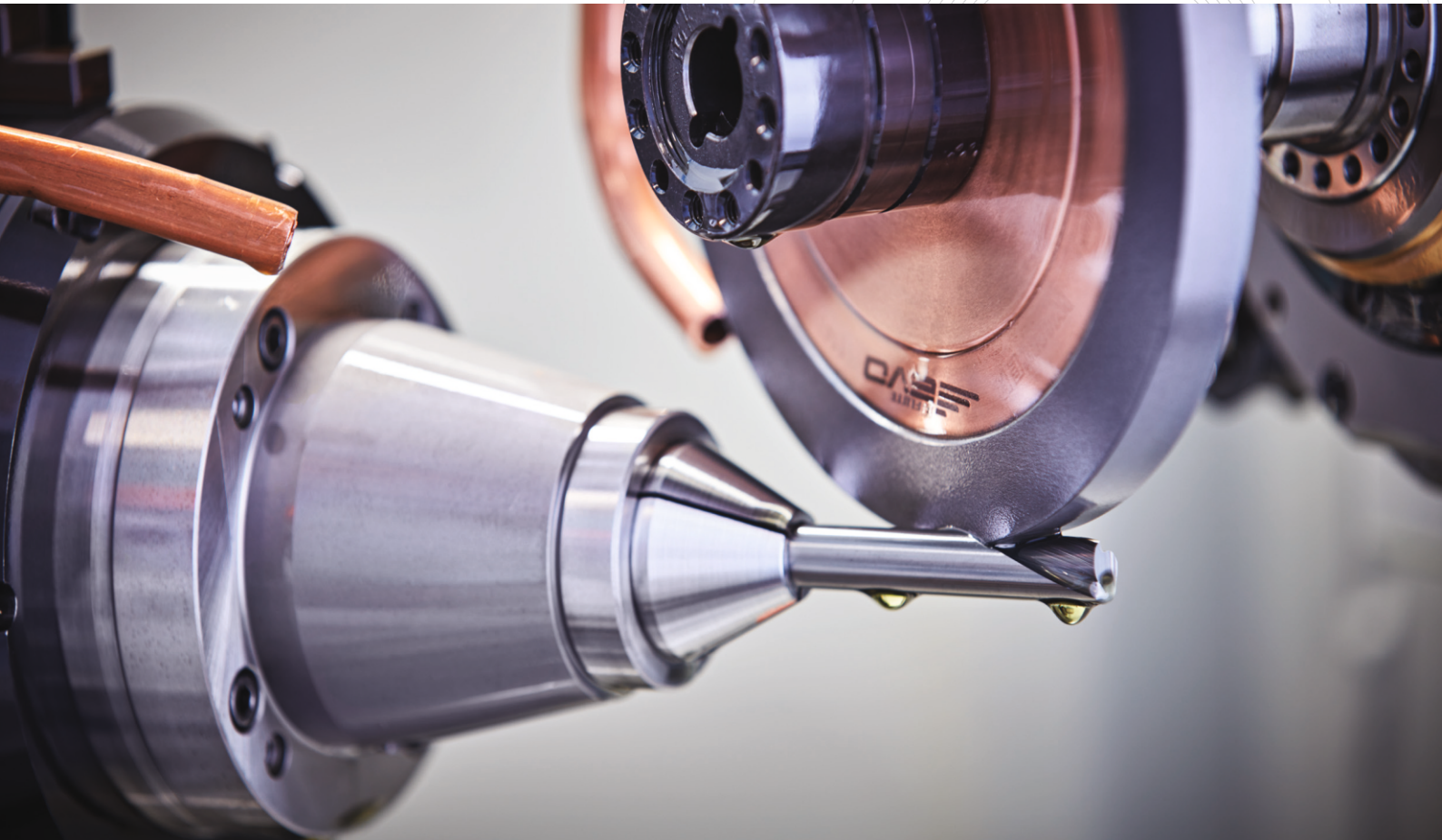


DIAMOND AND cBN WHEELS
FOR THE CUTTING TOOLS INDUSTRY



Grinding Solutions for Round Tools

THE NORTON WINTER BRAND PROMISES

INNOVATIONS

To this day, the NORTON WINTER philosophy is closely connected to innovation and technical progress. We thank our customers for over 160 years of momentum, challenges and confidence. **And in the future our next generation of innovations will ensure your success.**

PRECISION

From ACCURACY to Z-Axis - the NORTON WINTER precision alphabet spells the suitable solution for your needs. Profile accuracies below 1µm and a surface finish in the nanometer range are achieved regularly. **You can trust NORTON WINTER**

PERFORMANCE

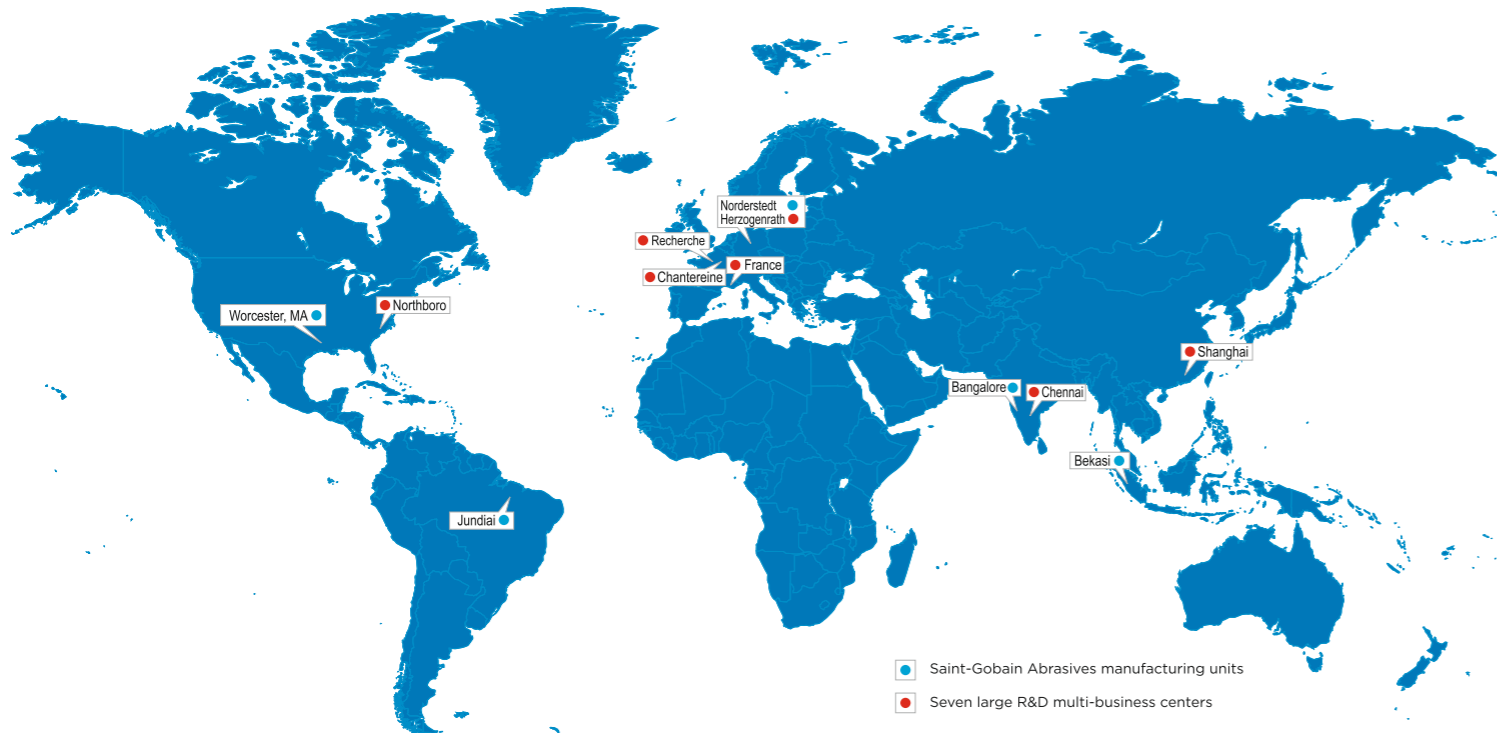
The NORTON WINTER performance package contains top-quality precision grinding tools, comprehensive service and individual customer care - which ranges from the best grinding tool selection to process optimization. **Benefit from our full service, and make use of our leading technical expertise to increase your profitability.**

QUALITY

Since the company's foundation, NORTON WINTER has stood for quality at the highest level. It begins with the first customer contact and covers the identification of appropriate tool specifications, manufacturing, customer support and the final optimization of your production process. **NORTON WINTER quality: Satisfaction Guaranteed!**



GLOBAL EXPERTISE



GENERAL DESCRIPTION

NORTON WINTER has engineered a wide product range to meet the demanding needs of precision cutting tool manufacturers and re-sharpeners. Matched to different applications and the system environment, innovative NORTON WINTER grinding wheels are always the best solution for all sequence of operation starting from preparation of blank followed by fluting, gashing, end face and clearance angle grinding in CNC tool and cutter grinder.



PROCESS PARAMETERS FOR FLUTE GRINDING OF TUNGSTEN CARBIDE AND HSS TOOLS (Q_w)

Recommended operating parameters



$$Q'_w = \text{Doc (mm)} \times \text{Feedrate (mm/s)}$$

Feed rate v_f [mm/min]

	30	40	50	60	70	80	90	100	120	140	160	180	200	220	240	260	280	300
2.0	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	4.0	4.7	5.3	6.0	6.7	7.3	8.0	8.7	9.3	10.0
2.2	1.1	1.5	1.8	2.2	2.6	2.9	3.3	3.7	4.4	5.1	5.9	6.6	7.3	8.1	8.8	9.5	10.3	11.0
2.4	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0
2.6	1.3	1.7	2.2	2.6	3.0	3.5	3.9	4.3	5.2	6.1	6.9	7.8	8.7	9.5	10.4	11.3	12.1	13.0
2.8	1.4	1.9	2.3	2.8	3.3	3.7	4.2	4.7	5.6	6.5	7.5	8.4	9.3	10.3	11.2	12.1	13.1	14.0
3.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
3.2	1.6	2.1	2.7	3.2	3.7	4.3	4.8	5.3	6.4	7.5	8.5	9.6	10.7	11.7	12.8	13.9	14.9	16.0
3.4	1.7	2.3	2.8	3.4	4.0	4.5	5.1	5.7	6.8	7.9	9.1	10.2	11.3	12.5	13.6	14.7	15.9	17.0
3.6	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	7.2	8.4	9.6	10.8	12.0	13.2	14.4	15.6	16.8	18.0
3.8	1.9	2.5	3.2	3.8	4.4	5.1	5.7	6.3	7.6	8.9	10.1	11.4	12.7	13.9	15.2	16.5	17.7	19.0
4.0	2.0	2.7	3.3	4.0	4.7	5.3	6.0	6.7	8.0	9.3	10.7	12.0	13.3	14.7	16.0	17.3	18.7	20.0
4.2	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.8	18.2	19.6	21.0
4.4	2.2	2.9	3.7	4.4	5.1	5.9	6.6	7.3	8.8	10.3	11.7	13.2	14.7	16.1	17.6	19.1	20.5	22.0
4.6	2.3	3.1	3.8	4.6	5.4	6.1	6.9	7.7	9.2	10.7	12.3	13.8	15.3	16.9	18.4	19.9	21.5	23.0
4.8	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	9.6	11.2	12.8	14.4	16.0	17.6	19.2	20.8	22.4	24.0
5.0	2.5	3.3	4.2	5.0	5.8	6.7	7.5	8.3	10.0	11.7	13.3	15.0	16.7	18.3	20.0	21.7	23.3	25.0

Potential of improvements →

Minimum Q_w 1-2.5



Minimum Q_w 2-4.5



Minimum Q_w 4-7



Minimum Q_w 5-9+



The feed rates stated are guidelines only and apply to both diamond and cBN tools. Feed rates have to be adjusted for small workpiece diameters, extreme flute widths and grinding wheels with a diameter of less than 100 mm.

BEST FLUTING WHEEL, MOUNT IT AND FORGET

QFLUTE PRIME

Flute Grinding
BEST

Flute grinding operations are constantly exposed to increasing demands for better productivity and quality. Designed to provide an optimal combination of tool life and free-grinding behaviour, Norton Winter Q-Flute PRIME wheels boost the grinding performance to a new, unprecedented level of efficiency. With significantly lower grinding forces, improved surface quality and up to 50% increased profile retention Q-Flute PRIME delivers improved edge stability and superior surface quality while offering the highest performance.

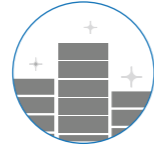
FEATURES & BENEFITS



Free grinding at extremely high Q'w range of 5-9+



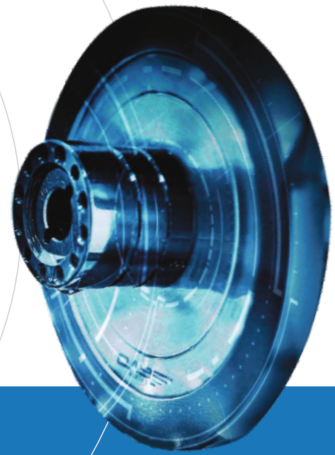
Ultimate profile stability at aggressive conditions



Best choice for mass production



Better sustainability is achieved with lower SGE (power) usage

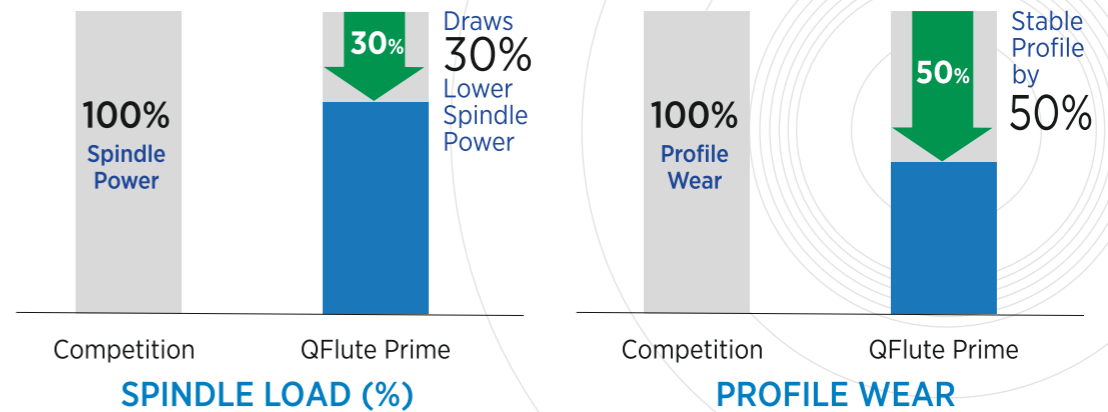


CASE STUDY

SIZE 1A1 125-12-10-31.75 D54	WORKPIECE DETAILS Ø10mm End mill 3 Flutes	DEPTH OF CUT/PASS 2.65mm
MACHINE Anca MX7	FLUTE DEPTH 2.65mm	FEED RATE 140mm/min
COOLANT Neat Oil	FLUTE LENGTH 25mm	SPEED 18m/s

QFLUTE PRIME Q'w 6.2

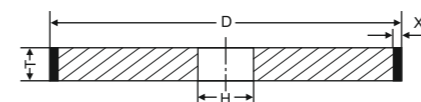
PERFORMANCE BENEFIT



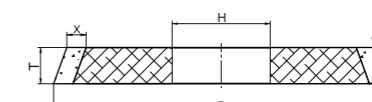
AVAILABILITY RANGE

SHAPES	D	T	X
1A1, 1V1, 1FE1	75, 100, 125 & 150	6, 8, 10, 1220	10

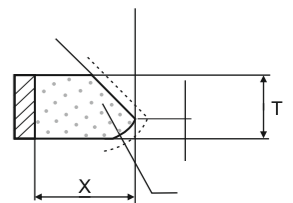
Dimensions are in mm
Other dimensions available on request



1A1



1V1



1FE1



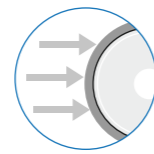
PREMIUM FLUTING WHEEL FOR HIGH PRODUCTIVITY

QFLUTE EVO

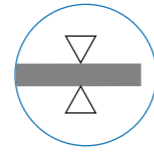
Flute Grinding
BETTER

The demands of modern grinding and machining round tools are constantly changing and becoming more sophisticated. To keep up with this ever-dynamic landscape, Norton Winter has developed Q-Flute-EVO: the next evolution in flute grinding. New high performance Q-Flute Bond is flexible and excels in the most demanding of processes.

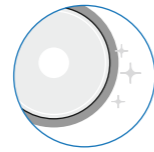
FEATURES & BENEFITS



Lower grinding forces than other Hybrid bond wheels



Optimised for precision with unparalleled standards of edge stability



Improved Flute surface quality

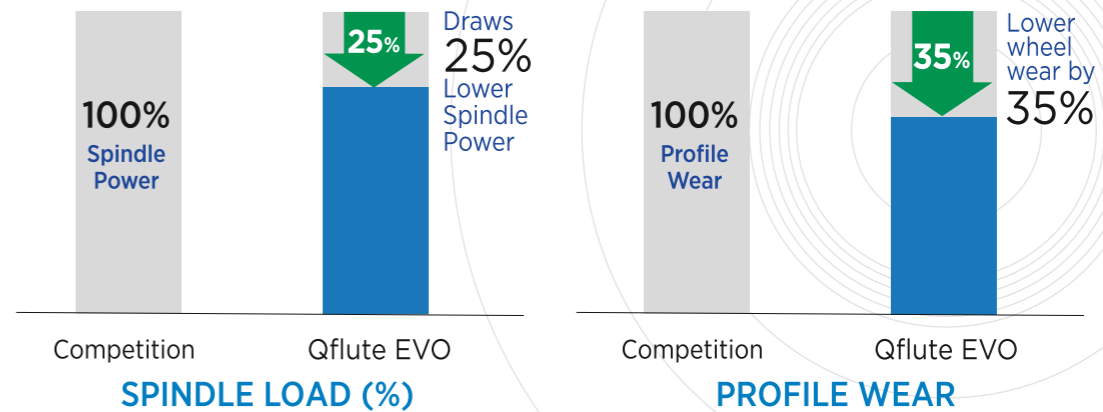


CASE STUDY

SIZE 1A1 100-12-10-20 D54	WORKPIECE DETAILS Ø18mm Drill 2 Flutes	DEPTH OF CUT/PASS 3mm
MACHINE Reinecker WZS60	FLUTE DEPTH 6.5mm	FEED RATE 100mm/min
COOLANT Neat Oil	FLUTE LENGTH 130mm	SPEED 18m/s

QFLUTE EVO Q'w 5

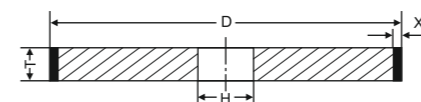
PERFORMANCE BENEFIT



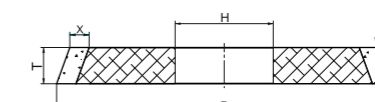
AVAILABILITY RANGE

SHAPES	D	T	X
1A1, 1V1, 1FE1	75, 100, 125 & 150	6, 8, 10, 1220	10

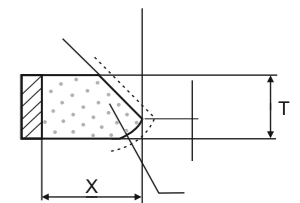
Dimensions are in mm
Other dimensions available on request



1A1



1V1



1FE1

VERSATILE FLUTING PRODUCT FOR ALL CONDITIONS

GFORCE



Unique Polyimide bond systems for Flute grinding operation. With superior form-holding ability it grinds at lower-power requirements compared to premium competitive wheels.

FEATURES & BENEFITS



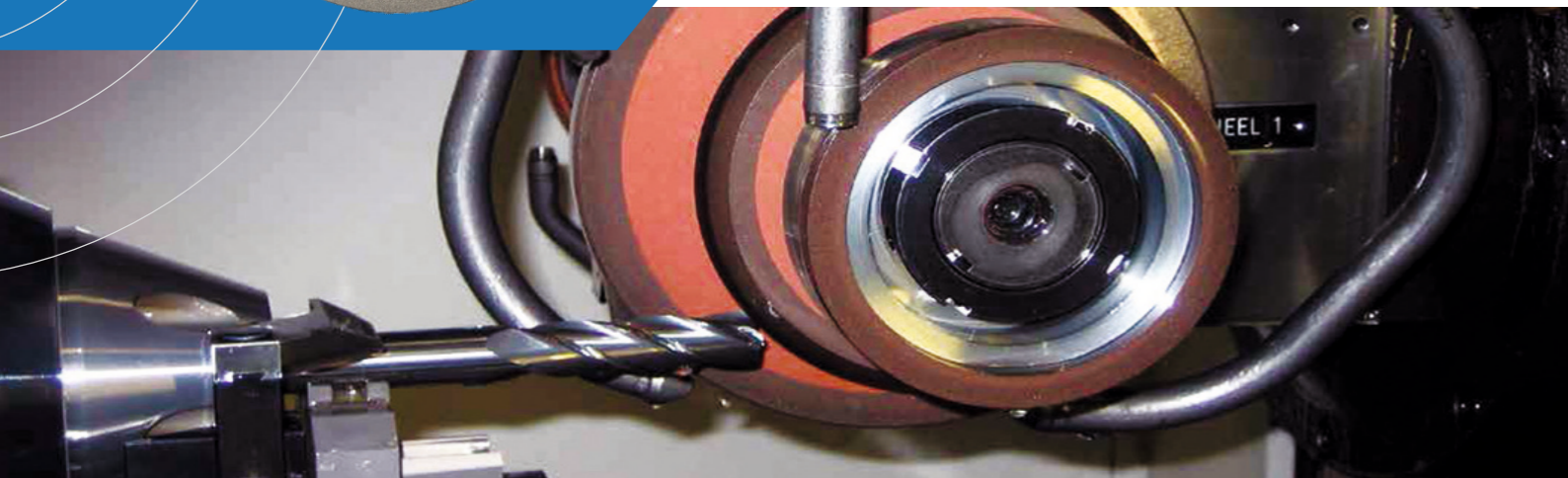
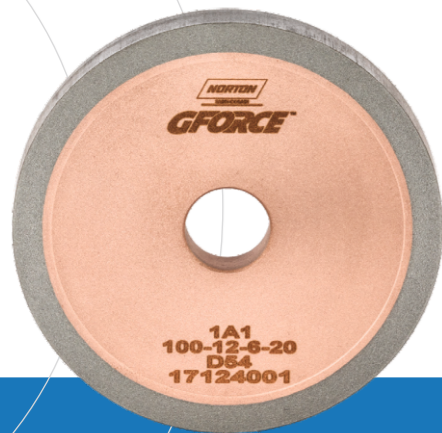
Unique bond excels on Flute grinding - Outperforms against resin bond wheels



Also competes against Hybrid bonds



Self-dressing; maintains a consistently sharp grinding edge



CASE STUDY

SIZE

1A1 100-12-10-20 D54

TOOL DIMENSION

Ø10mm End mill 4 Flutes

FEED RATE

140mm/min

MACHINE

Walter Helitronic Power

OPERATING PARAMETER

DOC: 2mm

SPEED

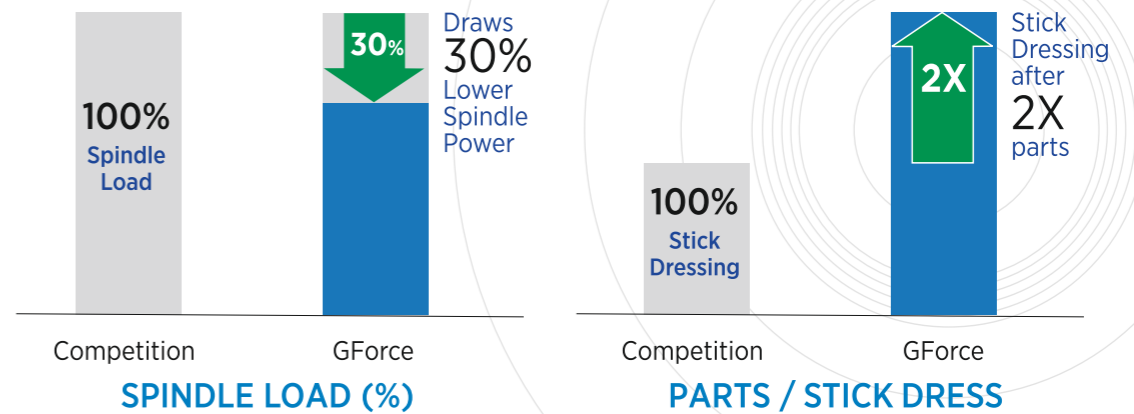
18m/s

SPINDLE POWER

11 kW

GFORCE Q'w 4.6

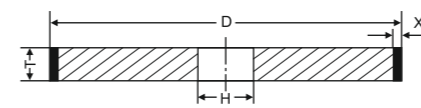
PERFORMANCE BENEFIT



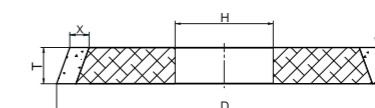
AVAILABILITY RANGE

SHAPES	D	T	X
1A1, 1V1	75, 100, 125 & 150	6, 8, 10, 1220	10

Dimensions are in mm
Other dimensions available on request



1A1



1V1

SOLUTION FOR LOW FORCE OPERATIONS

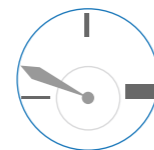
TOOL PRO Flute Grinding BASIC

TOOL PRO offers a reliable quality of wheel pack for new and re-sharpening of Round Cutting Tools. Provides optimal performance for less aggressive applications. It is an ideal solution for short-run manufacturing operations

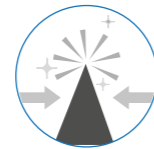
FEATURES & BENEFITS



Free cutting resin bond formulated for oil coolants



Ideal for low force applications



Performs at reduced grinding force with good edge stability

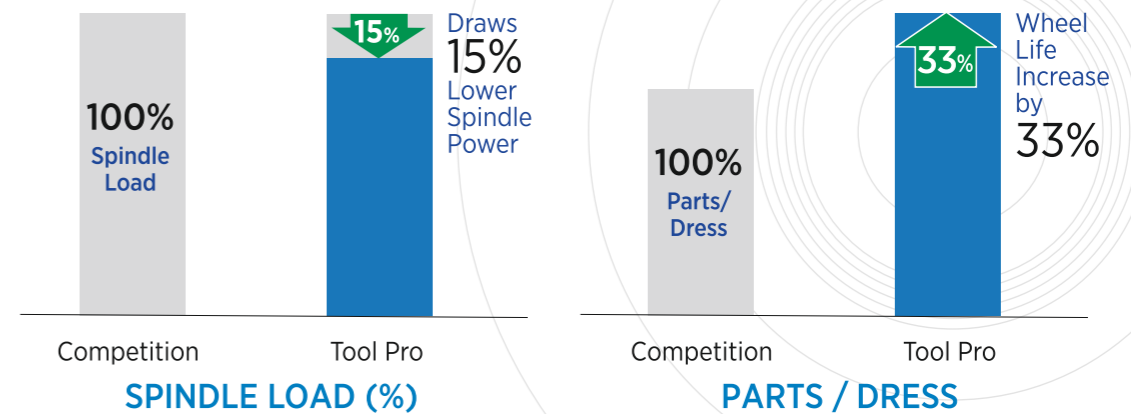


CASE STUDY

SIZE 1A1 125-8-5-20 D64	WORKPIECE DETAILS Ø7mm Drill 2 Flutes	STOCK 2.5mm
MACHINE Widma EcoGrind	FLUTE DEPTH 2.5mm	FEED RATE 65mm/min
COOLANT Neat Oil	FLUTE LENGTH 55mm	SPEED 17m/s

TOOLPRO Q'w 2.7

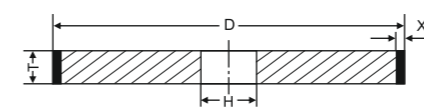
PERFORMANCE BENEFIT



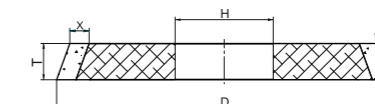
AVAILABILITY RANGE

SHAPES	D	T	X
1A1, 1V1	75, 100, 125 & 150	6, 8, 10, 1220	10

Dimensions are in mm
Other dimensions available on request



1A1



1V1

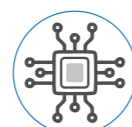
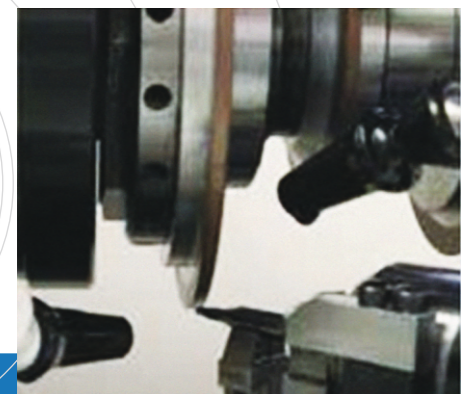


PRECISION FLUTE GRINDING FOR MINI AND MICRO TOOLS

μICRO+

As well as innovation in new materials and tool designs, the recent trend towards miniaturisation has become considerably more important. From mini- and micro- down to nano tools, nowadays tools with outer diameters below 0.1 mm are no longer exceptional. The NORTON WINTER range consists of Resin bonds with perfect edge stability which are marketed under μicro+ brand. The tools of the NORTON WINTER μicro+ range are grinding wheel systems that have been specifically developed for these requirements, which despite fast feed rates are characterised by their perfect edge stability compared to traditional resin bonds.

AREAS OF APPLICATION



Electronics,



Medical technology



Automotive Industry.

In addition, these grinding wheels can be used for similar metal removal tasks, Ex: burrs.

RECOMMENDATIONS - DIAMOND

Tool OD	Grain size	Bond	Concentration
Ø 0.05 mm - 0.75 mm	D10...D20A	μicro+6013	C150
Ø 0.75 mm - 2 mm	D20A...D26	μicro+6015	C150
Ø 0.75 mm - 2 mm	D20A..D46	BZ480	C150
Ø 2 mm - 4 mm	D32...D26	μicro+6065	C150



CASE STUDY

SIZE

D15B μicro+ 6055 C125 A

WORKPIECE DETAILS

TC Drill 0.8mm

GRINDING PARAMETERS

FEED RATE

40mm/min

INFEEED

0.3mm

CUTTING SPEED

25m/s

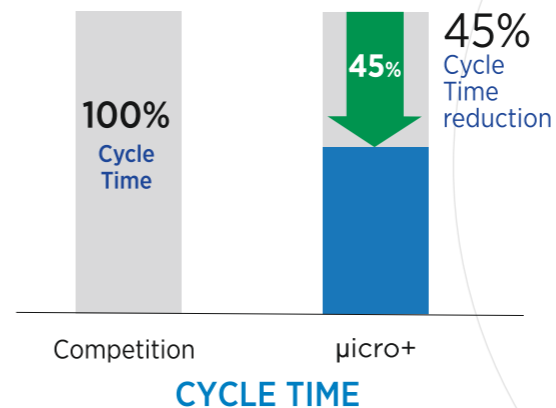
MACHINE

Rollomatic 620XS

COOLANT

Neat Oil

PERFORMANCE BENEFIT

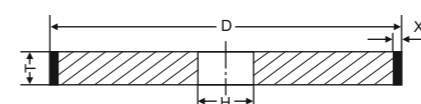


- 45% Cycle time reduction
- Perfect edge quality
- Longer dressing intervals

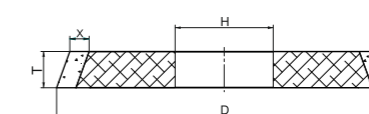
AVAILABILITY RANGE

SHAPES	D	T	X
1A1, 1V1	75, 100, 125 & 150	1.5, 2, 36	6, 10

Dimensions are in mm
Other dimensions available on request



1A1



1V1

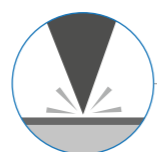
ULTIMATE EDGE STABILITY

V-PRIME

Gashing & Point Grinding
BEST

V-PRIME has been designed to provide excellent edge stability in gashing and clearance angle grinding. In today's challenging economic environment, it is more important than ever to maintain constant wheel geometry for as long as possible, without the need for correction, as this enables increased output and improved quality. The new V-PRIME can be easily implemented without any machine or process adjustments, offering manufacturers immediate improvements.

FEATURES & BENEFITS



The extreme edge stability of a hybrid / metal bond



The free grinding behaviour of standard resin bonds

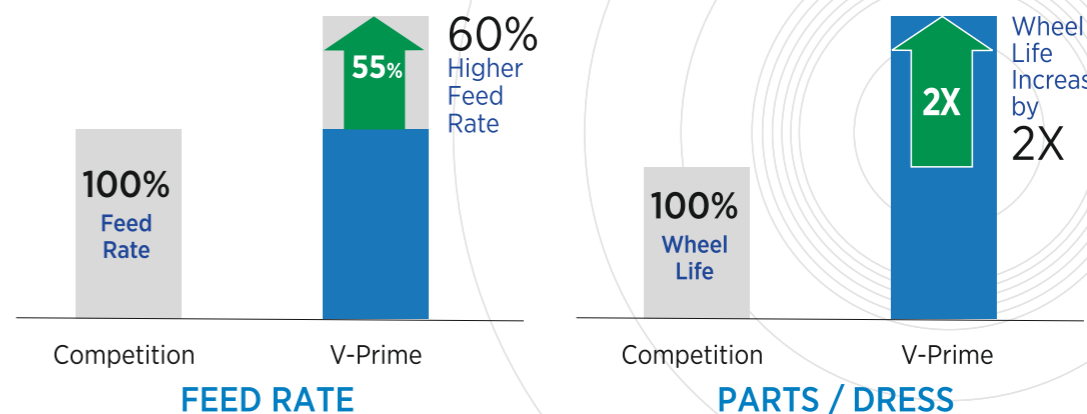


The stable grinding process leads to better part quality and less sub-surface damage

CASE STUDY

SIZE 12V9 100-3-10-20 D46	WORKPIECE DETAILS Ø9mm Drill	CURRENT FEED RATE 30mm/min
MACHINE Walter Helitronic Power	FLUTE DEPTH 2.65mm	V-PRIME FEED RATE 50mm/min
COOLANT Neat Oil	OPERATING PARAMETER Gashing	SPEED 22m/s

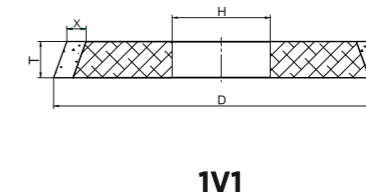
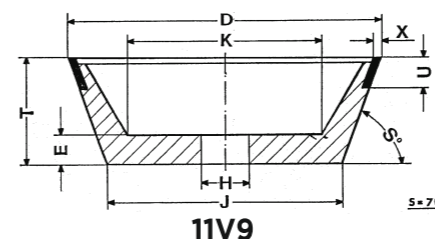
PERFORMANCE BENEFIT



AVAILABILITY RANGE

SHAPES	D	X	U
11V9, 12V9, 11A2, 6V5	75, 100 & 125	2, 3, 5 ... 10	10
SHAPES	D	T	X
1V1, 1A1	75, 100, 125 & 150	6, 8, 10, 12 ... 20	6, 10

Dimensions are in mm
Other dimensions available on request



PRECISE & POWERFUL

TOOL PRO

Gashing & Point Grinding
BASIC

TOOL PRO offers a reliable quality of wheel pack for new and re-sharpening of Round Cutting Tools. Provides optimal performance for less aggressive applications. It is an ideal solution for short-run manufacturing operations.

FEATURES & BENEFITS



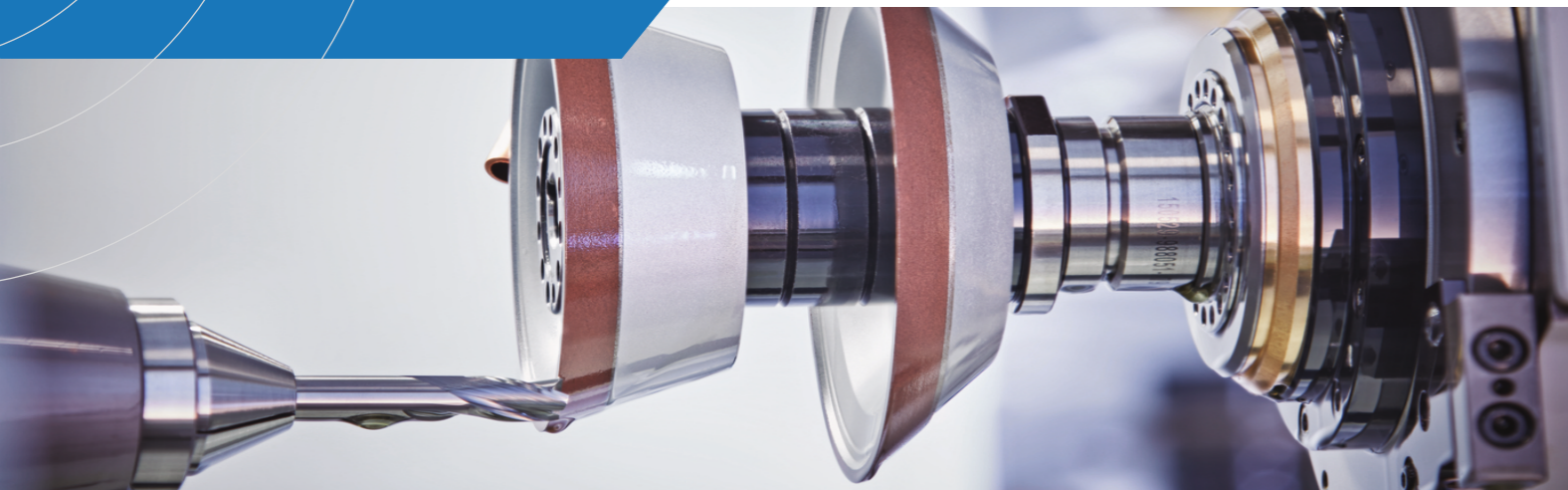
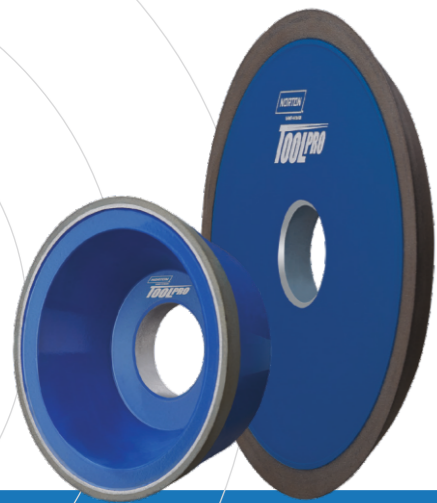
Ideal for resharpening and short-run manufacturing operations



Competitively-priced while providing premium performance



Very good surface and cutting edge quality



CASE STUDY

SIZE

1V1/45 100-8-6-31.75 D64

WORKPIECE DETAILS

Ø25mm End mill 4 Flutes

STOCK

1.7mm

MACHINE

Widma EcoGrind

OPERATION

Gashing

FEED RATE

60mm/min

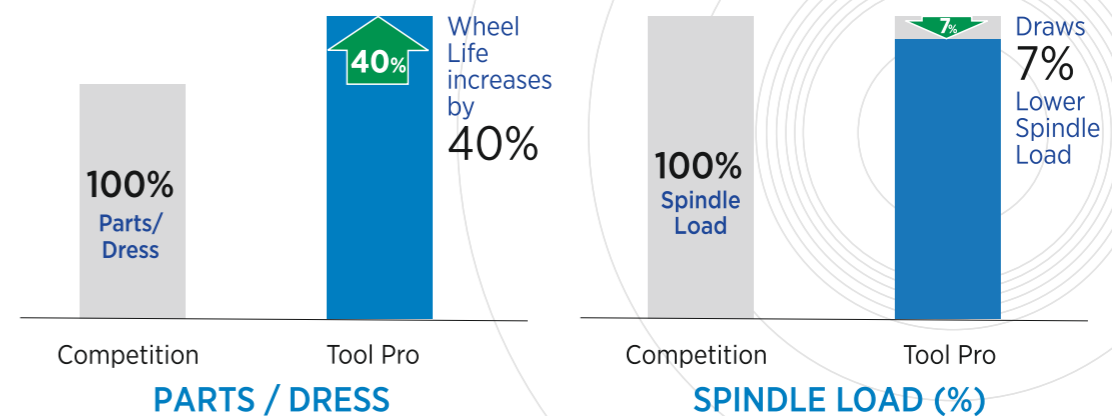
COOLANT

Neat Oil

SPEED

26m/s

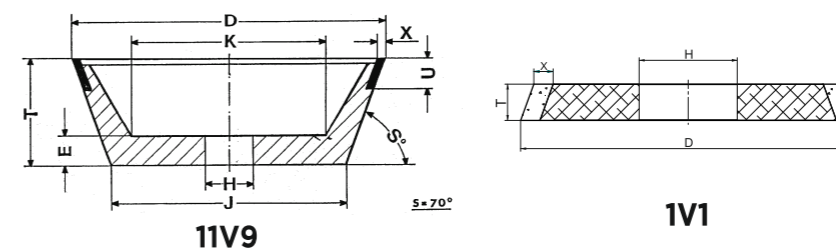
PERFORMANCE BENEFIT



AVAILABILITY RANGE

SHAPES	D	X	U
11V9, 11A2	75, 100	2, 3, 5 ... 10	10
SHAPES	D	T	X
1V1, 1A1	75, 100, 125	6, 8, 10, 12 ... 20	6

Dimensions are in mm
Other dimensions available on request



QUICK STOCK REMOVAL WITH CONSISTENT PART QUALITY

NORTON CYLINDRICAL OD GRINDING WHEELS

Norton offers highly durable bond system, recommended for fast material removal with less wheel wear. It is best suited for surface, and cylindrical grinding of tungsten carbide and ceramics. This product achieves quick stock removal with prolonged consistent part quality. With less manual intervention due to dressing the wheel reduces dimensional corrections. It is more user friendly.

FEATURES & BENEFITS



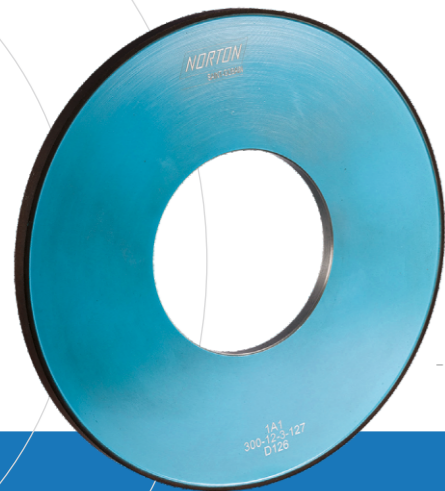
Free cutting bond system for high stock removal operations



Highly durable bond with less wheel wear

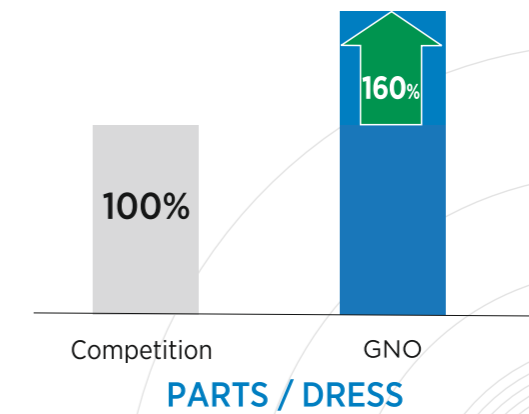


Maintains consistent part quality with reduced dressing frequency



CASE STUDY

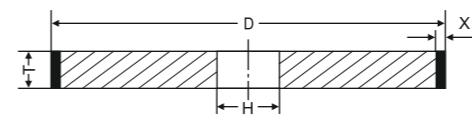
PERFORMANCE BENEFIT



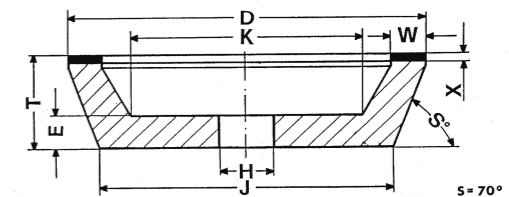
AVAILABILITY RANGE

SHAPES	D	T	X
1A1	150, 175, 200	6, 8, 10, 12.. 25	5, 6
1A1	250, 300, 350, 400	6, 8, 10, 12.. 25	5, 6
11A2	75, 100, 125 & 150	6, 10, 15	2, 5

Dimensions are in mm
Other dimensions available on request

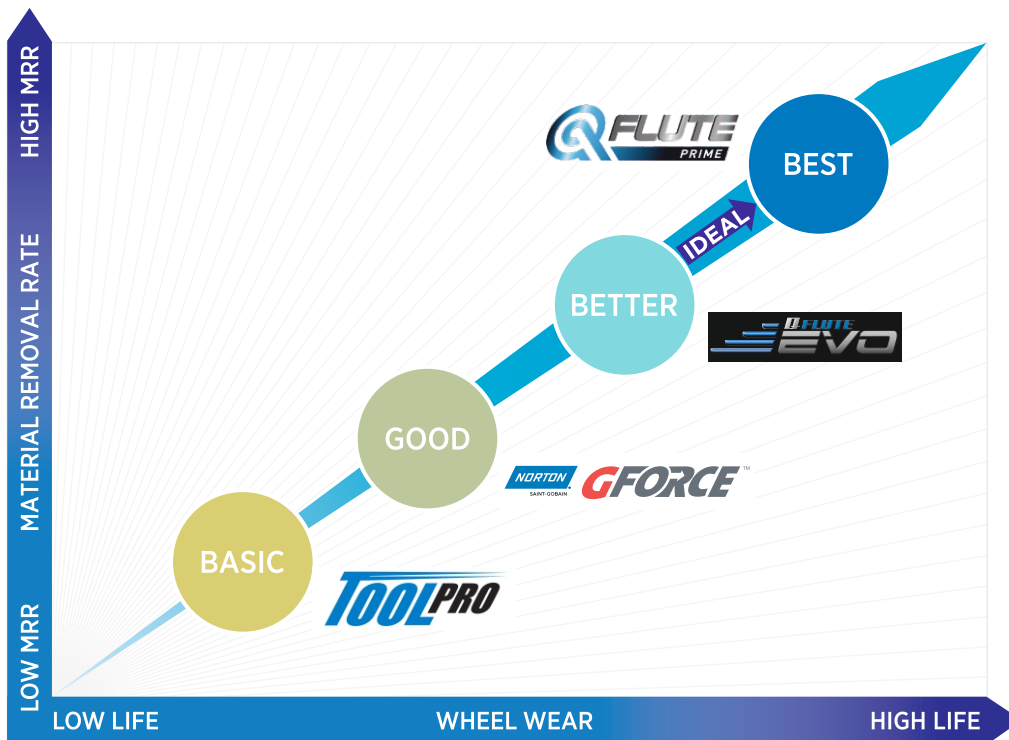


1A1



11A2

PRODUCT POSITIONING



GRINDWELL NORTON LTD.

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