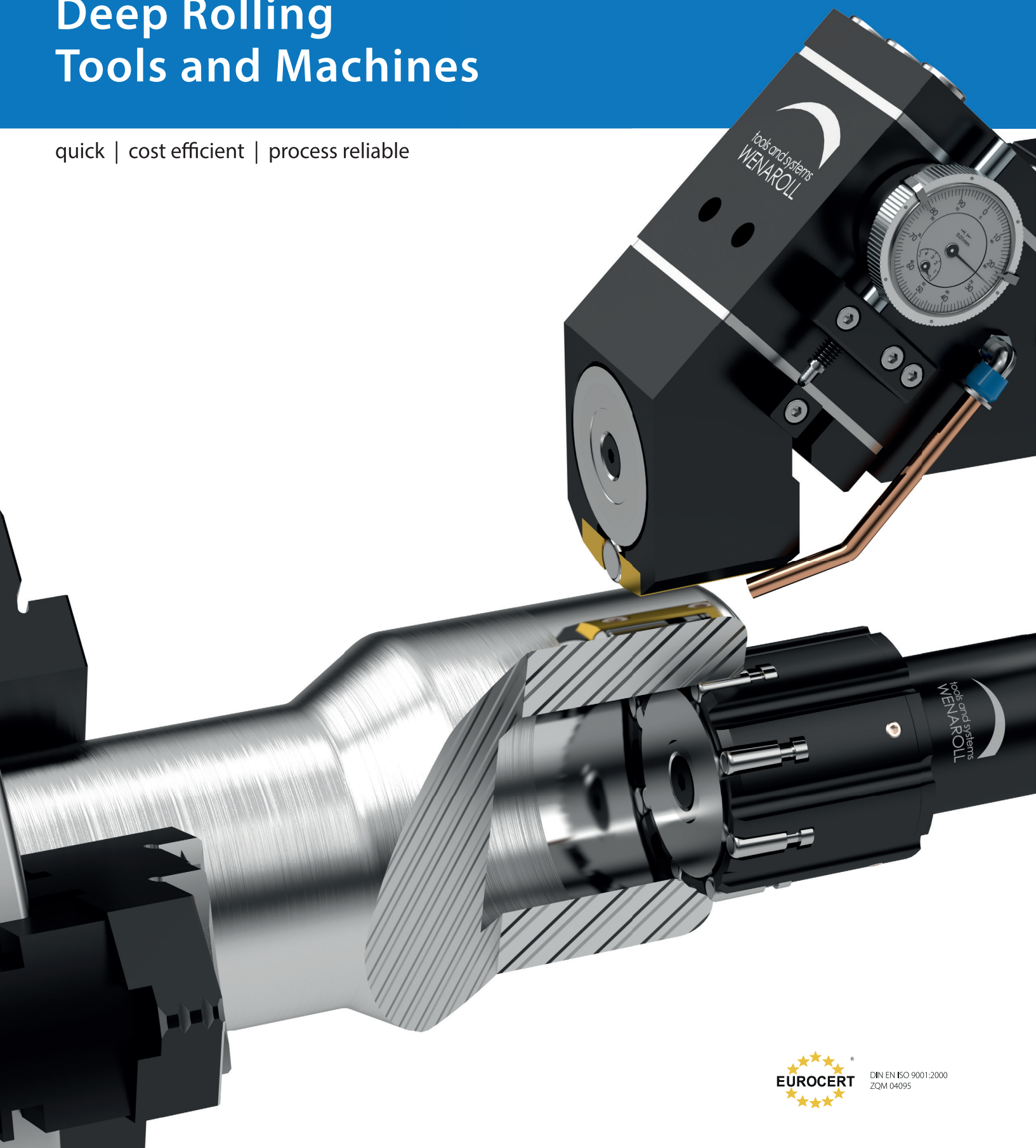


Roller Burnishing Cylinder Processing Deep Rolling Tools and Machines



quick | cost efficient | process reliable



DIN EN ISO 9001:2000
ZQM 04095

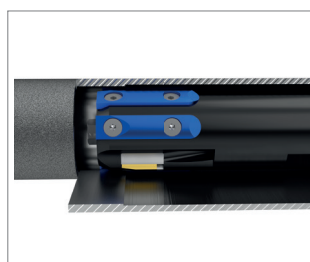
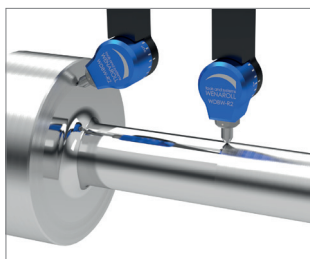
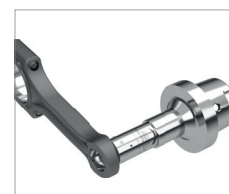


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TECHNOLOGY REQUIREMENTS

The modern production has a constantly increasing demand for an accurate workpiece surface. The steadily rising requirements for a better surface roughness as well as a high material fraction make high demands on the tool development. Furthermore, the process needs to be as cost efficient and as quick as possible. Roller burnishing can achieve results that has been only possible previously with

slow and polluting processes like honing. In addition to that, roller burnishing presents even more advantages that are not obvious at first glance.

ROLLER BURNISHING – THE INNOVATION PATH TO A PERFECT SURFACE

Parameters such as roller force and the feed speed of the tool or the workpiece are essential to the success of the whole process. With a closer look at the process, it might get the impression, that the tip of the roller on the workpiece surface has been bended down– that is a misconception. The material flow is the key to a successful roller burnishing process. The compressive stress at the contact zone is high enough to surpass the yield strength of the material – plastic deformation is the result. This forces the tip on the surface to be pushed down perpendicular to the surface and provokes a material flow that lifts material up.

Figure 1 will give an idea how the process works on a micro scale and helps to understand how the end results will differ based on feed speed and roller force. The feed speed can differ greatly based on the material used and the required surface roughness. Figure 2 and 3 show a cylindrical work piece before and after roller burnishing with the resulting surface roughness.



Fig. 1: A Roller during the machining process

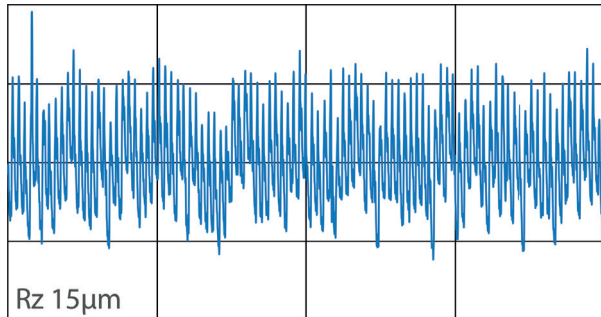
ROLLER BURNISHING AND ITS ADVANTAGES

- achievable surface roughness $R_z < 1 \mu\text{m}$
- fits are produced quickly, easily and cost-efficient
- only one process required
- high lifetime for wear parts
- processed surfaces are strain hardened and therefore have a higher wear resistance
- non-cutting and quiet process
- only one tool required
- can be used on almost every machine that produces a revolving motion
- rarely any lubricant / cooling required
- can be used with any cooling supply
- improves the tribological characteristics
- improves fatigue strength
- reduces surface roughness up to 70 %

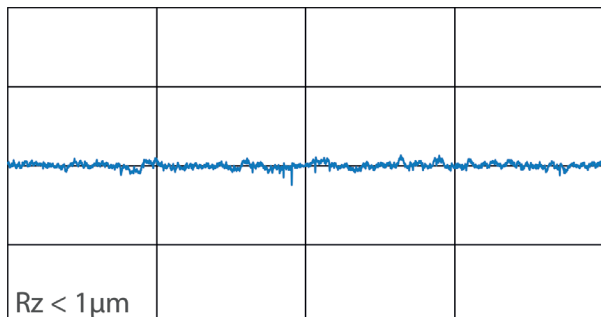
WORKPIECE PREPARATION

The machining allowance should be equal to the roughness of the workpiece prior to the burnishing process. The remaining surface roughness will disappear almost completely, and the dimension will shrink/grow accordingly. The surface roughness prior to the burnishing process is usually around $R_z = 5\text{ }\mu\text{m} - 50\text{ }\mu\text{m}$. The result is highly dependent on the surface roughness of the pre-machining. Therefore, a fast pre-machining process should be taken advantage to produce a surface that is ready for burnishing. Do not waste time on producing a surface which can

Surface roughness before Roller Burnishing



Surface roughness after Roller Burnishing



easily be achieved by the burnishing process itself. Figure 2 will give you an impression of the remaining surface roughness after burnishing. It is obvious that the surface quality has been improved greatly, and only small imperfections remain. Those imperfections are necessary in most applications otherwise the resulting surface would be too smooth to make an oil film stick.



Left during Roller Burnishing / Right after Roller Burnishing

ROLLER BURNISHING – QUICK, COST EFFECTIVE AND EXTRAORDINARILY VERSATILE

WENAROLL roller burnishing can be used on all sorts of turning and milling machines as well as production centers and transfer lines. They can process cylindrical drill holes, stepped and plane shafts, plane surfaces as well as tapered surfaces. Material up to a tensile strength of 1400 N/mm^2 and with a hardness up to 45 HRC can be processed. A few examples for products that require smooth surfaces:

- oil pumps and valves
- piston rods
- connecting rods
- bearing seat
- shafts
- hydraulic cylinders
- ball joints
- conical seats
- pistons
- gear parts
- clutch parts

WIW Internal Roller Burnishing Tool



WIW (Through hole)



WIW (Blind hole)

Application examples:	Machining parameters	
Bored holes	circumferential speed $V_{c \max}$:	up to 250 m/min
Sealing surfaces	Feeding f_z :	0,1 mm – 0,3 mm/U per Roller
Running surfaces	Burnishing depth:	$\varnothing < 35 \rightarrow$ up to 100 mm
		$\varnothing > 35 \rightarrow$ unlimited
	Machining allowance:	0,01 mm - 0,04 mm depending on preprocessing

DESCRIPTION

Wenaroll type WIW Internal Roller Burnishing Tools for cylindrical drill holes produce a fit with only one operation. During the process either the workpiece or the tool may rotate. To satisfy our customer expectations for the precision, the tools can be adjusted freely on a micron scale. WIW tools can be ordered for

through hole or blind hole applications. Through hole tools may be used either with self-feeding or machine feeding, blind hole tools are only suitable for machine feeding.

VARIANTS

Tool body	Diameter range	Machining			Rolling length	Shank		Dimension	Remarks
		Through hole		Blind hole		MK	Cylindrical		
		EV	MV	MV					
WIW 1.1	005 - 014	1	2	3	50/100	MK 2	ZS 20 Ø20 h6x50	146,0	Standard Rolling length 50/100mm Please ask for special shank options
WIW 1.2	015 - 021							146,0	
	022 - 034							139,0	
WIW 1.3	035 - 049							142,5	
WIW 2	050 - 080				177,5				
WIW 3	081 - 160				195,0				
WIW 4	161 - 350				272,5				

Special length and shank upon request

HOW TO ORDER

WIW1.2.	-	025,00	-	1	-	100	-	ZS20
↓ WIW1.2 Tool body		↓ 025,00 Diameter 25		↓ 1 Through hole machining with self-feeding		↓ 100 max. machining depth 100mm		↓ ZS20 cylindrical shank Ø20 h6 x 5

SHANK



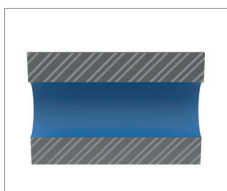
MK shank



Cylindrical



APPLICATION



Through hole



Blind hole



WAW External Roller Burnishing Tool



Application Examples:	Machining parameters	
Plain and stepped shafts	circumferential speed $V_{c \max}$:	up to 200 m/min
Bolts	Feeding f_z :	0,1 mm – 0,3 mm/U per roller
Coupling and clutch parts	Burnishing depth:	MK/ZS → up to 115 mm ZU → unlimited
	Machining allowance:	0,01 mm - 0,04 mm depending on preprocessing

DESCRIPTION

Wenaroll type WAW External Roller Burnishing tools are used for shafts and can achieve an IT8 fit with only one operation. To satisfy our customer expectations for precision the tools can be adjusted freely on a micron scale. WAW type tools can be ordered for plane shafts or stepped shafts. Through hole(plane)

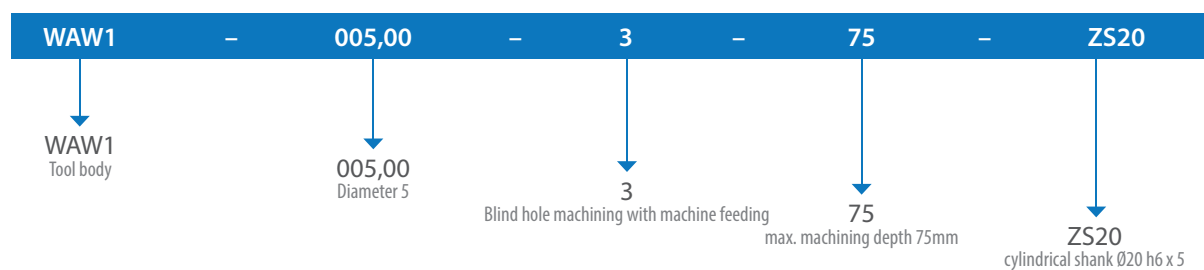
tools can be used either with self-feeding or machine feeding, blind hole (stepped) tools are only suitable for machine feeding.

VARIANTS

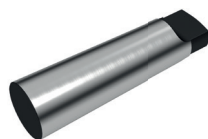
Tool body	Diameter range	Machining			Rolling length			Shank morsetaper or cylindrical			Tool length without shank
		Through hole	Blind hole					Limited length		Unlimited length	
		EV	MV	MV	MK	ZS	ZU	MK	ZS	ZU	
WAW 1	003 – 014	1	2	3	75	75	UN	MK 2	Ø20 h6 x 50	Ø25 h6 x 60 x Ø15	95 – 105
WAW 2	015 – 024							MK 3	Ø25 h6 x 56	Ø40 h6 x 70 x Ø26	100 – 110
WAW 3	025 – 049				100	100	UN	MK 4	Ø40 h6 x 70	Ø80 h6 x 90 x Ø50	119 – 129
WAW 4	050 – 085									Ø110 h6 x 110 x Ø87	128 – 138
WAW 5	086 – 110				115	115	UN	MK 3	Ø50 h6 x 80	Ø150 h6 x 120 x Ø112	141 – 151

Individual length and shank upon request

HOW TO ORDER



SHANK



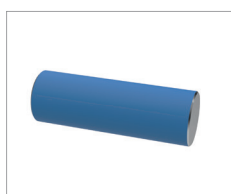
MK Taper



Cylindrical



APPLICATIONS



Stepped shafts



Plain shafts



Multi roller tools

WIK/WAK/WPF Roller Burnishing Tools



WIK



WAK



WPF

Application examples:	Machining parameters	
Tapered external Surface	circumferential speed $V_{c \max}$:	up to 200 m/min
Tapered Internal Surface	Feeding f_z (mm / U):	is pushed against the work piece with a certain force
	Machining allowance:	0,01 mm - 0,04 mm depending on preprocessing

DESCRIPTION

WENAROLL type WIK, WAK, WPF Roller Burnishing tools are used for burnishing internal and external surfaces of tapered as well as flat surfaces. The tool body is equipped with a specific spring system, which allows for an individual surface pressure adjustment for each work piece. The spring package is custom-built for each tool; thus, we can guarantee an excel-

lent surface finish. Furthermore, the spring system prevents overload on the tool and the machine. Therefore, an even and continuous load on every work piece is achieved.

VARIANTS

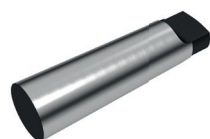
Tool body	Diameter range	Tool shank Morsetaper or cylindrical		Tool length without shank [mm]	x
		MK	ZS (Øk x m)		
WIK / WAK / WPF 1	006,00 - 044,00	MK 2	Ø20 h6 x 50	65 + x	Depends on the workpiece dimension
WIK / WAK / WPF 2	045,00 - 099,99	MK 3	Ø25 h6 x 56	95 + x	
WIK / WAK / WPF 3	100,00 - 149,99	MK 4	Ø32 h6 x 60	107 + x	

Individual length and shank upon request

HOW TO ORDER

WAK2	–	045,00	–	030,45	–	45°	–	ZS25
↓ WAK2 Tool body		↓ 045,00 Diameter ØD 45 mm		↓ 030,45 Diameter Ød 30,45 mm		↓ 45° Angle (only WIK / WAK)		↓ ZS25 cylindrical shank Ø25 h6 x 50

SHANK



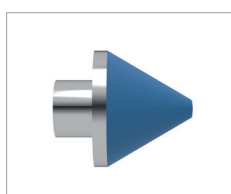
Morsetaper



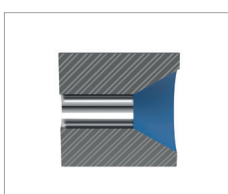
Cylindrical



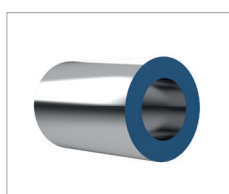
APPLICATION



Tapered external surface



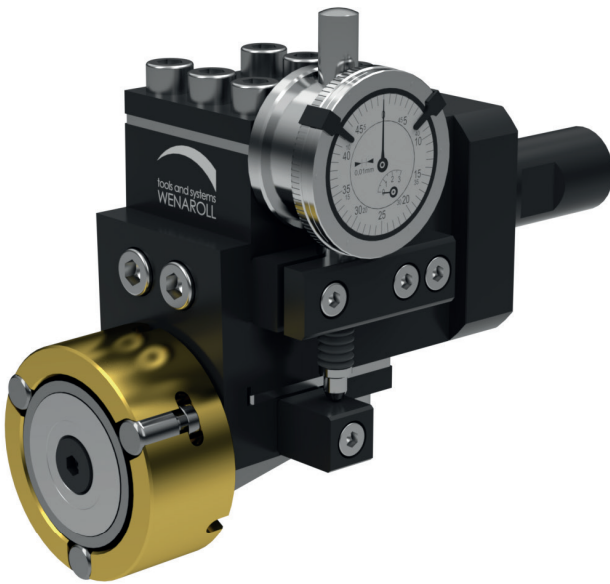
Tapered internal surface



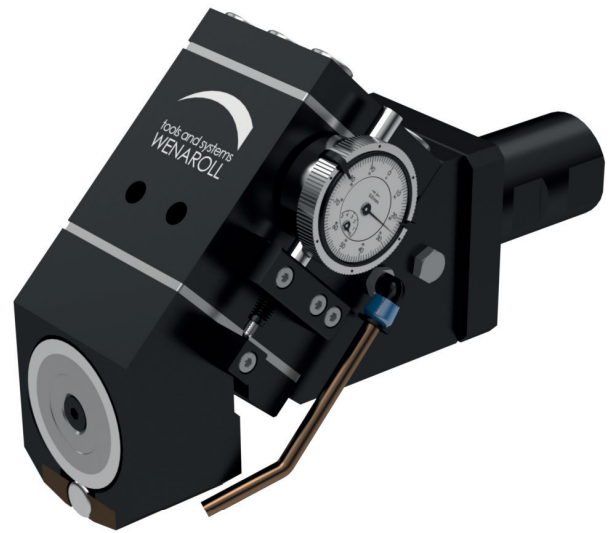
Flat Surface



ERGW Single Roller Burnishing Tools



ERGW-5 / ERGW-8



ERGW-14

Application Examples:	Machining parameters	
Plain shafts	circumferential speed $V_{c \max}$:	up to 150 m/min
Tapered shafts	Feeding f_z [mm / U]:	0,1 mm – 1 mm/U
Flat surfaces	Machining allowance:	0,01 mm - 0,04 mm depending on preprocessing

DESCRIPTION

WENAROLL ERGW burnishing tools are designed for processing cylindrical shafts, plane surfaces, as well as spherical and tapered work pieces. We offer these tools in different variations ERGW-5, ERGW-8, ERGW-14, whereby the digit at the end indicates the roller diameter.

We recommend the tools for the following applications:

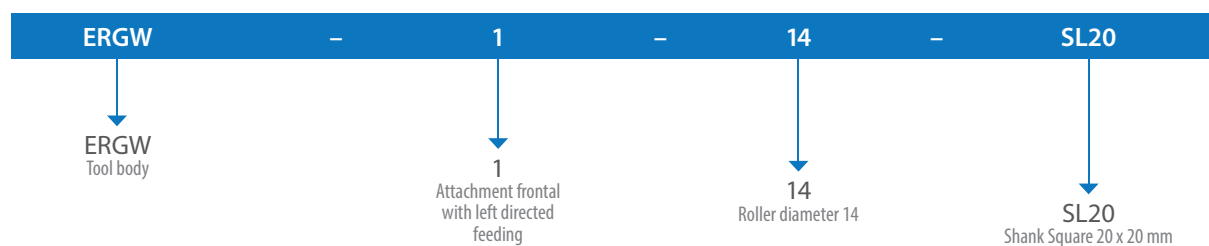
ERGW-5: process diameter Ø10 – Ø40
 ERGW-8: process diameter Ø12 – Ø150
 ERGW-14: process diameter Ø30 – Ø200

VARIANTS

Tool body	Position of Roller head	Roller diameter	Shank
ERGW	1 2 3 4	5 8 14	SL 16
			SL 20
			SL 25
			SL 32
			WE 20
			WE 25
			WE 32
			WE 40
			WE 50
			VDI 20
			VDI 25
			VDI 30
			VDI 40
			VDI 50
			ZS 20
			ZS 25
			ZS 32
			ZS 40
			ZS 50

Rolling Force: ERGW-5 und ERGW-8 up to 3000N / ERGW-14 up to 10000N
Please ask for individual shank options

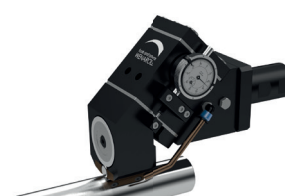
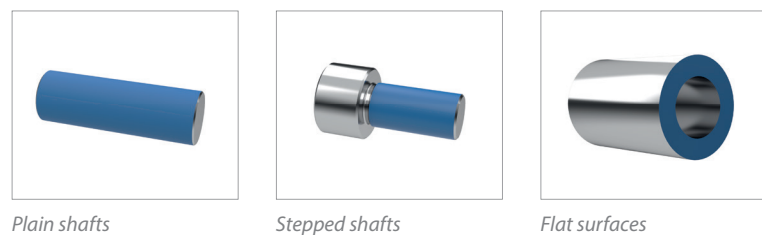
HOW TO ORDER



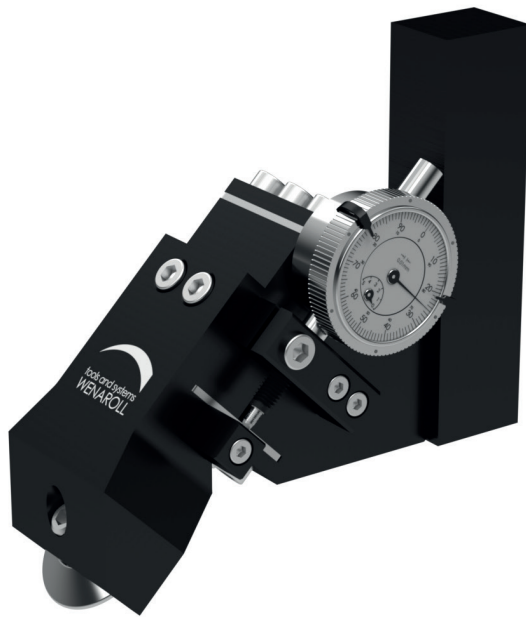
SHANK



APPLICATION



ERGK Single Roller Burnishing Tools



ERGK-45



ERGK-1-90

Application examples:

Plain Shaft
Stepped shaft
Flat surfaces
Spherical shape
Large holes
Male Taper

Machining parameters:

circumferential speed $V_{c \max}$: up to 250 m/min
Feeding f_z : 0,1 mm – 1 mm/U
Machining allowance: 0,01 mm - 0,04 mm depending on preprocessing

DESCRIPTION

WENAROLL ERGK burnishing tools are designed for processing cylindrical shafts, plane surfaces, as well as spherical and tapered work pieces. The ERGK tools have an angled contour roller that is especially suited for burnishing radii. The angle of the roller can either

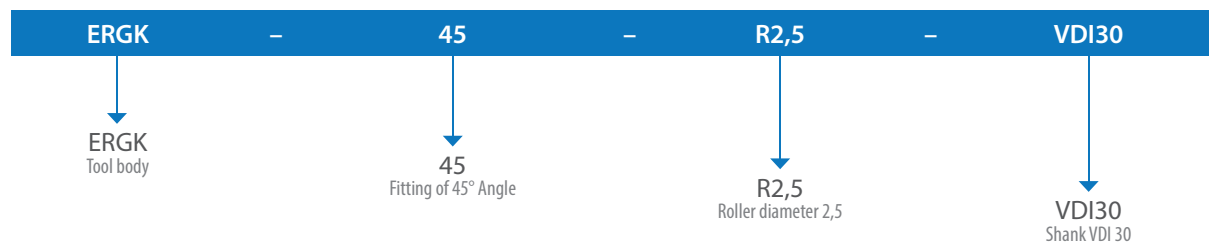
be 45° or 90° and enables you to process the whole radius. A dial indicator allows to check the rolling force indirectly.

VARIANTS

Tool body	Angle	Roller diameter	Shank
ERGK	45 90	R0,6 R0,8 R1,0 R1,2 R1,6 R2,5 R4,0 R6,0 R6,3	SL 16
			SL 20
			SL 25
			SL 32
			WE 20
			WE 25
			WE 32
			WE 40
			WE 50
			VDI 20
ERGK-1			VDI 25
			VDI 30
			VDI 40
			VDI 50
			ZS 20
			ZS 25
			ZS 32
			ZS 40
			ZS 50
ERGK-3	45		

Individual shank options upon request

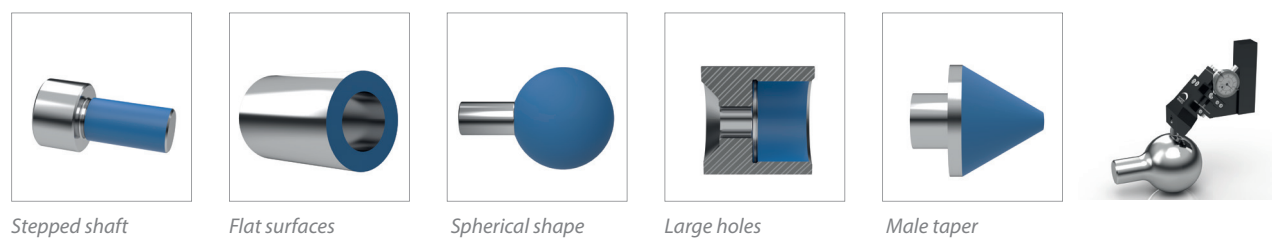
HOW TO ORDER



SHANK



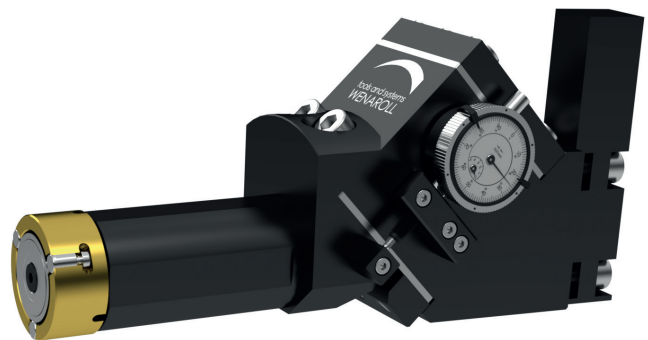
APPLICATION



ERGI Single Roller Burnishing Tools



ERGI-1



ERGI-2

Application Examples:	Machining parameters	
Large holes	circumferential speed $V_{c \max}$:	up to 150 m/min
Plain shafts	Feeding f_z :	0,1 mm – 1 mm/U
Tapered shafts	Machining allowance:	0,01 mm - 0,04 mm depending on preprocessing
	Processing depth:	100 mm

DESCRIPTION

WENAROLL ERGI roller burnishing tools are designed to process cylindrical holes and gently tapered holes (gradient $< 1^\circ$) with higher depth up to 100mm.

ERGI-1 is suited for holes with a diameter wider than 35 mm, ERGI-2 is designed for diameters wider than

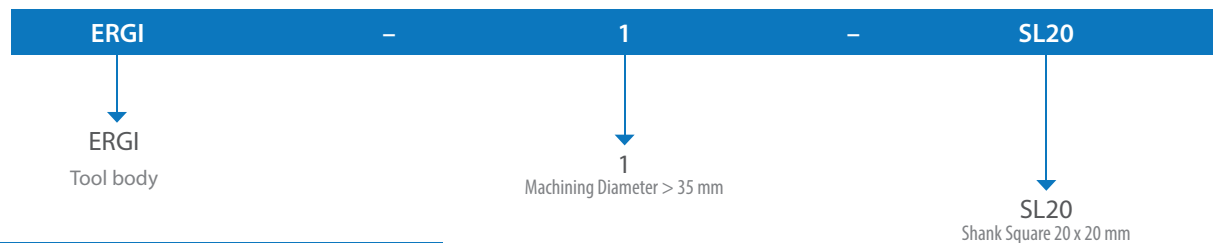
52 mm. The tool body is equipped with specific spring system, which allows an individual adjustment for each work piece. A dial indicator allows to check the rolling force indirectly.

VARIANTS

Tool body	diameter workpiece		Shank	Tool length without Shank [mm]
	1= 35 mm	2 = 52 mm		
ERGI	1		ohne	170
			SL 16	
			SL 20	
			SL 25	
			SL 32	
			WE 20	
			WE 25	
			WE 32	
			WE 40	
			WE 50	
	2		VDI 20	240
			VDI 25	
			VDI 30	
			VDI 40	
			VDI 50	
			ZS 20	
			ZS 25	
			ZS 32	
			ZS 40	
			ZS 50	

Individual shank options upon request

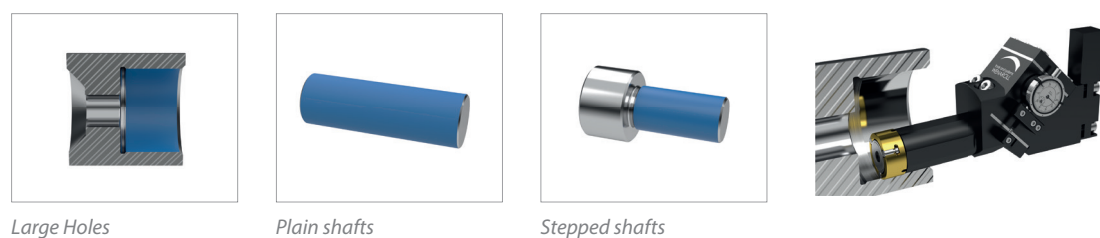
HOW TO ORDER



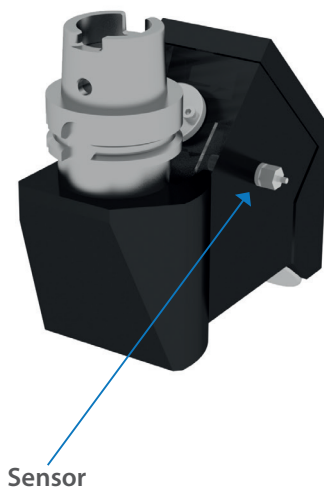
SHANK



APPLICATION



HTM Forming and Deep Rolling Tools



HyTraMeS[©]
Hydromechanical Force Transmission and Measuring System

Application:	Machining parameters
Groove	Plunging Process:
Cylindrical Surfaces	circumferential speed $V_{c,max}$: up to 120 m / min
Transitions Radii	Rolling-/Formingforce: up to 10000N
	Feeding Process:
	Circumferential speed: up to 250 m / min
	Feeding f_z : 0,1 mm – 1 mm / U

DESCRIPTION

WENAROLL HyTraMeS[©]-tool transfers rolling and forming forces in a combination of hydraulic and mechanical components.

This allows an immediate monitoring, measuring, controllable and operable power transmission.

Das HyTraMeS[©]- Process is available in three variants.

HTM-R: Steife/Rigid Design for defined forces and geometries (e.g. Groove)

HTM-S: Additionally mechanical spring package for variable force increase and reduction and tolerance compensation

HTM-F: In addition, complete active control of power and way

DETAIL DESCRIPTION

The HyTraMeS[©]-Hydrauliksystem is completely enclosed. This makes it insensitive to Influences such as Chip bombardment, Resilience or bonding. The measurement of the rolling and non-forming force is carried out directly by a force sensor.

HyTraMeS[©]-Rigid is ideal for forming process, in which the geometry of the tool must not change during the process. The Setting of the tool takes place precisely over the entire processing.

HyTraMeS[©]-Spring additionally allows a passive, controllable force build-up and dismantling.

HyTraMeS[©]-Full enables an active force increase and decrease through process control.

Both Spring and Full versions can even compensate larger workpiece tolerances. HyTraMeS[©]-Full allows

in combination with a process control the active control of the way and ensuring the parameterized force of the rolling unit

Every HyTraMeS[©]- Variant can perform a measurement of the rolling / forming force in millisecond resolution. This allows a complete process monitoring to detect process errors, to ensure process reliability, for detecting tool or workpiece breaks and for documenting critical processes (e.g. Workpieces, who need documentation)

Tool Body	Processing methods	Shank
HTM-R HTM-S HTM-F	Plunging process Feeding process	SL
		ZS
		VDI
		HSK
		SK

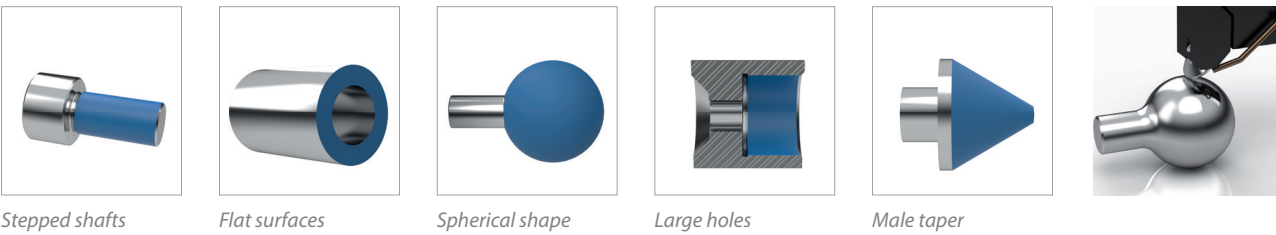
HOW TO ORDER

Please contact us directly if you are interested, so that we can advise you on the choice of tools

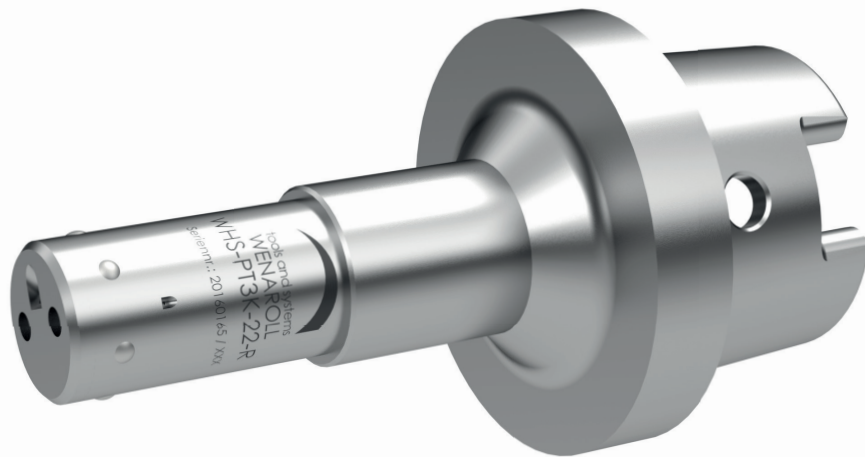
SHANK



APPLICATION



WHS Hydrostatic Tools.



Application:	Machining parameters	
Piston rod	circumferential speed $V_{c \max}$:	up to 250 m/min
Highly stressed components	Feeding f_z :	0,025 mm/U per ball
	Required filtration:	10 μ m

DESCRIPTION

Wenaroll Type WHS Hydrostatic Tools are used for a precise machining of drill holes or shafts. Cooling liquid is used to press one or more roller against the workpiece surface. The process will smoothen the surface and induce residual compressive stress. These tools can be used to machine workpieces with a hardness of up to 65 HRC and thus clearly differentiates itself from conventional roller burnishing tools. The process only requires a sufficient coolant pressu-

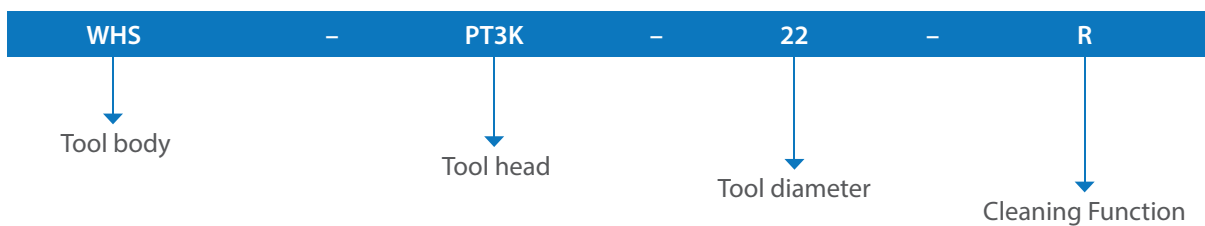
re, which can either be supplied directly through the spindle (IKZ), or by an external pump. These tools can be used on manual / CNC lathe or milling machines. For very small process diameters a pressure of up to 400 bar can be necessary.

APPLICATION

Application	Description
Roller Burnishing	All metals, which are plastically malleable rolled up to a hardness of 45 HRC
Hard Roller Burnishing	All metals and alloys with a hardness of up to 65 HRC
Deep Rolling	a method to improve dynamically high loaded components • Smoothing the Surface • Increasing material strength and hardness • Contribution of compressive residual stress

HOW TO ORDER

Please contact us directly if you are interested, so that we can advise you on the choice of tool.



SHANK

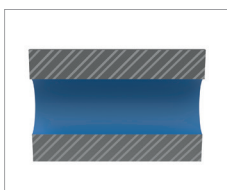


HSK



SK

APPLICATION



Through hole



WDB & WDBW Diamond Tools



Application Examples:

Hardened plain Shafts
Thin walled workpieces

Machining parameters

circumferential speed $V_{c \max}$: up to 150 m/min
Feeding f_z : up to 0,2 mm/U
Cooling required

DESCRIPTION

The WENAROLL Diamond Contouring Tools have been especially developed for smoothing hard surfaces. The spring-loaded diamond tip can be adjusted by the machine with the necessary force to burnish the surface. WDBW tools are designed for

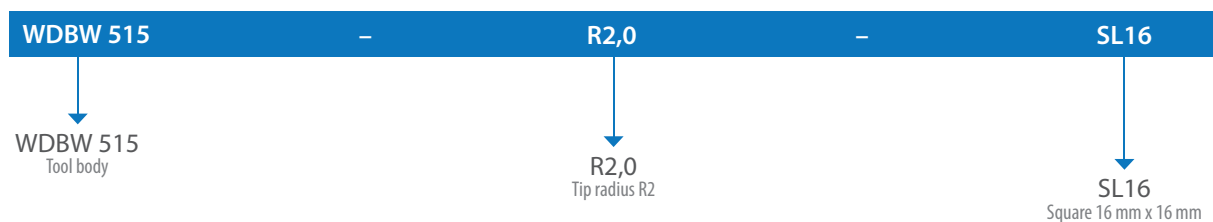
processing materials up to 65 HRC. Like the roller burnishing process the yield strength of the material will be exceeded with lower force. For processing more complex contours the tip of the tool may be rotated in 15° steps.

VARIANTS

Tool body	Tip radius	Shank
WDB 513	R2,0	SL8
WDB 514		SL10
		SL12
WDBW 512		SL16
WDBW 515		SL20
		SL25

Other radii upon request

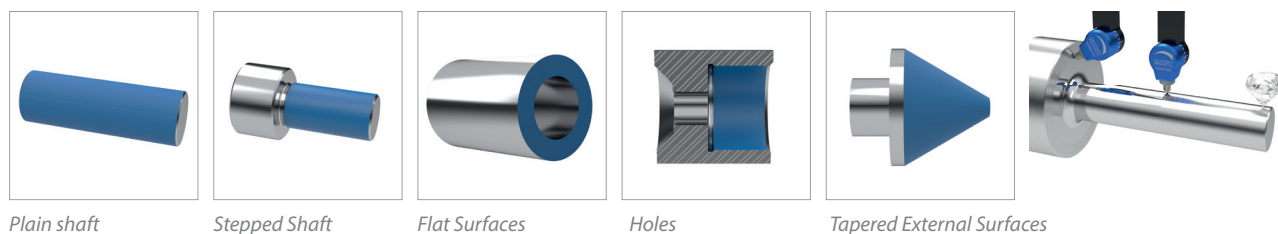
HOW TO ORDER



SHANK



APPLICATION



WPS/WPB Combined Drilling-Skiving and Roller Burnishing Tools

APPLICATION

Machining for cold drawn or hot rolled and drilled pipes.

There are two possible technologies with Wenaroll Polaris:

- Dual combined Skiving and Roller Burnishing (WPS) with movable skiving head
- Triple combined Drilling- Skiving- and Roller Burnishing (WPB) with a rigid skiving concept

These tools are used for the internal finishing of cylinder tubes. The tool eliminates irregularities in circular form such as rippling, that occur during the manufacturing process of hydraulic cylinders. During the roller burnishing process the tool also creates a perfect surface.

The combined Wenaroll Polaris (WPS) can achieve a diameter range of Ø 40 up to Ø 250 mm and a length up to 12m. With the operating of WPB the tool can achieve a diameter range of Ø 125 up to Ø250 and a maximum length of 4 m. Larger diameters on request.

The tool WPS is equipped on the head with three viper plates and at the skiving head with three more skiving knife plates. The tool WPB is equipped with 3 boring plates mounted to the boring head, as well as six viper plates mounted to the skiving head.

The exchange of the plates is a quick and simple. The WPS tools has a cutting efficiency of up to 3 mm in diameter. The WPB tool has a cutting ability of up to 8 mm. The excess material will be removed during the boring process and the skiving head will remove the rest up to the set diameter and prepares the optimal surface for the roller burnishing process.

Rollers placed in a cage on the tools circumference are forced into the cylinder's inner wall thus smooth the surface of the cylinder tubes. The forming process increases hardness and enhances, the wear and the fatigue resistance of surface subjected to dynamic working load.

FEATURES

- An environment friendly process in one step offers cost reduction
- The tool system can be switched with pneumatics or hydraulic
- A switching cylinder is integrated in the tool
- Skiving knife and burnishing head will retract automatically during reversing.
- Therefore it is possible to drive back the tool in fast traverse without damaging the surface

Advantages:

- 90% less machining time compared with honing
- High dimensional and shape accuracy
- High cutting depth
- Easy Handling
- Quick replacement of spare parts through storage





Tool type: WPB -Drilling -Skiving -Roller Burnishing

Tool type	Machining range Ø in mm	Macching length in Meter	Cutting efficiency v_c (m/min)	Feed in mm/U	Motor power (necessary) in kW
WPB Drilling Skiving Roller-Burnishing	125 - 250	max. 4	160 - 200	1,2 - 2,0	50 - 75



Tool type: WPS -Skiving -Roller Burnishing

Tool type	Machining range Ø in mm	Macching length in Meter	Cutting efficiency v_c (m/min)	Feed in mm/U	Motor power (necessary) in kW
WPS Skiving Roller-Burnishing	38 - 250	max. 12	250 - 300	3,0 - 4,0	30 - 55



WAS Skiving Tools



Application Examples:

Skiving of deep holes followed
by Roller Burnishing
on CNC-Machines

Machining parameters

circumferential speed $V_{c \max}$: up to 175 m/min
Feeding f_z : 1 - 2,5 mm/U
Machine with coolant supply required

DESCRIPTION

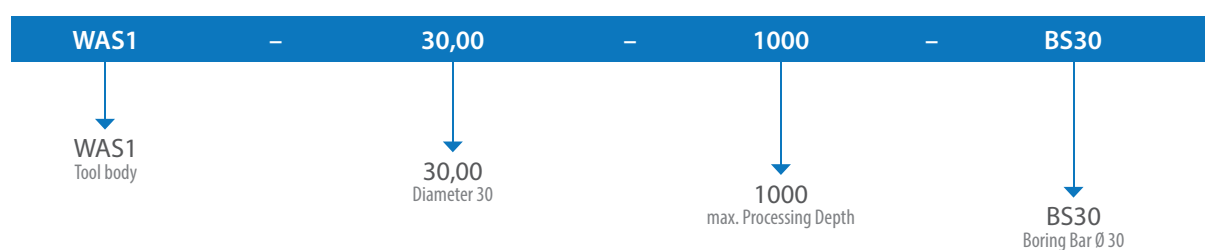
WENAROLL WAS Skiving tools are used for skiving deep holes on CNC machines. The tools consist of a skiving head and a skiving bar to achieve the desired machining depth. For a low-vibration process, the tool is equipped with several guide and supporting pads. The chip removal is performed by the cooling

channel directed to the skiving knives. The chips are washed out of the workpiece to the front. The surface produced is well suited for a roller burnishing process with our tools type WIW.

VARIANTS

Tool body	Diameter range	Equipment	Shank
WAS0	020 - 025	2 skiving knives	Boring bar
WAS1	025 - 050	2 - 4 guiding pads	
WAS2	050 - 080	4 - 6 supporting pads	

HOW TO ORDER:

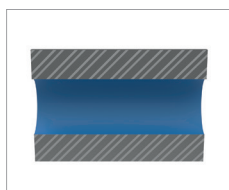


SHANK

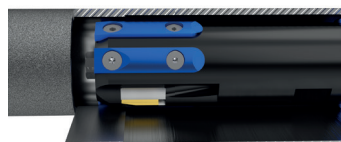


Boring bar

APPLICATION



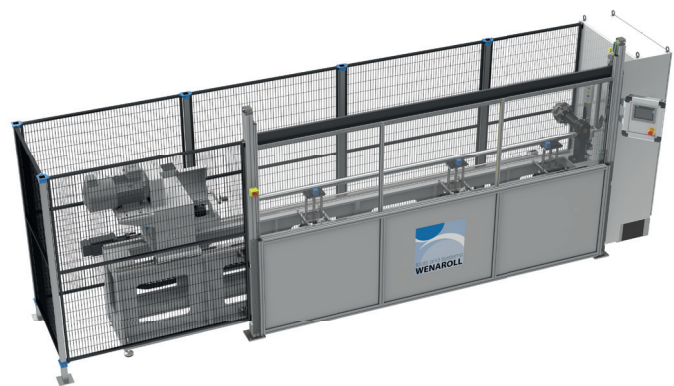
Through hole



WAM Roller Burnishing Machines



WAM-1



WAM Gamma

Application Examples:

Shaft
Bolts
Coupling and clutch parts

Machining parameters

circumferential speed $V_{c \max}$: up to 200 m/min
Feeding f_z : 0,1 mm – 0,3 mm/U per Roller

DESCRIPTION

Our roller burnishing machines type WAM are the ideal pick for processing all sorts of workpieces with large quantities that have a high requirement concerning surface quality. Possible application examples are piston rods, shafts, dowel pins, and all sorts of pre-products.

Not only does it create a great external surface, it is quick, precise, and centerless. You can achieve a surface roughness of up to $Ra = 0.02 \mu m$ reliably and

fast. Our machines can process all metal material with a maximum yield strength of $1400 N/mm^2$ and a maximum hardness of 45 HRC.

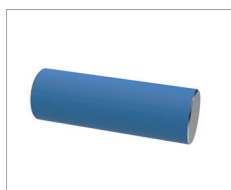
VARIANTS

Features	WAM1	WAM2	WAM Gamma
Diameter	1 mm - 20 mm	20 mm - 40 mm	16 mm - 90 mm
Feed	max 2 mm/U		max 2,7 mm/U
Max. Length	unlimited		3500 mm
Motorpower	1,5 kW	1,5 kW	11 kW
Lubrication	available		

HOW TO ORDER

Please contact us directly if you are interested, so that we can advise you on the choice of machine.

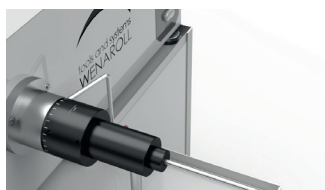
APPLICATION



Shaft



Stepped Shaft



About us

Wenaroll GmbH is your leading partner in roller burnishing technology of metallic surfaces for over 35 years.

The development and manufacturing of tools and machines is a tradition for many years and thus one of our core competence. As a result, our portfolio contains tools that provide a technological advantage to our customers.

Expensive processes such as grinding, reaming, lapping, honing and polishing may in most cases be substituted with roller burnishing. The resulting surface features a very high bearing ratio and greatly improved tribological properties.

On this basis Wenaroll GmbH as an innovative and future-oriented company offers custom-built solutions designed and manufactured in conjunction with our customers.

Our customer base contains renowned companies from a wide spectrum of areas:

- Commercial vehicles
- Construction machinery
- Aerospace technology
- Automotive industry
- Rescue equipment
- Industrial equipment
- Engineering

Research and Development

Modern development tools and up to date 3D-CAD software help our engineering team with creating

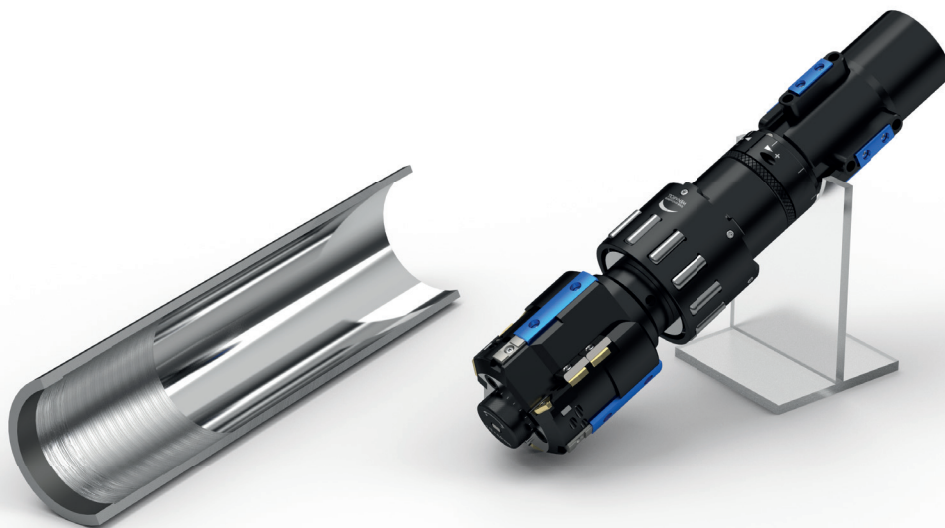
customized solutions for our customers.

Research and our promise to you

- We will continuously surprise you with innovative tools
- We will provide you consistent quality through strict quality management
- Competent and transparent consulting
- A customer support that will help you after your purchase

WENAROLL

PRECISION IN PERFECTION



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