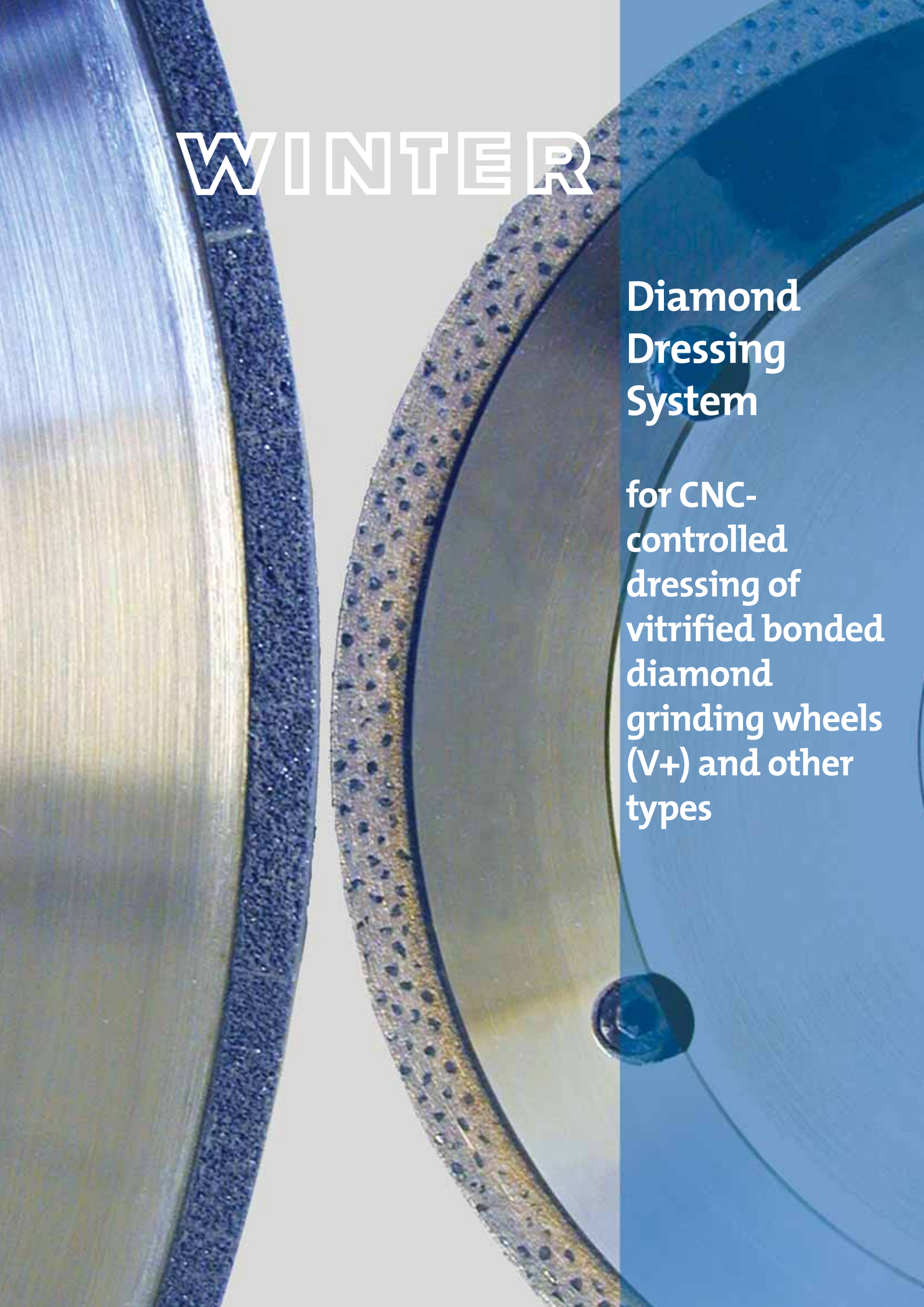
WINTER

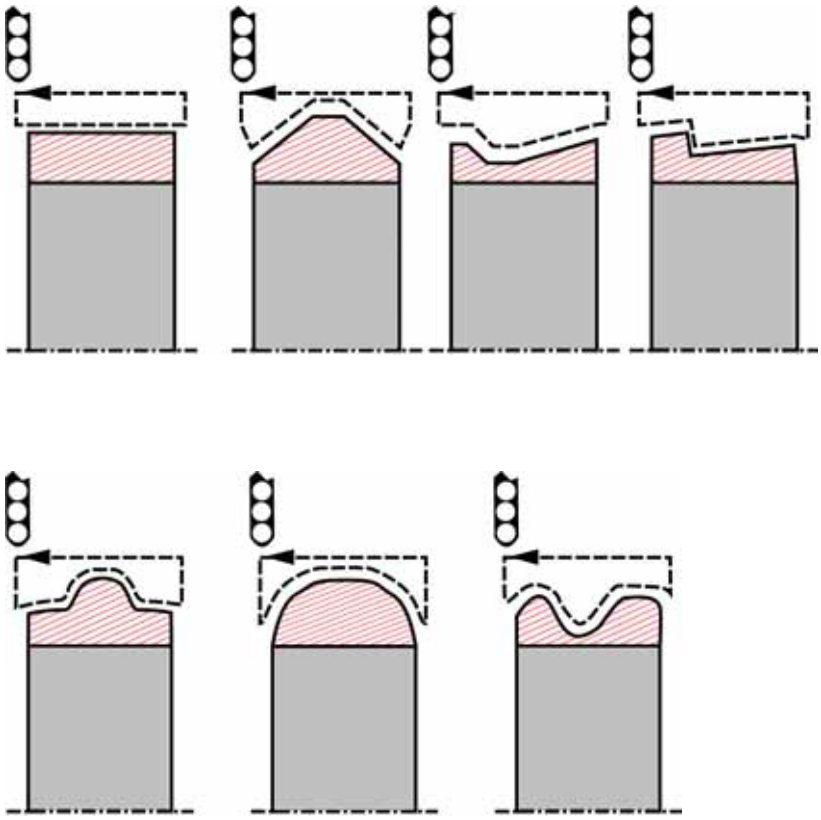
Diamond Dressing System

for CNC-controlled dressing of vitrified bonded diamond grinding wheels (V+) and other types



Examples of Profiles

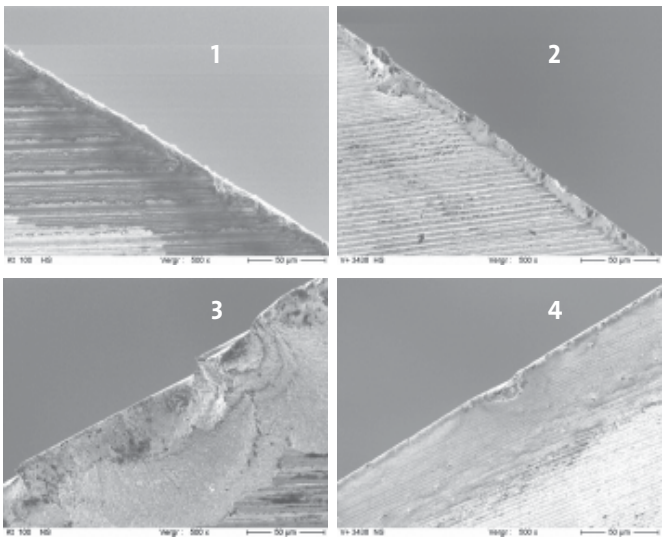
With this new dressing system you can create a broad range of different profiles in a single working step



The Diamond Dressing System allows V+ grinding wheels to be used cost-effectively for a wide variety of different applications.

Considerably better degrees of roughness and cutting edge chippings can be achieved with CNC-dressed V+ grinding wheels. Various application examples are given on the following pages.

1. Major cutting edge of carbide drill processed with K-plus (conventional dressing), showing thermal subsurface damage.
2. Major cutting edge of carbide drill processed with new DDS method, no thermal subsurface damage.
3. Minor cutting edge of carbide drill processed with K-plus, with chipping along cutting edge.
4. Minor cutting edge of carbide drill processed with new DDS method, improved cutting edge quality.

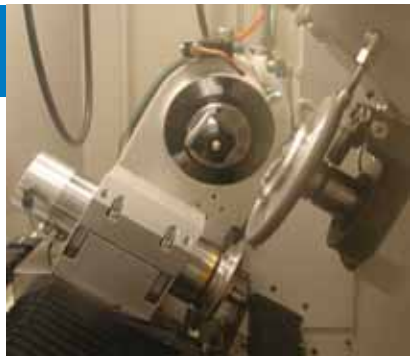


Profile dressing: Rough grinding

Machine parameters	Machine:	Cylindrical grinder STUDER S32
	Cooling lubricant:	Emulsion
	Workpiece:	Carbide K10
Grinding parameters	Grinding wheel:	1VG 3A1-500-5-4.5 D126 V+ 2046 J1SC C150 E
	Cutting speed:	v_c = 75 m/s
	Axial feed rate:	v_{fa} = 40 mm/min
	Depth of cut:	a_e = 0.2 mm
Dressing parameters	Dressing tool:	WINTER DS profile roller
	Dressing amount:	a_{ed} = 4 x 2 µm
	Speed ratio:	q_d = 0.7 Counter rotation
	Overlap factor:	U_d = 4
Results	Surface quality: R_a = 0.17 µm at v_{fa} = 5 mm/min R_a = 0.74 µm at v_{fa} = 40 mm/min	

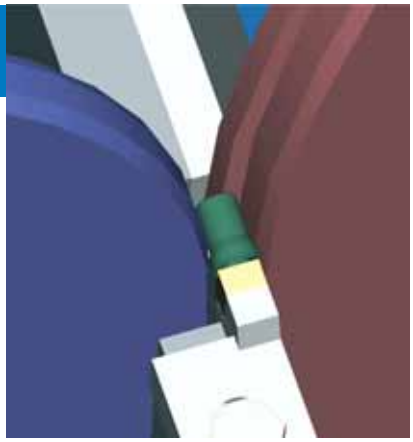
Profile dressing: Shaped grinding

Machine parameters	Machine:	Tool grinder SCHÜTTE WU 305
	Cooling lubricant:	Sintogrind oil (Oel-Held)
	Workpiece:	Bioceramic material
Grinding paramters	Grinding wheel:	99VG 700-15 / D64 D64 V+ 2046 J1SC C150
	Cutting speed:	v_c = 60 m/s
	Depth of cut:	a_e = 0.2 mm
	Overmeasure:	$a_{e\,tot}$ = 1 mm
Dressing parameters	Dressing tool:	WINTER DS profile roller
	Dressing amount:	a_{ed} = 2 µm
	Speed ratio:	q_d = 0,3
	Overlap factor:	U_d = 3-9
Results	Surface quality:	R_z = ≤ 3 µm



Profile dressing: Centerless grinding

Machine parameters	Machine:	Cylindrical grinder SCHAUDT MIKROSA KRONOS S
	Cooling lubricant:	Emulsion
	Workpiece:	Si3N4
Grinding parameters	Grinding wheel:	1VG 3A1-400-15 D46 V+ 2046 J1SC C100
	Cutting speed:	v_c = 120 m/s
	Overmeasure:	$a_{e\,tot}$ = 0.7 mm
Dressing paramters	Dressing tool:	WINTER DS profile roller
	Dressing amount:	a_{ed} = 3 µm
	Cutting speed:	v_{cd} = 40 m/s
	Speed ratio:	q_d = 0.4
Results	Roughness:	R_z = 2.02 µm
	Diameter tolerance	= ± 2 µm
	No measurable wear after 400 pieces	



Profile dressing: Drill flute grinding

Machine parameters	Machine:	WALTER Helitronic Power
	Cooling lubricant:	Sintogrind oil (Oel-Held)
	Workpiece:	Carbide K10
Grinding parameters	Grinding wheel:	99VG 700-125-10 D76 V+ 3438 J1SC C100
	Cutting speed:	v_c = 18-44 m/s
	Feed rate:	v_f = up to 200 mm/min
	Depth of cut:	a_e = 3.5 mm
	Material removal rate:	Q'_{wmax} = 8.75 mm³/(mm · s)
Dressing paramters	Dressing tool:	WINTER DS profile roller
	Dressing amount:	a_{ed} = 3 µm
	Cutting speed:	v_{cd} = 18 m/s
	Speed ratio:	q_d = 0,7
	Overlap factor:	U_d = 3

Results Considerably better roughness and cutting edge quality compared to K-plus

Profile dressing: Cylindrical surface plunge grinding

Machine parameters	Machine:	Cylindrical grinder STUDER S32 CNC
	Cooling lubricant:	Emulsion
	Workpiece:	Carbide K10
Grinding parameters	Grinding wheel:	99VG 700-400-5 D91 V+ 2046 J1SC C125 E
	Cutting speed:	v_c = 40 m/s
	Feed rate:	v_{fr} = 4 mm/min
	Depth of cut:	$a_{e\,tot}$ = 3.5 mm (radial)
Dressing paramters	Dressing tool:	WINTER DS profile roller
	Dressing amount:	a_{ed} = 3 µm
	Speed ratio:	q_d = 0.7
	Overlap factor:	U_d = 7

Result Good profile stability, excellent shape precision and low roughness

Profile dressing: Flat profile grinding

Machine parameters	Machine:	Flat profile grinder BLOHM MT 408
	Cooling lubricant:	Rotorol (Oel-Held)
	Workpiece:	SiC
Grinding parameters	Grinding wheel:	99VG 700-400-15 D46 V+ 2046 J1SC C100
	Cutting speed:	v_c = 45 m/s
	Depth of cut:	a_e = 0,3 mm
Dressing parameters	Dressing tool:	WINTER DS profile roller
	Cutting speed:	v_{cd} = 35 m/s
	Dressing amount:	a_{ed} = 2 µm
	Speed ratio:	q_d = 0.4
	Overlap factor:	U_d = 2

Result Good profile stability, excellent accuracy of shape and low roughness

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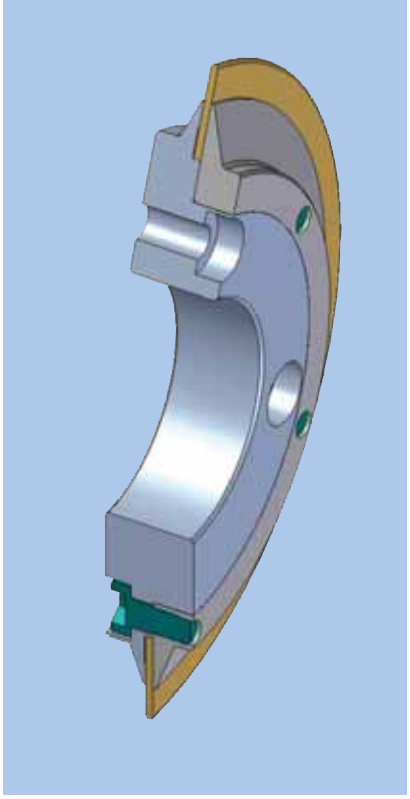
Diamond Dressing System „DDS“

CNC-controlled dressing of vitrified bonded diamond grinding wheels with DS profile roller



Features of Diamond Dressing System „DDS“

The new development from SAINT-GOBAIN Abrasives allows newly developed vitrified bonded diamond grinding wheels to be dressed under CNC control on production grinders.

Despite the comparatively hard active partners, the physical correlations are the same as those for dressing softer types of hard material such as Al_2O_3, SiC, SG, TG and CBN.

The working results of dressing these vitrified bonded diamond grinding wheels with a diamond profile roller can also be influenced by

- contact ratio and
- speed ratio

as usual.

Existing experience and know-how is 100%-applicable!

Advantages of dressing diamond grinding wheels under CNC control

- **Precise CNC dressing on the production machine**
  - greater profile precision
  - very simple process automation
  - dressing at production speeds
- **Grinding wheel does not need to be removed**
  - reduced nonproductive times
  - highly precise axial and radial running of grinding wheel
  - improved workpiece quality
- **Reproducibility of grinding wheel topography, improved process control**
- **Equipment same as that used for CBN dressing**

SAINT-GOBAIN Abrasives offers a range of comprehensive dressing solutions.

Just ask us!

Special features of the new DS dressing profile rollers

The DS diamond profile roller consists of a single set layer of sintered diamond which is clamped in a two-piece steel holder.

This new development ensures a constant layer width with consistently high active diamond component throughout its entire service life.

The design permits the highest possible degree of flexibility when dressing different profiles in a single working cycle.
The only requirement is a grinding machine with CNC dressing spindle and an Acoustic Emission contact sensor (e.g. Dittel).

The new Diamond Dressing System from SAINT-GOBAIN Abrasives for dressing of:

vitrified bonded diamond and
CBN grinding wheels
SiC grinding wheels and
corundum grinding wheels of all types.

Just ask us!

SAINT-GOBAIN Abrasives has the right solution!

SAINT-GOBAIN
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Certified to
DIN EN ISO 9001:2000, No. QS-453 HH;
DIN EN ISO 14001, No. EM-2129 HH;
OHSAS 18001, No. S-2984 HH

Organization
for the Safety
of Abrasives (oSa)

LG-Nr. DDS/03 e

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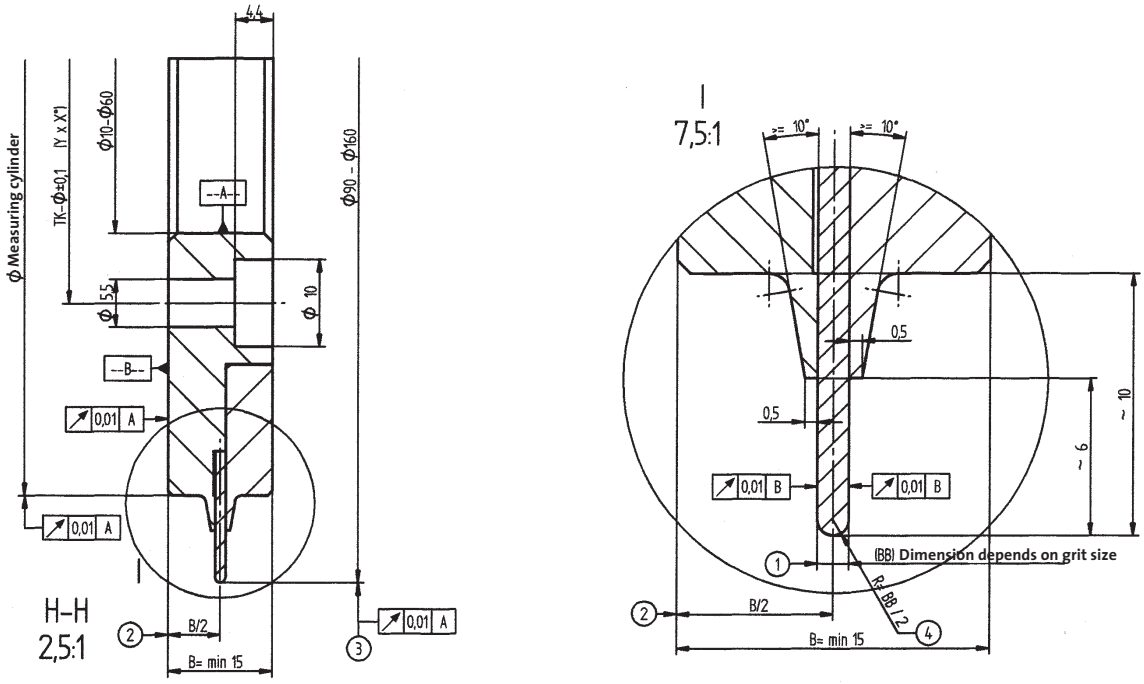
Available standard versions of WINTER DS profile roller

September 2003

Technical details

Standard version	1	2
Outer diameter	120 mm	150 mm
Layer (useful width)	approx. 1 mm	approx. 1 mm
Holder width	15 mm	15 mm
Bore	40 mm H3	52 mm H3

Special profiles are possible on request.
The illustration below will assist you in making the appropriate selection.



Possible version variations (required ordering information):

Outer diameter	90 mm to 160 mm
Layer width (useful width)	0.5 mm-1.3 mm
Holder width	≥ 15 mm
Bore	Specified by customer
	Depends on outer diameter and assembly holes
Assembly holes	Specified by customer

All Winter DS profile rollers are balanced according to Q1 at n = 3000 rpm

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