

# BALINIT DURANA

The versatile coating for demanding machining



**Cutting Tools**



# Your advantages at a glance

- Combination of AlTiN-based and TiSiXN layers gives BALINIT® DURANA a high degree of ductility and superior abrasive wear resistance even at extreme service temperatures, resulting in hugely improved performance during demanding machining operations.
- A tailored combination of coating structure and properties significantly reduces abrasive wear, resulting in longer tool service life.

COATING PROPERTIES	BALINIT® DURANA
Coating material	AlTiN/TiSiXN
Coating hardness HIT (GPa)	37 ± 3
Compressive stress (GPa)	-3.5 ± 1
Max. service temperature (°C)	1,000
Coating temperature (°C)	< 500
Coating colour	bronze

## OPTIMISED PERFORMANCE

Superior resistance against abrasive wear	>	Optimised layer structure: a combination of high ductility of the AlTiN-based layer and outstanding wear resistance of the outermost TiSiXN layer
Minimised chipping	>	Tailored combination of the coating structure and properties contributes to increased toughness of cutting edge
Significantly reduced crack formation	>	Defined stress profile in the coating significantly reduces crack formation and propagation during alternating thermal loads
Protection of the cutting edge from high temperatures and oxidation	>	BALINIT® DURANA provides outstanding protection against oxidation even at high temperatures

## BALINIT® DURANA The versatile coating solution for demanding applications

MATERIAL	STICK BLADES	ENDMILLS	DRILLS	REAMERS
Unalloyed steel	DR / AT / AP	AP	PT / AP / LM	ALC / PT / AP
Steel < 1000 N/mm <sup>2</sup>	DR / AT / AP	AP	PT / LM / AP	ALC / PT / AP
Steel > 1000 N/mm <sup>2</sup>	DR / AT / AP	AP / LM / DR	DR / PT / LM	ALC / DR / AP
Steel 45 - 56 HRC	DR / AT / AP	DR / AN / LM	DR / PT / LM	ALC / DR / LM
Steel 56 - 72 HRC	DR / AT / AP	TIS / DR / LM	DR / PT / LM	TIS / DR / PT
Stainless steel		TF / AN / LM	DR / PT / LM	ALC / DR / PT
Cast iron (GG, GGG)	DR / AT / AP	AN / LM / AP	PT / LM / AP	ALC / PT / AP
Nickel alloys		TF / TIS / LM	PT / LM	TIS / LM
Titanium, titanium alloys		TF / TIS / AN	PT / LM / AP	TIS / LM



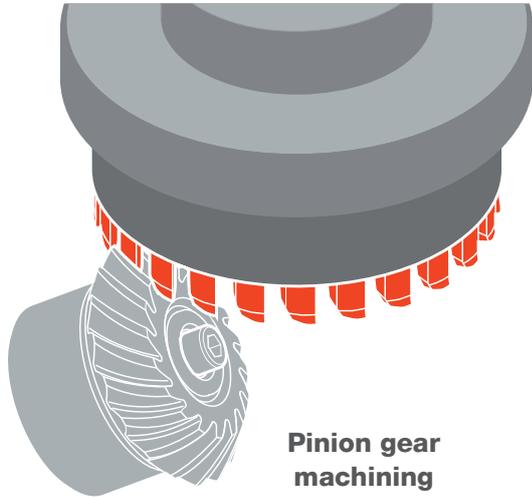
ALC = BALIQ® ALCRONOS  
AN = BALINIT® ALNOVA  
AP = BALINIT® ALCRONA PRO

AT = BALINIT® ALTENSA  
DR = BALINIT® DURANA  
LM = BALINIT® LATUMA

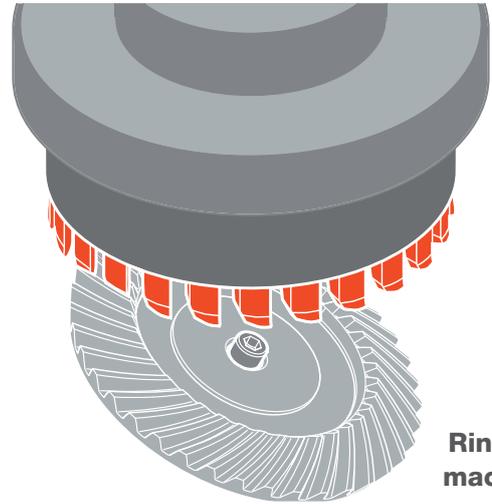
PT = BALINIT® PERTURA  
TIS = BALIQ® TISINOS  
TF = BALINIT® TISAFLEX

# BALINIT DURANA for bevel gear cutting applications

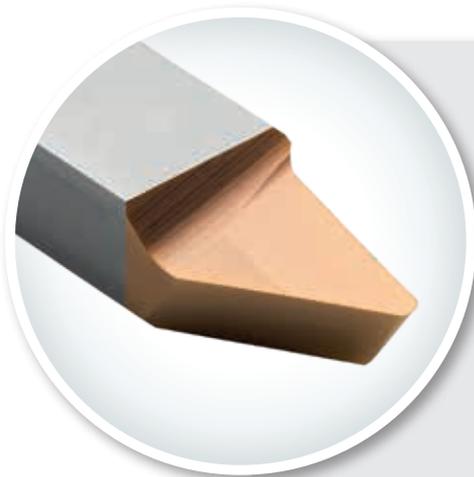
In the production process, your bevel gear cutting tools are exposed to extremely high mechanical and thermal stresses that inevitably lead to chipping and crack formation. Oerlikon Balzers has developed BALINIT® DURANA, a superior coating that withstands these tough machining conditions and gives you significantly longer tool service life and increased productivity.



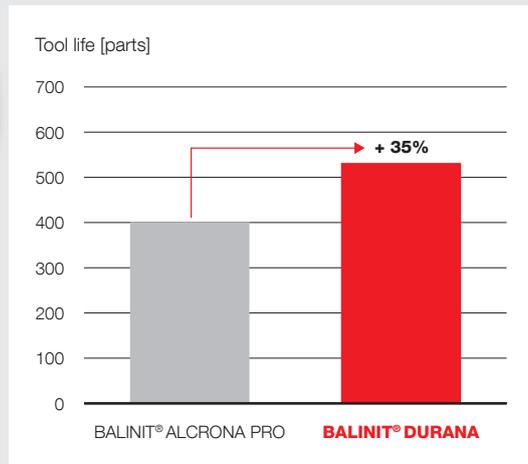
**Pinion gear machining**



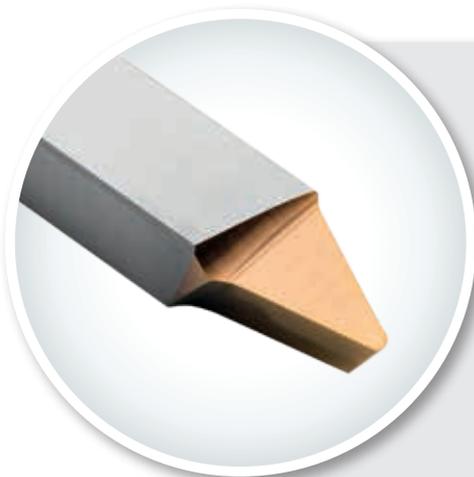
**Ring gear machining**



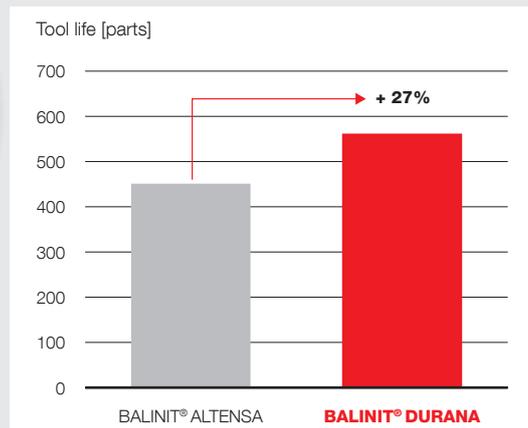
## BALINIT DURANA – pinion gear machining (truck gears)



<b>Tool</b>	Carbide stick blade
<b>Workpiece</b>	Pinion gear
<b>Cutting data</b>	$v_c = 160$ m/min $f_z = 0.05$ mm
<b>Benefit</b>	<b>Reduced manufacturing costs</b>
<b>Source/customer</b>	Axle manufacturer



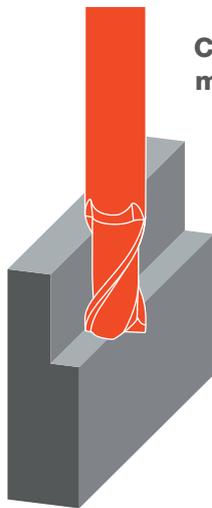
## BALINIT DURANA – ring gear machining



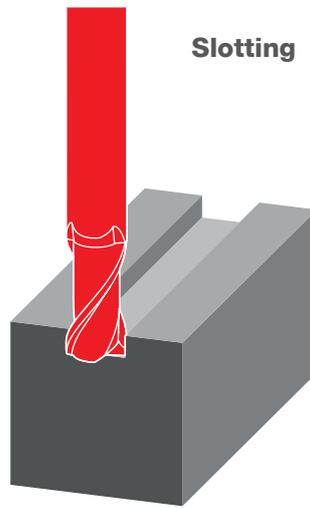
<b>Tool</b>	Carbide stick blade
<b>Workpiece</b>	Ring gear
<b>Cutting data</b>	$v_c = 170$ m/min $f_z = 0.03$ mm
<b>Benefit</b>	<b>Reduced manufacturing costs</b>
<b>Source/customer</b>	Axle manufacturer

# BALINIT DURANA for end milling applications

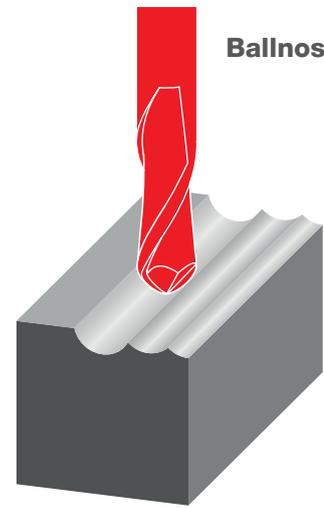
BALINIT® DURANA can be used for various types of end mills. Testing under the toughest possible conditions at our in-house machining laboratory and under real-life production conditions at our customers' sites have shown that it considerably extends tool service life.



**Corner milling**



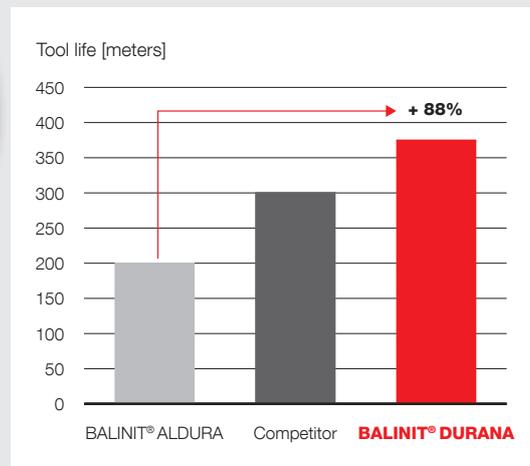
**Slotting**



**Ballnose**



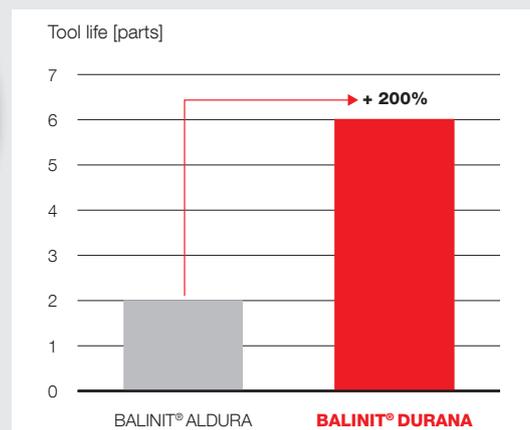
## BALINIT DURANA – milling tool steel 62 HRC (1.2379)



<b>Tool</b>	Ballnose endmill Ø 12.0 mm
<b>Workpiece</b>	Steel 1.2379 X155CrMo121 (AISI D2, JIS SKD11) 62 HRC
<b>Cutting data</b>	$v_c = 150$ m/min $f_z = 0.12$ mm/tooth $a_p = 0.24$ mm $a_e = 0.30$ mm Dry
<b>Benefit</b>	<b>Longer tool service life</b>
<b>Source/customer</b>	Oerlikon Balzers Cutting Laboratory



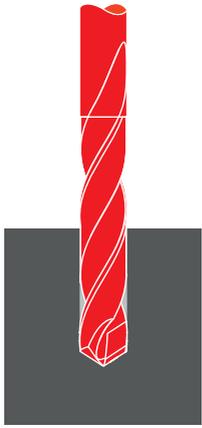
## BALINIT DURANA – milling tool steel 55 HRC (1.2379)



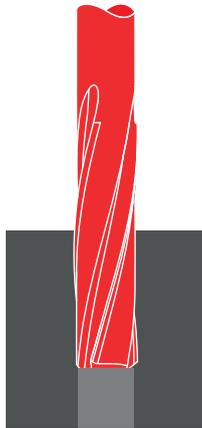
<b>Tool</b>	Endmill Ø 10.0 mm
<b>Workpiece</b>	Steel 1.2379 X155CrMo121 (AISI D2, JIS SKD11) 55 HRC
<b>Cutting data</b>	$v_c = 180$ m/min $f_z = 0.15$ mm/tooth $a_p = 0.05$ mm $a_e = 0.05$ mm Dry
<b>Benefit</b>	<b>Longer tool service life</b>
<b>Source/customer</b>	Tool manufacturer

# BALINIT DURANA for drilling applications

The BALINIT® DURANA coating has proven to be highly reliable for a wide range of drills and their different applications under the toughest possible conditions. The coating significantly extends tool service life – even after regrinding.



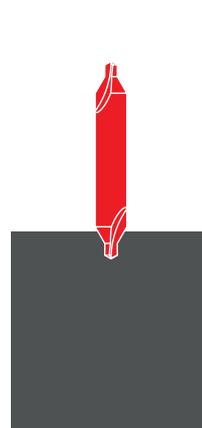
Deep hole drilling



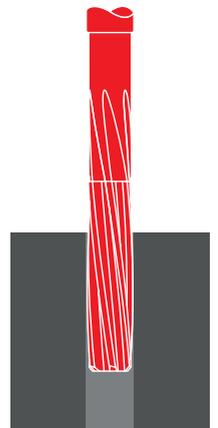
Spiral countersink



Counterbore



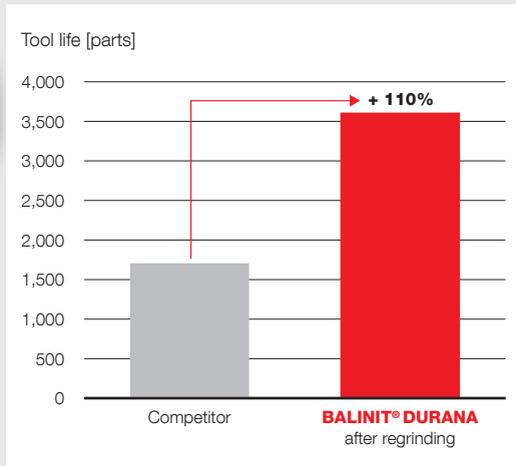
Centre hole drilling



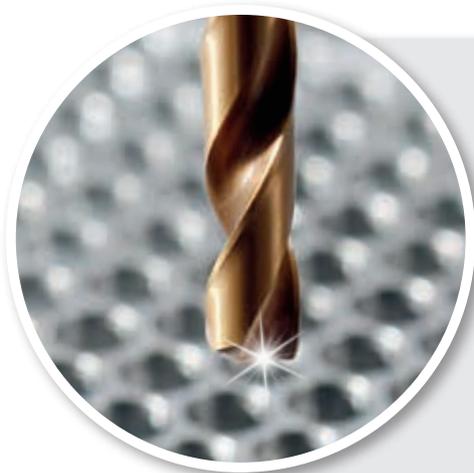
Reaming



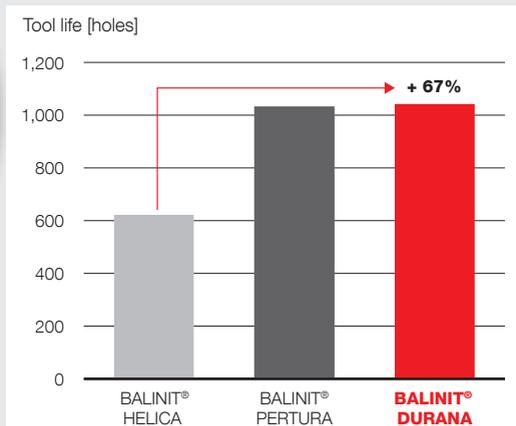
## BALINIT DURANA – deep hole drilling for automotive component



<b>Tool</b>	Solid carbide drill Ø 10.0 mm
<b>Workpiece</b>	Connecting rod Steel 1.8159 51CrV4 (AISI6150, 50CV4)
<b>Cutting data</b>	$v_c = 82$ m/min $f = 0.28$ mm/rev MQL
<b>Benefit</b>	<b>Longer tool service life</b>
<b>Source/customer</b>	Automotive component producer



## BALINIT DURANA – deep hole drilling in low alloy steel (1.7225)



<b>Tool</b>	Solid carbide drill Ø 8.5 mm
<b>Workpiece</b>	Steel 1.7225 42CrMo4 (AISI4140, SCM440)
<b>Cutting data</b>	$v_c = 160$ m/min $f = 0.26$ mm/rev $a_p = 40$ mm Internal coolant Through hole
<b>Benefit</b>	<b>Longer tool service life</b>
<b>Source/customer</b>	Oerlikon Balzers Cutting Laboratory

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