

NORTON

VORTEX[™]
technology



Centerless Grinding

REVOLUTIONARY technology for centerless grinding

VORTEX™ Technology in Centerless Organic Wheels is an exciting new concept from Norton that provides high metal removal and ultimate part quality.

High Metal Removal

Combining a new engineered abrasive grain and an innovative manufacturing process, VORTEX Technology carefully controls the structure to create a highly porous and permeable grinding tool with unsurpassed abrasive grain spacing. This brings all the advantages of much higher metal removal rates, improved form holding and longer wheel life alongside a greatly improved part quality.

Long Wheel Life

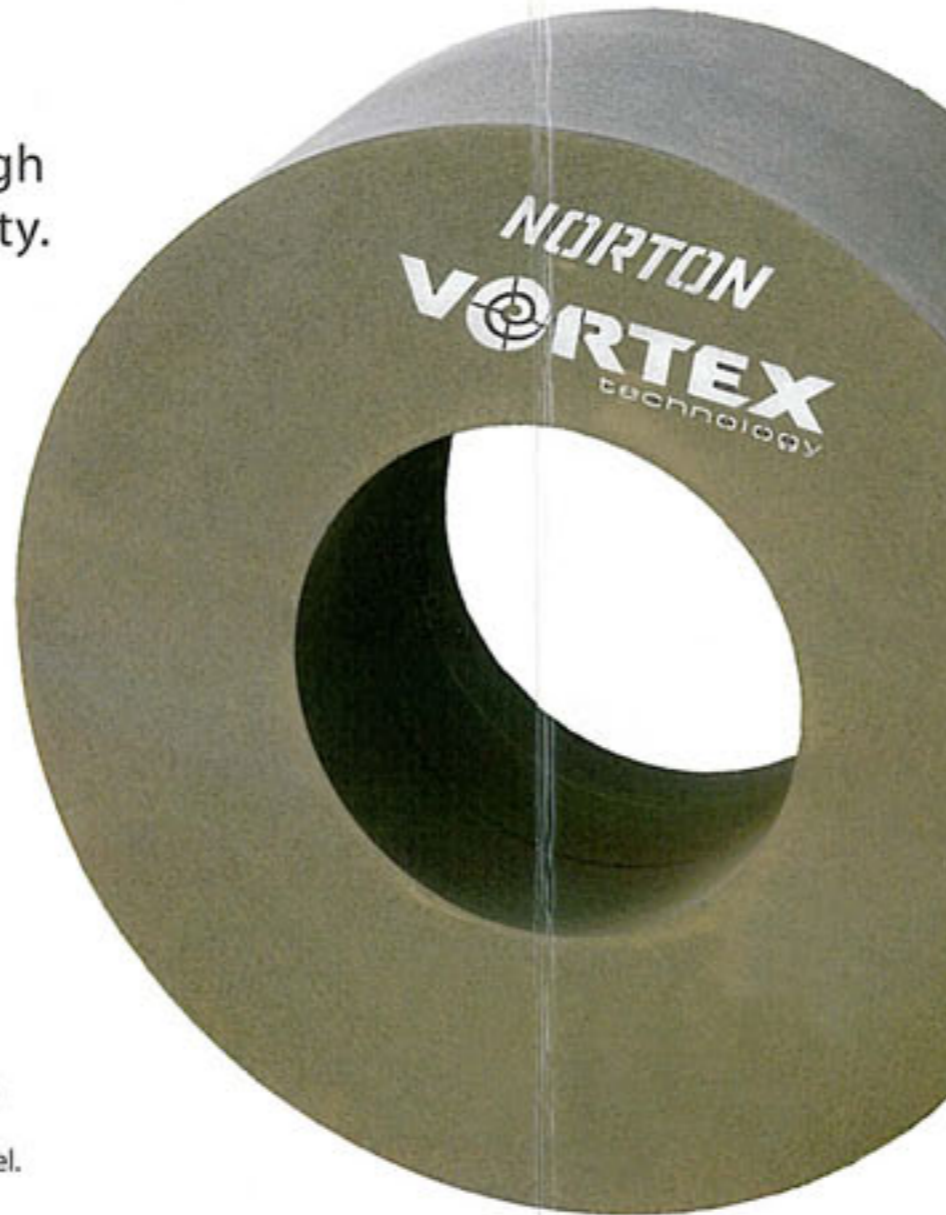
Optimizing the abrasive porosity distribution is critical for improving material removal, for decreasing dressing frequency and wheel wear resulting in extended wheel life.

Versatility

- One single Vortex specification can produce the finish and the performances obtained coupling different specifications with the conventional product.
- Vortex resinoid product with one single abrasive blend can replace both alumina oxide and silicon carbide abrasive families
- Vortex centerless is suitable for both application types: through feed and plunge grinding
- Resinoid Vortex can replace all standard organic products and vitrified products on many applications.

Reduced Cycle Times

Cycle reduction time of up to 50%, together with 2 to 3 times the number of pieces ground per wheel.



MARKETS

- Bearing
- Automotive
- Steel (bar)
- Aerospace
- Tools

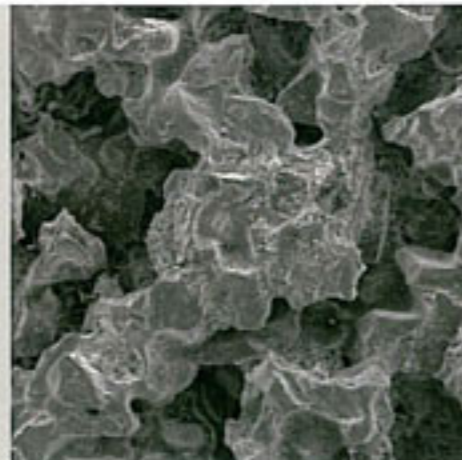
FEATURES

- High performance engineered alumina grain
- Highly porous & permeable for maximising coolant diffusion in the grinding zone
- Optimum grain spacing for improved chip clearance and reduced friction from "spot contact"

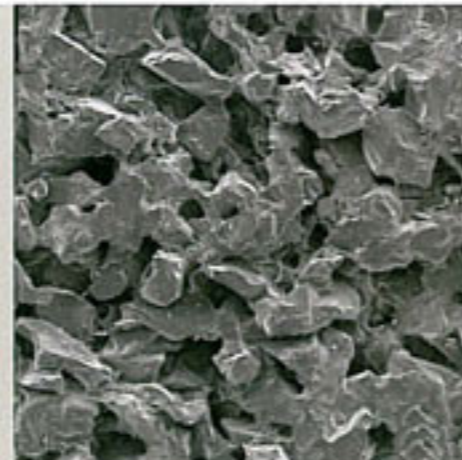
BENEFITS

- Very high metal removal rates giving dramatically reduced cycle times
- Faster grinding
- Up to 70% wheel life increase through dramatically reduced wheel dressing
- Gentle on the dressing tool, very easy to profile and to re-open
- Ultimate degree of burn reduction through extreme permeability
- Consistent grinding performance from first grind to stub eliminates changing of grinding parameters

HIGH
metal removal
REDUCED
grinding costs
ULTIMATE
part quality



Structure of a centerless wheel made with VORTEX Patented Technology



Structure of a centerless wheel made with conventional technology

Using VORTEX Technology, you can:

- Achieve higher maximum MRR (metal removal rate) at a constant power
- Grind at lower power at a constant MRR
- Achieve longer life at a constant MRR

Standard



Vortex



Grain Structure and Porosity
Open structure differentiates Vortex Wheel from standard technology



Our patented VORTEX Technology does not require the use of artificial pore inducers (chemicals) unlike other porous wheel technologies. By choosing VORTEX Technology for your grinding operation, YOU help to preserve the environment.

Centerless Vortex Availability (For detailed info contact the Product Manager)

Dimensions and Specification

Application Field:

High performance on soft Steel, Tool Steel, Carbon Steel, Ni/Cr/Mo alloyed steels, Nickel based alloys and stainless steels

Grit Size Selection

80 and 100 grit in Vortex are able to cut at rates that are possible with a coarser grit on conventional products. Reported conversion table for a preliminary choice:

Specifications		Dimensions		Standard product grit-size (FEPA)	Recommended Vortex grit-size
Abrasive	A	Diameter	From 350 – 650mm	46	60
Grit	60 to 120	Thickness	Up to 250mm thickness for each wheel	60	80 – 100
Hardness	J to O (mainly M-O)	Maximum Operating Speed		80	100 – 120
Bond	B	50m/sec grades J-K			
Technology	Vortex	63m/sec grades L-O			

Abrasives consumables to be used with Vortex

Rubber Feed Wheels

Norton offers a wide choice of rubber feed wheels all characterized by:

- High coefficient of friction for the best possible control of work travel rate
- High resilience to absorb the vibrations
- Minimum wear and form alteration

Three product performance levels:

Product class	Bond technology	Grades	Grit sizes	Diameter range mm	Starting specification
Better	REU	R, S	80 & 120	300 - 355	A80RREU
Best	R90 & R91	R, S, T, U	80 - 220	all	A80RR90






Specifications for special requirements:

- Improved life or sizing: A80SR90
- Fast thru-feed rates: A100TR91
- Extremely good finish required: A 120R90
- Irregular shapes: A 120UR91

Truing and Dressing

A broad range of stationary dressing items are available. For dressing Vortex Centerless Grinding Wheels, Multipoint Dresser Fliese or Multipoint are the best choice. For centerless regulating wheels Single Point Dressers are recommended. By using the benefit of Vortex Technology a reduced dressing frequency is recommended, this will extend the wheel and dresser life for most economical use.

Single Point Diamond Dresser	Diameter x Thickness (mm) < 50000 0,5 carat Diameter x Thickness (mm) > 50000 1, carat Please specify Shank Design (MT1, Cyl.11 etc.)	
Multipoint Diamond Dresser	D1001 Wheel Grit Sizes 60-80 D711 Wheel Grit Sizes 80-120 Diameter x Thickness (mm) < 60000 IG2,5 Diameter x Thickness (mm) > 60000 IG 5 Please specify Shank Design (MT1, Cyl.11 etc.) and tool approach angle	
Fliese Dressing Blade	FAS 115 Wheel Grit Sizes 60-80 FAS 90 Wheel Grit Sizes 80-120 Diameter x Thickness (mm) < 70000 Single Plate Diameter x Thickness (mm) > 70000 Twin Files	

Your SGA application engineer can help you determine the right truing and dressing product for your application.

Application Example 1

General Information

Application:	Large straight bearing rollers
Machine:	Cincinnati Viking grinder
Feed wheel:	Rubber wheel
Dressing:	Single point diamond
Coolant:	Water soluble, 3% concentration

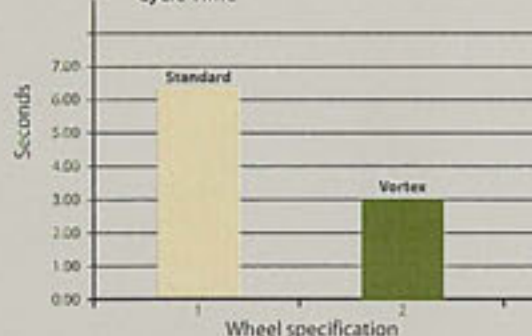
Part Information

Material type:	Molybdenum alloyed steel type 4322
Hardness:	60-64 HRc
Size range:	31,5mm diameter x 88mm length
Stock removal:	0,3mm
Surface finish (Ra):	0.7-0,8µm

Wheel Information

Wheel size:	456 x 254 x 203,2mm
Std specification:	Vitrified wheel A60
Vortex specification:	A80NBVortex

Cycle Time



Results

- Vortex Wheels were able to grind at a 60% faster part rate with higher productivity
- Vortex Wheels had a 75% higher lifespan than standard wheels

Application Example 2

General Information

Application:	Bar grinding
Machine:	Cincinnati grinder
Feed wheel:	Rubber wheel
Dressing:	Single point diamond
Coolant:	Water soluble, 4% concentration

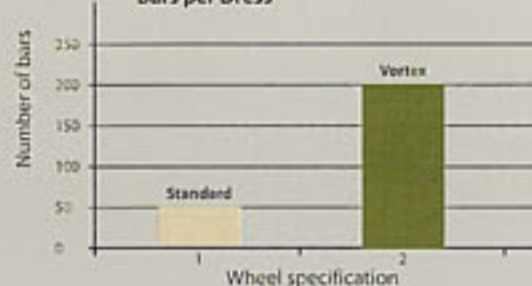
Part Information

Material type:	Nickel alloy, chromium alloys and Inconel
Hardness:	64 HRc
Size range:	10-32mm diameter x 3,5m length
Stock removal:	0,5-0,7mm in total (obtained in multiple passes)
Surface finish (Ra):	N/A

Wheel Information

Wheel size:	508 x 203 x 304,8mm
Std specification:	Vitrified wheel C54
Vortex specification:	A80MBVortex

Bars per Dress



Results

- Vortex Wheels were able to grind at a 50% faster part rate lowering the dressing frequency
- Vortex Wheels had a 30-50% higher lifespan depending on material type

Application Example 3

General Information

Application:	Bar grinding
Machine:	Schumag grinder
Feed wheel:	2 opposite grinding wheels
Dressing:	Multipoint diamond
Coolant:	Water soluble, 4% concentration

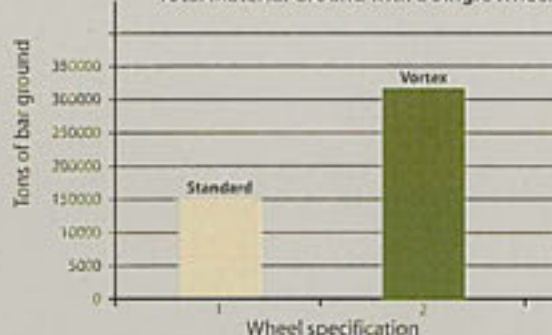
Part Information

Material type:	Bearing steel (100C6), tool steel (115CV3), stainless steel
Hardness:	Various
Size range:	4-20mm diameter x 2-3,5m length
Stock removal:	0,04 mm per pass (single pass)
Surface finish (Ra):	0,5-0,8µm
Wheel size:	355 x 150 x 203mm

Std specification : Resinoid wheel ACS4B

Vortex specification: A80NBVortex

Total Material Ground with a Single Wheel



Results

- Vortex Wheels were able to double the quantity of material ground
- Dressing frequency was reduced keeping constant the material removal with benefits to productivity and labour cost
- Total cost reduction per part: -7%

Application Example 4

General Information

Application:	Taper roller bearing
Machine:	Cincinnati
Feed wheel:	Steel charger
Dressing:	Single point diamond
Coolant:	Water soluble, 5% concentration

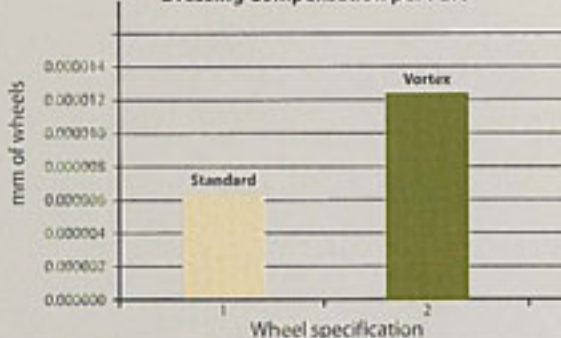
Part Information

Material type:	Bearing steel 100C6
Hardness:	60 HRC
Size range:	Apex diameter: 9.14mm; End diam. 8.26; Length: 12.32mm
Stock removal:	0.203mm
Surface finish (Ra):	0.33µm

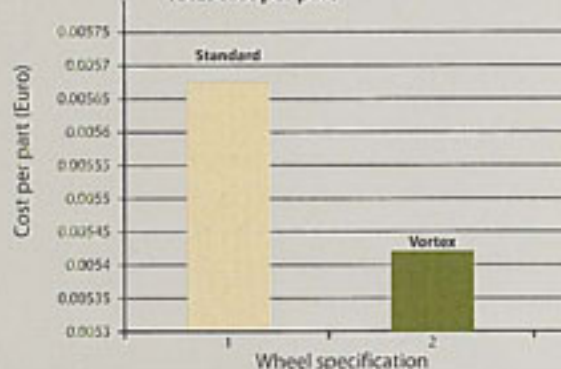
Wheel Information

Wheel size:	508 x 152.4 x 305mm
Std specification:	Resinoid wheel 80 grit with ceramic aluminium oxide
Vortex specification:	A1000BVortex

Dressing Compensation per Part



Total cost per part



Results

- Vortex Wheels were able to grind with lower wheel consumption (45% less wheel wear/hour versus standard wheels)
- Vortex Wheels were able to grind with 15% less power than standard wheels
- Vortex Wheels had twice the lifespan of standard wheels
- Total yearly cost reduction per part: -6%

For more information on how VORTEX Technology can increase your productivity, contact your local Norton distributor or contact Matteo Baracchi, European Product Manager - organic product, e-mail: matteo.baracchi@saint-gobain.com
Please mark your request VORTEX INFO REQ

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