

Case studies

Case Study 1

Application: Creepfeed Grinding
Part: Nozzle guide vane
Material: Inconel
Machine: Makino
Coolant: Emulsion 5%
Wheel dimension: 220x20x32mm
Wheel specification: IPA100EH17VTX2

Results vs. competitor:

Wheel life: **+30% MORE**
 Cycle time: **-11% SHORTER**
 Total cost per part: **-18% LOWER**

Case Study 2

Application: Gear profile grinding
Part: Large windmill gear axis, module 12
Material: M6 steel 62 HRC
Machine: Gleason-Pfauter P1200G
Coolant: Neat oil
Wheel dimension: 400x50x127mm
Wheel specification: IPA100XH26VTX2

Results vs. competitor:

Wheel life: **+25% MORE**
 Cycle time: **-50% SHORTER**
 Total cost per part: **-30% LOWER**

Case Study 3

Application: Creepfeed Grinding
Part: Gas turbine blade, fir tree
Material: Inconel
Machine: Blohm Profimat
Coolant: Emulsion 6%
Wheel dimension: 550x160x203.2mm
Wheel specification: IPA60ME26VTX2

Results vs. competitor:

Wheel life: **+50% MORE**
 Cycle time: **-16% SHORTER**
 Total cost per part: **-20% LOWER**

Case Study 4

Application: Creepfeed Grinding
Part: Turbine blade, fir tree
Material: Inconel
Machine: Makino
Coolant: Emulsion 5%
Wheel dimension: 220x35x32mm
Wheel specification: IPA60EH20VTX2

Results vs. competitor:

Wheel life: **+35% MORE**
 Cycle time: **-24% SHORTER**
 Total cost per part: **-20% LOWER**

Vortex 2 availability

	DESIGNATION	DESCRIPTION
Abrasive type	IPA	Engineered 3D alumina grain
Grain size FEPA F	46, 60, 80, 100, 120	
Grade	ME HA EH XH	Medium Hard Extra hard Extra, extra hard
Structure	17 20 26 29	Less open structure for improved form holding and wheel wear More open structure for higher MRR and heat sensitive parts
Bond type	VTX2	New bond for improved form holding and wheel life
Colour	Blue-green	

Form holding

MRR increases

Environmental benefits

The patented Vortex grain technology does not require the use of chemical pore inducers, unlike other porous vitrified wheel technologies. By choosing **Vortex 2** Technology for your grinding operation, you help to preserve the environment.



NEXT GENERATION TECHNOLOGY



Advanced Creepfeed Grinding

NORTON

SAINT-GOBAIN

VORTEX 2
TECHNOLOGY

INNOVATION TECHNOLOGY

SAINT-GOBAIN
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 Form # 1974



The advanced high performance bond in Vortex™ 2 Technology, developed by Saint-Gobain Abrasives, maximises profile holding, significantly increasing metal removal rates and wheel life, raising productivity to a new level.



Innovative bond technology for improved productivity



High Metal Removal
Vortex 2 Technology combines specially engineered abrasive grain and a new bond formula. This brings all the advantages of significantly higher metal removal rates, further improved form holding and longer wheel life with reduced risk of metallurgical damage.

Reduced Cycle Times
Vortex 2 Technology reduces cycle time by up to 60% thanks to the increased depth of cut and reduced number of passes.

Exceptional Profile Holding
Vortex 2 maintains a tight edge radius at high MRR, for excellent profile holding and increased productivity.

Long Wheel Life
The optimised abrasive and porosity distribution combined with new bond system provides a 40% increase in wheel life. The need for frequent wheel dressing is reduced due to improved form holding of the wheel profile

Ultimate Burn Reduction
A complete revolution from classical porous wheel technologies as optimum 3D grain spacing is achieved without artificial pore inducers. The totally open porosity is a key advantage, providing excellent coolant access on difficult to grind and heat sensitive nickel based alloys

Large Areas of Contact
Excels in grinding applications with large areas of contact such as Creepfeed Grinding, Gear and Surface Grinding.

Markets

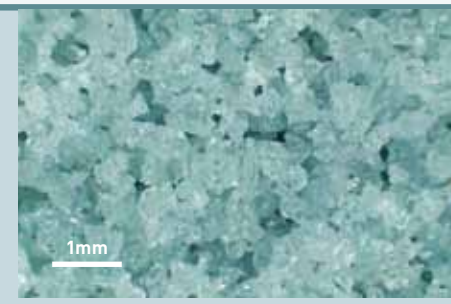
- Aerospace
- Tools
- Automotive
- Gears

Features

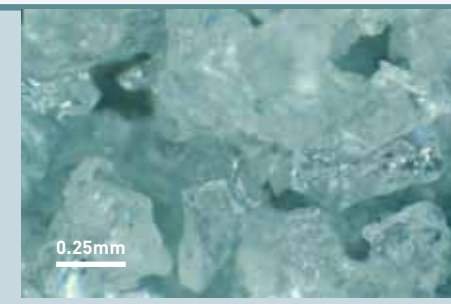
- New bond formula
- High performance engineered fused alumina grain
- Highly porous & permeable for maximising coolant diffusion in the grinding zone
- Optimum grain spacing for improved chip clearance and reduced friction from 'spot contact'

Benefits

- High profile holding for extended wheel life and improved productivity
- Improved total cost versus performance ratio
- Maintains cool cutting
- Very high metal removal rates for significant cycle time reduction
- Very long wheel life though dramatically reduced wheel dressing
- Gentle on the dressing tool, very easy to profile
- Ultimate degree of burn reduction through extreme permeability
- Reduced residual stress after grinding
- Easy conversion from Vortex to Vortex 2 specification



Highly porous and permeable grain structure for maximum coolant access to the grinding zone.



Fir tree before and after grinding



Before

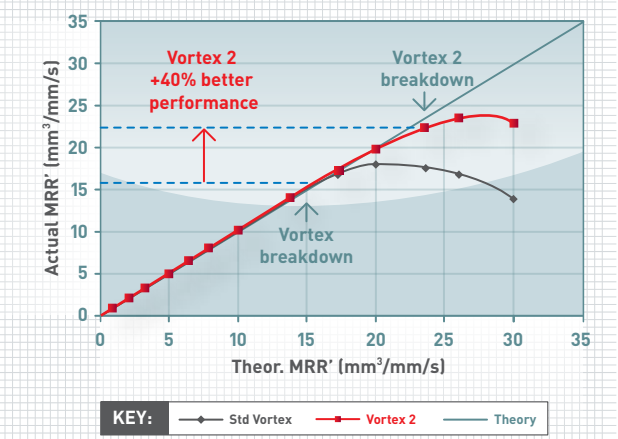
After

Internal testing

Test 1: Wheel Life Analysis

Vortex 2 works up to 40% faster

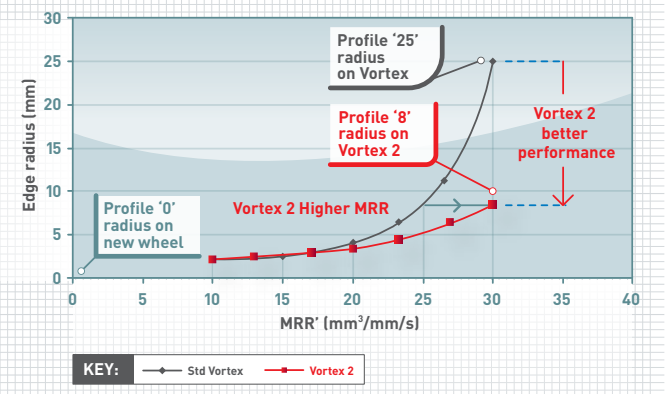
By grinding under extreme MRR, an indication of wheel durability is given when actual MRR no longer follows the theoretical MRR line. At 16mm³/mm/s, standard Vortex begins to break down. Vortex 2 matches theoretical MRR until 22mm³/mm/s. Vortex 2 provides a huge improvement in productivity.



Test 2: Profile Holding

Vortex 2 has improved profile holding

For a given MRR, a lower edge radius indicates better profile holding. At similar profile radius, Vortex 2 guarantees a higher MRR.



Innovation

Vortex 2 is the combination of engineered 3D grain spacing and a new technology bond created by Saint-Gobain Abrasives' Research & Development Department. The result is a cool cutting abrasive which provides a 40% increase in wheel life and profile holding. An excellent tool with superb performance benefits.