

Productivity with a big plus +85% for drilling in steel 钢上钻削，生产力大幅提高85%

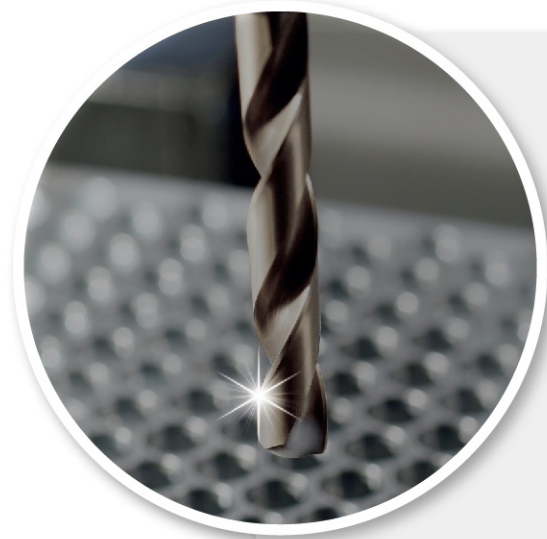
Higher productivity with BALINIT® PERTURA

A general rule says that the costs for mechanical machining operations can only be reduced significantly through increased productivity of the tools employed. A simple calculation demonstrates this: An increase in tool lifetime of 50% results in cost savings amounting to only 1% per component. The

通过使用BALINIT® PERTURA，生产力大幅度提高。常规来说，只有通过提高工具生产力，才能降低机械加工的成本。一个简单的计算显示：工具使用寿命增加50%，单个部件只能节约成本1%，节约的成本与工具

savings are about the same when tool costs are decreased by 30%. On the other hand, increasing the feed rate and cutting speed by 20% can reduce manufacturing costs by at least 15%. BALINIT® PERTURA allows significantly higher cutting speeds and feed rates than do conventional PVD coatings – especially under difficult application conditions.

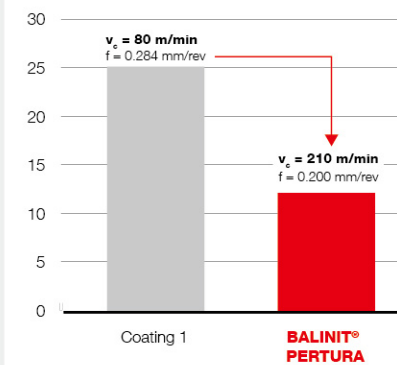
成本减少30%几乎一致。另一方面，仅需提高进给率和切削速度20%，就可以减少至少15%的生产成本。BALINIT® PERTURA相对于传统的PVD涂层，特别是在难加工应用环境下，可以显著提高切削速度和进给率。



BALINIT® PERTURA for drilling in steel

BALINIT® PERTURA用于钢上钻削

Machining time for 500 drilled holes [min]
加工500个孔的加工时间(分钟)



Tool 工具	Carbide drill 硬质合金钻头 Ø 8.5 mm
Workpiece 工件	Steel 钢 1.7225 (AISI 4140, SCM440) 900 N/mm ²
Cutting data 切削参数	LD = 5xD (through hole) Internal cooling with emulsion 乳化液冷却内部
Criterion for end of service life 使用寿命结束标准	VB = 0.3 mm
Source 来源	Oerlikon Balzers cutting laboratory 欧瑞康巴尔查斯切削实验室

Benefit from the BALINIT PERTURA high-performance coating Contact us now!

体验BALINIT PERTURA高性能涂层
即刻与我们联系!

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BALINIT PERTURA At full power BALINIT PERTURA 全力高效

High-performance drilling
高性能钻削



Cutting Tools



BALINIT PERTURA

You benefit from more performance and flexibility

您将获益于更高性能、更灵活的涂层

BALINIT®PERTURA is a coating for all high-performance carbide drills. It is the result of the refinement process involving our BALINIT®FUTURA and HELICA coatings. Regardless of whether for machining operations in steel or cast iron, for new or recoating: With its unique nano-layer structure, BALINIT®PERTURA enhances the stability and process reliability of your tools even under difficult conditions. BALINIT®PERTURA适用于所有高性能硬质合金钻头，是BALINIT®FUTURA和HELICA涂层工艺的提炼。无论是加工钢材还是铸铁，首次涂层还是重复涂层，BALINIT®PERTURA因其独特的纳米结构在难加工情况下，也能提高稳定性和工艺可

machining conditions. This means reduced tool changing and increased machine service life. Moreover, machining times are shortened, which in turn allows for maximum machine capacity utilization as well as savings in production costs. There are numerous advantages offered only by Oerlikon Balzers, a global technology leader in hard coatings. 可靠性，这意味着减少了工具替换，增加了加工寿命。此外，较短的加工时间使您的设备利用率达到最大，这就降低了生产成本。全球硬涂层技术领导者欧瑞康巴尔查斯为您提供众多优势。

reliability, which means reduced tool replacement, increased processing life. In addition, shorter processing times allow your equipment utilization to reach its maximum, which also reduces production costs. Global hard coating technology leader Oerlikon Balzers offers you many advantages.

Every coating property is a factor for success

每一项涂层性能都是成功的因素

OPTIMIZED PERFORMANCE 优化性能

Nanolayer structure and specific layer composition 纳米层结构和独特的多层结构	>	Consistent prevention of crack growth 持续防止裂纹延伸 Versatile application in highend drilling 高端钻削的通用应用
Optimal balance between residual stress, hardness and fracture toughness 优化平衡残余应力、硬度和断裂韧性	>	Applications at moderate and high cutting speeds possible 适用于中、高速切削
Enormous abrasion-resistance and high hot hardness 极高的耐磨性和红硬性	>	High tool lifetimes 工具使用寿命长
Extremely smooth coating surface 涂层表面极度光滑	>	Trouble-free chip transport 排屑无阻 Reduction of cutting forces 减少切削阻力
Outstanding oxidation resistance 突出的抗氧化性	>	Very high tool stability, especially of the cutting edges 工具稳定性高，特别是切削刃 Extremely high service life, even with deep-hole and dry drilling 工具使用寿命长，即使是深孔钻或干式钻削

BALINIT® PERTURA

More productivity, process reliability and efficiency in carbide drilling

在硬质合金钻削中，生产力、工艺稳定性和效率均得到提高

Rely on a broad application range – even under difficult conditions

即使在难加工条件下，也拥有广阔的应用范围

Ideal for a diverse variety of carbide drills

多种硬质合金钻头的理想解决方案

- Deep-hole drills – 深孔钻
- Step drills – 阶梯钻
- As well as all standard drills – 以及标准钻头

Ideal for challenging materials

适用于难加工材料

- C70
- GGG60
- GJV
- Materials with high tensile strength – 高强度材料
- Stainless steels – 不锈钢

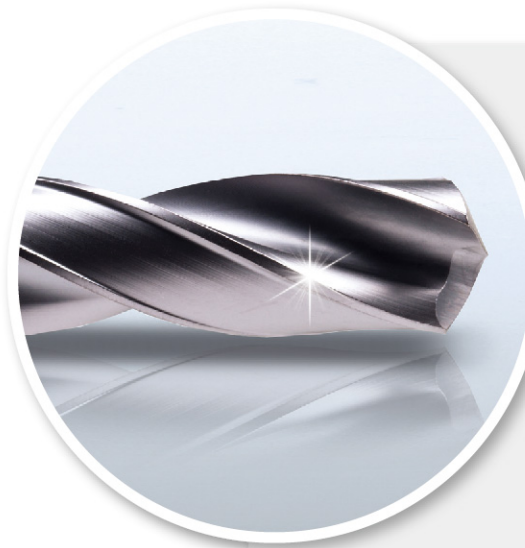
Ideal for all cooling variants

适用于所有冷却方式

- Internal cooling – 内冷
- External cooling – 外冷
- MQL – 少量润滑剂
- Dry machining – 干加工

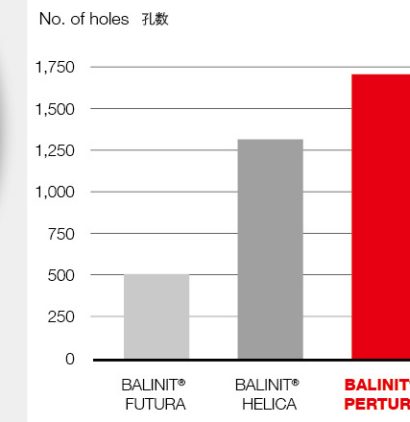
Obtain top performance statistics in your machining

在您机械加工过程中，获得顶级性能数据



Drilling in steel at moderate cutting speeds

中速钻削



Tool
工具

Workpiece
工件

Cutting data
切削参数

Criterion for end of service life
使用寿命结束标准

Source
来源

Carbide drill Ø 8.5 mm 硬质合金钻头

Steel 钢 1.7225 (AISI 4140, SCM440)
900 N/mm²

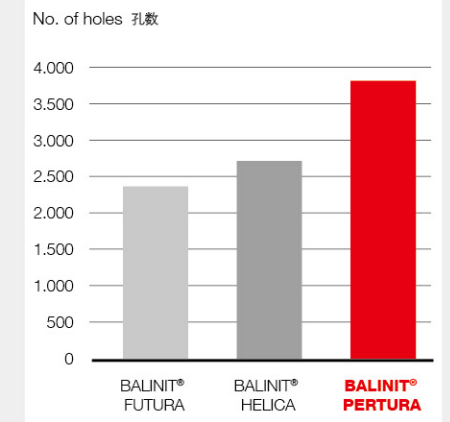
$v_c = 80$ m/min
 $f = 0.284$ mm/rev
 $L_D = 5xD$ (through hole)
Internal cooling with emulsion
用乳化液内部冷却

VB = 0.3 mm

Oerlikon Balzers cutting laboratory
欧瑞康巴尔查斯切削实验室

Drilling in cast iron

铸铁钻削



Carbide drill Ø = 8.5 mm 硬质合金钻头

Cast iron 铸铁 0.7060
(AISI 100-70-03, FCD600)

$v_c = 90$ m/min
 $f = 0.220$ mm/rev
 $L_D = 5xD$ (through hole)
Internal cooling with emulsion
用乳化液内部冷却

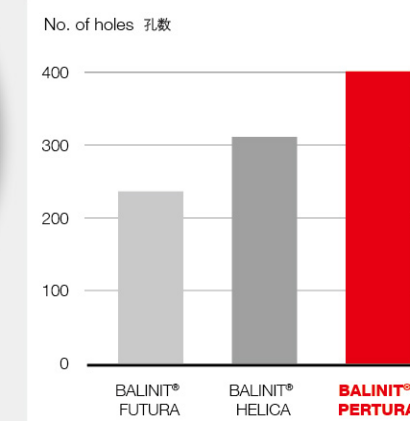
VB = 0.3 mm

Oerlikon Balzers cutting laboratory
欧瑞康巴尔查斯切削实验室



Drilling in hot-work steel

中速钻削



Tool
工具

Workpiece
工件

Cutting data
切削参数

Criterion for end of service life
使用寿命结束标准

Source
来源

Carbide drill Ø = 5.5 mm 硬质合金钻头

Steel 钢 1.2714 (~AISI L6, ~SKT4)
1200 N/mm²

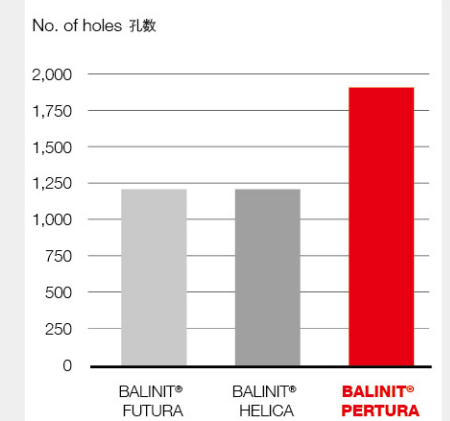
$v_c = 65$ m/min
 $f = 0.10$ mm/rev
 $L_D = 25$ mm
MQL 少量润滑剂

VB = 0.3 mm

Oerlikon Balzers/University of Hamburg
欧瑞康巴尔查斯/汉堡大学

Drilling in stainless steel

铸铁钻削



Carbide drill Ø = 8.5 mm 硬质合金钻头

Steel 钢 1.4571
(AISI 316Ti, SUS316Ti)

$v_c = 80$ m/min
 $f = 0.1$ mm/rev
 $L_D = 40$ mm
Internal cooling with emulsion 用乳化液冷却内部

VB = 0.3 mm

Oerlikon Balzers cutting laboratory
欧瑞康巴尔查斯切削实验室