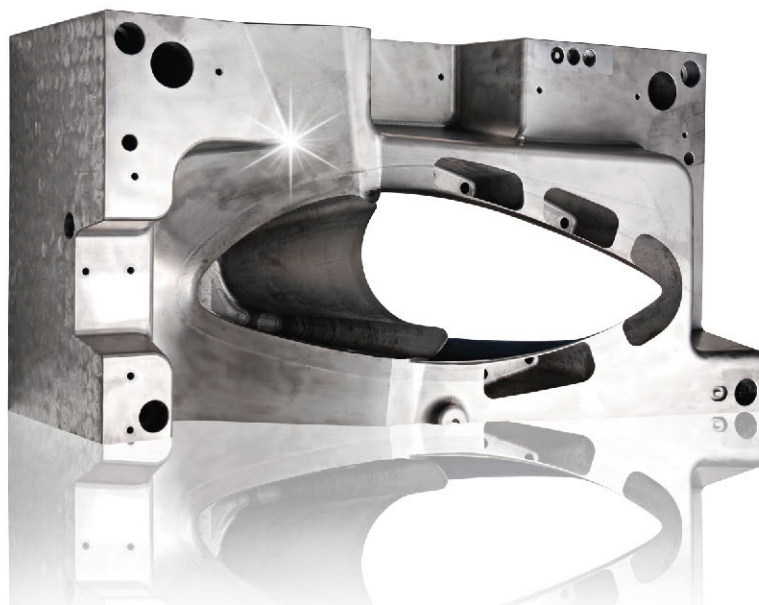
由于缩短了设备停工时间、改善了部件质量，从而降低了生产和单位成本

#### Reduction of maintenance costs due to fewer servicing and cleaning intervals

减少服务和清洁间隔，从而降低维护成本

**BALINIT® for injection molding and extrusion: Boost productivity, cost-effectiveness, and process reliability**

经BALINIT®涂层的注塑模具和挤出模具：提高生产力、成本效益以及工艺稳定性





# Convincing performance in injection molding.

在注塑模具上，值得信赖的表现



**fischer**   
AUTOMOTIVE SYSTEMS

## BALINIT® D for air vents (automotive)

BALINIT®D用于汽车通风口(汽车行业)

**Tool:** 4 cavities, steel: 1.2343 ESU 模具: 4个型腔, 钢: 1.2343 ESU

**Processed polymer:** PA6I/X 塑料材料: PA6I/X

**High gloss challenge:** 高光泽挑战:

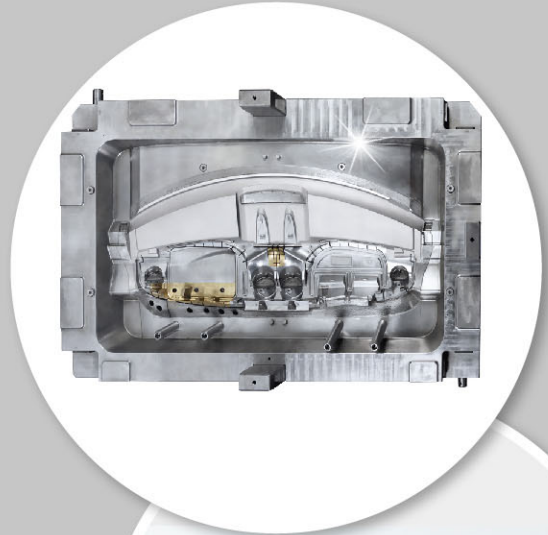
Sensitivity of mirror-polished cavities to scratching,  
critical cleaning of the tool surface  
镜面抛光的腔体容易有刮痕, 工具表面难清洗。

**The solution 解决方案: BALINIT® D**

- Improved demolding
- Greater production efficiency and reliability
- Wear and scratch protection of mirror-polished cavities
- Simplified mold cleaning
- 改善脱模
- 生产更高效、可靠
- 防止镜面抛光腔体磨损以及刮伤
- 简易模具清洗

Source 来源: fischerwerke GmbH & Co. KG, Germany

Tool life  
extension  
工具寿命增加  
**20%**



## BALITHERM® PRIMEFORM treat- ment for instrument panels (automotive)

BALITHERM®PRIMEFORM用于汽车仪表盘(汽车行业)

**Tool:** cavity, steel: 1.2738 HH 模具: 型腔, 钢: 1.2738HH

**Processed polymer:** PA6.6 GF30 塑料材料: PA6.6 GF30

**No-treatment challenge:** 无处理时面临的挑战:

Tool wear due to fibreglass-reinforced material with fla-  
me retardant (VO), scratch-sensitive, flashing, corrosion  
高玻纤并含有阻燃剂的塑料材料, 工具容易磨损、刮伤、飞边、腐蚀。

**The solution 解决方案: BALITHERM® PRIMEFORM**

For noticeably improved demolding, optimised  
processability, enhanced component quality.

- Greater production efficiency and reliability
- Reduced scrap costs
- Reduced maintenance costs
- Reduced flashing at parting line

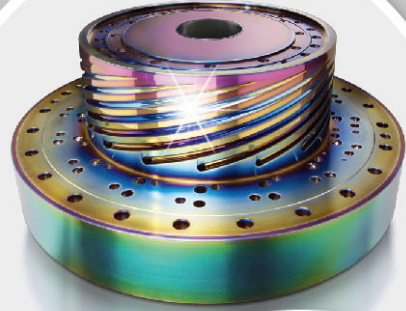
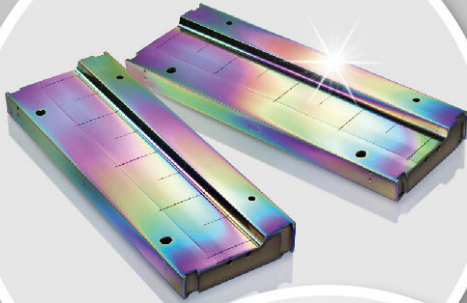
显著改善脱模, 优化加工性能, 增强零部件质量。

- 生产更高效可靠
- 降低报废成本
- 降低维护成本
- 减少在飞行线上的飞边

Productivity  
gain  
生产力增加  
**30%**

# Convincing performance in extrusion.

在挤出模具上，值得信赖的表现



## **BALINIT® CROMA PLUS** for PVC profiles for windows BALINIT®CROMA PLUS用于PVC型材窗

**Tool:** Vacuum calibration unit 模具: 真空校准装置

**Processed polymer:** PVC 塑料材料: PVC

**Challenge:** 挑战

Glas fibres and TiO<sub>2</sub> cause wear at the edges of the vacuum grooves and on the flat sliding surface, this results in scratches on the profile and stick-slips effects 玻纤和TiO<sub>2</sub>导致了真空槽边缘和滑动面的磨损; 从而引起滑动面划痕和粘滑效应

**The solution 解决方案: BALINIT® CROMA PLUS**

- Wear and scratch protection
- Increase lifetime of coating up to 6,000 miles / 9.600 km
- Oxyd-Layer improves flow by 30%
- Reduction of sticking
- Greater production efficiency and reliability
- 耐磨损、抗划痕
- 延长涂层寿命达6000英里/9600公里
- 氧化层改善物料流动性30%
- 减少粘附
- 提高生产力和生产工艺稳定性

Material flow  
increase by  
**30%**

## **BALINIT® CROMA PLUS** for plastics films BALINIT®CROMA PLUS用于塑料薄膜

**Tool:** Spiral mandrel distributor/dies 模具: 螺旋芯棒式模头

**Processed polymer:** HDPE 塑料材料: HDPE

**Challenge:** 挑战

Quality issues in the films due to local plastic spots sticking to the surface, abrasive cleaning causing wear and scratches, surface gets dull and rougher after ~1 year process

局部塑胶点粘附表面从而导致质量问题, 清洁导致磨损和划痕, 使用一年以后表面变得暗淡、粗糙。

**The solution 解决方案: BALINIT® CROMA PLUS**

Greater production efficiency and reliability

- Significantly reduced or even eliminated sticking
- Excellent scratch protection
- No chemical interaction – no visual change of BALINIT® CROMA PLUS

提高生产效率和稳定性

- 明显减少甚至避免粘附
- 抗划痕
- 没有化学反应-BALINIT®CROMA PLUS, 产品外观没有视觉改变

Reduction  
of downtime for  
cleaning by  
**60%**



# For injection molding, coating properties at a glance: 用于注塑模具，涂层性能一览表：

	Carbon-based coatings: 碳基涂层:			
	BALINIT® DYLYN	BALINIT® TRITON	BALINIT® C	BALINIT® HARD CARBON
Coating material 涂层材料	a-C:H:Si	a-C:H	Me-C:H	ta-C
Microhardness (HV 0.05) 维氏硬度	2,500	2,500	1,500	5,000
Coefficient of friction (dry against steel) 摩擦系数(干式, 对钢)	0.1 – 0.2	0.1 – 0.2	0.1 – 0.2	0.1 – 0.2
Coating thickness (µm) 涂层厚度	1 – 3	1 – 3	1 – 4	1 – 2
Residual stress (Gpa) 剩余应力			-1.0	
Max. service temperature (°C) 最高工作温度	300	300	300	500
Coating temperature (°C) 涂层温度	180 – 220	180 – 250	180 – 250	<150
Coating colour 涂层颜色	Black 黑色	Black 黑色	Charcoal 炭黑	Black 黑色
Coating structure 涂层结构	Multilayer 多层	Monolayer 单层	Lamellar 薄片	Monolayer 单层
Abrasion 磨损	++	++	+	+++
Adhesion (seizure) 粘附(咬合)	++	+++	+++	+
Corrosion 腐蚀	+++	++	+	++
Demolding 脱模				
Mold filling 充模				
Available as BALINIT® ARCTIC low-temperature coating (max. 200°C) 适用于BALINIT®ARCTIC低温涂层				
Available as STAR version* 适用于STAR版本	x (Ti)	x (CrN)	x (CrN)	
Available in BALINIT® DUPLEX Series** 适用于BALINIT®DUPLEX系列	x	x	x	
Available in BALINIT® ADVANCED Series*** 适用于BALINIT®ADVANCED系列				

\*The STAR versions deliver better load-bearing capabilities paired with high surface pressures. \*STAR版本针对表面高负载的应用，它实现更高的承载力。

The following materials can be coated: High-speed steels, plastic mold steels, cold- and hot-working steels, stainless steels, heat-treatable steels, cemented carbides, suitable CuBe alloys. 如下材料可以进行涂层处理：高速钢、塑料模具钢、热冷作钢、不锈钢、热处理钢、硬质合金和合适的铜合金。

## Application recommendations: 应用推荐:

	Carbon-based coatings: 碳基涂层:			
	BALINIT® DYLYN	BALINIT® TRITON	BALINIT® C	BALINIT® HARD CARBON
<b>Thermoplastics 热塑性塑料:</b>				
PE, PP, PB				
PS, SB, SAN, ABS, ASA				
PVC				
PTFE, SPTFE, PVDF				
POM				
PA				
PC, PBT (B), PET (P)	For moving tool elements / dry operation (slides/ejectors) 用于移动部件/干式加工(滑块/顶针)	For moving tool elements / dry operation (slides/ejectors) 用于移动部件/干式加工(滑块/顶针)	For moving tool elements / dry operation (slides/ejectors) 用于移动部件/干式加工(滑块/顶针)	For moving tool elements / dry operation (slides/ejectors) 用于移动部件/干式加工(滑块/顶针)
PPE, PEEK, PAEK / PPS, PSU, PES				
PI				
CA, CP, CAP				
PMMA				
TPU				
<b>Thermosets 热固性材料:</b>				
PF				
EP				
UP				
MF, UF, MP				
<b>Elastomers 弹性体:</b>				
PUR				
NBR, EPDM, Si				
Multipolymer TPE, FPM				

- + = Conditionally suited
- ++ = Well suited
- +++ = Excellently suited

All BALINIT® coatings intended for manufacturing food industry packaging have been classified by the FDA as safe for this application. All data provided herein is for reference purposes only. Definitive values depend on the respective substrate, geometry, and surface finish. 所有将用于食品包装行业制造的所有BALINIT®涂层已被FDA列为安全应用。所有数据仅作参考。实际值基于具体基材、几何形状和表面处理情况。

## Coating properties at a glance: 涂层性能一览表:

	BALINIT® D	BALINIT® CROVEGA	BALINIT® CROMA	BALINIT® CROMA PLUS
Coating material 涂层材料	CrN	CrN	CrN	CrN+OX
Microhardness (HV 0.05) 维氏硬度	1,750	1,750	2,500	2,500
Coefficient of friction (dry against steel) 摩擦系数(干式, 对钢)	0.5	0.5	0.3 – 0.5	0.3 – 0.5
Coating thickness (µm) 涂层厚度	2 – 4	2 – 4	4 – 10	4 – 10
Residual stress (Gpa) 剩余应力	-1.5/-2.0	-1.5/-2.0	-1.5/-2.0	-1.5/-2.0
Max. service temperature (°C) 最高工作温度	700	700	700	700
Coating temperature (°C) 涂层温度	200 – 450	250	250 – 450	250 – 450
Coating colour 涂层颜色	Silver grey 银灰色	Silver grey 银灰色	Silver grey 银灰色	Rainbow 彩虹色
Coating structure 涂层结构	Monolayer 单层	Monolayer 单层	Multilayer 多层	Multilayer 多层
Abrasion 磨损	++	++	++	++
Adhesion (seizure) 粘附(咬合)	++	++	++	+++
Corrosion 腐蚀	+	++	++	++
Demolding 脱模	++	++	++	++
Mold filling 充模	+	+	+	+
Available as BALINIT® ARCTIC low-temperature coating (max. 200°C) 适用于BALINIT®ARCTIC低温涂层	x			
Available as STAR version* 适用于STAR版本				
Available in BALINIT® DUPLEX Series 适用于BALINIT®DUPLEX系列 Nitriding in combination with BALINIT® coating 渗氮结合BALINIT®涂层			x	x
Available in BALINIT® ADVANCED Series 适用于BALINIT®ADVANCED系列 (enhanced support effect of the tool surface) 加强工具表面支撑力作用				

**Especially for extrusion**  
特别针对挤出模具

\*The STAR versions deliver better load-bearing capabilities paired with high surface pressures. \*STAR版本能够在表面压力高的情况下, 实现更高的承载力。

The following materials can be coated: High-speed steels, plastic mold steels, cold- and hot-working steels, stainless steels, heat-treatable steels, cemented carbides, 如下材料可以进行涂层处理: 高速钢、塑料模具钢、冷/热作钢、不锈钢、热处理钢、硬质合金、合适的硬质合金和合适的铜合金。

## Application recommendations: 涂层性能一览表:

	BALINIT® D	BALINIT® CROVEGA	BALINIT® CROMA	BALINIT® CROMA PLUS
<b>Thermoplastics 热塑性塑料:</b>				
PE, PP, PB	++	++	++	+++
PS, SB, SAN, ABS, ASA	++	++	++	+++
PVC	++	++	++	+++
PTFE, SPTFE, PVDF	++	++	++	++
POM	++	++	++	+++
PA	++	++	++	+++
PC, PBT (B), PET (P)	++	++	++	+++
PPE, PEEK, PAEK / PPS, PSU, PES	++	++	++	+++
PI				
CA, CP, CAP				
PMMA				+++
TPU	+	+	+	+++
<b>Thermosets 热固性材料:</b>				
PF	++	++	++	+++
EP	++	++	++	+++
UP	+	+	+	+
MF, UF, MP	++	++	++	+++
<b>Elastomere 弹性体</b>				
PUR	+	+	+	+++
NBR, EPDM, Si	++	++	++	++
Multipolymer TPE, FPM	++	++	++	+++

+ = Conditionally suited  
++ = Well suited  
+++ = Excellently suited

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			Carbon-based coatings: 碳基涂层:	
BALINIT® A	BALINIT® ALCRONA PRO	BALINIT® LUMENA	BALINIT® DYLYN PLUS	BALINIT® DYLYN PRO
TiN	AlCrN	TiAlN	a-C:H:Si	a-C:H:Si
2,300	3,200	3,400	2,200	2,100
0.4	0.35	0.3 – 0.35	0.05 – 0.1	0.05 – 0.1
2 – 4	2 – 4	8 – 12	1 – 3	1 – 3
-2.5	-3.0	-1.1		
600	1100	900	350	350
200 – 450	470	450	180 – 220	180 – 220
Gold-yellow 金黄色	Blue-grey 蓝灰色	Violet-grey 紫灰色	Black 黑色	Black 黑色
Monolayer 单层	Monolayer 单层	Nanostructured 纳米结构	Multilayer 多层	Multilayer 多层
++	+++	+++	++	++
+	+	+	+++	+++
+	++	++	+++	+++
+	++	+	++	+++
+	+	+++	+++	+++
x				
			x (Ti)	x (Ti)
	x	x	x	x
	x	x		

BALITHERM® PRIMEFORM
up to 1,400
0
400
380/480
++
+
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+

suitable CuBe alloys.

			Carbon-based coatings: 碳基涂层:	
BALINIT® A	BALINIT® ALCRONA PRO	BALINIT® LUMENA	BALINIT® DYLYN PLUS	BALINIT® DYLYN PRO
+	+++	+++	+++	+++
+++	++	+++	++	++
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BALITHERM® PRIMEFORM
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**Benefit from high-end wear protection solutions for your plastics processing applications. Contact us now!**

**给您的塑料加工应用，带来高端耐磨解决方案。  
即刻联系我们！**

OC Oerlikon Balzers AG | Balzers Technology & Service Centre | Iramali 18 | 9496 Balzers | Liechtenstein  
T: +423 388 7500 | F: +423 388 5419 | E: [components.balzers@oerlikon.com](mailto:components.balzers@oerlikon.com) | [www.oerlikon.com/balzers](http://www.oerlikon.com/balzers)

Oerlikon Balzers Coating (Suzhou) Co., Ltd | No.9 Chang Yang Street | Suzhou Industrial Park 215024 | Jiangsu Province | P.R.China  
T: +86 512 67620369 | F: +86 512 67620359 | E: [info.balzers.cn@oerlikon.com](mailto:info.balzers.cn@oerlikon.com) | [www.oerlikon.com/balzers/cn](http://www.oerlikon.com/balzers/cn)

欧瑞康巴尔查斯涂层（苏州）有限公司 | 长阳街9号苏州工业园区 | 215024 | 江苏省 | 中国  
电话: +86 512 67620369 | 传真: +86 512 67620359 | 邮箱: [info.balzers.cn@oerlikon.com](mailto:info.balzers.cn@oerlikon.com)

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