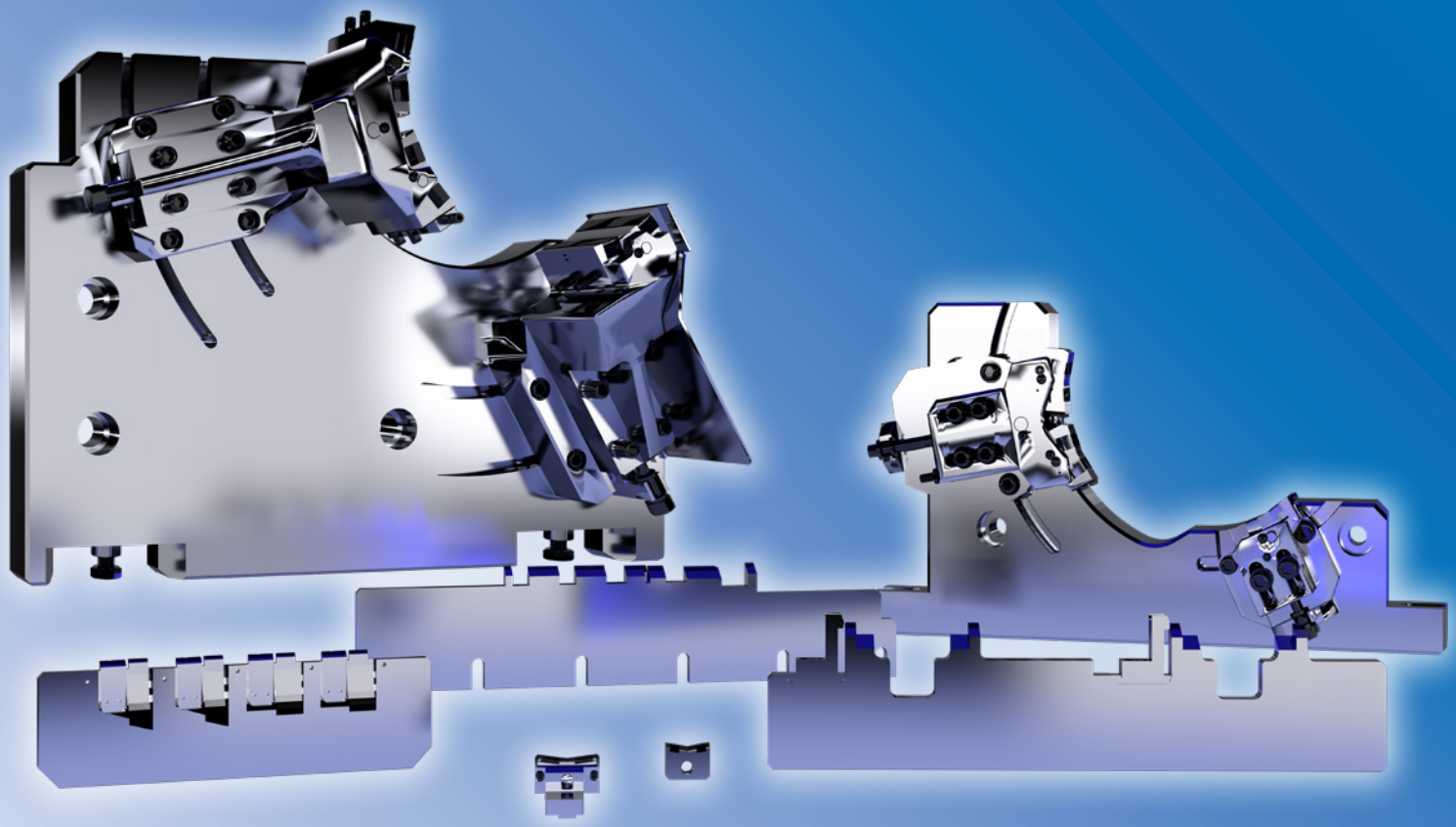
NORTON SAINT-GOBAIN

WINTER

Reshaping your world®

The Diamond Standard for Centreless Plunge Grinding



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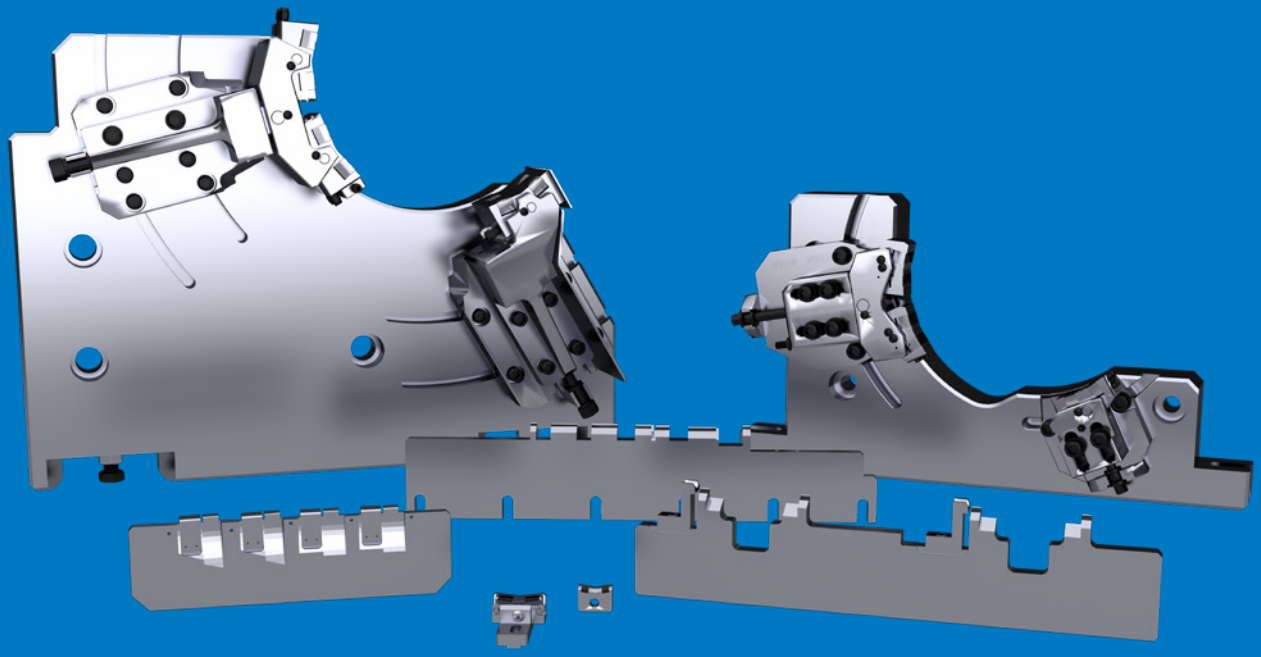
SAINT-GOBAIN

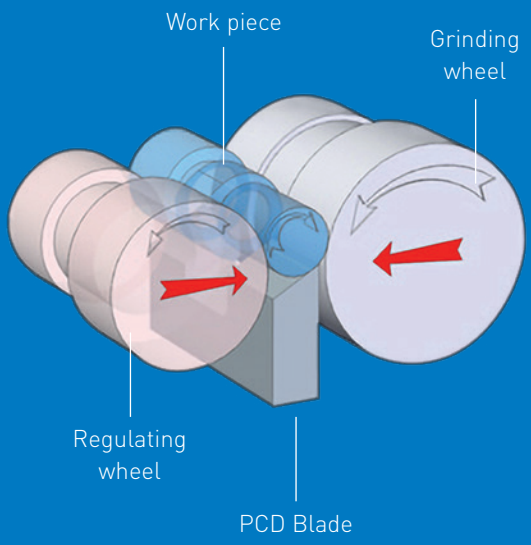
Capitalising on the superior material properties offered by **PCD** (polycrystalline diamond) and in house design and manufacturing facilities, the Norton Winter team are able to offer bespoke solutions for your centreless grinding projects, maximising output with minimised rework and defects thanks to our **Diamond Wear Parts portfolio**.



CENTRELESS PLUNGE GRINDING

In centreless plunge grinding, the work piece is located in the grinding zone between the grinding wheel and regulating wheel, and is supported by a work rest blade. The grinding wheel is then fed towards the work piece.

Regardless of if the work piece has multiple diameters or bevelling requirements, it can be ground in one single plunge in this process. Additionally, if the grinding zone is wide enough, several work pieces can even be processed at the same time.



DIAMOND SHOES

The wear part components play a crucial part in the centreless grinding process. The level of friction generated is very important when considering productivity and grinding process stability. Diamond wear parts are an excellent choice as they last significantly longer than carbide.

Our rest steadies incorporate synthetic polycrystalline diamond, providing savings in grinding axles, bearing components, cam- and crankshafts, through extended life, due to reduced machine changeover time and resetting.

PCD Shoes

THE WIDER NORTON WINTER OFFERING

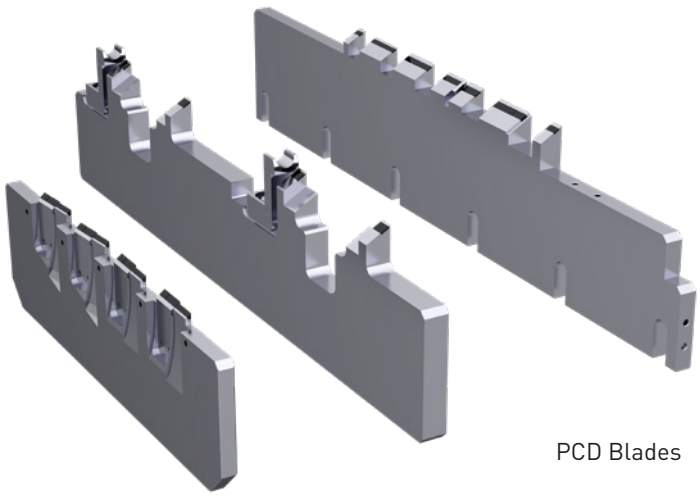
Our team has extensive knowledge in grinding processes, tool design and process optimisation. Coupled with our design and manufacturing facilities we are positioned perfectly to work with customers to satisfy individual project needs, maximising your performance.

PCD WORK REST BLADES

PCD blades are the typical for centreless grinding in applications such as cam & crankshaft manufacture, transmission axles and smaller components.

Economical Choice

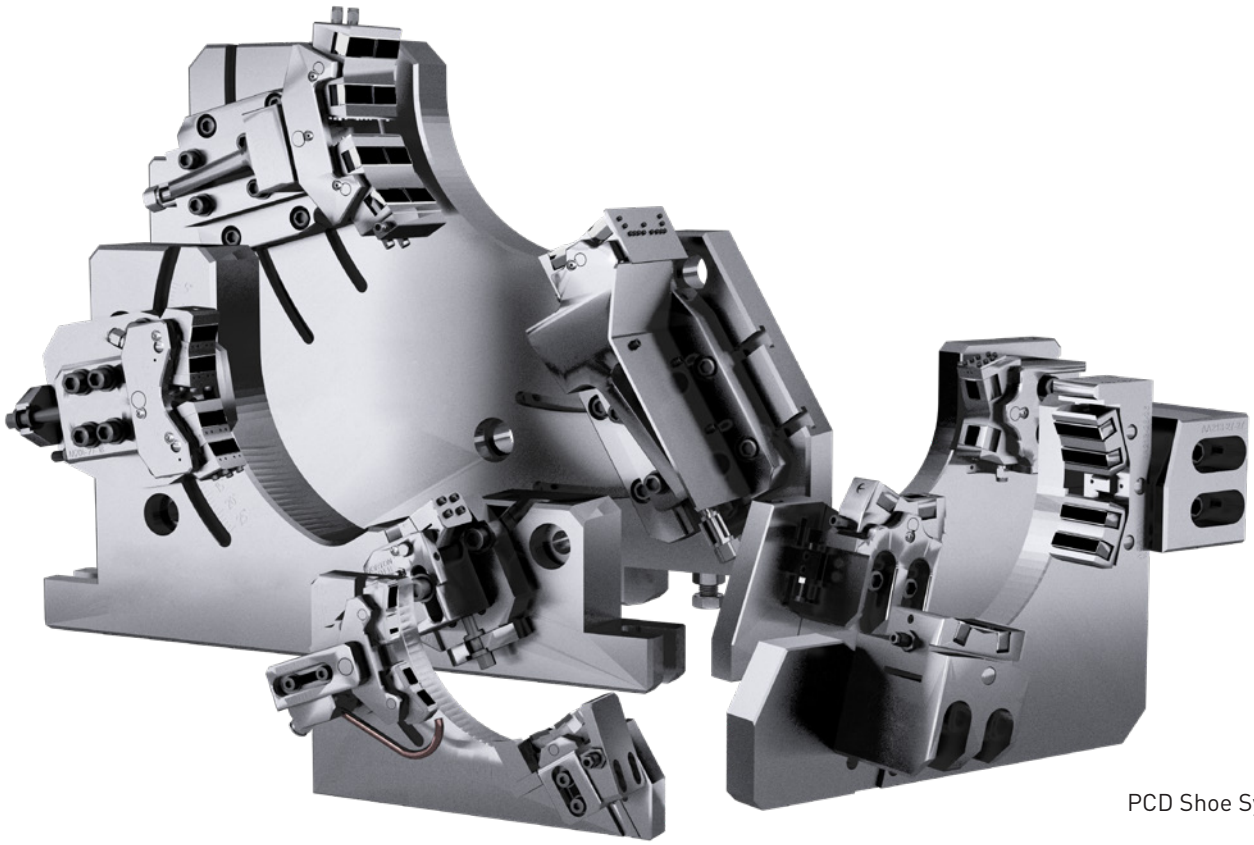
- Low wear on the PCD blade gives a stable process with less down time and fewer adjustments.
- Over the life of the product, PCD blades offer significant cost savings versus carbide blades owing to 10 x longer tool life.



PCD Blades

TOOL SETS AND SHOE SYSTEMS

PCD equipped shoe systems for specialist centerless machines.
For grinding of work pieces that are near the same diameter in length.



PCD Shoe Systems

Productivity

PCD enables higher RPM on the work piece and higher forces on the shoes, for better productivity.

Economy

Unlike conventional carbide shoes, which require a specific shoe for each diameter work piece, PCD shoe systems are able to cover a wide range of diameters thanks to the wear resistant properties of PCD. The versatility of these systems offers savings both in set up time and tooling.

Quality

The low levels of friction and potential for higher RPM on the work piece is a benefit for roundness grinding of the work piece.

PRODUCT RANGE

All of our solutions are designed to the specific task at hand, and made to order.
Each project presents differing requirements and limitations in design. Below are some guidelines to the products we can create.

PCD Blades:
Max active length - 600mm, Max total length - 1000mm. Min diameter Ø8mm.

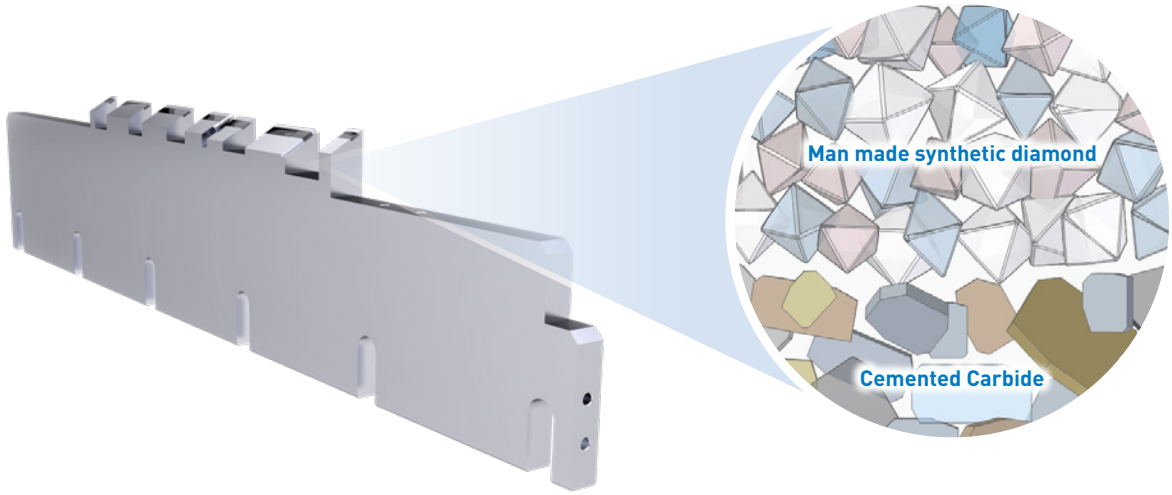
Shoe Systems:
Diameter range Ø10mm - 450mm

POLYCRYSTALLINE DIAMOND (PCD)

PCD consists of a Tungsten Carbide substrate, which provides a robust and durable base, onto which the man made synthetic diamond layer is seamlessly fused.

Whilst other solutions in the market utilise a wear resistant coating of typically 0,002 – 0,003 mm, all Norton Winter Diamond Wear Part solutions contain PCD segments as an integral component, with a thickness ranging from 0,5 mm up to 1,5 mm.

The combination of manufacture technique and thickness both contribute to the longevity and robustness of the product.



Physical properties of various tooling material

- Diamond is the hardest material on our planet and is 5x more thermally conductive than copper.
- Diamond has half to a quarter of the friction of tungsten carbide.
- These physical properties of diamond gives PCD fantastic resistance to wear and very suitable for support tools in centreless grinding applications.

Property	Units	Super Abrasives		Cemented Carbide	Ceramic	Steel
		PCD PolyCrystalline Diamond	PCBN	6% Co	Si3N4 Hot-press	4340
Hardness	Knoop Kg/mm2	**5000 - 8000**	2700 - 3200	-	-	-
	Vickers Kg/mm2		2600 - 3500	1600	2200	528
Compressive Strength	N/mm2	**7000 - 8000**	2700 - 3500	6200	6800	1848
Friction	-	**0,08 - 0,15**	0,10 - 0,15	0,2	0,2	0,78
Thermal Conductivity	W/mK	**150 - 550**	100 - 200	95	29	48

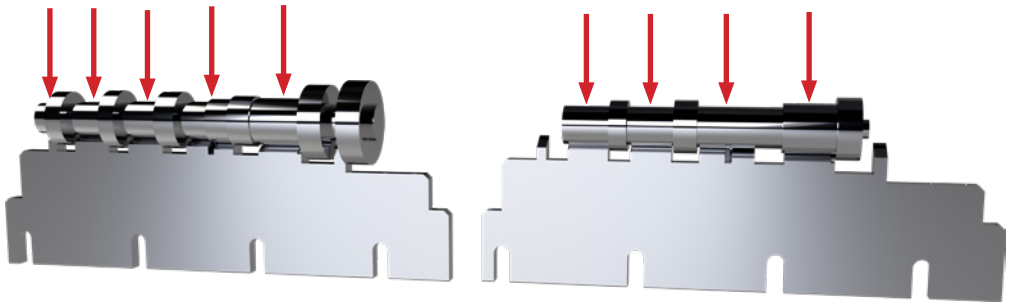
CENTRELESS WORK REST BLADE

PCD work rest blades provide and ideal solution when the work pieces are similar in shape but with a different number of contact diameters.

Diamond lineal makes it possible to use the same setup in the same machine for several work pieces. This subsequently offers significant time savings, leading to higher productivity and fewer scrapped parts.

Traditional carbide lineal solutions could not function effectively on different sized work pieces, due to the inherent imbalance between wear rates of the carbide fingers. When grinding short work pieces, wear occurs on the carbide "fingers" in contact with the work piece causing an imbalance in the blade and resulting in higher levels of rework and scrappage.

This imbalance in wear rates is not seen with a PCD Diamond Wear Part Blade, making them the ideal solution for use cases featuring mixed work pieces.



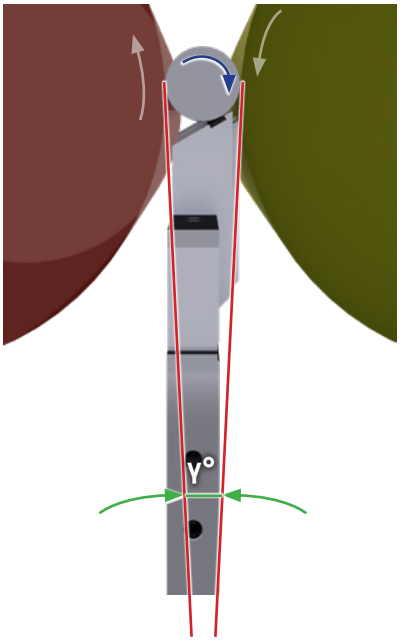
MAINTAINING ROUNDNESS

Work piece roundness is a critical measure when ensuring a high quality product.

To maintain roundness during centreless grinding, it is important to obtain and maintain the correct γ° Gamma angle.

Achieving a consistent Gamma angle is challenging when considering that there are 3 contact points: the grinding wheel, regulating wheel and work rest blade.

With a PCD work rest blade in the machine, at least one of those contact points is guaranteed to be constant, making it much more likely that the γ° Gamma angle is consistent and roundness is maintained.



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