WINTER

NORTON

Technical Machining Solutions For Transmission Systems

Gear shaft machining

Gear and tooth grinding

Gear honing

Bevel gear grinding

Hard turning

Contents

Quality and precision achievements

Saint Gobain was founded in 1665 as a company with new ideas for the manufacturing of flat glass. Since its foundation Saint - Gobain has concentrated on innovation and expertise in the area of technical materials. In many industries Saint - Gobain has become a market leader. Today Saint - Gobain employs approximately 16,000 people in the area of bonded abrasive products and dressing tools.
Saint - Gobain is present in 45 countries worldwide and is the largest manufacturer of dressing tools and abrasives in the world.

Advanced technologies

Manufacturing technology

Saint -Gobain has developed up-to-date production facilities, through continuous investment in manufacturing equipment. Its excellent on-time delivery performance is backed by in-depth product knowledge and very high quality levels.

Saint - Gobain Diamantwerkzeuge is certified according to ISO 9001; ISO 14001 and has also obtained the prestigious FORD Q1-Certification.

Technology Center for Abrasives Engineering

The objectives of the technical centers are to develop and improve grinding technology.
These are located in Germany (at Norderstedt, near Hamburg) and in the USA (at Worcester, near Boston).

They support customers in developing their demands for the future, allowing them to become world class in their application of dressing tools and abrasives.
These „“Centers of competence“ include developments like „System concept“ that describe the microscopic interrelation of the process during the dressing and grinding process. To gather and spread this knowledge of dressing and grinding, there is an European Technical Data Base (ETDB) created at the local level.

Absolute Dressing precision with WINTER

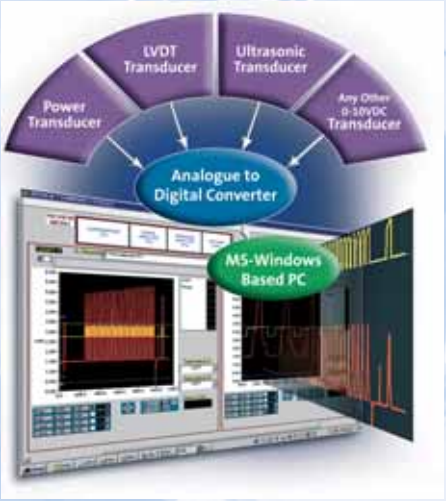
High accuracy dressing tools are needed to dress an abrasive wheel to close tolerances. Only then it is it possible to guarantee the quality of the components produced.

Saint - Gobain produce the following diamond dressing tools with the WINTER brand:

- CNC rotary roller dresser
- CNC stationary dressing tools
- Rotary profile roller dresser
- Rotary single taper dressing disc and profile roller dresser

Optimum solution for gear honing with WINTER and NORTON

The latest technologies for gear honing, guarantee the best quality honing process.



Saint–Gobain offers both high precision dressing gears from WINTER and honing rings from NORTON for an excellent complete solution.

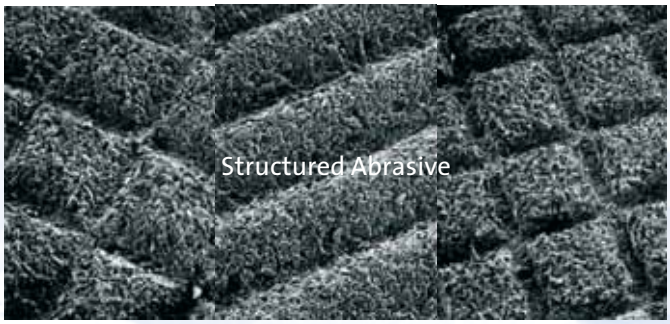
- Direct plated dressing gears
- Reverse plated dressing gears
- Resin bond honing rings
- Ceramic bond honing rings

Outstanding grinding achievements with NORTON

By applying the latest abrasive technologies we have developed the following high performance products :

SG	- Sol-Gel-abrasive
TG	- Extruded ceramic abrasives
ALTOS	- Advanced ceramic technology
OPTIMOS	- Porous products for high processing speeds
VORTEX	- High porosity and permeance to maximise the cooling diffusion at the grinding area

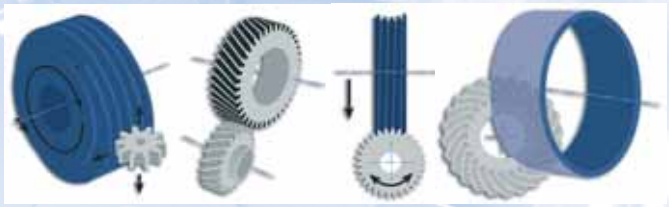
These products were developed by Saint-Gobain for specific customer bond systems and requirements. Technology developments like ALTOS and VORTEX offer the best stock removal rates.



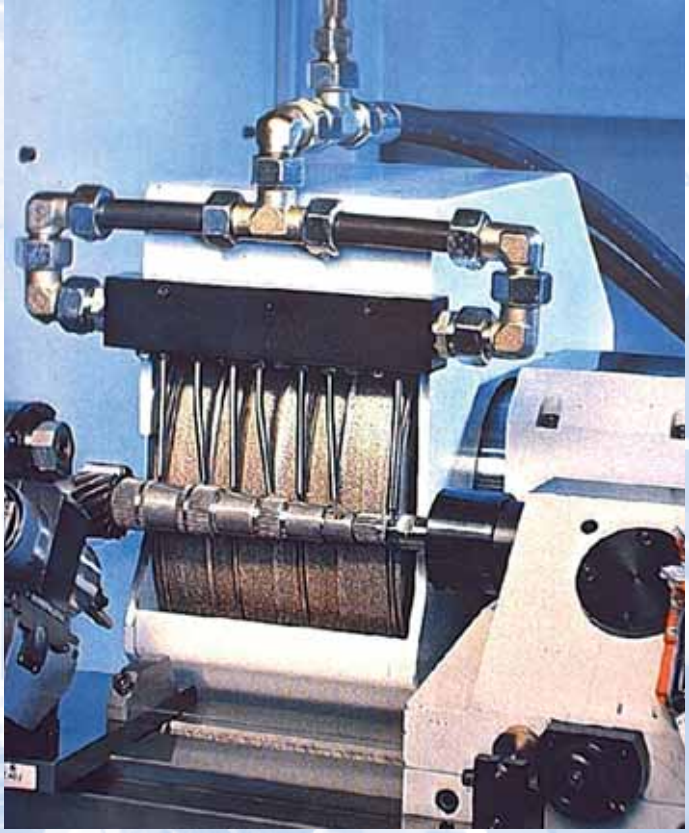
High precision turning processes with EHS

EH-Stock produce PCBN inserts for soft and hard machining with different hardness grades.
Applications include :

- Groove turning
- External turning
- Internal turning



Product performance range



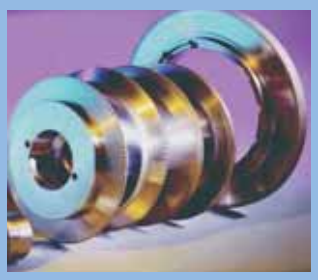
Gear shaft machining

Groove grinding

gear basic®

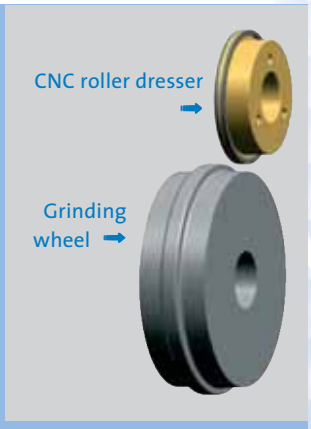
Aluminium oxide grinding wheels from NORTON together with CNC rotary roller dressers from WINTER.

Maximum peripheral speed
- [x] 63 m/s
- [ ] 80 m/s
- [ ] 100 m/s



Coolant
- [ ] Oil
- [x] Emulsion
- [ ] High pressure
- [ ] Cleaning of grinding wheel

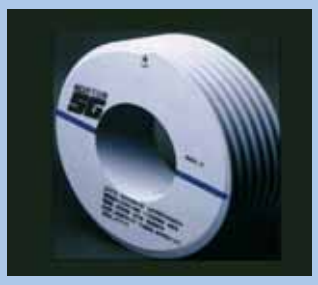
Grinding wheel
- [x] Dressing
- [ ] No dressing



Resharpening / Relapping of the dressing tool
- [ ] Possible
- [x] Limited possible
- [ ] Replating

gear spectrum®

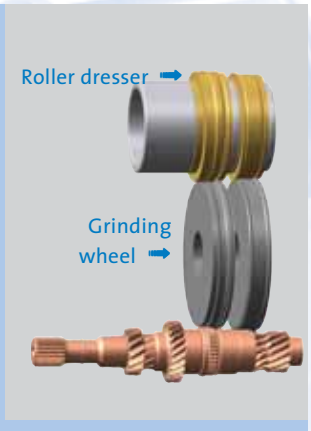
Grinding wheels with special corundum from NORTON together with high precision rotary profile roller dresser from WINTER.



Minimum peripheral speed
- [x] 30 m/s
- [ ] 80 m/s
- [ ] 100 m/s

Coolant
- [ ] Oil
- [x] Emulsion
- [ ] High pressure
- [ ] Cleaning of grinding wheel

Grinding wheel
- [x] Dressing
- [ ] No dressing



Resharpening / Relapping of the dressing tool
- [ ] Possible
- [x] Limited possible
- [ ] Replating

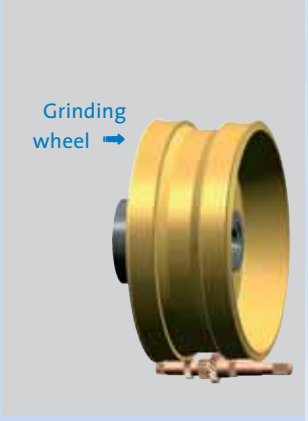
gear performance®

Electroplated CBN grinding wheels from WINTER and OptiMOS from NORTON.

Minimum peripheral speed
- [ ] 63 m/s
- [ ] 80 m/s
- [x] 100 m/s

Coolant
- [x] Oil
- [ ] Emulsion
- [x] High pressure
- [x] Cleaning of grinding wheel

Grinding wheel
- [ ] Dressing
- [x] No dressing



Reworking electroplated CBN grinding wheel
- [ ] Possible
- [ ] Limited possible
- [x] Replating

Outer diameter and peel grinding

gear basic ®

Aluminium oxide grinding wheels from NORTON together with contour-controlled stationary dressing tools from WINTER.

Maximum peripheral speed
- ☑ 63 m/s
- ☐ 80 m/s
- ☐ 100 m/s

Coolant
- ☐ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel

Grinding wheel
- ☑ Dressing
- ☐ No dressing

Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☐ Replating

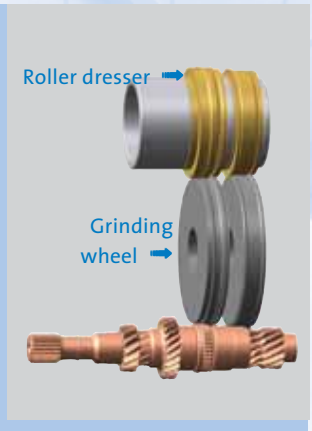
gear spectrum ®

Rough grinding with electroplated CBN grinding wheels and finish grinding with vitrified CBN grinding wheels together with contour-controlled rotary roller dresser from WINTER.

Minimum peripheral speed
- ☑ 30 m/s
- ☐ 80 m/s
- ☐ 100 m/s

Coolant
- ☐ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel

Grinding process
- ☑ Direct grinding
- ☐ Indirect grinding



Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☐ Replating

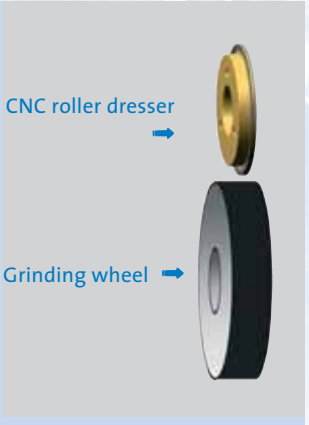
gear performance ®

Vorschleifen mit galvanisch gebundene CBN-Schleifscheiben und Fertigschleifen mit keramisch gebundenen CBN-Schleifscheiben in Verbindung mit CNC gesteuerten rotierenden Formrollen von WINTER.

Minimum peripheral speed
- ☐ 63 m/s
- ☑ 80 m/s
- ☐ 100 m/s

Coolant
- ☑ Oil
- ☑ Emulsion
- ☑ High pressure
- ☑ Cleaning of grinding wheel

Grinding process
- ☑ Direct grinding
- ☑ Indirect grinding



Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☑ Replating

Centerless grinding

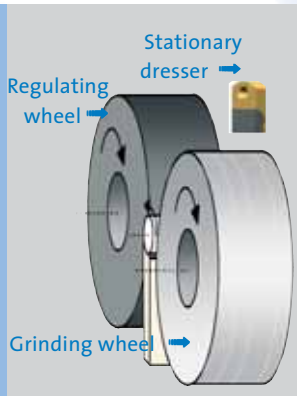
gear basic®

Aluminium oxide grinding wheels and vulcanised bonded regulating wheels from NORTON together with contour-controlled stationary dressing tools from WINTER.

Minimum peripheral speed
- ☑ 30 m/s
- ☐ 80 m/s
- ☐ 100 m/s

Coolant
- ☐ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel

Grinding wheel
- ☑ Dressing
- ☐ No dressing



Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Not possible
- ☐ Replating

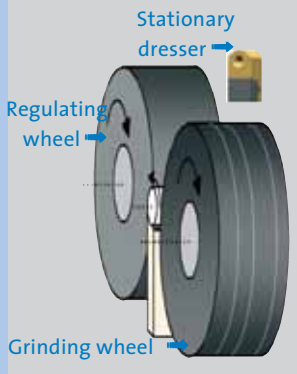
gear spectrum®

Rough grinding with electroplated CBN grinding wheels from WINTER and ceramic regulating wheels from NORTON together with contour-controlled stationary dressing tools from WINTER.

Minimum peripheral speed
- ☐ 30 m/s
- ☐ 80 m/s
- ☑ 100 m/s

Coolant
- ☑ Oil
- ☑ Emulsion
- ☑ High pressure
- ☑ Cleaning of grinding wheel

Grinding wheel
- ☐ Dressing
- ☑ No dressing

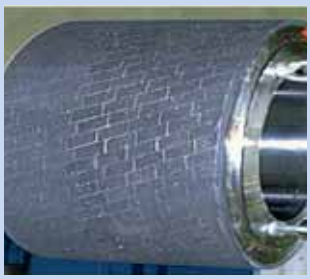


Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☑ Replating

gear performance®

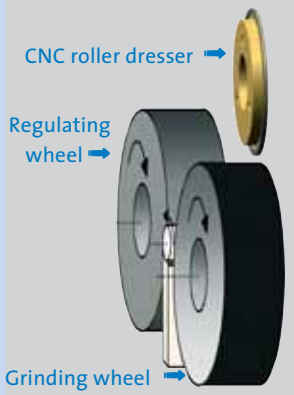
Grinding wheels with special corundum from NORTON or vitrified CBN grinding wheels from WINTER and ceramic regulating wheels from NORTON together with contour-controlled rotary roller dresser from WINTER.

Minimum peripheral speed
- ☑ 63 m/s
- ☐ 80 m/s
- ☐ 100 m/s



Coolant
- ☑ Oil
- ☐ Emulsion
- ☑ High pressure
- ☑ Cleaning of grinding wheel

Grinding wheel
- ☑ Dressing
- ☐ No dressing



Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☑ Replating

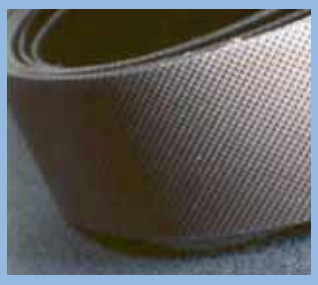
Finishing thrust bearing

gear spectrum®

Abrasive belts from NORTON

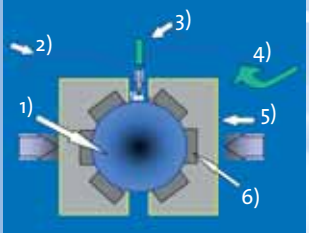
Peripheral speed
- ☑ Stationary
- ☑ Max. 40 m/s
- ☐ 100 m/s

Coolant
- ☑ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel



Finishing
- ☐ Indirect finishing
- ☑ Direct finishing

1) Crankshaft
2) Film
3) Coolant
4) Anti-Slip Coating
5) Tooling
6) India Stone

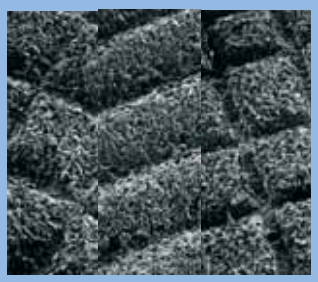


Tool Resharpening/Relapping
- ☐ Possible
- ☑ Not possible
- ☐ Replating

gear spectrum®

Abrasive belts from NORTON

Peripheral speed
- ☑ Stationary
- ☑ Max. 40 m/s
- ☐ 100 m/s



Coolant
- ☑ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel

Finishing
- ☐ Indirect finishing
- ☑ Direct finishing

Tool Resharpening/Relapping
- ☐ Possible
- ☑ Not possible
- ☐ Replating

NOTE

Gear grinding

Gear grinding
for external, internal and face grinding

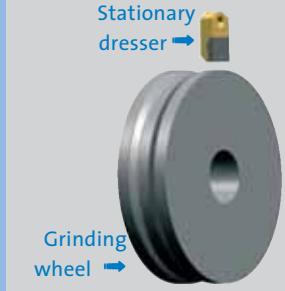
gear basic®

Aluminium oxide grinding wheels from NORTON together with contour-controlled stationary dressing tools from WINTER.

Maximum peripheral speed
- ☑ 63 m/s
- ☐ 80 m/s
- ☐ 100 m/s

Coolant
- ☐ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel

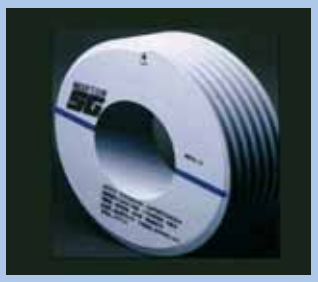
Grinding wheel
- ☑ Dressing
- ☐ No dressing



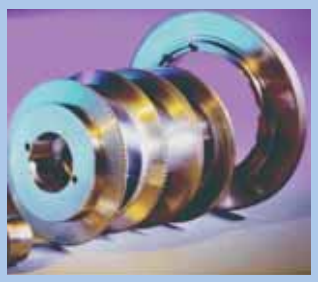
Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Not possible
- ☐ Replating

gear spectrum®

Grinding wheels with special corundum from NORTON together with contour-controlled rotary roller dresser from WINTER.

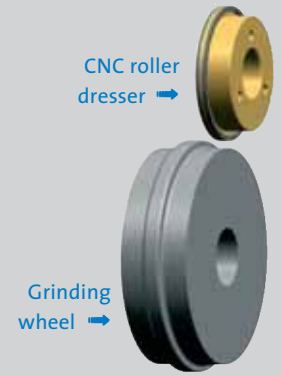


Minimum peripheral speed
- ☑ 30 m/s
- ☐ 80 m/s
- ☐ 100 m/s



Coolant
- ☐ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel

Grinding wheel
- ☑ Dressing
- ☐ No dressing



Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☐ Replating

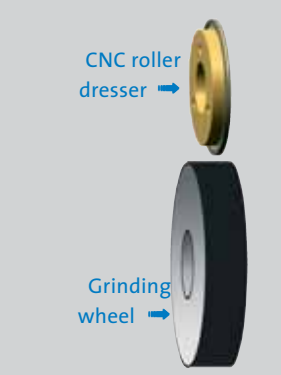
gear performance®

Rough grinding with electroplated CBN grinding wheels and finishing with vitrified CBN grinding wheels together with contour-controlled rotary roller dresser from WINTER.

Minimum peripheral speed
- ☐ 63 m/s
- ☑ 80 m/s
- ☐ 100 m/s

Coolant
- ☑ Oil
- ☑ Emulsion
- ☑ High pressure
- ☑ Cleaning of grinding wheel

Grinding wheel
- ☑ Dressing
- ☑ No dressing



Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☑ Replating

Gear grinding
Discontinuous profile grinding

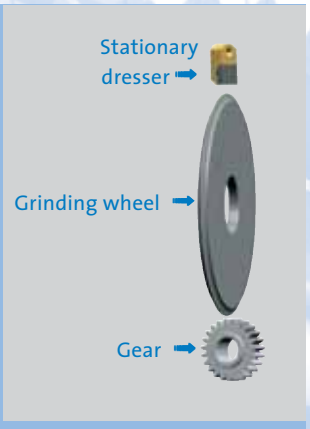
gear basic ®

Aluminium oxide grinding wheels from NORTON together with contour-controlled stationary dressing tools from WINTER.

Maximum peripheral speed
- ☑ 63 m/s
- ☐ 80 m/s
- ☐ 100 m/s

Coolant
- ☑ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel

Grinding wheel
- ☑ Dressing
- ☐ No dressing

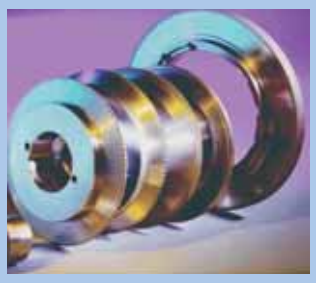


Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Not possible
- ☐ Replating

gear spectrum ®

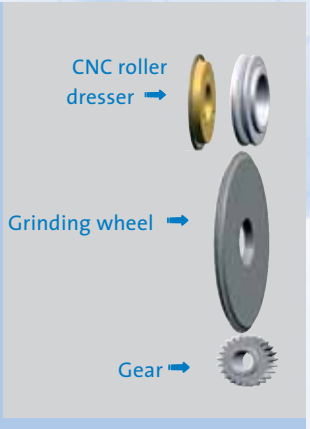
Grinding wheels with special corundum from NORTON together with contour-controlled rotary roller dresser or profile roller dresser from WINTER.

Minimum peripheral speed
- ☑ 30 m/s
- ☐ 80 m/s
- ☐ 100 m/s



Coolant
- ☑ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel

Grinding wheel
- ☑ Dressing
- ☐ No dressing

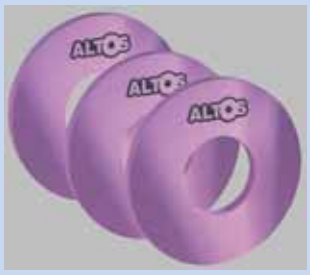


Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☐ Replating

gear performance ®

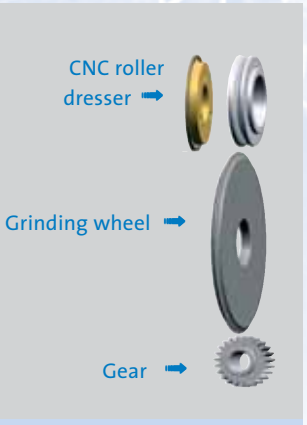
Grinding wheels with special corundum from NORTON together with contour-controlled rotary roller dresser or profile roller dresser from WINTER.

Minimum peripheral speed
- ☑ 50 m/s
- ☐ 80 m/s
- ☐ 100 m/s



Coolant
- ☑ Oil
- ☑ Emulsion
- ☑ High pressure
- ☑ Cleaning of grinding wheel

Grinding wheel
- ☑ Dressing
- ☐ No dressing



Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☑ Replating

Gear grinding
Continuous profile grinding

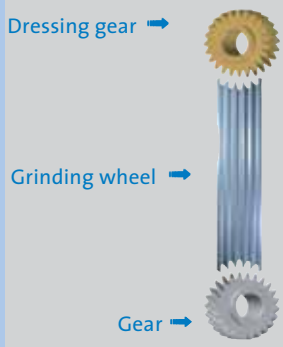
gear spectrum®

Aluminium oxide grinding wheels from NORTON together with positive plated dressing gears from WINTER.

Minimum peripheral speed
- ☑ 30 m/s
- ☐ 80 m/s
- ☐ 100 m/s

Coolant
- ☑ Oil
- ☑ Emulsion
- ☐ High pressure
- ☐ Cleaning of grinding wheel

Grinding wheel
- ☑ Dressing
- ☐ No dressing



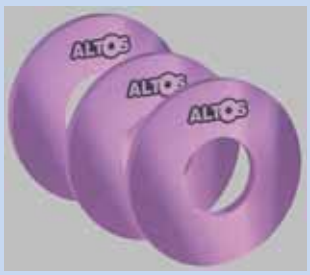
Resharpening / Relapping of the dressing tool
- ☐ Possible
- ☑ Limited possible
- ☐ Replating

gear performance®

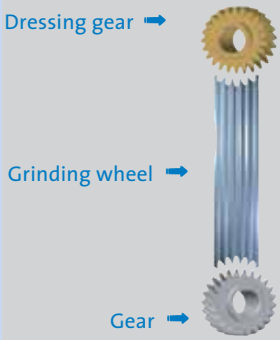
Grinding wheels with special corundum from NORTON together with reversed plated dressing gears from WINTER.

Minimum peripheral speed
- ☑ 50 m/s
- ☐ 80 m/s
- ☐ 100 m/s

Coolant
- ☑ Oil
- ☑ Emulsion
- ☑ High pressure
- ☑ Cleaning of grinding wheel

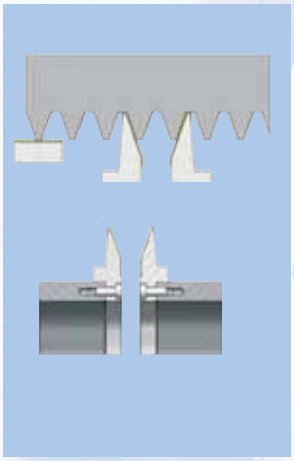


Grinding wheel
- ☑ Dressing
- ☐ No dressing



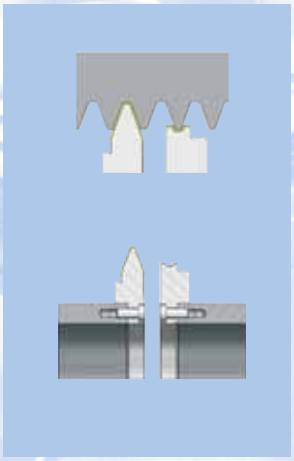
Resharpening / Relapping of the dressing tool
- ☑ Not possible
- ☐ Limited possible
- ☐ Replating

Gear grinding
Continuous generation grinding



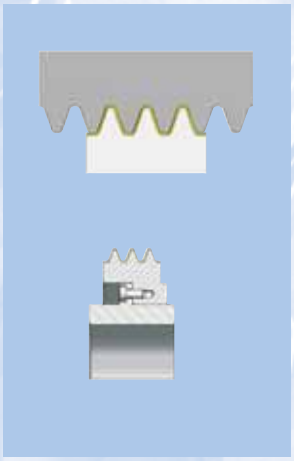
Conventional grinding worms from NORTON together with positive plated single taper disc and profile roller dresser from WINTER

- high flexibility of tooling
- dressing discs are used in ‘sets’
- each dressing disc is mounting on a separate driven dressing spindle
- each dressing disc can be independently positioned to give the best gear quality
- the pitch is variable
- variable disc profile depth
- applications with overlapping module ranges are possible
- for gear root grinding, Saint-Gobain can deliver an integrated solution
- It is possible to repair dressing tools by the conditioning of the diamond layer or by strip and plate



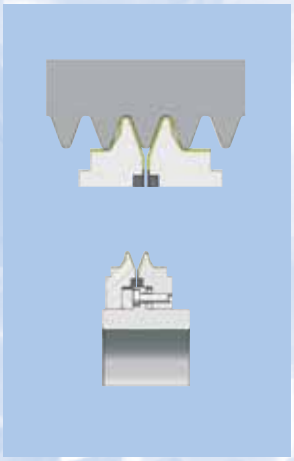
Conventional grinding worms from NORTON together with positive or reversed plated profile roller dressers and plain roller dressers from WINTER

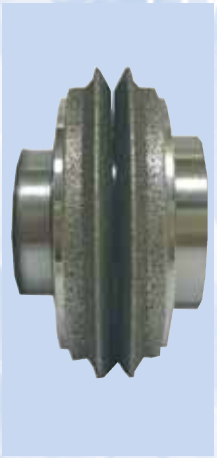
- very good solution for root grinding
- reverse plated dressers are used for small modules (<1)
- direct plated dressers are used for larger modules (>1)
- roller dressers are used in 'sets' and each dresser is mounted on a separate driven spindle. Variable positioning of roller dresser is possible
- direct plated tools can be re-conditioned by strip and replating



Conventional grinding worms from NORTON together with reversed plated profile roller dresser from WINTER

- very good tool system with low set-up and adjustment time
- good performance especially for module range < 1
- profile roller dresser is a one tool system
- mounting on a driven dressing spindle
- one or more start dressing tool
- tool system is dependent on the component
- most applications are include integrated root grinding
- replating is not possible





Conventional grinding worms from NORTON together with positive plated single taper dressing sets for one start dressing from WINTER

- very good tool system for gear root grinding
- dressing tool system with short dressing cycles
- dressing tool system is dependent on the component and is mounted on a driven dressing spindle
- dressing system is mounted on a high precision bush with a fine pitch adjustment
- allows a fast assembly/disassembly time for dressing tools in situ
- repair by conditioning of the diamond layer or by strip and replate

Saint - Gobain Abrasives offers an economic solution for all dressing applications in gear machining:

Grinding wheel types for external diameter, internal diameter and face grinding operations
Conventional grinding wheels from NORTON as well as electroplated and vitrified CBN grinding wheels from WINTER

Grinding wheel types for gear grinding
Conventional grinding wheels, grinding worms and grinding cups from NORTON as well as electroplated and vitrified CBN grinding wheels, grinding worms and grinding cups from WINTER

Dressing tool types
WINTER offers a range of dressing tools for all dressing applications. The range includes stationary dressing tools, CNC rotary dressers, profile roller dressers and single taper discs with round roller dresser for grinding worms.

Dressing tools for small modules can be reinforced on the outer diameter.

Overview complete solutions

Gear grinding processing

Internal grinding	Conventional grinding wheel	Diamond and CBN grinding wheel	
Face grinding	Conventional grinding wheel	Diamond and CBN grinding wheel	
External grinding	Conventional grinding wheel	Diamond and CBN grinding wheel	
Dressing tools	CNC driven stationary dressers	CNC driven rotary dresser	Rotary profile roller dresser

Tooth processing by profile grinding and generating grinding

Grinding worms	conventional and vitrified CBN grinding worms
Grinding wheels	conventional grinding wheels, electroplated and vitrified CBN grinding wheels
Dressing tools	Single taper discs with round roller dresser, roller dresser sets for one start dressing, stationary dresser, contour-controlled rotary roller dresser, rotary profile roller dresser

Surface and power honing

Gear finishing technology
Process sequence for machining gear teeth

Hobbing / Shaping

Shaving

Hardening

Grinding

Grinding

Structure honing

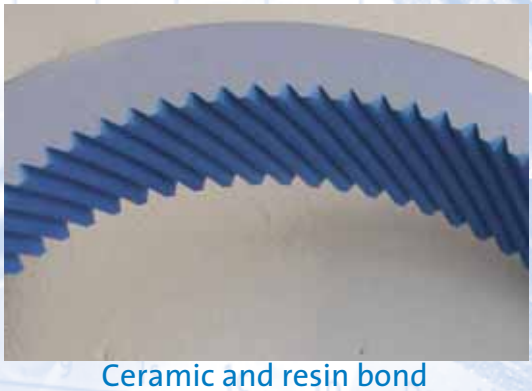
Power honing

Final inspection

Assembly

Complete solutions for gear tooth honing

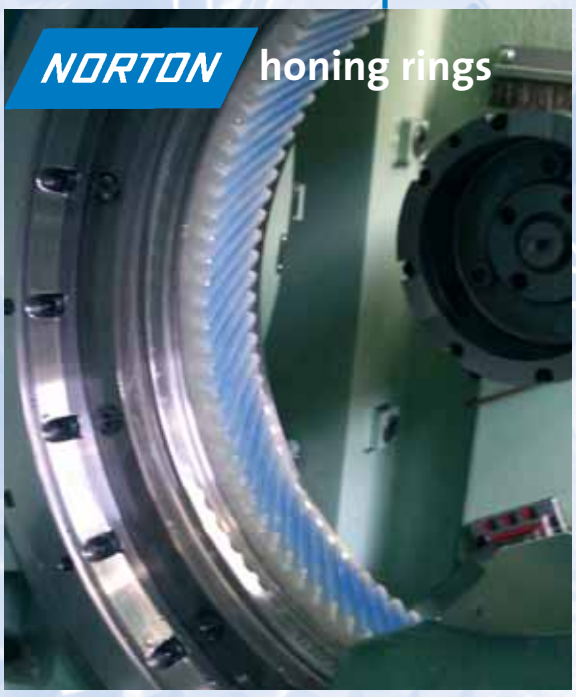
Positive plated dressing gears



Ceramic and resin bond honing rings

Reversed plated dressing gears

External and internal honing



Power and structure honing on gear honing machines

The new generation of WINTER diamond dressing gears are available in both positive and reversed plated specification. Together with the new NORTON development of resin-bond and ceramic-bond honing rings, this enables a much faster processing of gear tooth systems.

Coordinated tooling, from one sourse is the guarantee for an optimised performance in production.

The advantages of NORTON honing rings:

- Free cutting
- High dressing frequency
- Excellent profile holding
- Extended tool life
- Smooth surface finish

The advantages of WINTER diamond dressing gears:

- High precision
- Excellent dressing performance
- Extended tool life
- Guaranteed consistency and repeatability

WINTER and NORTON combine for the effective manufacture perfect of transmission systems, at an optimised price performance ratio.

Bevel gear grinding for spiral and hypoid gears

Complete solutions for bevel gear grinding

Source: Klingelnberg

Source: Klingelnberg

Saint - Gobain Abrasives have, with the brands WINTER and NORTON, a coordinated product range for bevel gear grinding for both spiral and hypoid gears.

Klingelnberg and Gleason-Pfauter are the main suppliers of Bevel Gear grinding machinery

Saint - Gobain Abrasives is able to provide both conventional and vitrified CBN cup wheels, together with rotary dressing tools, in an optimal coordinated solution for the grinding process.

- ceramic-bond CBN cup wheels with the WINTER brand
- Cup wheels with aluminium oxide or special corundum with the NORTON brand
- Rotary dressing tools with the WINTER brand

Hard turning with PCBN inserts for transmission components

PCBN hard machining inserts

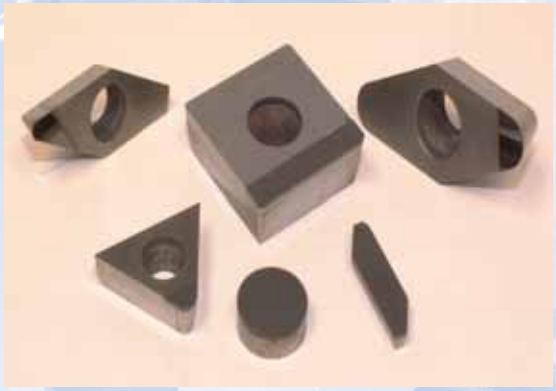
Saint-Gobain Abrasives manufacture a range of hard machining inserts using selected PCBN grades.

The PCBN tool material is sintered at high pressure and temperature and then processed using spark erosion and grinding methods to form the finished tools.

PCBN tools can give better surface finishe along with improved tolerances, less down time, lower cutting forces and lower cost per part when compared to conventional grinding.

PCBN inserts are suited for the machining of hard ferrous materials with and without coolant. Suitable work piece materials include hardened steels (>45HRC), sintered irons, grey cast iron, chilled cast irons and hard facing alloys.

The inserts are available in standard ISO formats as well as bespoke tooling.



The advantages of using PCBN tools are as follows:
- Reduced machining costs
- Improved work piece quality
- Ideal solution for roughing and finishing operations
- Process reliability improvement
- Reduction in environmental issues
- Machining possible without coolant

Groove machining:
- ☑ Bespoke tooling solutions
- ☑ PCBN grades for continuous and interrupted cuts
- ☑ Tool widths 1,5 mm - 5 mm are possible
- ☑ Width tolerances of 0,01 mm are possible
- ☑ Tool life potential > 500 parts

Outer diameter machining:
- ☑ Standard ISO formats are available
- ☑ PCBN grades for continuous and interrupted cuts
- ☑ Possible surface quality of R_a 0,2
- ☑ Tolerances of 0,005 mm are possible
- ☑ Suitable for a wide variety of applications

Bore diameter machining:
- ☑ Standard ISO formats are available
- ☑ PCBN grades for continuous and interrupted cuts
- ☑ Surface quality by R_a 0,2
- ☑ Tolerances of 0,005 mm are possible
- ☑ Suitable for a wide variety of applications

Data for PCBN inserts
Process optimisation / actual quantity taken

Checklist for PCBN inserts

Customer data:

Customer		Date	
Plant			
Tooling engineer		Phone no.	
Purchasing		Phone no.	
		E-Mail	
Part description		Process	
Tool number		Machine	
Drawing number		Maximum spindle speed Machine condition	

Process information:

Material		Hardness (HRC)	
Tool holder		Insert type	
Current supplier		Tool material (PCD, CBN, etc.)	
Current cycle time		Annual tool usage	
Machine hourly rate		Cycle time	
Current tool cost		Continuous cut	
Parts per tool		Interrupted cut	
Produced parts		Heavy interrupted cut	
Set up time per tool			
Set up cost		Surface quality R_a; R_z	
Diameter of workpiece		Required surface quality	
Coolant			
Cutting speed (m/min)			
Feed rate (mm/rev)			
Depth of cut (mm)			
Times (min)			
Workpiece sizes (min)		Currency (Euros / £ ?)	

Customer specific instructions and issues:

Please copy this page, complete it and send it to our sales department +(0)44 2380 255 930

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Data for manufacturing of dressing tools / grinding worms

WINTER
NORTON

Checklist for manufacturing of dressing tool / grinding worm

Customer / Customer no.: _____

Machine / Dressing device: _____

Design data:

- ☐ Component drawing / diagrams with tolerances and registered flank allocation Post or e-mail (DXF, DWG, PDF or TIF formats)
- ☐ Diagram from flank line modification and profile modification with all data and tolerances for traction flank and thrust flank
- ☐ Designation of the component and allocation from traction flank and thrust flank by different profile modifications / per flank

Profile crowning	C_h = _____
Profile angular deviation	fH_α = _____
Tip relief	C_a = _____
Start - Ø tip relief	d_{ca} = _____
Helix crowning	C_b = _____
Flank line – angular deviation	fH_β = _____

☐ Root of the tooth to be grind

Tool tip radius and/or fillet radius	roh_{fp} = _____ r_f = _____
☐ Tool addendum	h_{ap} = _____

☐ Drawing for approval desired

Gearing data:

Normal module	m_n = _____
Number of teeth	z = _____
Pressure angle	α_n = _____
Helix angle and direction	β = _____
Tip circle-Ø	d_a = _____
Root circle- Ø	d_f = _____
Usable tip diameter	d_{Na} = _____
Usable root diameter	d_{Nf} = _____
Required surface finish	R_a / R_z = _____
Diametrical two ball / two roller diameter	M_{dk} / M_{dr} = _____
Measure ball / roller diameter or Base tangent length	D_M = _____ W_k = _____
Measure number of teeth or Normal tooth thickness	k = _____ S_n = _____

Adjustmentat the machine:

Pressure angle	α_n = _____
Module	m = _____

Grinding worm:

Dimension _____

Number of starts _____

Current specification _____

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Contact information is on back cover.

Data for manufacturing of dressing gears / honing rings

WINTER
NORTON

Checklist for manufacturing of dressing gears / honing rings

Customer / customer no.: _____

Machine / Machine type: _____

Honing process:

☐ Structure honing
(approx. 10µm material removal / flank)
Premachining: shaved /ground

☐ Power honing
(>30µm material removal / flank)
Premachining: milled

Loading:

☐ Automation ☐ Manual

Requested information:

☐ Component Drawing / diagrams with tolerances and flank allocation
per post or e-mail (DXF, DWG, PDF or TIF formats)

☐ Diagram from flank line modification and profile modification with all data and tolerances for traction flank and thrust flank
Designation at the workpiece of allocation from traction flank and thrust flank by different profile modifications / per flank

Profile crowning	C_h = _____
Profile angular deviation	fH_α = _____
Tip relief	C_a = _____
Start - Ø tip relief	d_{ca} = _____
Helix crowning	C_b = _____
Flank line – angular deviation	fH_β = _____

☐ Definition of gear position
(machine / measurement / allocation of flanks)

☐ Drawing for approval desired

Gear data:

Normal module	m_n = _____
Number of teeth	z = _____
Pressure angle	α_n = _____
Helix angle and direction	β = _____
Tip circle diameter	d_a = _____
Root circle diameter	d_f = _____
Usable tip diameter	d_{Na} = _____
Usable root diameter	d_{Nf} = _____
Required surface quality	R_a/R_z = _____
Diametrical two ball / two roles diameter	M_{dk}/M_{dr} = _____
Measure ball / roller diameter	D_M = _____
or	
Base tangent length	W_k = _____
Measure number of teeth	k = _____
or	
Normal tooth thickness	S_n = _____

Dressing gear:
(only for repeat orders)

Grit size:
☐ D91 ☐ D126 ☐ D151 ☐ D181 ☐ x _____

Honing rings:

Cutting material specification _____

Dimensions _____

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Ask us!

SAINT-GOBAIN Abrasives has the solutions for all grinding applications.

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Saint-Gobain Abrasives manufactures and markets its engineering products across the world. The above represent a small selection of our operations. Please contact any of them for details of a location near you.

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Organization for the Safety of Abrasives (oSa)

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