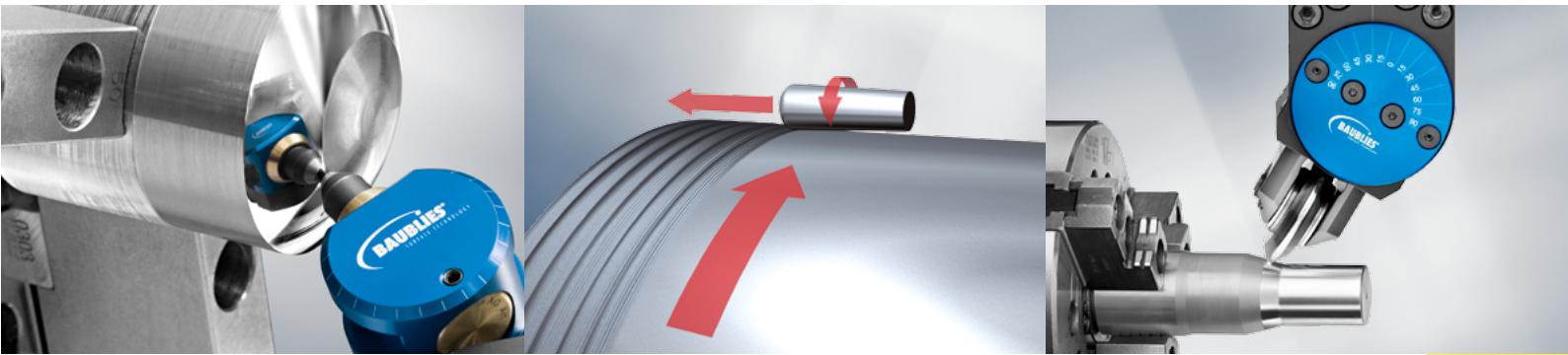


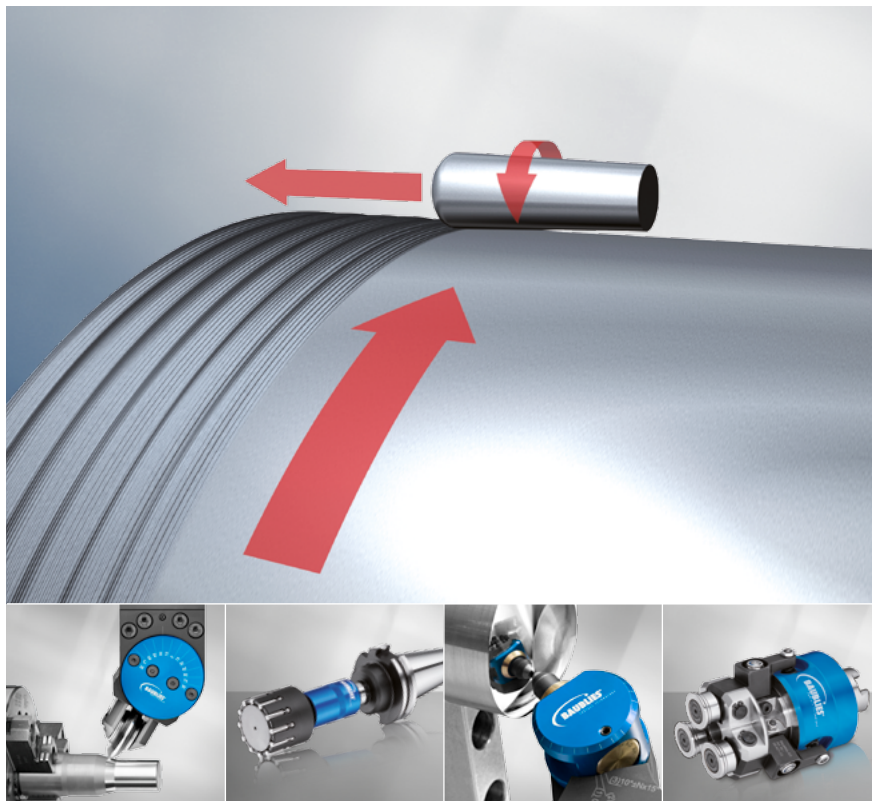
BAUBLIES SURFACE TECHNOLOGY



OPTIMIZED SURFACES BY
ROLLER BURNISHING

INTRODUCTORY GUIDE TO ROLLER BURNISHING TECHNOLOGY

FINISHING WITH MULTIPLE BENEFITS



ROLLER BURNISHING

ESSENTIALS OF THE PROCESS

Roller burnishing is a chipless smoothing and compression process for metallic surfaces achieved by rolling elements. To understand what happens during this finishing process and to be able to use the full range of advantages, a basic knowledge about the requirements, impacts and possibilities is helpful. Here are the important subject areas:

■ Workpiece quality	Page	3
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■ The aim of roller burnishing	Page	7
■ Types of roller burnishing tools	Page	10
■ Use of roller burnishing tools	Page	12
■ Customer benefits	Page	14

WORKPIECE QUALITY

Any surface produced with cutting methods shows a typical structure created by the geometry and feed of the cutting edge.

This shape of the surface is crucial for the result of the roller burnishing process

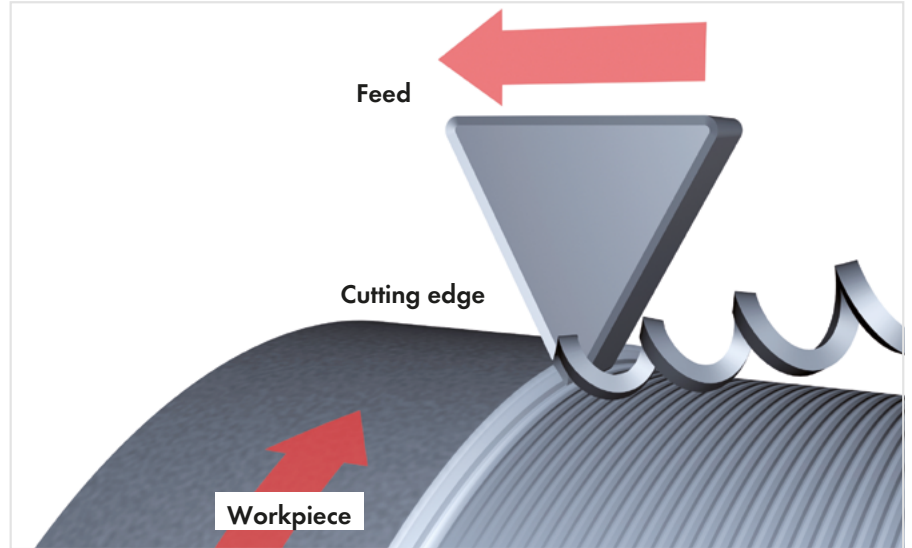
Surfaces created by geometrically defined cutting edges e.g. turning:

- constant periodic profile
- constant roughness
- marked profile peaks

The results are very stable conditions for a roller burnishing process.

Surface created by geometrically undefined cutting edges e.g. grinding:

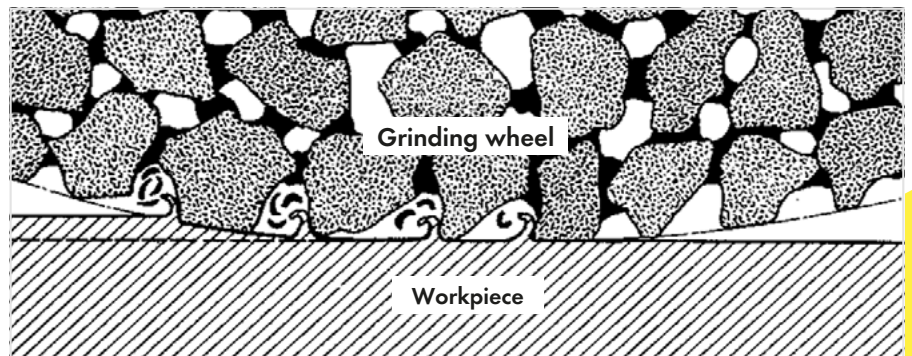
- irregular profile
- low roughness with „single kerfs“
- plateau formation



Turning process



Typical surface created by geometrically defined cutting edges



Grinding process



Typical surface created by geometrically undefined cutting edges

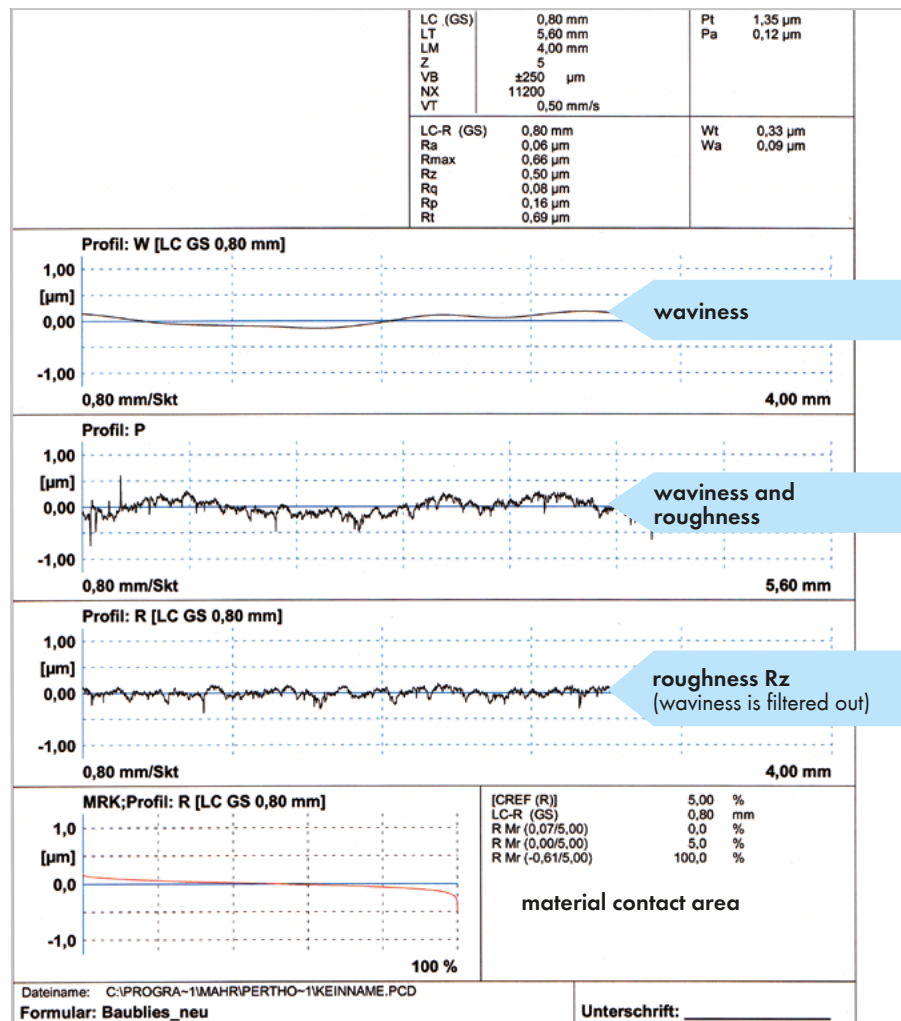
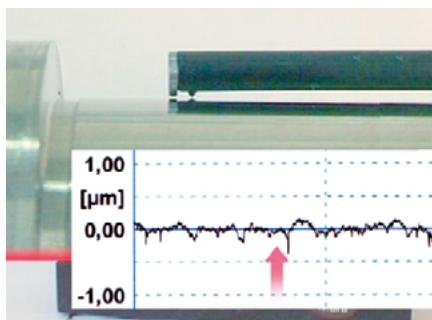
The results are higher rolling forces and wear during rolling.

The surface measurement is mostly carried out with a so called profilometer.

A diamond stylus (e.g. with a radius of $0.2\text{ }\mu\text{m}$) is moved vertically in contact with the workpiece and then moved laterally across the surface over a defined measurement distance. Thus the surface profile is recorded.

In reality every surface deviates more or less from the ideal surface (without deviation of dimension, form and shape).

The different types of shape deviation can be displayed separately (e.g. in charts).



Measurement protocol of a roller-burnished surface

Surface roughness parameters

■ Total height Wt :

The total height of the respective profile type is the maximum height between the highest peak and the deepest valley. It describes the waviness of the surfaces.

■ Maximum roughness depth Rmax:

The maximum roughness is the largest single depth inside the evaluation length. It depends on individual criteria and therefore can vary widely.

■ Average maximum height of the profile Rz:

Average value of the five Rz values from the five sampling lengths. It depends less on the individual criteria and therefore characterizes the „real“ roughness better.

■ Arithmetical mean deviation of the assessed profile Ra:

Ra is the arithmetic mean roughness value from the amounts of all profile values. Ra does not differentiate between peaks and valleys and has a relatively weak information character.

■ Maximum profile peak height Rp, maximum profile valley depth Rv:

The quotient of Rp and Rv shows if peaks or valleys prevail in the profile.

■ Material ratio of the profile Rmr:

Rmr indicates what ratio the totalled length in the material has assumed relative to the evaluation length (in %). The comparison is made in the specified section height (c) and the total evaluation length (lm). The material ratio curve indicates the material ratio as a function of the section height.

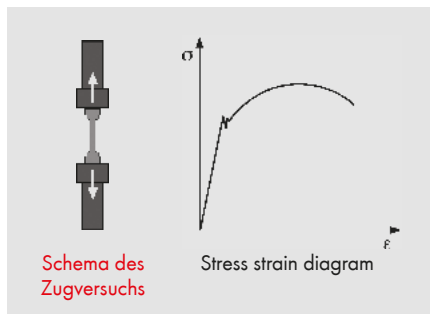
MATERIAL PROPERTIES

Strength in N/mm² or MPa

Strength is the ability of material to resist applied force.

The strength of a metallic material is mainly determined by the crystal lattice and its structure (Lattice structure errors). The stress conditions also influence the material strength.

The tensile strength is detected by a tensile test. During this test material sample is exposed increasing stretching force and thereby the associated elastic and plastic deformations are recorded in the stress-strain diagram.

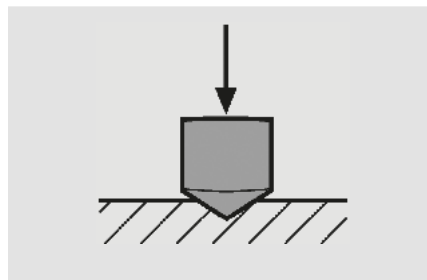


Hardness

Hardness describes a material ability to resist indentations - that is, compressions in the surface of a material caused by impacts.

There are different testing methods (Rockwell, Vickers, Brinell) for determining hardness.

The increased surface hardness through roller burnishing is one positive result of the technology.



Schema of a hardness measurement

Surface layer hardening

In order to make components in technical applications durable and resistant, various methods of surface layer hardening can be applied. For example:

- **thermal processes**
(hardening)
- **thermochemical methods**
(nitriding or nitrocarburizing)
- **mechanical methods**
(roller burnishing)

Strain hardening through mechanical methods is based on the following mechanisms:

- cold work hardening by increasing the dislocation density which is caused by the formation of new dislocations during the plastic deformation of the material.
- the generation of residual stresses in the surface layer. Internal compressive stresses, induced by the surface stretching which is compensated by the underlying material.
- the mechanically induced transformation of the microstructure.
- reducing the notch effect through improvement of the surface finish.

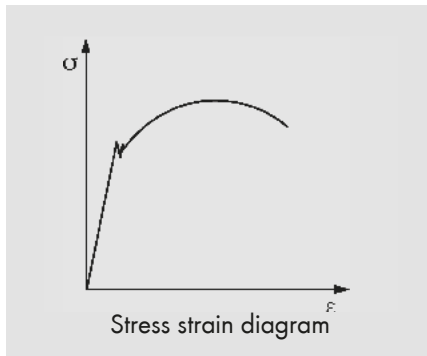
Material strain

The difference between static and dynamic strain has to be considered.

Static load

This is a constant force on a material by tension, pressure or torsion. The load capacity of the material, beginning with plastic deformation until fracture, can be predicted from the material properties (stress strain diagram) and the load case.

$$F_{\max} = \text{strength} \times \text{cross-section-area}$$



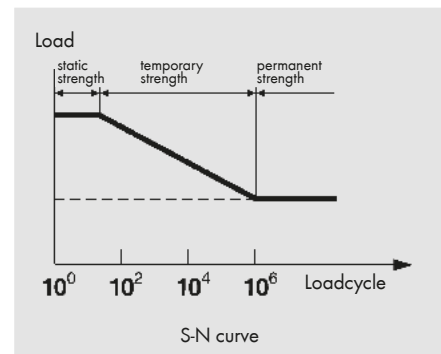
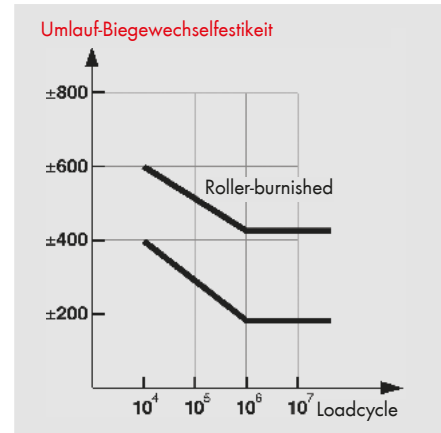
Dynamic strain

This is a recurring force on a material by tension, pressure or torsion.

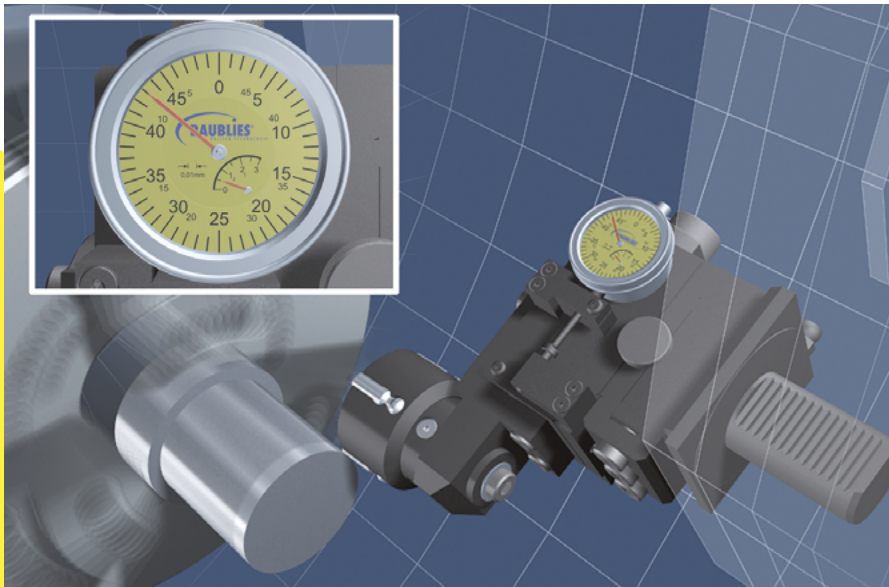
In case of dynamic strain the load limit is much lower compared to static strain. The material performance is defined under such strain. It is displayed in a S-N curve. It shows the tolerable strain depending on the number of load cycles till fracture.

Depending on the number of load cycles we distinguish between static, temporary and permanent strength.

The area of fracture is often at a change of diameters because there a peak of tension occurs in the material. Also areas of high surface roughness are the reason for fractures caused by the notch effect.



Darstellung der dynamischen Belastbarkeit von Bauteilen in einer Wöhlerkurve.

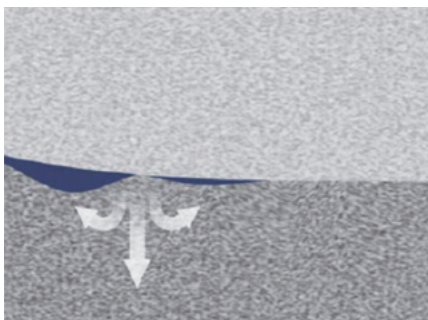


THE AIM OF ROLLER BURNISHING

The benefit of roller burnishing is the economical, simple and reliable manufacturing of maximum surface quality while increasing the strength and hardness of the workpiece.

What is roller burnishing?

- Roller burnishing is a non-cutting method for smoothing and strain hardening metallic surfaces with forming elements.
- During roller burnishing, the forming elements are loaded with a vertically directed force to the surface (roller burnishing force). Thereby the roughness profile is plastically deformed and levelled.
- Roller burnishing changes the stress condition in the surface layer of the material.
- Roller burnishing is a method of microfinishing.



Material flow during roller burnishing

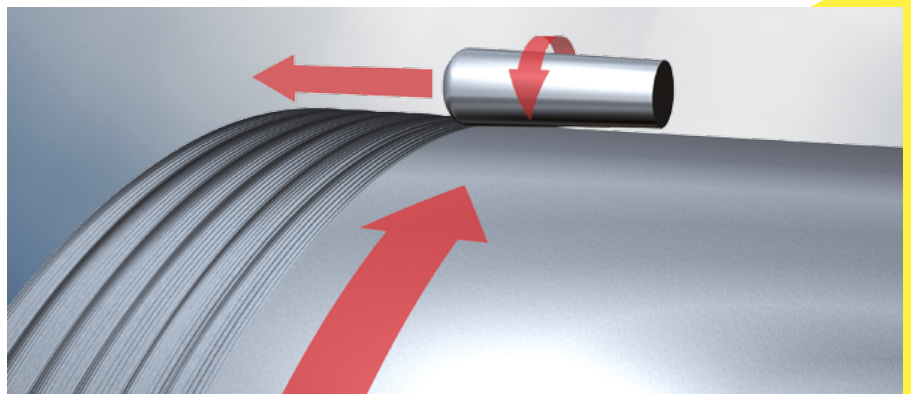
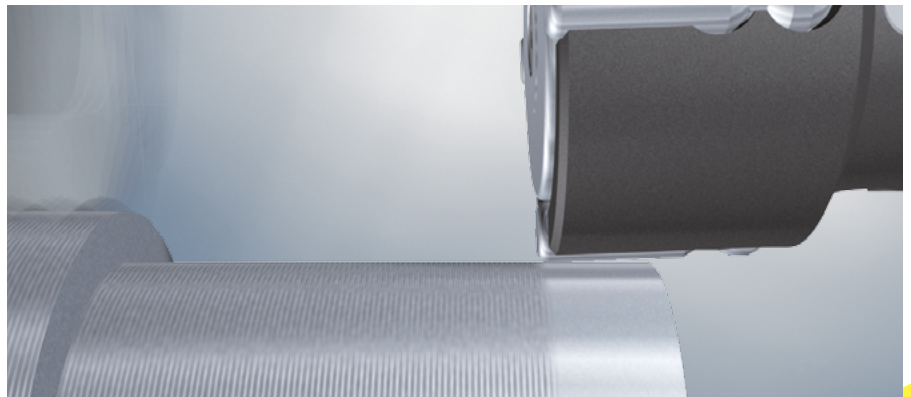
Roller burnishing for smoothing

The roller burnishing force produces a surface pressing (Hertzian stress) in the contact zone of the burnishing elements. Thereby the flow limit of the material is reached in the contact area and thus the surface profile is plastically deformed and levelled. The material volume of the elevated areas of profile peaks is pressed out into the levelling profile valleys. Thus the surface roughness is significantly reduced. The resulting dimensional difference between the preworked and the roller burnished workpiece depends on the original roughness.

Here the rolling force is kept as low as possible. The preferred aim of the process is the surface quality, not so much the strain hardening.

Benefits

- **Mirror like surfaces with roughness below 1µm**
- **High material ratio of the profile creating optimized wear characteristics**
- **Reduced risk of crack formation caused by micro notches**
- **Improved corrosion resistance**

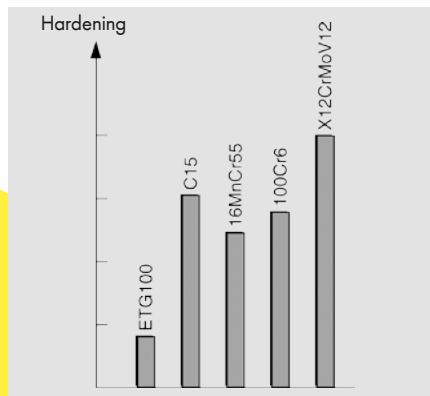


Movements of workpiece and roller during roller burnishing

Strain hardening by deep rolling

During deep rolling the same kinematic is carried out as with roller burnishing. The aim is the strain hardening of the material. The rolling pressure is higher in this case. Thus the following effects occur:

- Work hardening caused by dislocation movements within the crystal structure of the material.
- The occurrence of a stress state in the surface layer. This appears due to the interaction of plastic surface stretching, which is compensated by elastic deformation of the boundary layer. This stress state typically takes place in a depth up to 0.8 mm.
- The mechanically induced micro structural transformation.
- The improvement of the surface quality and reduced notch effect.



Hardening of various materials by roller burnishing

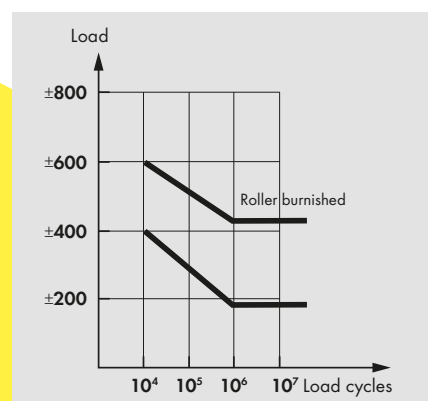
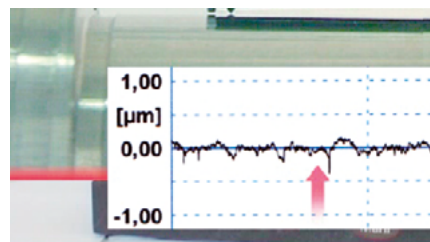
The level of the strain hardening depends on different parameters:

- The rolling pressure and -speed
- The geometry of the roll and the workpiece
- The material properties
- The number of revolutions in a certain section

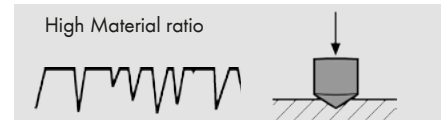
Properties of roller burnished surfaces

Roller-burnished surfaces are characterized by the following properties:

- very low roughness values, up to $R_z < 1 \mu\text{m}$, results in reduced crack formation and corrosion.
- very high material ratio of the profile caused by plateau formation.
- reduced profile peaks.



Increase of dynamic resilience through roller burnishing



- „Rounded “ profile, with lower abrasiveness compared to a ground surface.
- Increased dynamic resilience caused by significant strain hardening.
- Increased surface hardness, reducing abrasive wear.

Which materials can be roller burnished ?

- Every plastically deformable metal can be roller burnished.
- Standard roller burnishing tools with steel rollers can be used at hardness of up to 45 HRC.
- When using diamond burnishing tools material hardness can exceed 60 HRC.
- The rollability is defined by the ability of the material to be plastically deformed. An indication is the break elongation, which should be higher than 5 %. A higher break elongation improves the rollability.

What results can be achieved ?

Due to the variety of the materials only rough numbers are shown.

Average roughness Rz

Process conditions	Steel (1.4104)	Cast Iron (GG40)	Brass
Optimal	0.5-1	1.5-2.5	0.5-1
Normal	0.8-1.5	2.5-4	0.8-1.5
Difficult	1.5-3	4-6	1.5-3

Hard machining over 60 HRC:

In the machining of materials with a hardness of more than 60 HRC the surface should be preprocessed in a range of Rz 2-5 μm . Then the achievable surface finish is approximately Rz 1 μm .

Material ratio

Roller burnishing increases the material ratio. In a height C of 0.2-0.4 μm the values should reach more than 70 %.

Dynamic resilience

The vibration resistance generally can be increased by 20 - 60 %. Under certain conditions more than 100 % can be achieved.

Surface hardness

The increase of hardness in steel material can be more than 20 HV and up to 50 HV.

Which geometries can be roller burnished ?

Roller burnishing can be applied on external and internal surfaces of almost all rotationally symmetric workpieces. For roller burnishing holes and shafts we have a comprehensive range of standard tools available.

Based on over 40 years of experience we are also able to provide tailor made solutions for nearly all other geometries.

The development of diamond burnishing technology enables us to work in new areas such as the burnishing of free form surfaces, e.g. in moldmaking.

Some examples of burnishable shapes



TYPES OF ROLLER BURNISHING TOOLS

Due to the different requirements roller burnishing tools are divided into different types:

- multi-roller tools and machines
- single-roller tools
- diamond burnishing tools
- forming tools

Multi-roller tools



The classic design of roller burnishing tools are the multi-roller tools.

They are offered in a broad range of standard and special forms.

They are normally used to work cylindrical holes, shafts, tapers and plane surfaces.

The advantages of multiple rollers working simultaneously is a fast and economical machining without cross force to the rotation axis.

These type of tools are used on all established types of machines.



Kinematics of multi roller tools

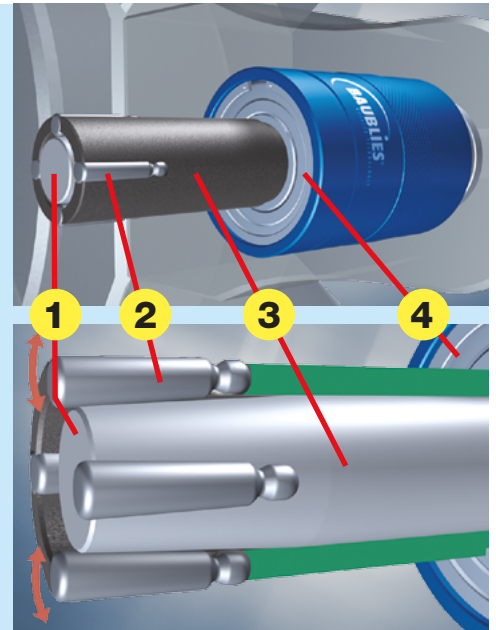
The workpiece, the tool or both rotate during roller burnishing.

During roller burnishing the rolling motion is similar to the kinematics of a planetary gear.

The taper (1) is firmly connected to the tool fixture (4). The ball beared cage (3) carrying the rollers (2) can freely rotate.

The taper supports the rollers and it adjusts the pressure required for forming the surface.

The axial position of the taper defines the tool diameter and the rolling pressure.



Single roller burnishing tools



- Single roller tools are suitable for processing cylindrical parts and profiles like radii, tapers or recesses.
- Single roller tools are perfectly suitable for strain hardening.

- Here only one roll is in operation.

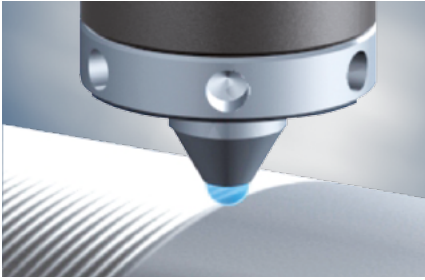
- Single roller tools are offered in different designs: Variable, Modular and Slim systems.

- Single roller tools are used to process various diameters.

- Single roller tools are spring loaded to compensate prework tolerances.

- Single roller tools can be fitted with standard or specially designed rollers according to process requirements.

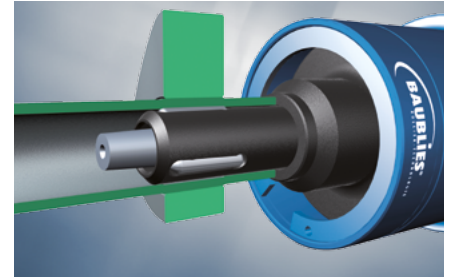
Diamond burnishing tools



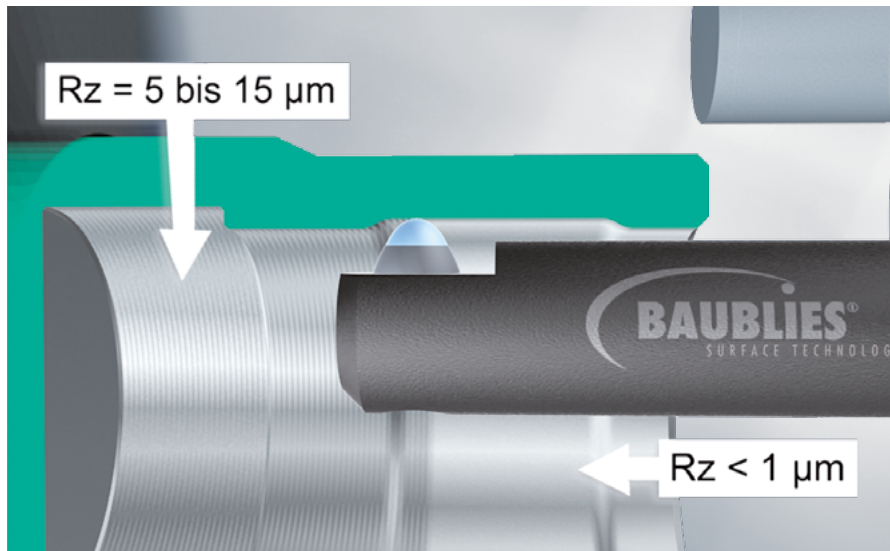
- This process of smoothing and strain hardening is similar to the process with conventional rolling tools.
- The possibilities in design and the outstanding material characteristics of the diamond generate a significant extension for the applications of roller burnishing.
- With the point-shaped contact area and the slim design of the diamond numerous contours can now be processed. For example, thin walled parts can be smoothed with the diamond.

- The enormous hardness of the diamond enables the machining of materials with a hardness of more than 60 HRC.
- The design of the tools exclusively contains mechanical components, therefore the tools can be used on almost every machine tool. There is no additional expensive equipment such as driven tools or hydraulic pumps required.
- The slim design enables application of the tools in small spaced machines such as swiss type lathe machines.
- According to the requirements of the workpiece the shape of the diamond can be adapted from variable radii to cones and pyramids.
- The combination of the diamond burnishing tool with cutting tools is possible.

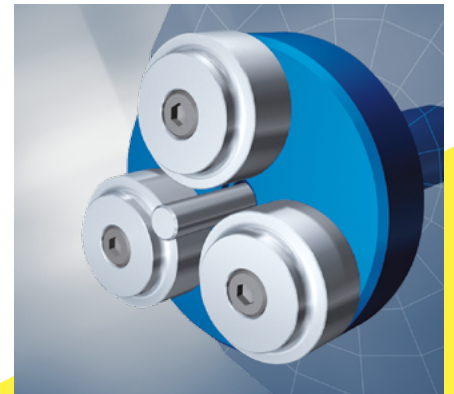
Forming tools



- Forming tools are a special feature in the Baublies product range. The design of the tools is related to roller burnishing tools.
- The most important aim of the forming process is not the improvement of the surface roughness but the specific transformation of the workpiece geometry.
- Forming tools are normally used on standard (CNC-) machine tools or on special machines which are integrated in assembly lines.



Smoothing and strain hardening of internal contour with a diamond burnishing tool



USE OF ROLLER BURNISHING TOOLS

Machine requirements

Roller burnishing tools are suitable on all common machine tools as...

- Lathes, both conventional and CNC
- Machining centers
- Transfer lines
- Revolving transfer machines
- Drilling machines
- Milling machines etc...

Roller burnishing tools are in use in nearly all metalworking branches, e.g. automotive industries, hydraulic and pneumatic components, aircraft industries, medical industries, machine building industries, jewellery making

Fixtures and clamping possibilities

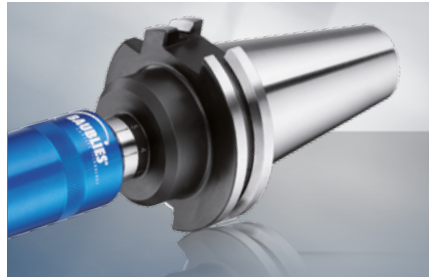
The standard tool fixture for multi roller burnishing tools is:

- Cylindrical according to DIN 1835
- Morse taper according to DIN 228

All common clamping systems are available, e.g.:

VDI - DIN 69880,
SK - DIN 69871, DIN 2080
HSK - DIN 69893

Also producer specific systems are available: Capto®, MVS®, KM®, ABS®

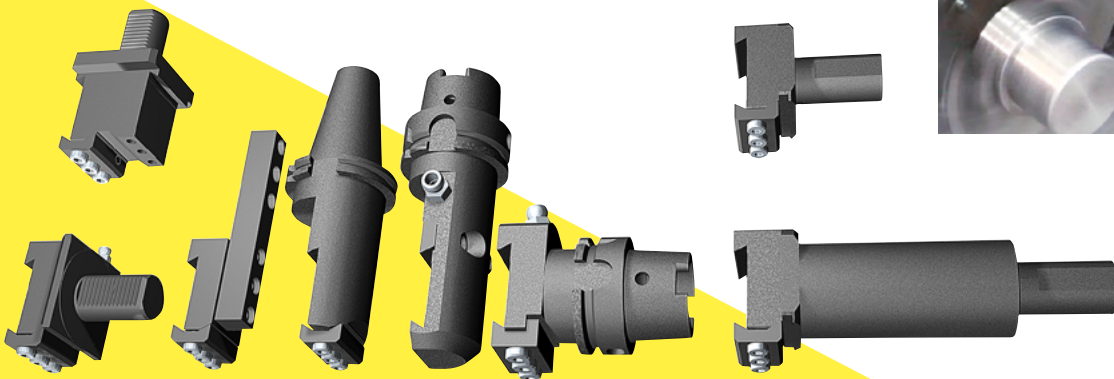
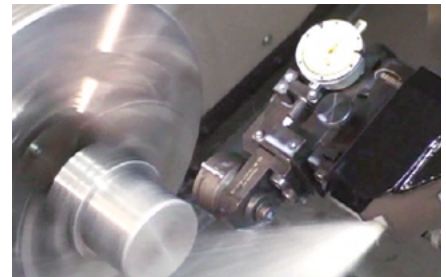


Cooling/Lubrication

For roller burnishing in a manual process (e.g. with a drilling machine) lubrication with a small amount of oil is adequate. At high burnishing speed or pressure a continuous cooling with emulsion or cutting oil is very useful to increase the lifetime of the tool.

The coolant/lubrication fluid is also used for removal of dirt from the surface and should be kept as clean as possible to avoid the dirt particles being pressed into the surface. (filtration of the coolant is recommended)

Diamond burnishing tools must be used with coolant because the frictional heat of the diamond sliding on the surface would damage the diamond quickly.



CONVERSION CHART

for R_a -, R_z - und R_t - values (approximate).

Conversion chart for R_a -, R_z - und R_t -values (approximate)

	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12
$R_a \mu m$	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25.0	50.0
$R_z \mu m$ approximate	0.22 to 0.30	0.45 to 0.60	0.8 to 1.1	1.0 to 1.80	1.6 to 2.8	3.0 to 4.8	5.9 to 8.0	12 to 16	23 to 32	46 to 57	90 to 110	180 to 220
$R_t \mu m$ approximate	0.24 to 0.40	0.49 to 0.80	0.85 to 1.45	1.10 to 2.40	1.75 to 3.60	3.2 to 6.0	6.3 to 10.0	13.0 to 19.5	25 to 38	48 to 68	95 to 130	190 to 250
ratio R_z to R_a	9 : 1 to 12 : 1	9 : 1 to 12 : 1	8 : 1 to 11 : 1	5 : 1 to 9 : 1	4 : 1 to 7 : 1	3.8 : 1 to 6 : 1	3.7 : 1 to 5 : 1	3.7 : 1 to 5 : 1	3.7 : 1 to 5 : 1	3.7 : 1 to 4.6 : 1	3.6 : 1 to 4.4 : 1	3.6 : 1 to 4.4 : 1

Standard ISO tolerance ranges adapted from DIN 7151

Nominal size (mm)	IT-Tolerance range in microns											
	IT 1	IT 2	IT 3	IT 4	IT 5	IT 6	IT 7	IT 8	IT 9	IT 10	IT 11	IT 12
1 – 3	0.8	1.2	2	3	4	6	10	14	25	40	60	100
> 3 – 6	1	1.5	2.5	4	5	8	12	18	30	48	75	120
> 6 – 10	1	1.5	2.5	4	6	9	15	22	36	58	90	150
> 10 – 18	1.2	2	3	5	8	11	18	27	43	70	110	180
> 18 – 30	1.5	2.5	4	6	9	13	21	33	52	84	130	210
> 30 – 50	1.5	2.5	4	7	11	16	25	39	62	100	160	250
> 50 – 80	2	3	5	8	13	19	30	46	74	120	190	300
> 80 – 120	2.5	4	6	10	15	22	35	54	87	140	220	350
> 120 – 180	3.5	5	8	12	18	25	40	63	100	160	250	400
> 180 – 250	4.5	7	10	14	20	29	46	72	115	185	290	460
> 250 – 315	6	8	12	16	23	32	52	81	130	210	320	520

CUSTOMER BENEFITS

Complete Machining

As a result of the complete machining using one machine, no special machines are required. The handling of the workpieces in the production is simplified thus the costs of transport, storage and machine setup are reduced.

Reliable Processing

The process of roller burnishing is extremely reliable, quick and easy to execute. It can easily be adapted to an established manufacturing process.

Quality Enhancement

Compared to chipping processes there is a significant increase of surface quality, strength, hardness and wear resistance of the material.

Environmentally Friendly

In the roller burnishing process no material is removed, therefore there is no waste products to be disposed of.

Economical

Roller burnishing is economically efficient due to short cycle times and results in high product quality. The result is good value for money manufacturing with fast amortisation.

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MULTI-ROLLER BURNISHING TOOLS

IT'S A „SPRINT“ TO THE FINISH:
EXTREMELY SMOOTH SURFACES
IN JUST SECONDS



Multi-roller burnishing: Impressive advantages

Surface roughnesses of under $R_z\ 1\ \mu\text{m}$, short cycle times and low investments with fast amortization make chipless multi-roller burnishing a high-quality, cost effective alternative to any cutting process. In addition, the results achieved with multi-roller burnishing are impressive thanks to

- hardened boundary layers
- increased fatigue strength
- larger contact area ratios due to plateau formation
- greater surface resistance to wearing and corrosion
- shifting of the material fatigue limits
- reduction of coefficients of sliding friction
- environmental friendliness due to a lack of waste products.

Multi-roller burnishing tools: „sprinting“ to extreme smoothness

The best surface quality fast – that’s a main characteristic of Baublies multi-roller burnishing tools.

Depending on the roller burnishing task various numbers of hardened rollers are arranged in a cage. The machining times are kept short by using several rollers simultaneously.

During roller burnishing with multi-roller tools, a roll-off process with kinematics similar to those of a planetary gear results. A taper supports the rollers and provides the contact force for forming the



Burnishing tool for a cylindrical shaft.

material. The rolling diameter is adjusted by axial shifting of the taper relative to the roller.

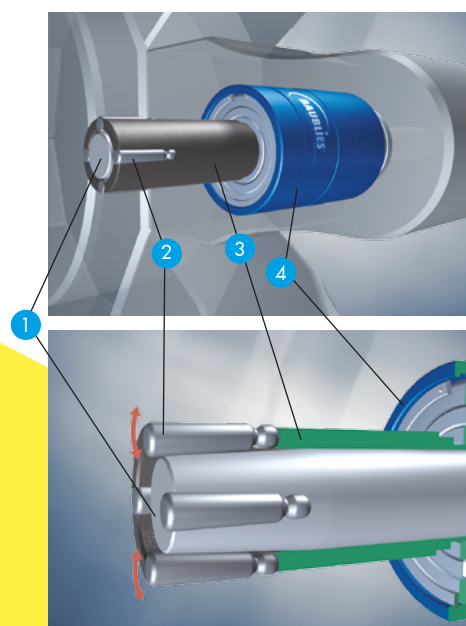
Diversity for any machining task

Baublies multi-roller burnishing tools are available as standard tools for an extremely broad range of interior and

exterior applications. An unlimited number of special solutions optimally round off the product line and open up roller burnishing for an increasing number of new applications.

Multi-roller tools are worth the investment, as they...

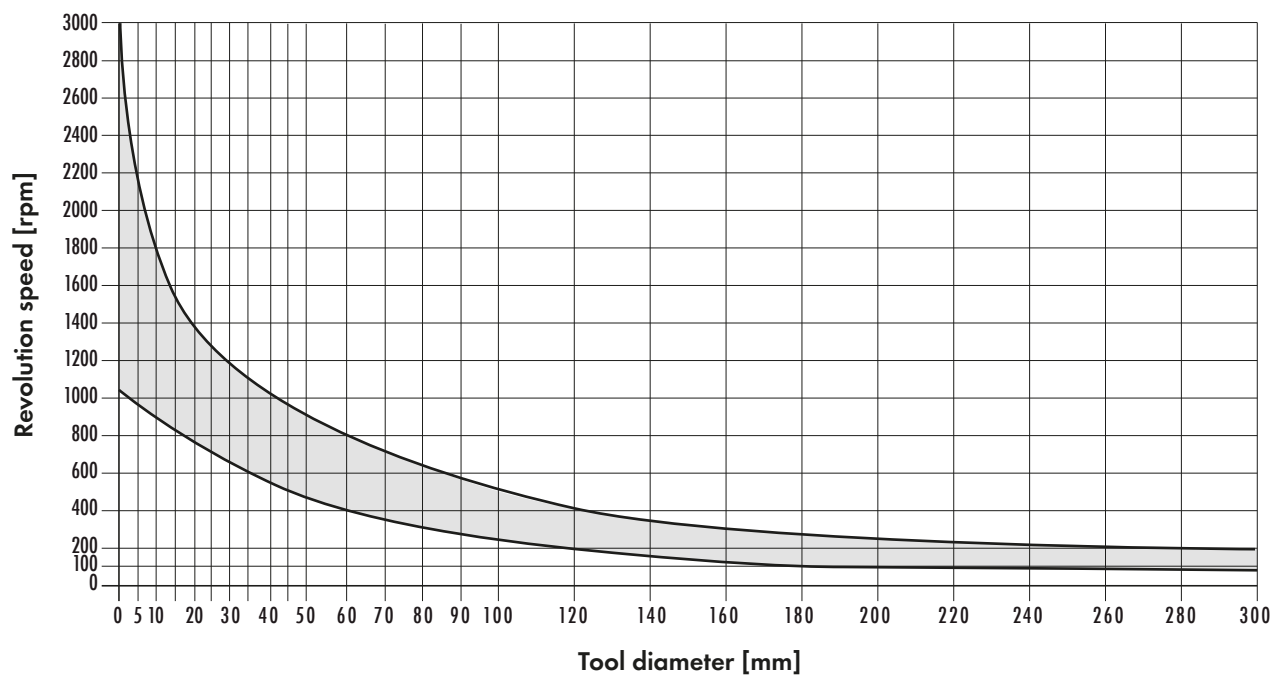
- require very short machining times
- realize outstanding surface qualities
- do not subject the workpiece to lateral forces.



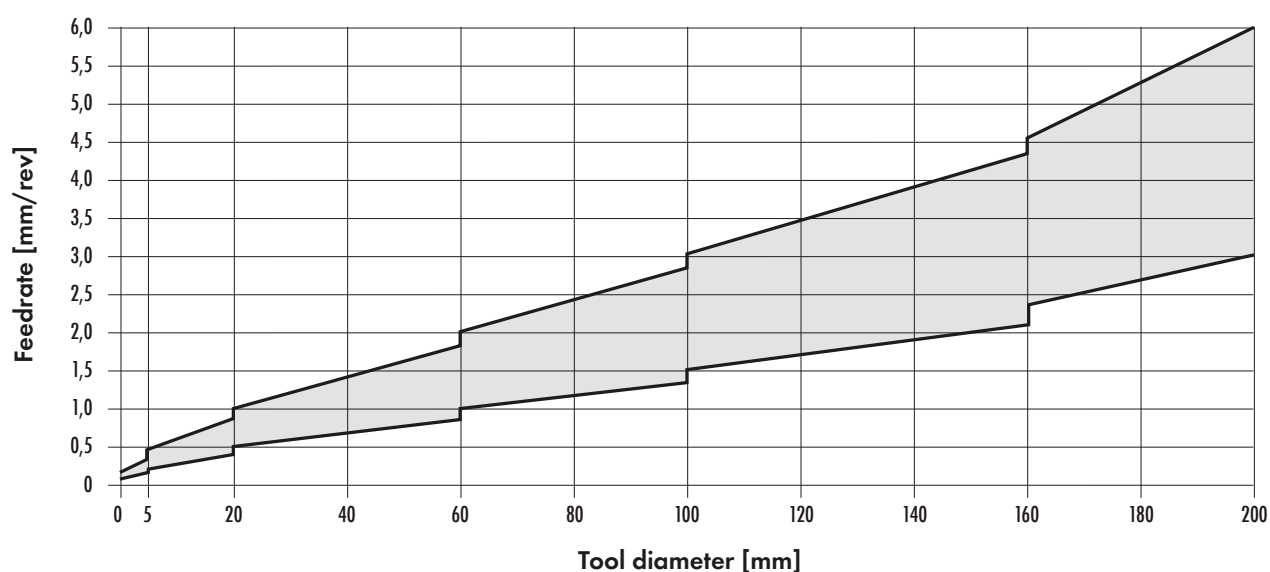
Principle of a planetary gear:
The taper (1) is permanently connected to the tool holding fixture (4).
The cage (3) with mounted rollers (2) can be freely rotated.

SPEED AND FEEDRATE CHART FOR MULTI-ROLLER BURNISHING TOOLS

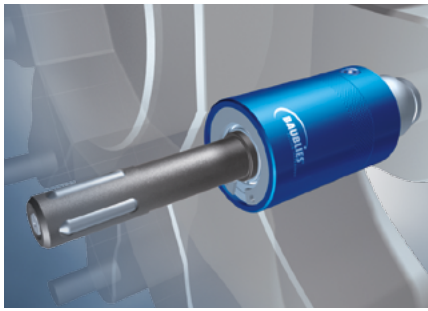
Guide value for speed



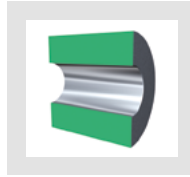
Guide value for feedrate



Speed and Feedrate are depending of various parameters such as cooling, workpiece clamping, material properties, etc.



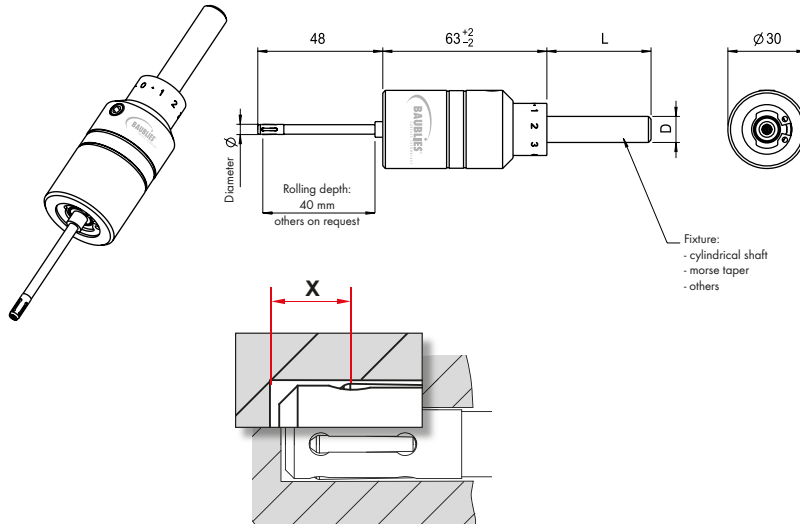
Internal roller burnishing tool for through hole



IRG-1-D

Ø 4.0 - 4.9 mm

Technical details: Type IRG-1-D from Ø 4.0 - 4.9 mm



Internal roller burnishing tool IRG-1-D

Application	through hole			
Diameter range	4 - 4.9 mm			
Adjustment range	-0.05 up to +0.1 mm			
Rolling depth	40 mm			
Rollers	Diameter	Type	Quantity	Dimension "X"
	4 - 4.9 mm	D-1060	4	3 mm
Standard fixture	cylindrical shank Ø 10 - 20 m Morse taper 1 to 2			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different rolling depth
- Different number of rollers
- Tailor made rollers

Application parameters

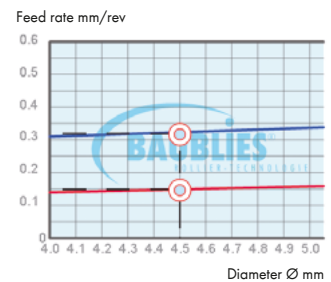
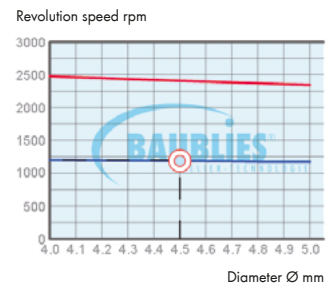
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.01 mm
Tool preclamping	up to 0.03 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 10 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-1-D.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

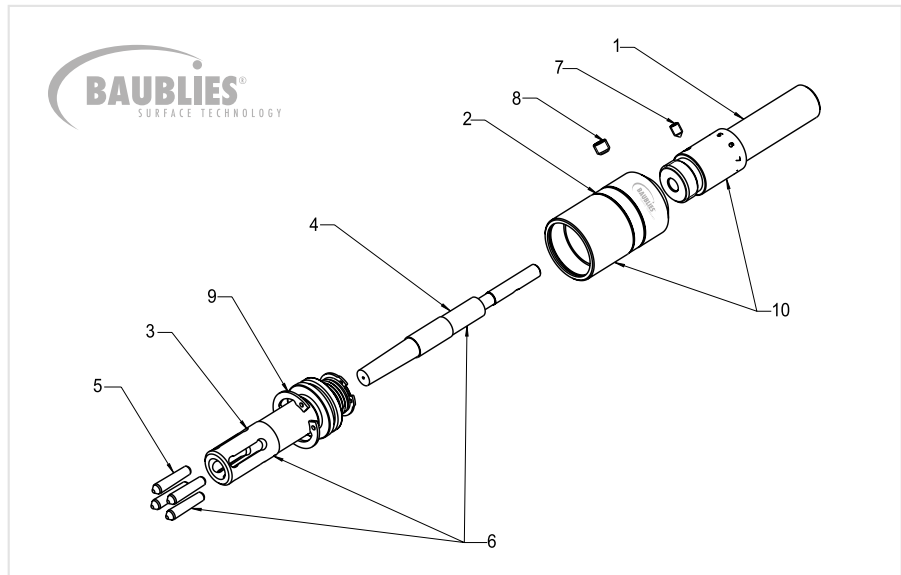
When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Tool assembly and handling

IRG-1-D

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, including bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

Changing components

Rollers

a) Loosen clamping screw (8) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Alternative:

b) Remove the locking ring (9) and lift out the cage (3) towards the front until the rollers are clear. Replace the rollers in sets and remount the locking ring.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly.

When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (8) and screw the fixture (1) out of the sleeve (2). Unscrew clamping screw (7). Pull the taper (4) out of the fixture. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (7).

Tip

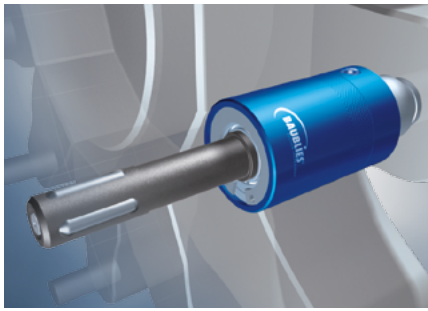
When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

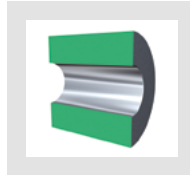
Remove the locking ring (9) and lift out the cage (3) towards the front. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



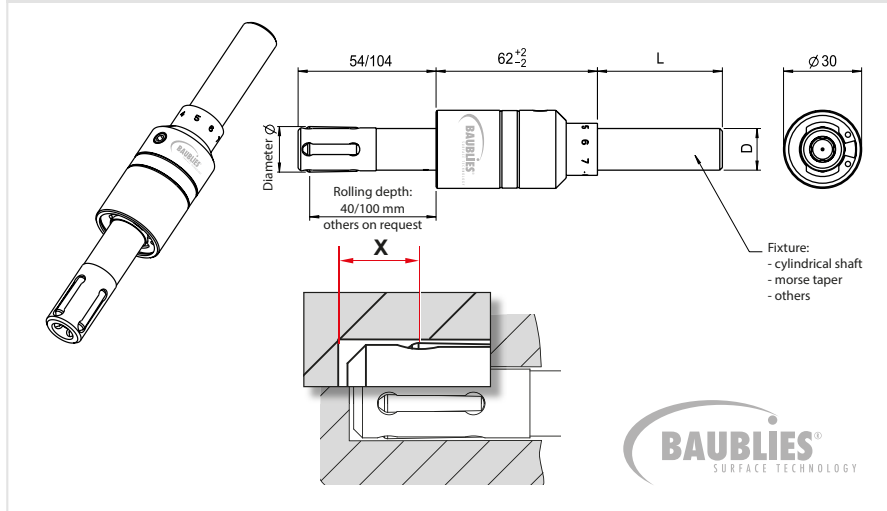
Internal roller burnishing tool for through hole



IRG-2-D

Ø 4.9 - 20.8 mm

Technical details: Type IRG-2-D from Ø 4.9 - 20.8 mm



Internal roller burnishing tool IRG-2-D

Application	through hole			
Diameter range	4 - 20,8 mm			
Adjustment range	- 0.1 up to + 0.3 mm			
Rolling depth	50 mm			
Rollers	Diameter	Type	Quantity	Dimension "X"
	4.9 - 6.8 mm	D-1680	4	4 mm
	6.9 - 8.8 mm	D-2010	4	5 mm
	8.9 - 11.8 mm	D-2714	4	5 mm
	11.9 - 15.8 mm	D-3718	4	5 mm
	15.9 - 20.8 mm	D-4722	4	6 mm
Standard fixture	cylindrical shank Ø 10 - 20 mm Morse taper 1 to 3			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different rolling depth
- Different number of rollers
- Tailor made rollers
- Internal coolant from Ø 8 mm

Application parameters

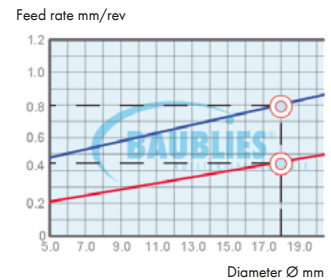
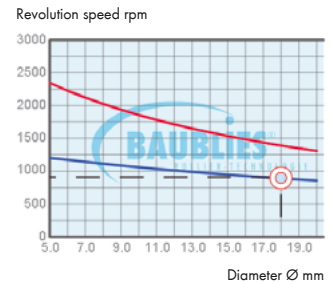
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.02 mm
Tool preclamping	up to 0.05 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-2-D.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

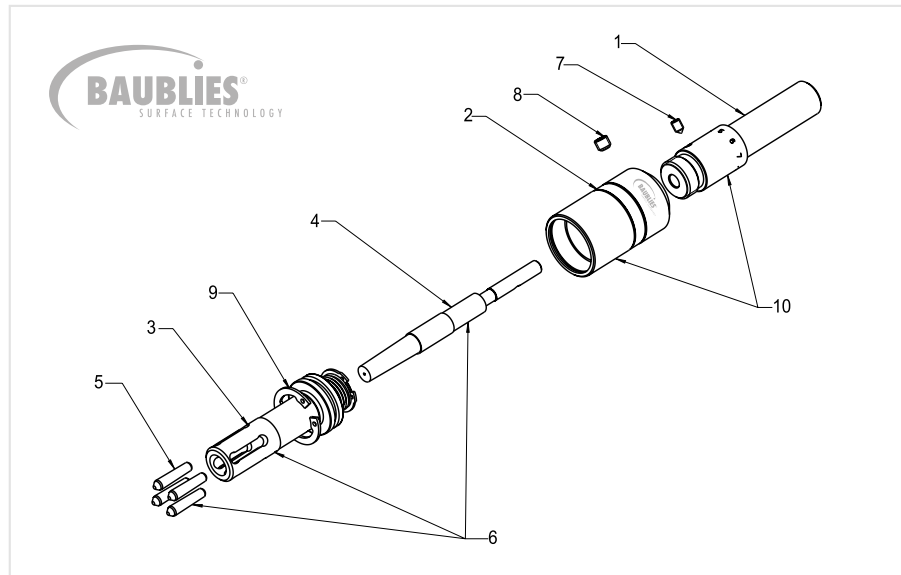
When setting up a tool, the revolution speed can be considerably reduced, how-ever the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Tool assembly and handling

IRG-2-D

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, (conversion kit for other diameters including item (3)(4)(5))
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

Changing components

Rollers

a) Loosen clamping screw (8) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Alternative:

b) Remove the locking ring (9) and lift out the cage (3) towards the front until the rollers are clear. Replace the rollers in sets and remount the locking ring.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly.

When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (8) and screw the fixture (1) out of the sleeve (2). Unscrew clamping screw (7). Pull the taper (4) out of the fixture. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (7).

Tip

When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

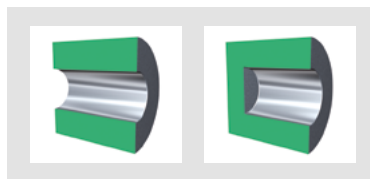
Remove the locking ring (9) and lift out the cage (3) towards the front. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



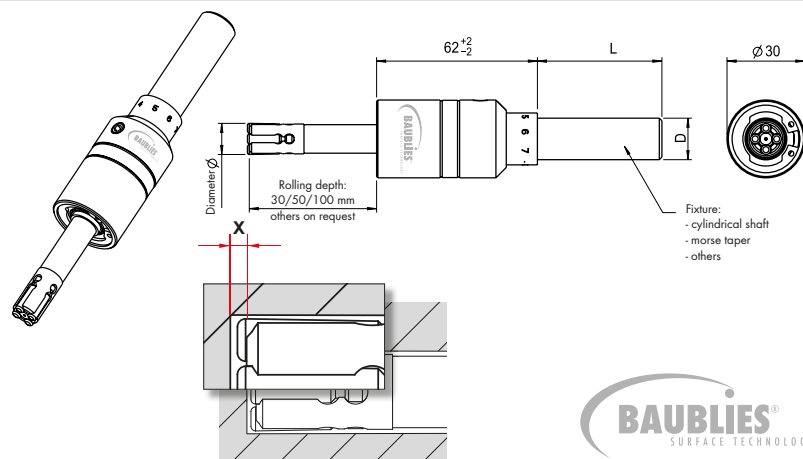
Internal roller burnishing tool for blind hole and through hole



IRG-2-S

Ø 4.9 - 20.8 mm

Technical details: Type IRG-2-S from Ø 4.9 - 20.8 mm



Internal roller burnishing tool IRG-2-S

Application	blind hole and through hole			
Diameter range	4.9-20.8 mm			
Adjustment range	- 0.1 up to + 0.2 mm			
Rolling depth up to Ø 8	30 mm, 50 mm			
Rolling depth from Ø 8	30 mm, 50 mm, 100 mm			
Rollers	Diameter	Type	Quantity	Dimension „X“
	4.9-6.8 mm	S-1680	3	0.5 mm
	6.9-8.8 mm	S-2010	4	0.5 mm
	8.9-11.8 mm	S-2714	4	0.5 mm
	11.9-15.8 mm	S-3718	4	0.7 mm
	15.9-20.8 mm	S-4722	4	0.7 mm
Standard fixture	cylindrical shank Ø 10-20 mm Morse taper 1 to 4			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different rolling depth
- Different number of rollers
- Tailor made rollers
- Internal coolant from Ø 8 mm

Application parameters

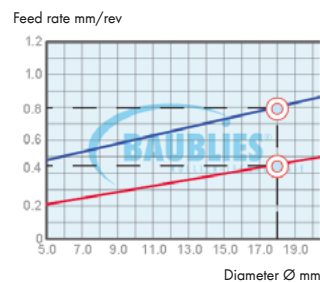
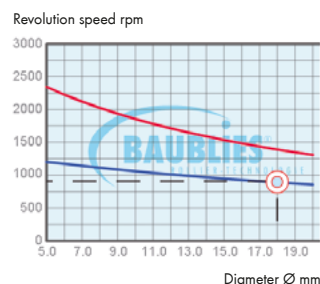
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.02 mm
Tool preclamping	up to 0.05 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-2-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

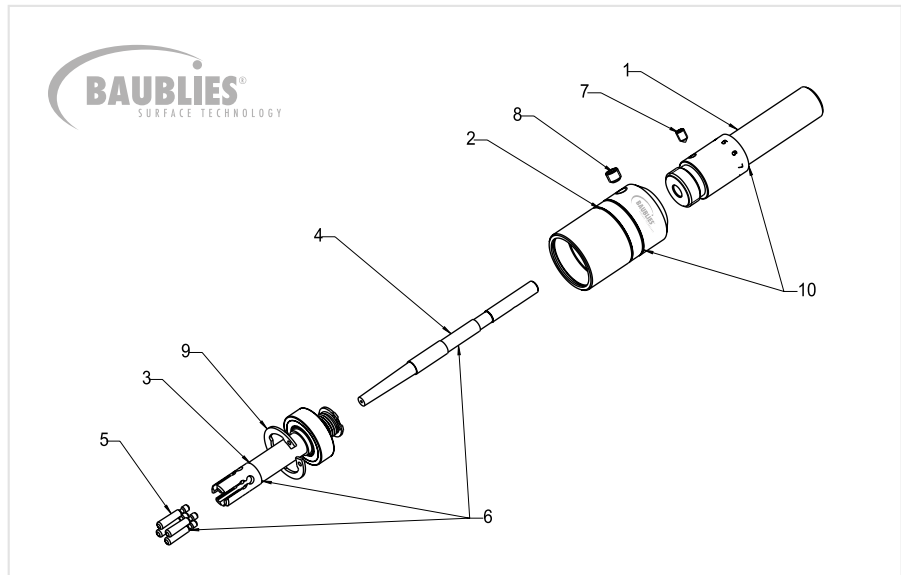
When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Tool assembly and handling

IRG-2-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, (conversion kit for other diameters including item (3)(4)(5))
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

a) Loosen clamping screw (8) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Alternative:

b) Remove the locking ring (9) and lift out the cage (3) towards the front until the rollers (5) are clear. Replace the rollers in sets and remount the locking ring.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (8) and screw the fixture (1) out of the sleeve (2). Unscrew clamping screw (7). Pull the taper (4) out of the fixture. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (7).

Tip

When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

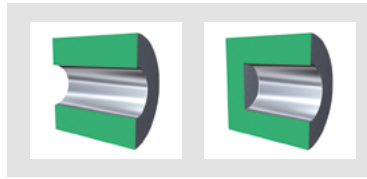
Remove the locking ring (9) and lift out the cage (3) towards the front. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.

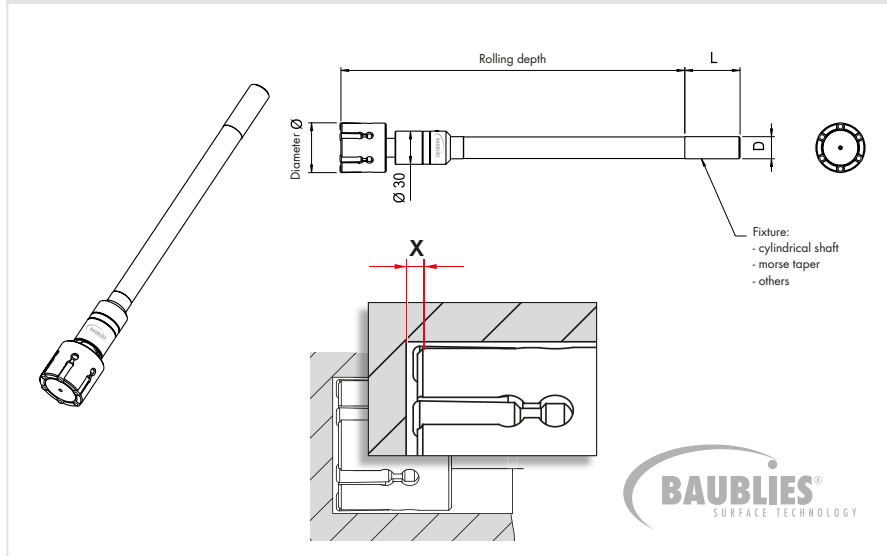


Internal roller burnishing tool for blind hole and through hole



IRG-2-SPECIAL
Ø 30.9 - 52.8 mm

Technical details: Type IRG-2-Special from Ø 30.9 - 52.8 mm



Internal roller burnishing tool IRG-2-Special

Application	blind hole and through hole			
Diameter range	30.9-52.8 mm			
Adjustment range	- 0.1 up to + 0.4 mm			
Rolling depth	unlimited over sleeve			
Rollers	Diameter	Type	Quantity	Dimension „X“
	30.9-39.8 mm	S-4722	6	0.7 mm
	39.9-52.8 mm	S-6730	6	1.0 mm
Standard fixture	cylindrical shank Ø 10-20 mm Morse taper 1 to 2			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different number of rollers
- Tailor made rollers
- Internal coolant

Application parameters

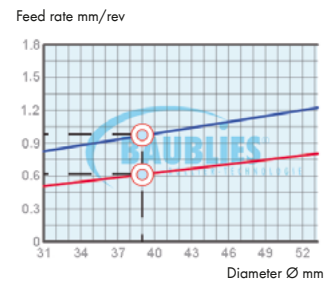
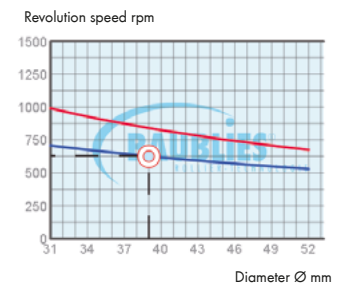
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.03 mm
Tool preclamping	up to 0.06 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-2-Special.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

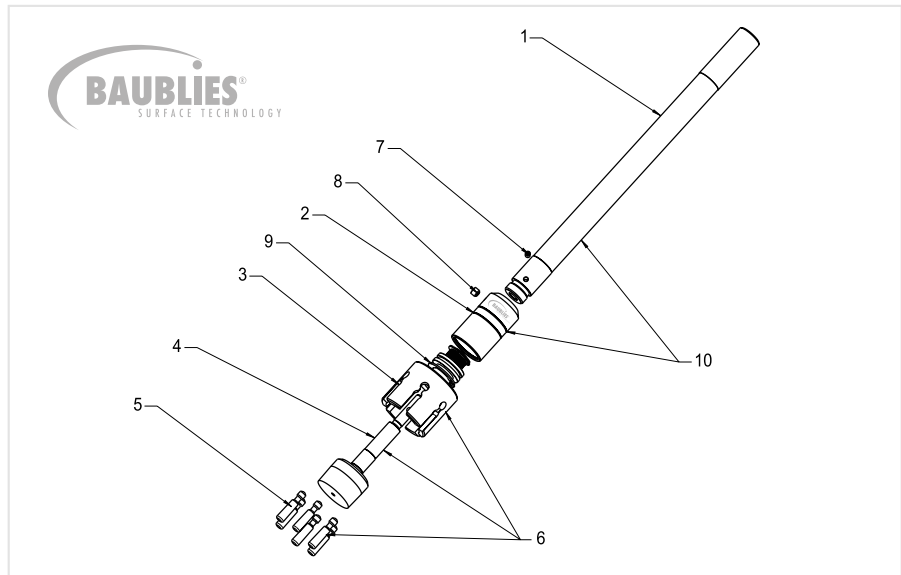
When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Tool assembly and handling

IRG-2-Special

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, (conversion kit for other diameters including item (3)(4)(5))
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Unscrew clamping screw (8) and clamping screw (7). Remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper until the rollers (5) are clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Unscrew clamping screw (8) and clamping screw (7). Remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (7).

Tip

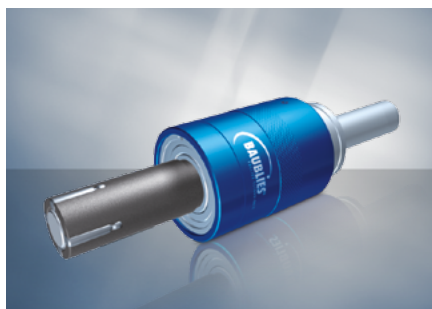
When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

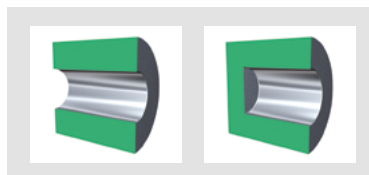
Unscrew clamping screw (8) and clamping screw (7). Remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



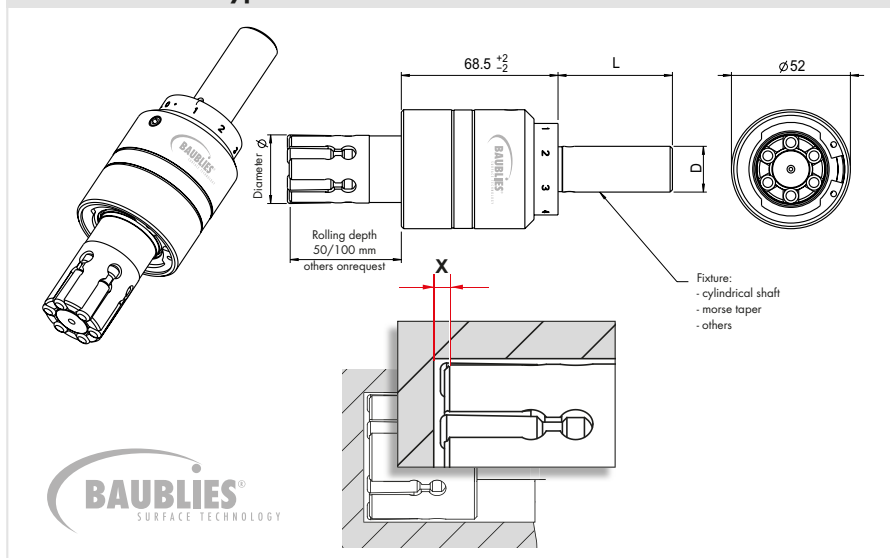
Internal roller burnishing tool for blind hole and through hole



IRG-3-S

Ø 20.9 - 33.8 mm

Technical details: Type IRG-3-S from Ø 20.9 - 33.8 mm



Internal roller burnishing tool IRG-3-S

Application	blind hole and through hole			
Diameter range	20.9-33.8 mm			
Adjustment range	- 0.1 up to + 0.4 mm			
Rolling depth	50 mm, 100 mm			
Rollers	Diameter	Type	Quantity	Dimension „X“
	20.9-29.8 mm	S-4722	6	0.7 mm
	29.9-33.8 mm	S-6730	6	1.0 mm
Standard fixture	cylindrical shank Ø 19.05-40 mm Morse taper 2 to 4			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different rolling depth
- Different number of rollers
- Tailor made rollers
- Internal coolant

Application parameters

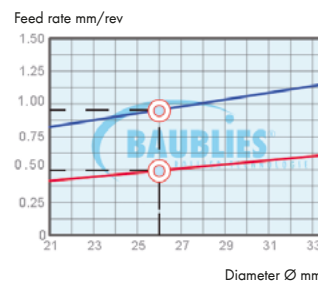
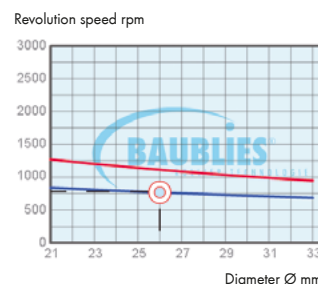
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.03 mm
Tool preclamping	up to 0.07 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-3-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

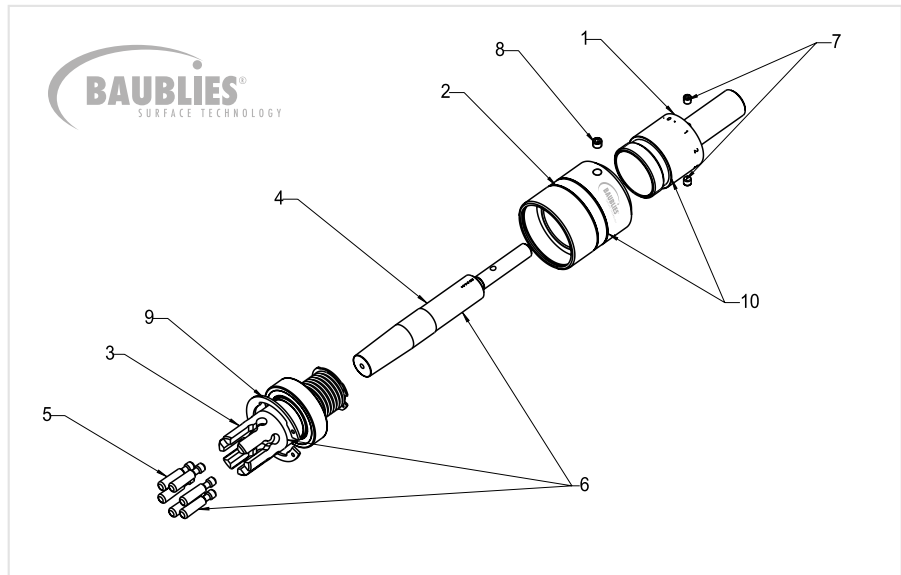
When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Tool assembly and handling

IRG-3-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

a) Loosen clamping screw (8) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Alternative:

b) Remove the locking ring (9) and lift out the cage (3) towards the front until the rollers (5) are clear. Replace the rollers in sets and remount the locking ring.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly.

When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (8) and screw the fixture (1) out of the sleeve (2). Unscrew clamping screw (7). Pull the taper (4) out of the fixture. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (7).

Tip

When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

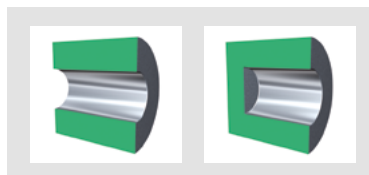
Remove the locking ring (9) and lift out the cage (3) towards the front. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



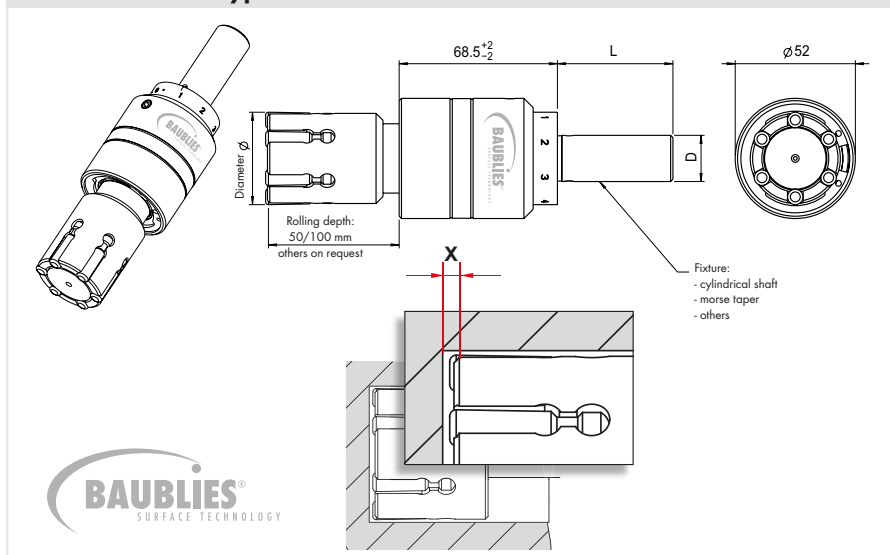
Internal roller burnishing tool for blind hole and through hole



IRG-4-S

Ø 33.9 - 52.8 mm

Technical details: Type IRG-4-S from Ø 33.9 - 52.8 mm



Internal roller burnishing tool IRG-4-S

Application	blind hole and through hole			
Diameter range	33.9-52.8 mm			
Adjustment range	- 0.2 up to + 0.5 mm			
Rolling depth	50 mm, 100 mm			
Rollers	Diameter	Type	Quantity	Dimension „X“
	33.9-50.8 mm	S-6730	6	1.0 mm
	50.9-52.8 mm	S-9740	6	1.3 mm
Standard fixture	cylindrical shank Ø 19.05-40 mm Morse taper 2 to 4			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different rolling depth
- Different number of rollers
- Tailor made rollers
- Internal coolant

Application parameters

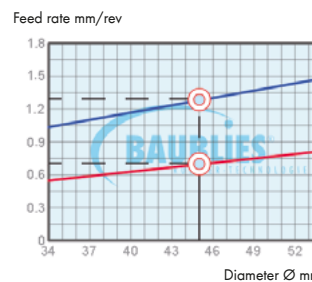
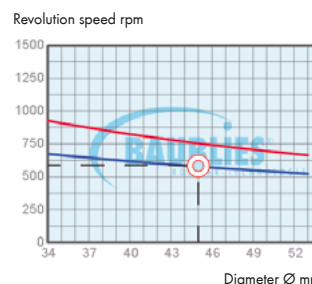
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.03 mm
Tool preclamping	up to 0.08 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-4-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

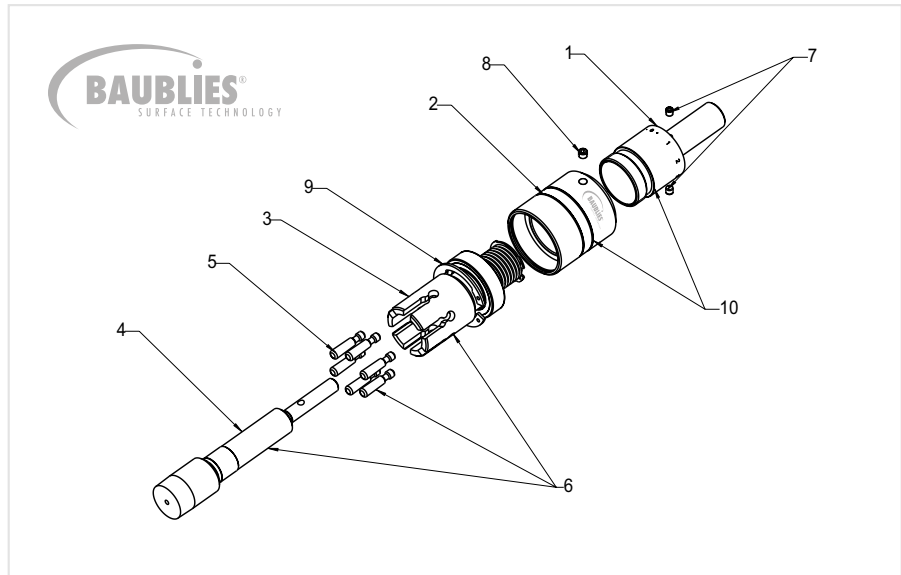
When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Tool assembly and handling

IRG-4-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Unscrew the clamping screws (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper until the rollers (5) are clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Unscrew the clamping screws (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (7).

Tip

When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

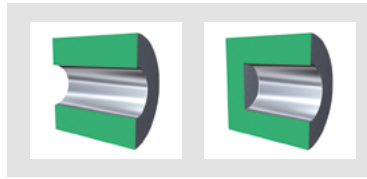
Unscrew the clamping screws (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



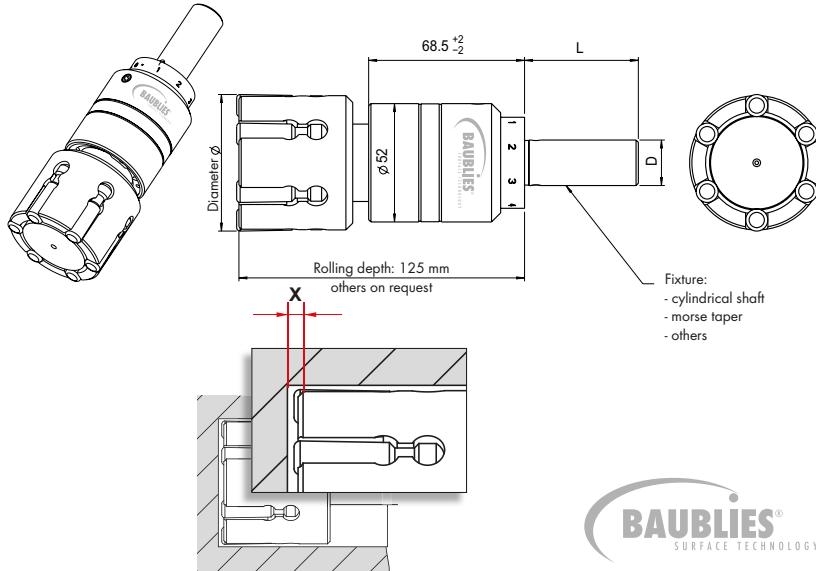
Internal roller burnishing tool for blind hole and through hole



IRG-4-S

Ø 52.9 - 64.8 mm

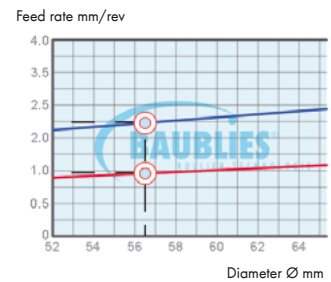
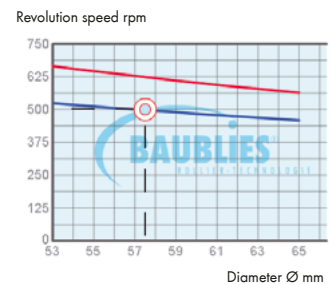
Technical details: Type IRG-4-S from Ø 52.9 - 64.8 mm



What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-4-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Internal roller burnishing tool IRG-4-S

Application	blind hole and through hole			
Diameter range	52.9-64.8 mm			
Adjustment range	- 0.2 up to + 0.5 mm			
Rolling depth	125 mm over sleeve			
Rollers	Diameter	Type	Quantity	Dimension „X“
	52.9-64.8 mm	S-9740	6	1.3 mm
Standard fixture	cylindrical shank Ø 19.05-40 mm Morse taper 2 to 4			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different rolling depth
- Different number of rollers
- Tailor made rollers
- Internal coolant

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

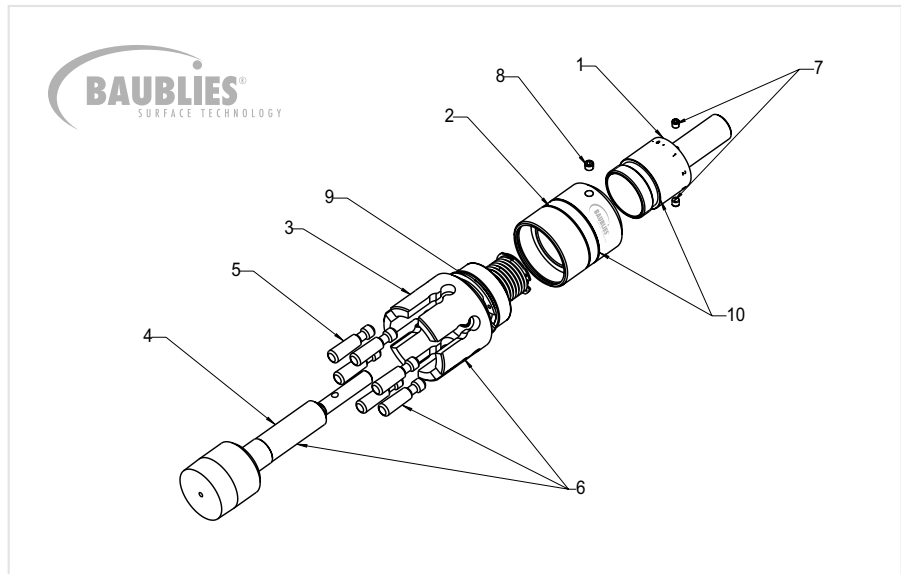
Workpiece allowance	up to 0.03 mm
Tool preclamping	up to 0.08 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

Tool assembly and handling

IRG-4-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Unscrew the clamping screws (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper until the rollers (5) are clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Unscrew the clamping screws (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (7).

Tip

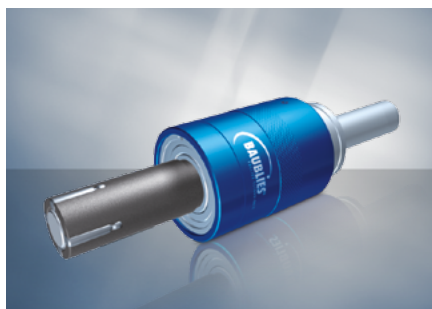
When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

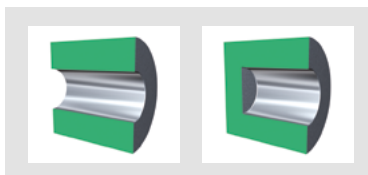
Unscrew the clamping screws (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



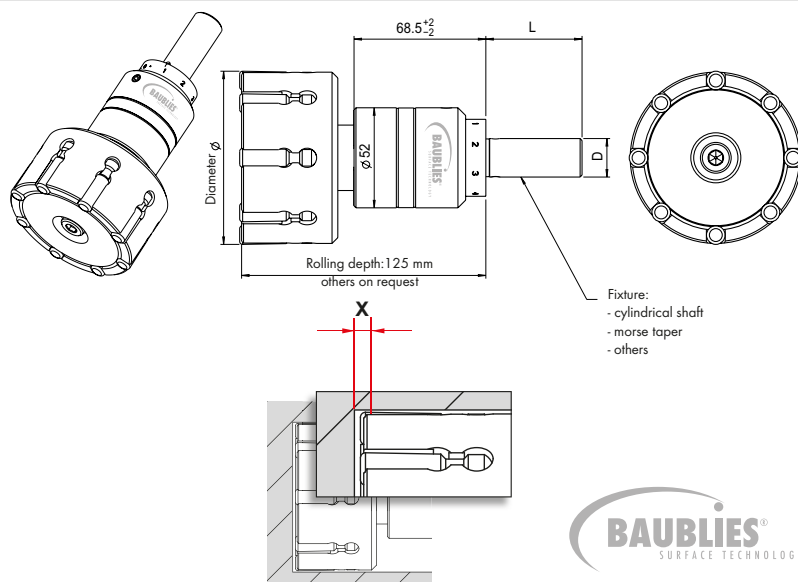
Internal roller burnishing tool for blind hole and through hole



IRG-5-S

Ø 64.9 - 100.8 mm

Technical details: Type IRG-5-S from Ø 64.9 - 100.8 mm



Internal roller burnishing tool IRG-5-S

Application	blind hole and through hole			
Diameter range	64.9 - 100.8 mm			
Adjustment range	- 0.1 up to + 0.5 mm			
Rolling depth	125 mm over sleeve			
Rollers	Diameter	Type	Quantity	Dimension „X“
	64.9 - 100.8 mm	S-9740	8	1.3 mm
Standard fixture	cylindrical shank Ø 19.05 - 40 mm Morse taper 2 to 4			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different rolling depth
- Different number of rollers
- Tailor made rollers
- Internal coolant

Application parameters

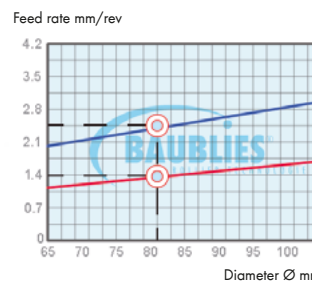
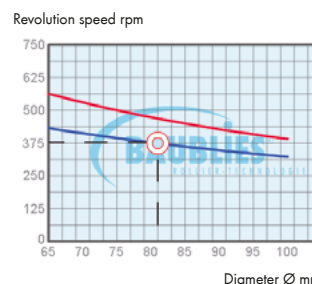
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.03 mm
Tool preclamping	up to 0.08 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-5-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

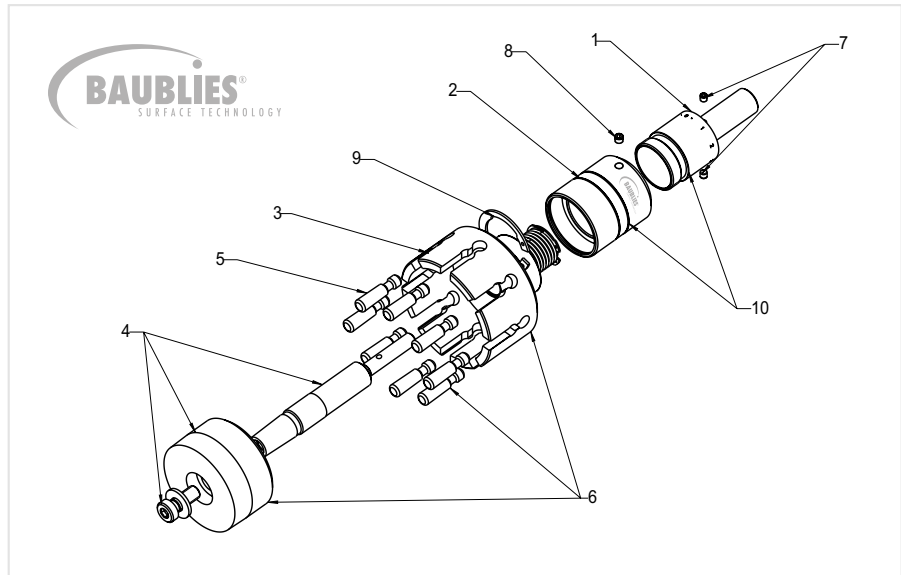


Tool assembly and handling

IRG-5-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Unscrew the clamping screws (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper until the rollers (5) are clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Unscrew the clamping screws (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (7).

Tip

When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

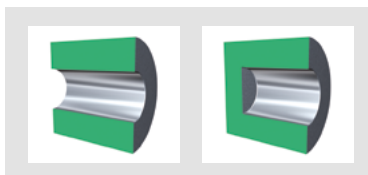
Unscrew the clamping screws (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



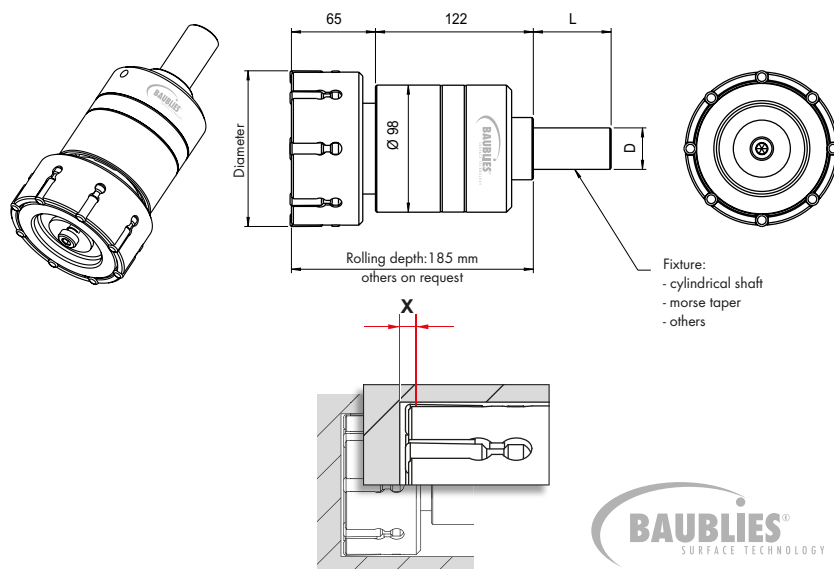
Internal roller burnishing tool for blind hole and through hole



IRG-6-S

Ø 100.9 - 200.8 mm

Technical details: Type IRG-6-S from Ø 100.9 - 200.8 mm



Internal roller burnishing tool IRG-6-S

Application	blind hole and through hole			
Diameter range	100.9-200.8 mm			
Adjustment range	- 0.2 up to + 0.6 mm			
Rolling depth	190 mm over sleeve			
Rollers	Diameter	Type	Quantity	Dimension „X“
	100.9-149.8 mm	S-9740	8	1.3 mm
	149.9-200.8 mm	S-9740	10	1.3 mm
Standard fixture	cylindrical shank Ø 19.05-40 mm Morse taper 3 to 5			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different rolling depth
- Different number of rollers
- Tailor made rollers
- Internal coolant

Application parameters

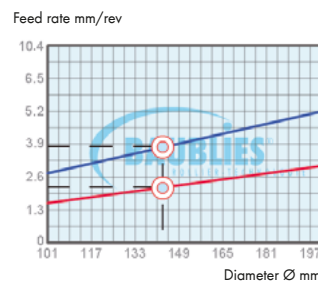
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.04 mm
Tool preclamping	up to 0.01 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-6-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

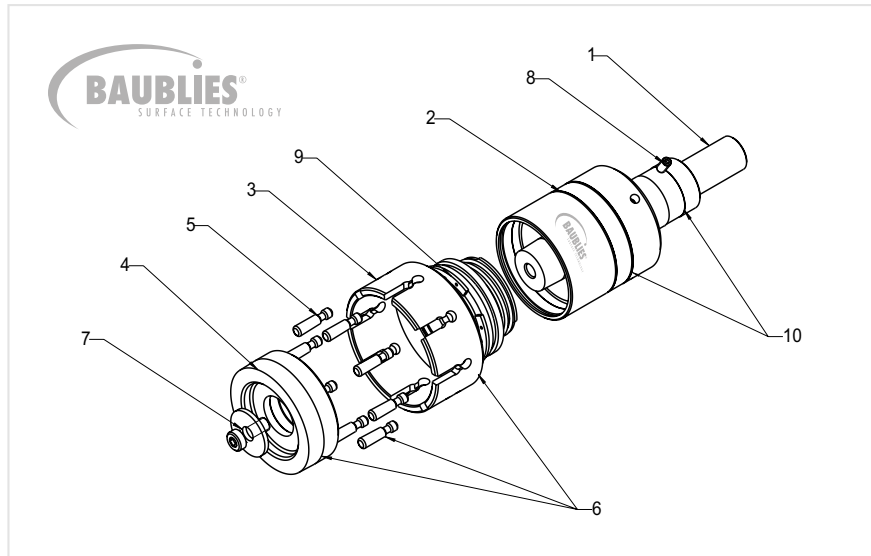


Tool assembly and handling

IRG-6-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Dismount screw (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper until the rollers (5) are clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Dismount screw (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the taper and remount the components.

Tip

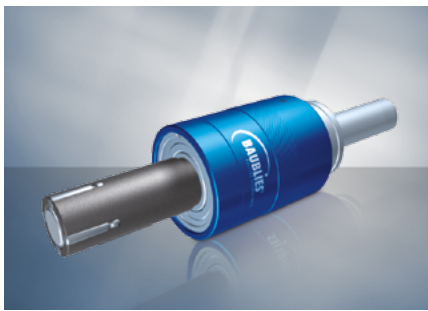
When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

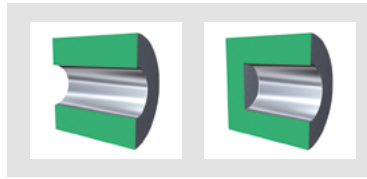
Dismount screw (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



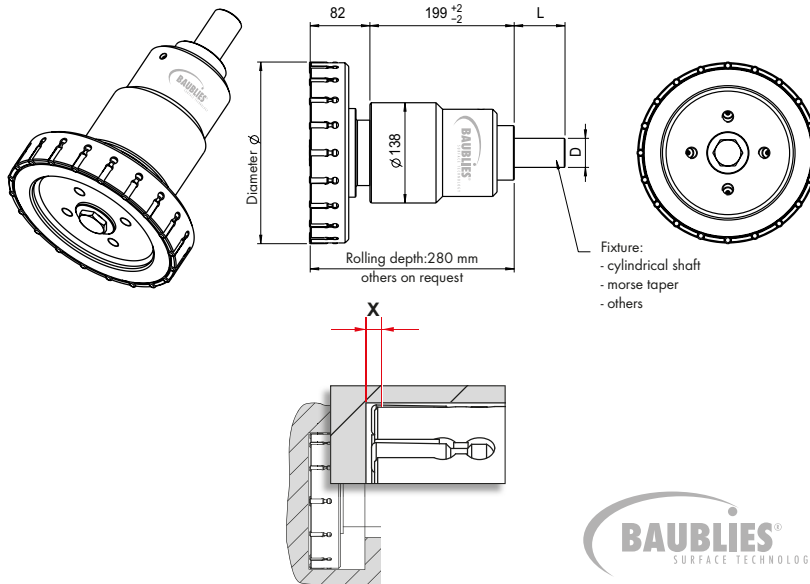
Internal roller burnishing tool for blind hole and through hole



IRG-7-S

Ø 200.9 - 400.8 mm

Technical details: Type IRG-7-S from Ø 200.9 - 400.8 mm



Internal roller burnishing tool IRG-7-S

Application	blind hole and through hole			
Diameter range	200.9-400.8 mm			
Adjustment range	- 0.2 up to +0.6 mm			
Rolling depth	280 mm over sleeve			
Rollers	Diameter	Type	Quantity	Dimension „X“
	200.9-300.8 mm	S-9740	20	1.3 mm
	300.9-400.8 mm	S-9740	26	1.3 mm
Standard fixture	cylindrical shank Ø 30-50 mm Morse taper 4 to 5			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Different rolling depth
- Different number of rollers
- Tailor made rollers
- Internal coolant

Application parameters

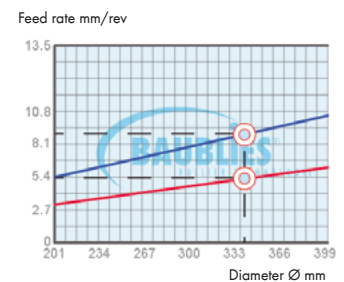
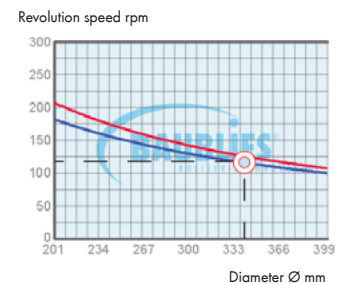
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.04 mm
Tool preclamping	up to 0.01 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the IRG-7-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

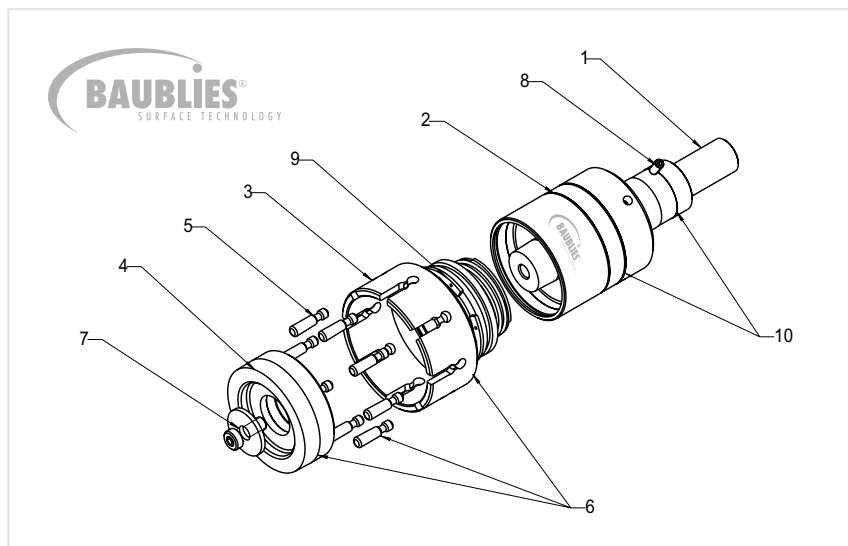
When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Tool assembly and handling

IRG-7-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (8), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (8).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Dismount screw (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper until the rollers (5) are clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Dismount screw (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the taper and remount the components.

Tip

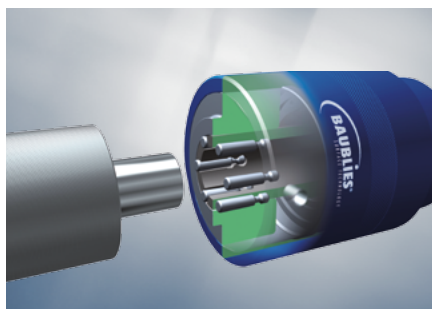
When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

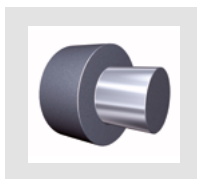
Dismount screw (7) and remove locking ring (9). Then lift out the cage (3) and the taper (4) towards the front. Disassemble cage from taper. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



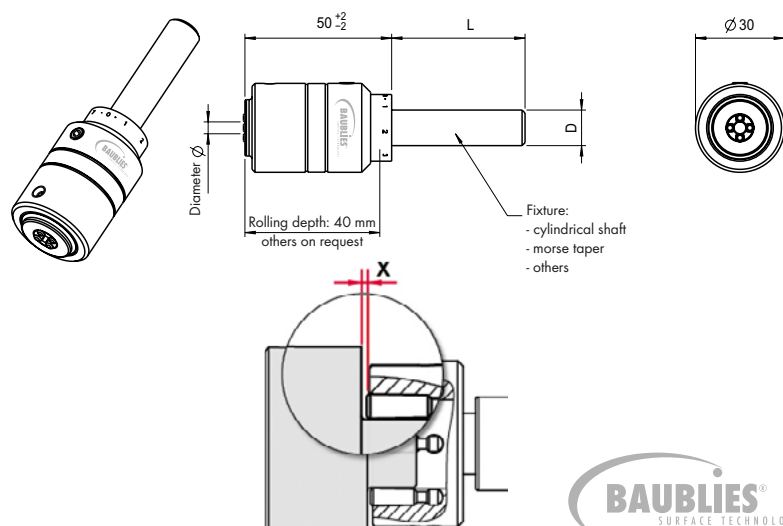
External roller burnishing tool



ARG-0-S

Ø 1.0 - 7.9 mm

Technical details: Type ARG-0-S from Ø 1.0 - 7.9 mm



Internal roller burnishing tool ARG-0-S

Application	shafts, also against shoulder			
Diameter range	1.0-7.9 mm			
Adjustment range	- 0.2 up to +0.1 mm			
Rolling depth	40 mm			
Rollers	Diameter	Type	Quantity	Dimension „X“
	1.0-1.8 mm	S-2010	3	0.5 mm
	1.9-2.8 mm	S-2714	3	0.5 mm
	2.9-7.9 mm	S-2714	4	0.5 mm
Standard fixture	cylindrical shank Ø 6-22 mm Morse taper 1 to 3			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Rolling depth unlimited with cylindrical shank
- Different number of rollers
- Tailor made rollers
- Internal coolant, max. 8 bar coolant pressure

Application parameters

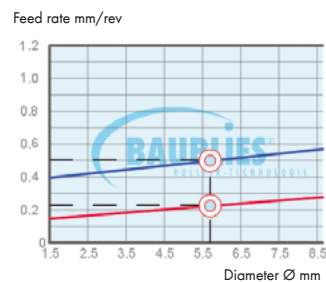
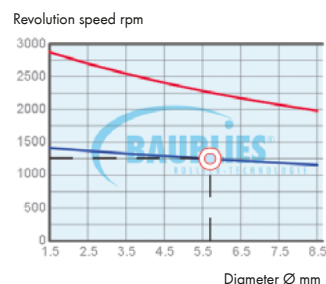
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.01 mm
Tool preclamping	up to 0.04 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the ARG-0-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

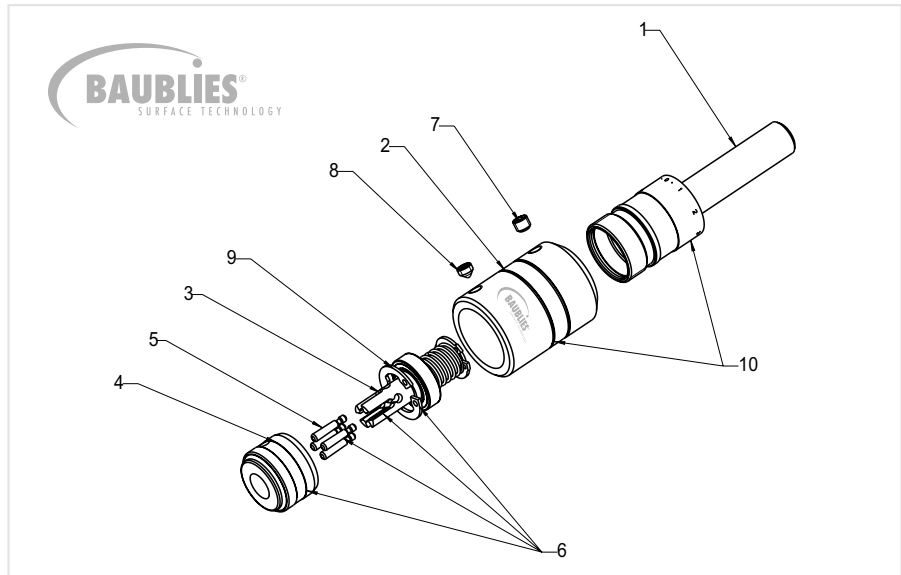


Tool assembly and handling

ARG-0-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (7), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (7).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Unscrew clamping screw (8). Pull the taper (4) out of the sleeve. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (8).

Tip

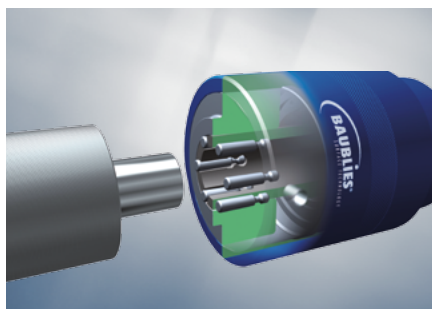
When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

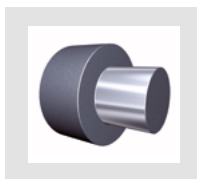
Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Remove locking ring (9) then lift out the cage (3). Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



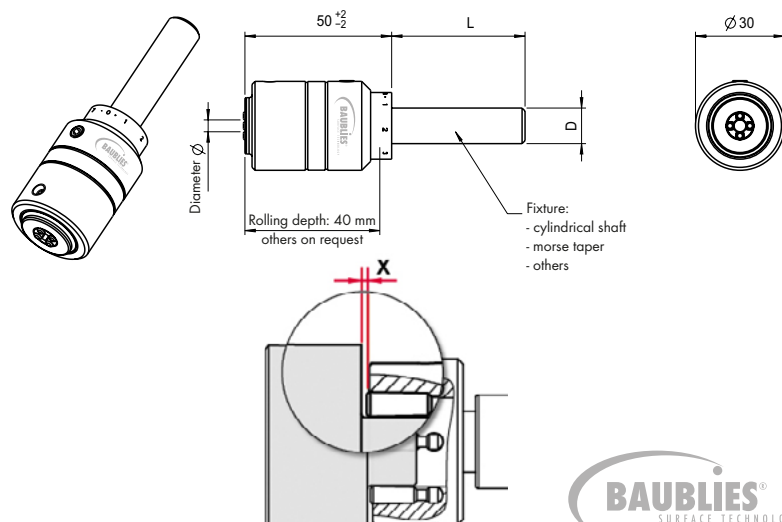
External roller burnishing tool



ARG-1-S

Ø 1.9 - 8.8 mm

Technical details: Type ARG-1-S from Ø 1.9 - 8.8 mm



Internal roller burnishing tool ARG-1-S

Application	shafts, also against shoulder			
Diameter range	1.9 - 8.8 mm			
Adjustment range	- 0.2 up to +0.1 mm			
Rolling depth	50 mm			
Rollers	Diameter	Type	Quantity	Dimension „X“
	1.9 - 2.8 mm	S-2714	3	0.5 mm
	2.9 - 8.8 mm	S-2714	4	0.5 mm
Standard fixture	cylindrical shank Ø 10-30 mm Morse taper 1 to 3			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Rolling depth unlimited with cylindrical shank
- Different number of rollers
- Tailor made rollers
- Internal coolant, max. 8 bar coolant pressure

Application parameters

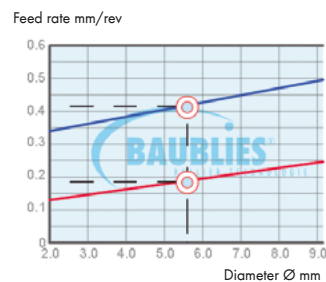
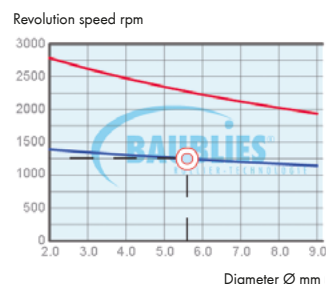
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.01 mm
Tool preclamping	up to 0.04 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the ARG-1-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

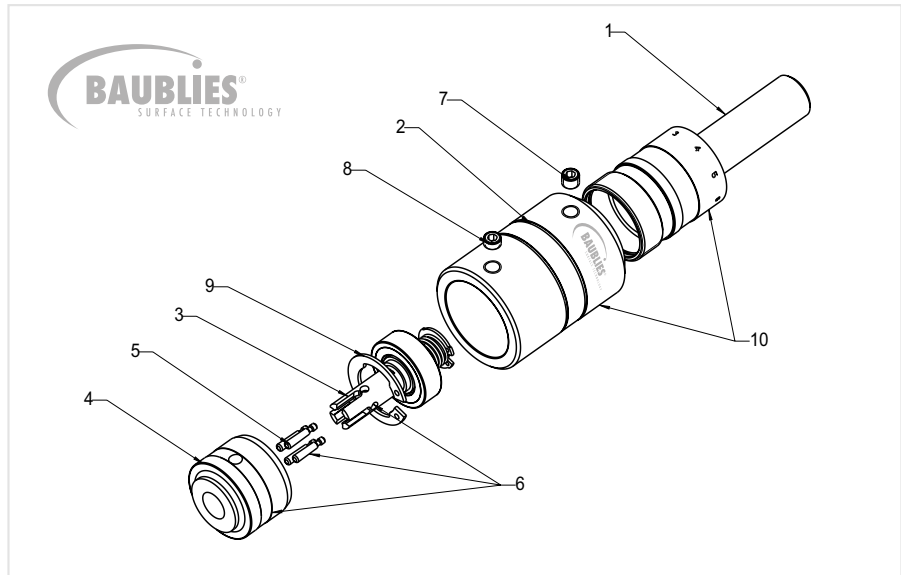


Tool assembly and handling

ARG-1-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (7), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (7).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Unscrew clamping screw (8). Pull the taper (4) out of the sleeve. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (8).

Tip

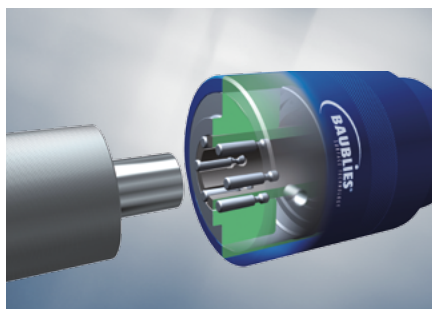
When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

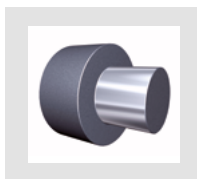
Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Remove locking ring (9) then lift out the cage (3). Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



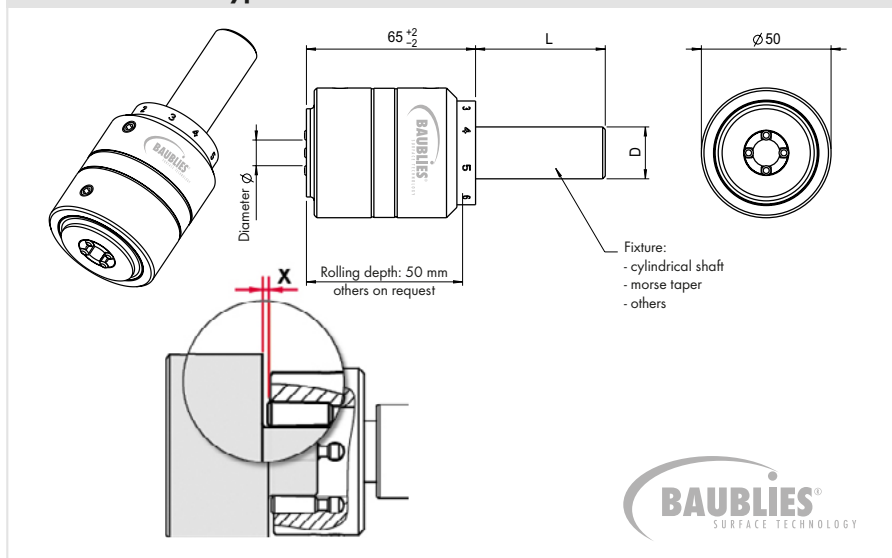
External roller burnishing tool



ARG-2-S

Ø 8.9 - 17.8 mm

Technical details: Type ARG-2-S from Ø 8.9 - 17.8 mm



Internal roller burnishing tool ARG-2-S

Application	shafts, also against shoulder			
Diameter range	8.9 - 17.8 mm			
Adjustment range	- 0.2 up to +0.1 mm			
Rolling depth	50 mm			
Rollers	Diameter	Type	Quantity	Dimension „X“
	8.9 - 17.8 mm	S-3718	4	0.7 mm
Standard fixture	cylindrical shank Ø 10 - 40 mm Morse taper 2 to 4			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Rolling depth unlimited with cylindrical shank
- Different number of rollers
- Tailor made rollers
- Internal coolant, max. 8 bar coolant pressure

Application parameters

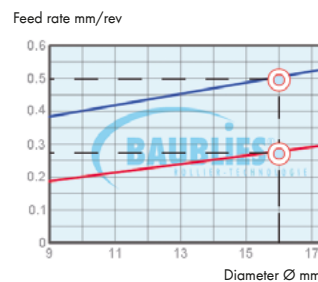
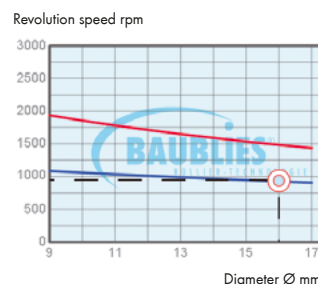
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.02 mm
Tool preclamping	up to 0.05 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the ARG-2-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

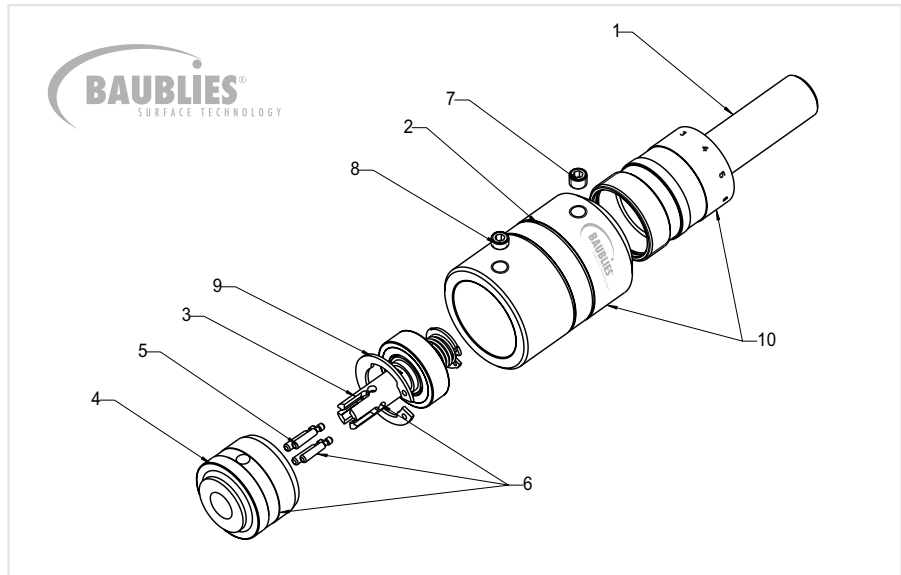
When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Tool assembly and handling

ARG-2-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (7), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (7).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Unscrew clamping screw (8). Pull the taper (4) out of the sleeve. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (8).

Tip

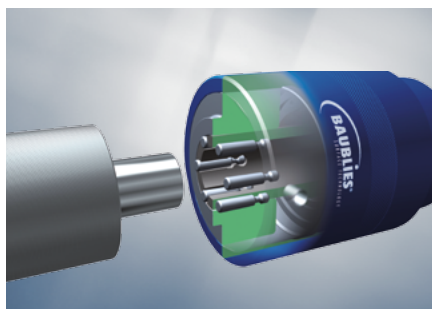
When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

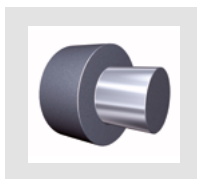
Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Remove locking ring (9) then lift out the cage (3). Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



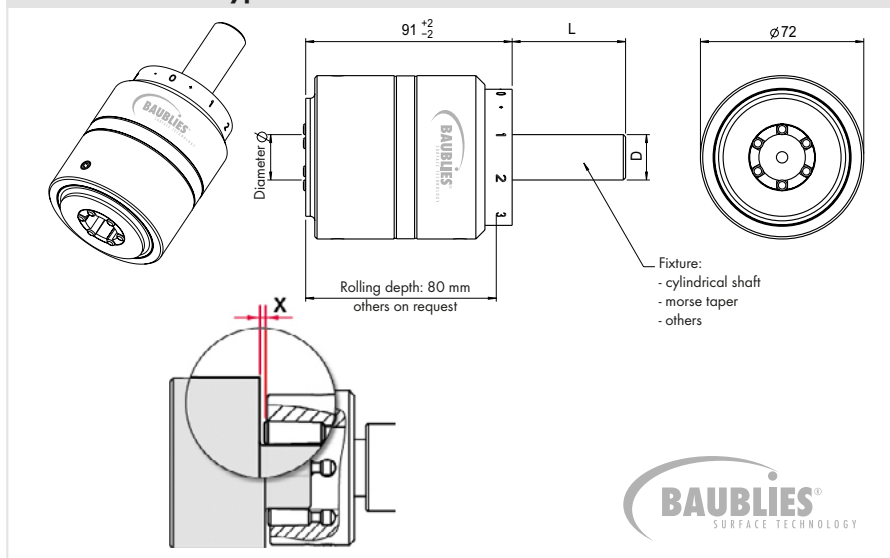
External roller burnishing tool



ARG-3-S

Ø 17.9 - 30.8 mm

Technical details: Type ARG-3-S from Ø 17.9 - 30.8 mm



Internal roller burnishing tool ARG-3-S

Application	shafts, also against shoulder			
Diameter range	17.9-30.8 mm			
Adjustment range	- 0.2 up to +0.1 mm			
Rolling depth	80 mm			
Rollers	Diameter	Type	Quantity	Dimension „X“
	17.9-30.8 mm	S-4722	6	0.7 mm
Standard fixture		cylindrical shank Ø 16-40 mm Morse taper 2 to 4		

Options

- Fixture with clamping surface; VDI, HSK etc.
- Rolling depth unlimited with cylindrical shank
- Different number of rollers
- Tailor made rollers
- Internal coolant, max. 4 bar coolant pressure

Application parameters

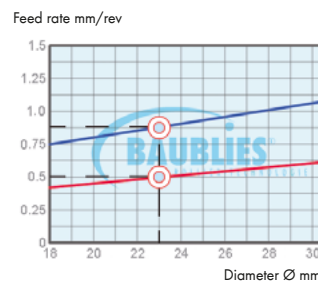
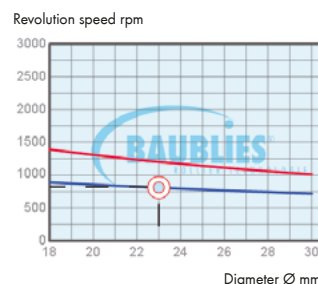
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.02 mm
Tool preclamping	up to 0.05 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the ARG-3-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

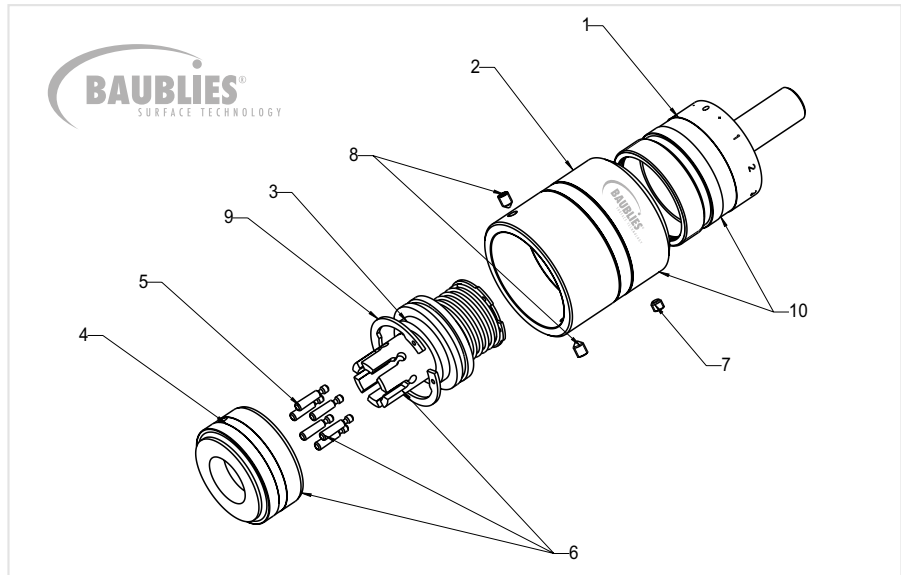
When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Tool assembly and handling

ARG-3-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (7), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (7).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Unscrew clamping screw (8). Pull the taper (4) out of the sleeve. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (8).

Tip

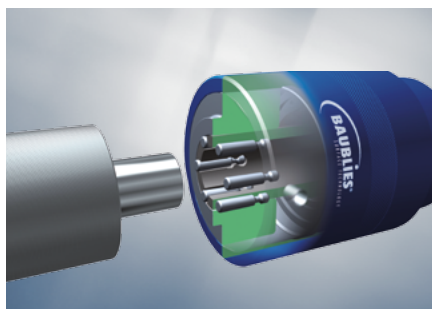
When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

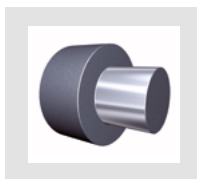
Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Remove locking ring (9) then lift out the cage (3). Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



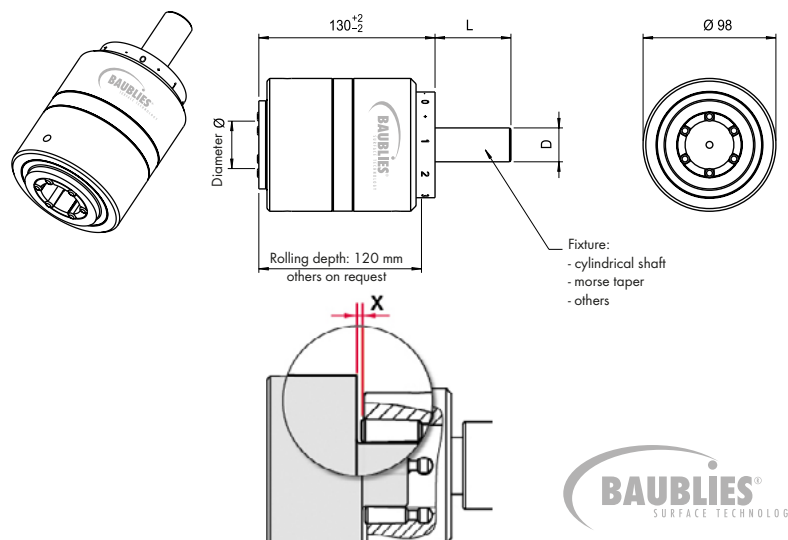
External roller burnishing tool



ARG-4-S

Ø 30.9 - 40.8 mm

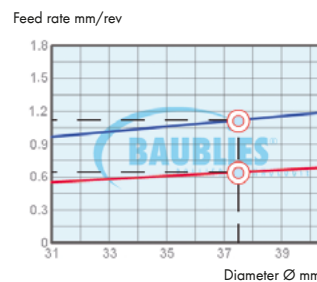
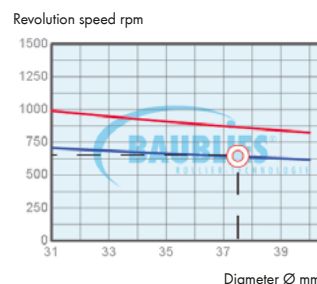
Technical details: Type ARG-4-S from Ø 30.9 - 40.8 mm



What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the ARG-4-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per revolution is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

Internal roller burnishing tool ARG-4-S

Application	shafts, also against shoulder			
Diameter range	30.9-40.8 mm			
Adjustment range	- 0.2 up to +0.1 mm			
Rolling depth	120 mm			
Rollers	Diameter	Type	Quantity	Dimension „X“
	30.9-40.8 mm	S-6730	6	1.0 mm
Standard fixture	cylindrical shank Ø 19.05-50 mm Morse taper 2 to 4			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Rolling depth unlimited with cylindrical shank
- Different number of rollers
- Tailor made rollers
- Internal coolant, max. 4 bar coolant pressure

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

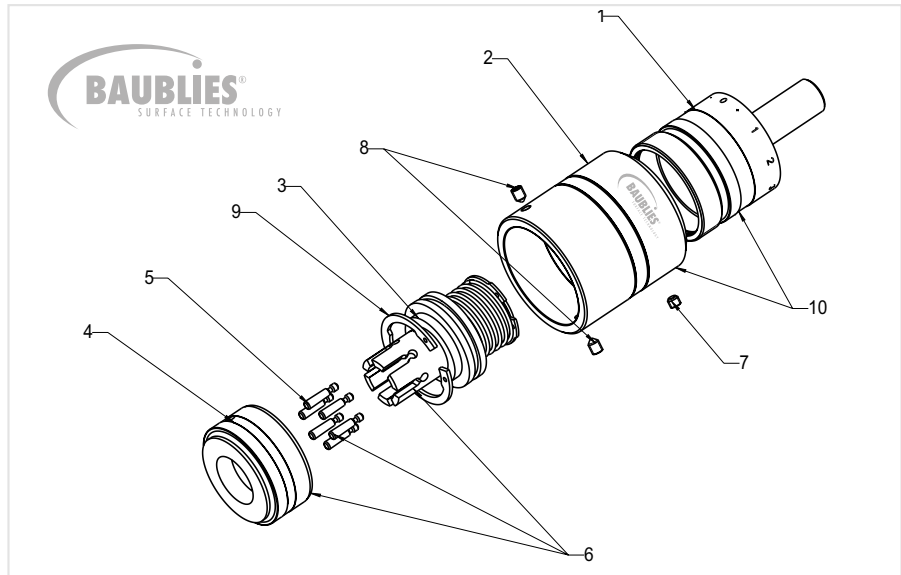
Workpiece allowance	up to 0.02 mm
Tool preclamping	up to 0.06 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

Tool assembly and handling

ARG-4-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (7), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (7).

Tip for adjusting the tool

When setting up a tool, the revolution speed can be considerably reduced, however the feed rate per rotation is not to be decreased. When conducting roller burnishing under unfavorable conditions, e.g. when using high-strength materials, with insufficient lubrication or very deep holes, it is advisable to reduce the revolution speed.

To carry out a fast basic adjustment of the tool, it is advisable to adjust the tool to the smallest dimension and then to guide it into the pre-machined hole by hand. The tool can then be adjusted in the hole until the rollers are felt to contact the surface. Starting from this setting, the pre-clamping can be increased by 1-2 marks on the scale. This basic adjustment then usually requires only minor corrections dependent on the achieved roller burnishing result.

When setting the tool diameter above the nominal size of the tool then the taper will overlap the cage. Therefore the dimension "X" (see overleaf) will increase. This increase will be about 0.2 mm per 0.01 mm diameter enlargement (= one mark on the tool scale) of the tool setting.

Changing components

Rollers

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly. When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Unscrew clamping screw (8). Pull the taper (4) out of the sleeve. Replace the taper and remount the components.

Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (8).

Tip

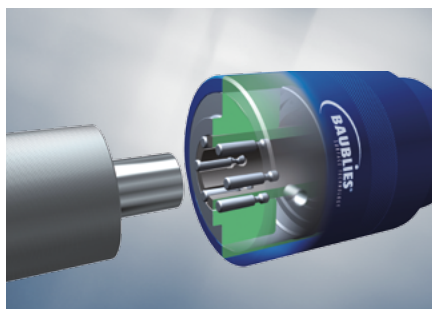
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Cage

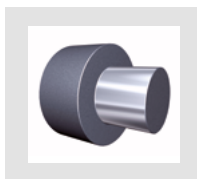
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Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.



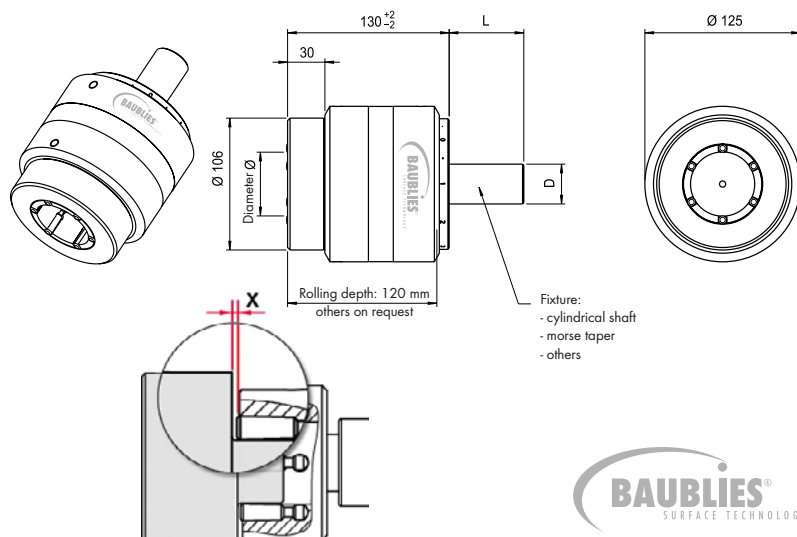
External roller burnishing tool



ARG-5-S

Ø 40.9 - 55.8 mm

Technical details: Type ARG-5-S from Ø 40.9 - 55.8 mm



Internal roller burnishing tool ARG-5-S

Application	shafts, also against shoulder			
Diameter range	40.9-55.8 mm			
Adjustment range	- 0.3 up to +0.1 mm			
Rolling depth	120 mm			
Rollers	Diameter	Type	Quantity	Dimension „X“
	40.9-55.8 mm	S-6730	6	1.0 mm
Standard fixture	cylindrical shank Ø 19.05-50 mm Morse taper 3 to 5			

Options

- Fixture with clamping surface; VDI, HSK etc.
- Rolling depth unlimited with cylindrical shank
- Different number of rollers
- Tailor made rollers
- Internal coolant, max. 4 bar coolant pressure

Application parameters

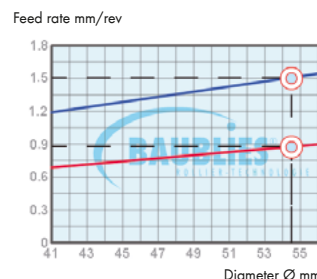
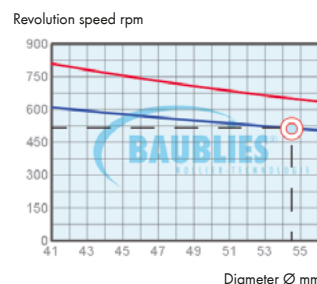
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.02 mm
Tool preclamping	up to 0.06 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

What revolution speed and what feed rate ...

The graph below shows the revolution speed and the feed rate for the whole diameter range of the ARG-5-S.

Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com).

Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

Tip

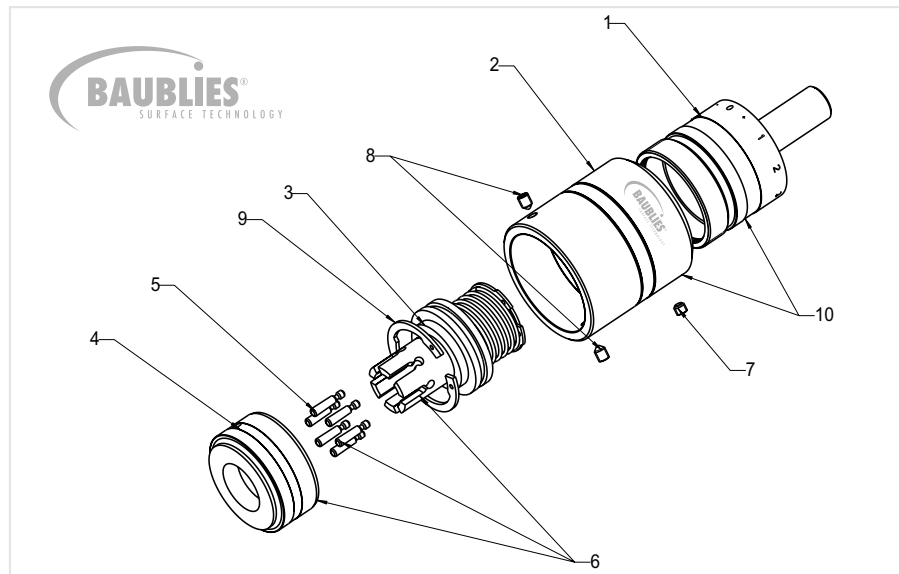
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Tool assembly and handling

ARG-5-S

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Roller
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Clamping screw for taper
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Adjustment unit



Adjustment of the tool

Loosen clamping screw (7), then turn the fixture (1) and sleeve (2) against each other according to scale. One mark is equivalent to 0.01 mm in the diameter. Retighten clamping screw (7).

Tip for adjusting the tool

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Changing components

Rollers

Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). The rollers (5) become clear. Replace the rollers in sets and remount the components.

Tip

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Taper

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Please Note: When assembling, ensure the correct position of the countersink in the taper and the clamping screw (8).

Tip

When replacing the taper, clean the cage and the rollers. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

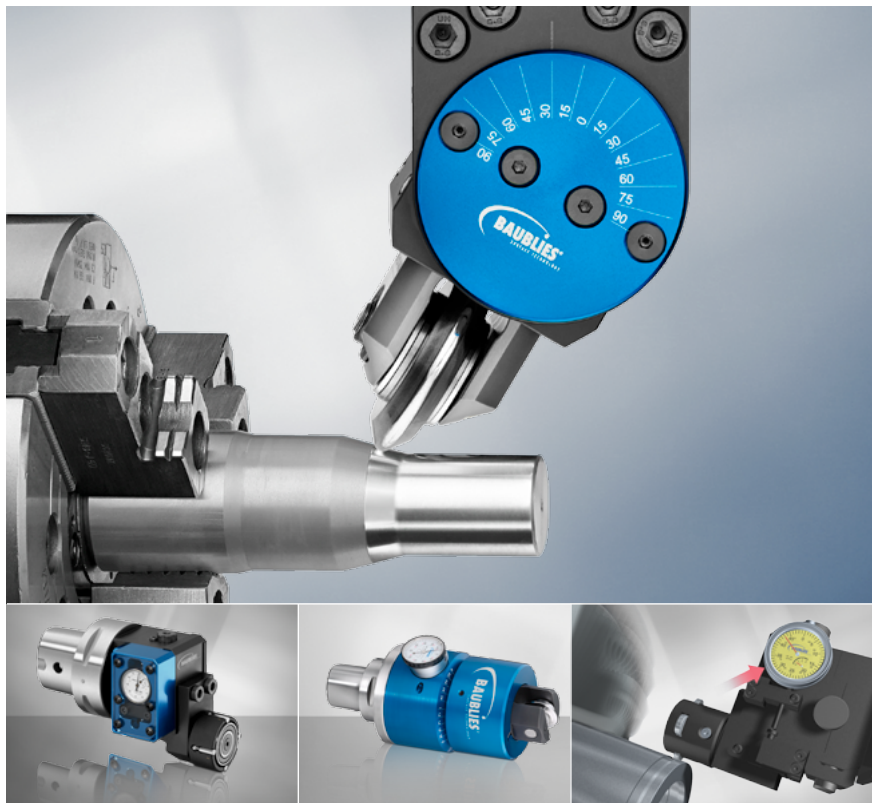
Loosen clamping screw (7) and screw the fixture (1) out of the sleeve (2). Remove locking ring (9) then lift out the cage (3). Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.

SINGLE-ROLLER BURNISHING TOOLS

**THE PRESSURE IS ON:
POWERFUL COMPRESSION AND
SMOOTH SURFACES**



First choice for finishing

With single-roller burnishing, a hardened roller flattens the surface of the workpiece by contacting it at one single point. In this area of contact the steplessly adjustable roller pressure reaches the yield point of the material.

Single-roller burnishing – convincing results

An increase of surface hardness with a simultaneous increase in the endurance strength, low investments and fast amortization make chipless single-roller burnishing a high-quality alternative to any cutting process. In addition, the results achieved with single-roller burnishing are impressive thanks to

- maximum process reliability
- short cycle times
- surface roughnesses of under Rz 1.0 µm
- larger contact area ratios due to plateau formation
- greater surface resistance to wearing and corrosion
- constant dimensions and high fitting accuracy
- shifting of the material fatigue limits
- reduction of coefficients of sliding friction
- environmental friendliness due to a lack of waste products



Modular single-roller tools: The system is characterized by exchangeable rolling heads for various machining tasks.

Single-roller burnishing tools: fast, smooth and firm

Compressed surfaces with a considerable increase in the boundary layer hardness including extreme smoothness – these are just some of the advantages of the variable and the modular single-roller tool systems from Baublies.

- are high-quality and rugged
- have a broad range of applications
- realize top-quality surfaces
- extend the durability, for example of machined pins and axes

Variable and swiveling

Variable single-roller burnishing tools are flexibly adjustable for various contours and can also be used in hard-to-reach places. The rolling unit can be swiveled by 180°, and is therefore suitable for universal use.



Variable single-roller burnishing tools for external and internal machining; for example, for roller burnishing and deep rolling radii, cylindrical outside diameters, cones, flat surfaces, grooves, undercuts etc.

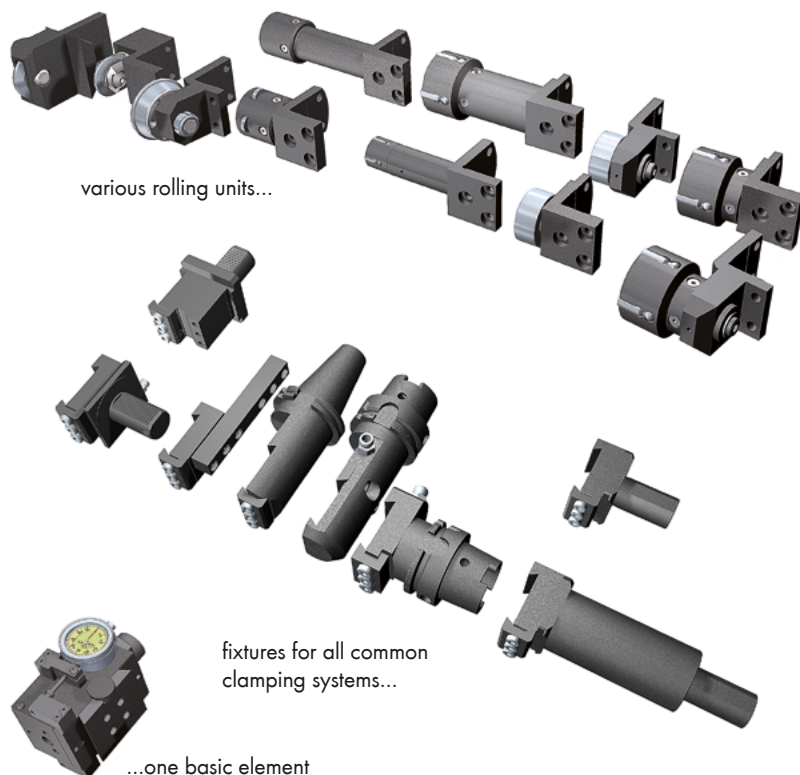
Master of diversity

The modular single-roller tool system for lathe machines is an innovative solution for virtually all roller burnishing and roller compression tasks.

A basic element is used to mount the interchangeable system components or rolling units. As a result, the tool can be converted in an extremely short time. This enables special machining tasks to be carried out quickly. Otherwise it would be necessary to use various tools consecutively.

Modular single-roller tool system

Overview, modular single-roller tool system



Modular single-roller tool system

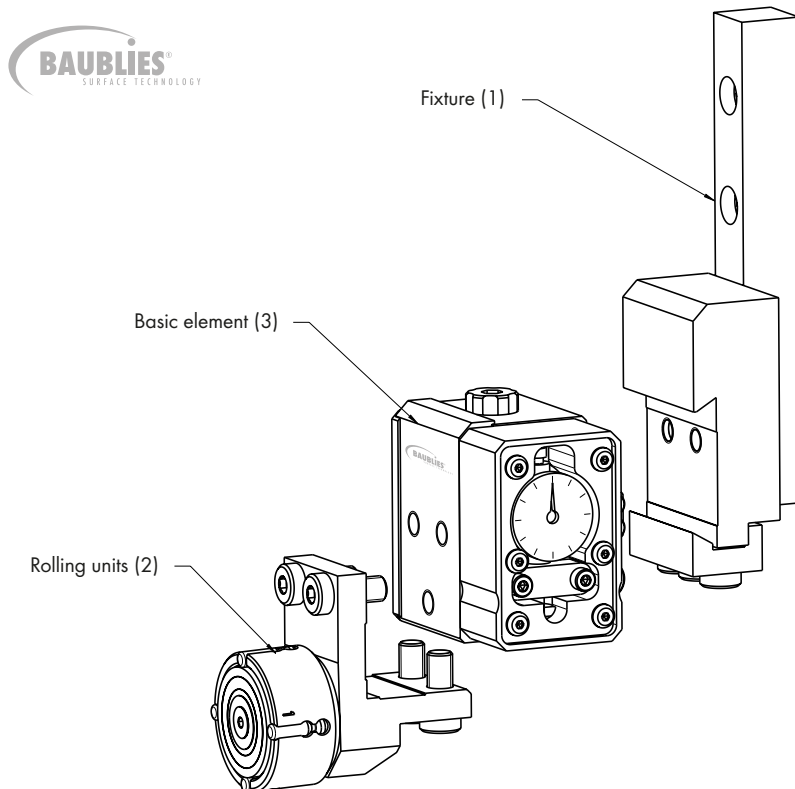
Modular single-roller tools are reliable precision instruments. The modular design makes it possible to process nearly all smoothing and work hardening tasks. The tools can be used on lathe machines, both CNC and conventional.

Typical burnishing results

The tools are used for improvement of:

- surface roughness
- material ratio
- hardness of the surface layer
- fatigue strength

Design of the modular single-roller tool system



Functions

Fixture (1)

The fixture connects the tool to the machine. Fixtures are available for all common clamping systems. Due to the modularity of the tool system the fixture type can be replaced in very short time.

Rolling units (2)

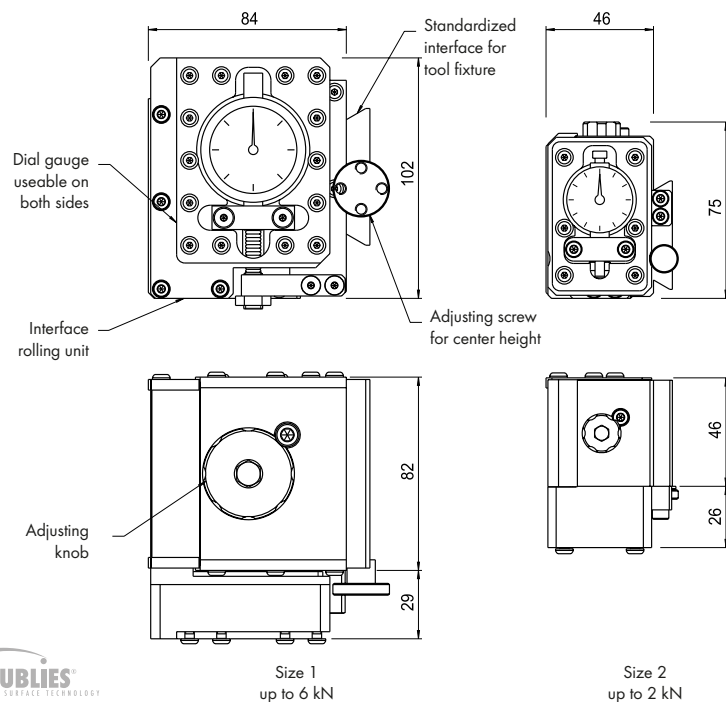
During the rolling process the rolling unit guides and supports the roll. The rolling unit is fixed to the basic element. A variety of rolling units is available.

Basic element (3)

The basic element can be used for rolling external and internal contours. Therefore the direction of the spring load has to be reversed. This is done by setting the adjusting knob into the designated position.

Modular single-roller tool system – test device

Basic element modular single-roller tool system

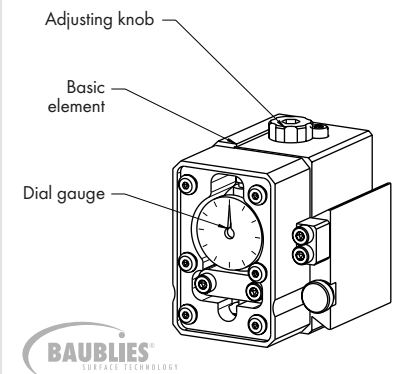


Basic element modular single-roller tool system

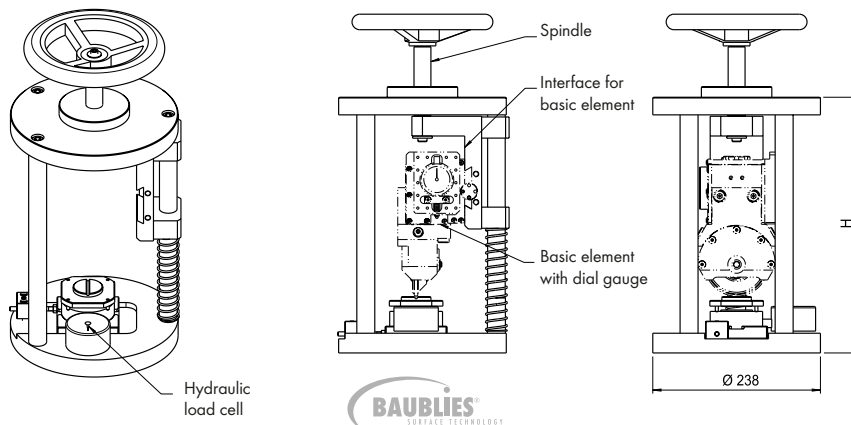
The basic element is available in three sizes. The machining direction (internal/external) and the tool preload is set by an adjusting knob.

Advantages

- easy to use
- adjustable tool preload
- rugged tool design



Test device



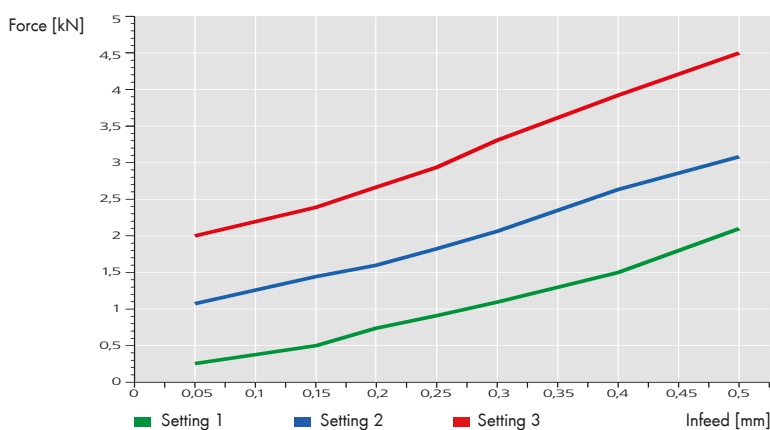
Properties

The test device is used to set and to check the required tool preload characteristics. With the dial gauge and the load cell it is then possible to correlate the tool preclamp with the rolling force to support constant process parameters.

Advantages

- easy to use
- including certified hydraulic load cell
- useable for diverse tool types
- rugged design

Classification Force – Spring Deflection

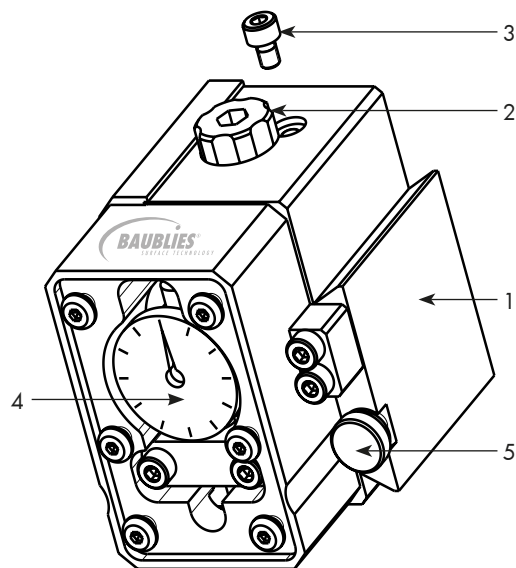


Tool assembly and handling

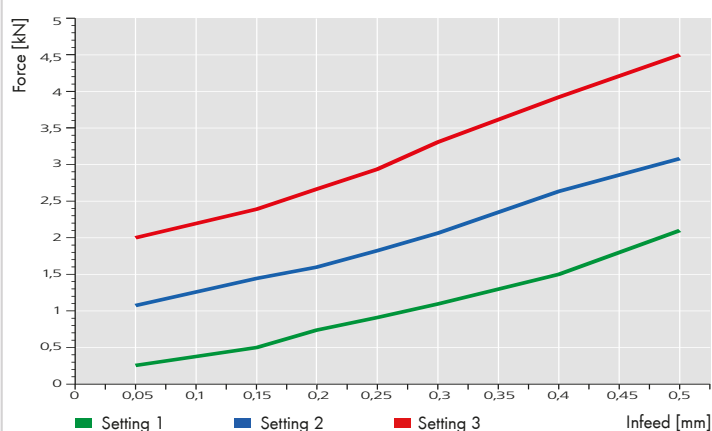
Modular single-roller tool system

Parts list and assembly

- 1 Basic element
- 2 Adjusting knob with spring
- 3 Fixing collar with locking pin
- 4 Dial gauge
- 5 Adjusting screw for center height



Classification Force – Spring Deflection



Vorspannung des Werkzeugs ändern:

Unlock the fixing screw (3) turn the spindle with spring package according to the scale. Relock the fixing screw (3). Check the preload setting with test device.

Turn clockwise
= preload increases
Turn counterclockwise
= preload decreases

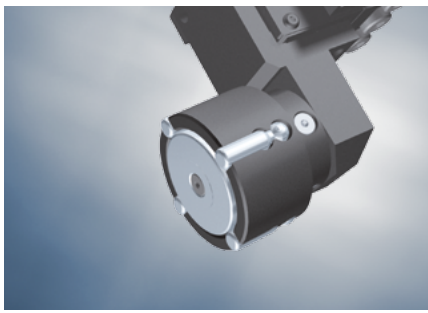
Adjusting the center height:

Loosen the clamping of the tool fixture. The center height is adjusted by the adjusting screw (5). The setting should be between 0 and 2 mm above the machining center line. Fix the clamping of the tool fixture.

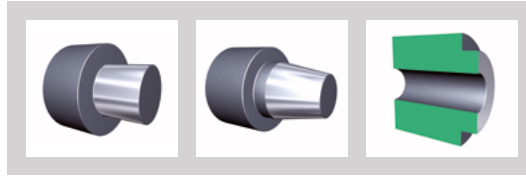
Tipp

- The preload of the tool during burnishing should be in a range between 0.1 and 0.5 mm
- Coolant must be used at any time
- Avoid interrupted cuts
- The dial gauge helps to set up the tool, especially when using conventional machines

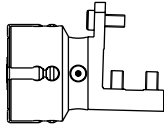
Please note: The occurring forces can be very high! For safety reasons always ensure a sufficient clamping of the tool on your machine.



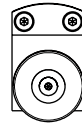
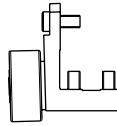
Modular single-roller tool system — Rolling unit for external use



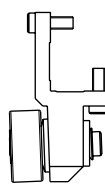
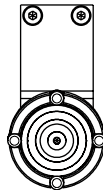
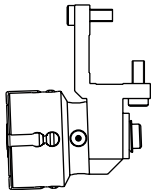
Technical details: Rolling unit for external use



Rolling unit with 4 rollers



Rolling unit with 1 roller



Modular single-roller

Application	cylindrical shafts also against shoulder, plane surfaces
Diameter range	from 15mm, due to the rolling forces during the process, the stability of the workpiece and the clamping has to be ensured (e.g. by using tailstock or rest)
Rolling unit (4 rollers)	with 4 small rollers (one roll in process), – lower rolling forces, quick and easy change of the rollers by rotating the cage in steps of 90° without removing the tool out of the machine
Rolling unit (1 roller)	with 1 bigger roll, – higher processing speed, and higher lifetime

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

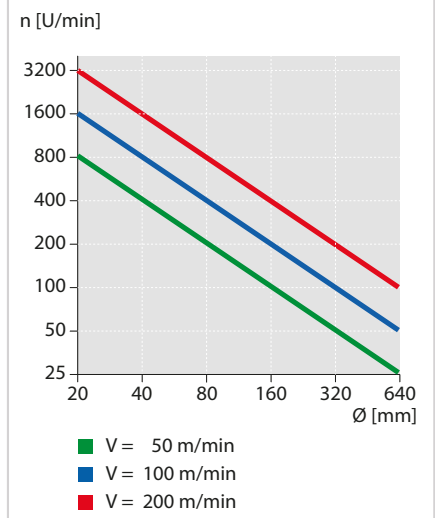
Speed	up to 200 m/min depending on the application
Feed rate	0.05 – 0.3 mm/rev
Workpiece allowance	up to 0.03 mm
Tool pre-load	up to 1.5 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness up to 15 µm
Workpiece hardness	up to 45 HRC

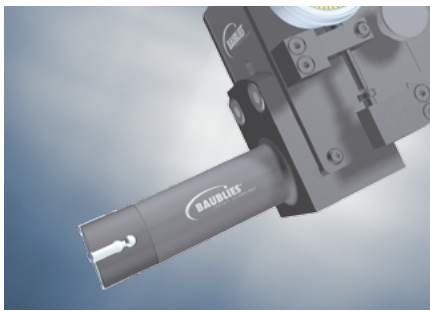
Modular single-roller burnishing tool system

Rolling unit for smoothing and work hardening shafts.

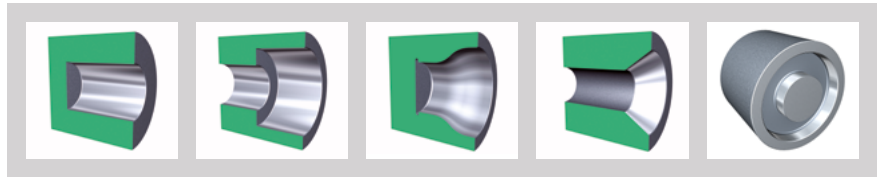
Advantages

- processing cylindrical shafts also against shoulder
- processing tapers up to 5°

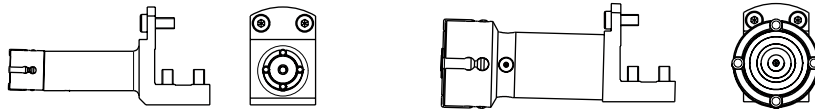




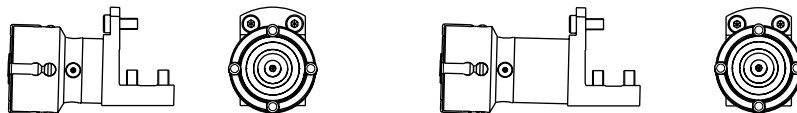
Modular single-roller tool system — Rolling unit for internal use



Technical details: Rolling unit for internal use



Rolling unit with 4 rollers



Rolling unit with 4 rollers

Modular single-roller burnishing tool for internal use

Application	through and blind holes
Diameter range	from 32 mm, due to the rolling forces during the process, the stability of the workpiece and the clamping has to be ensured (e.g. by using rest)

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

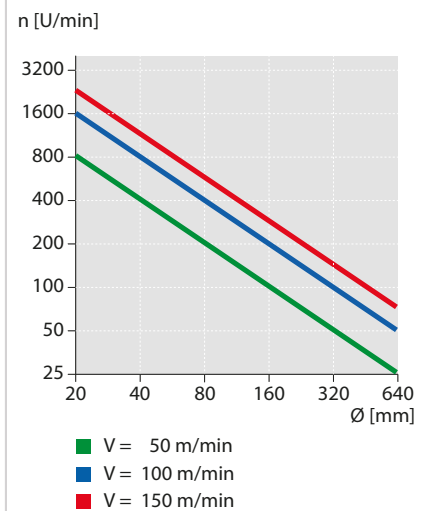
Speed	up to 130 m/min depending on the application
Feed rate	0.05 – 0.3 mm/rev
Workpiece allowance	up to 0.03 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
machining of workpiece	surface roughness up to 15 µm
Workpiece hardness	up to 45 HRC

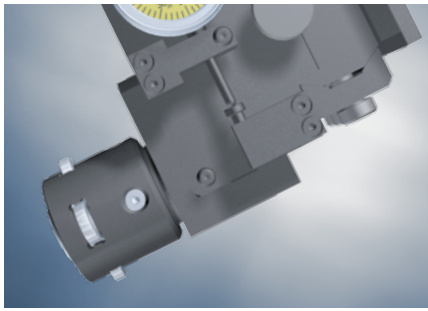
Modular single-roller burnishing tool system

Rolling unit for smoothing and work hardening holes.

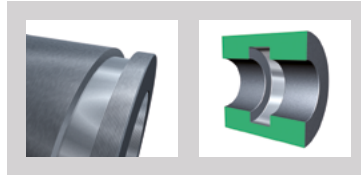
Advantages

- processing of cylindrical holes
- processing tapers up to 5°

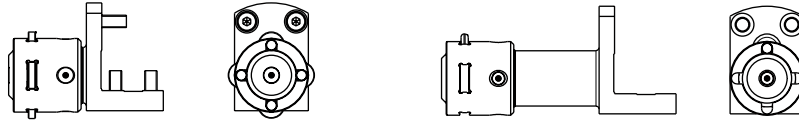




Modular single-roller tool system — Rolling unit for external and internal grooves



Technical details: Rolling unit for external and internal grooves



Rolling unit with 4 rollers



Rolling unit with 1 roller

Modular single-roller tool for external and internal grooves

Application "internal"	from Ø 50 mm and up to 120 mm depth
Application "external"	from Ø 20 mm
Roller	tailor made

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

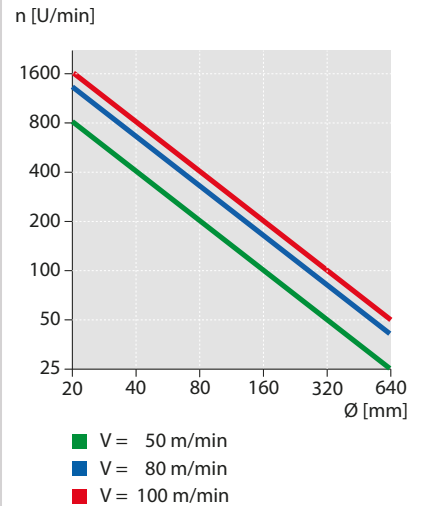
Speed	up to 100 m/min depending on the application
Feed rate	0.05 – 0.3 mm/rev
Workpiece allowance	up to 0.03 mm
Tool pre-load	up to 1.5 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness up to 15 µm
Workpiece hardness	up to 45 HRC

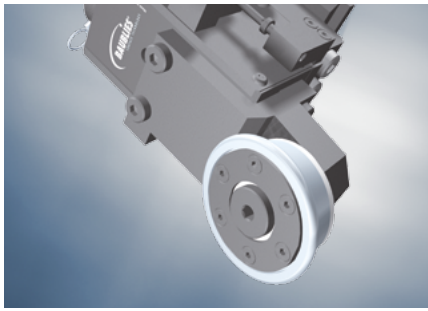
Modular single-roller burnishing tool system

for smoothening and work hardening of external and internal grooves.

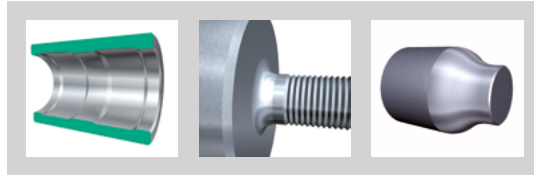
Advantages

- useable for both external and internal grooves
- are not dependent on diameters of the workpiece

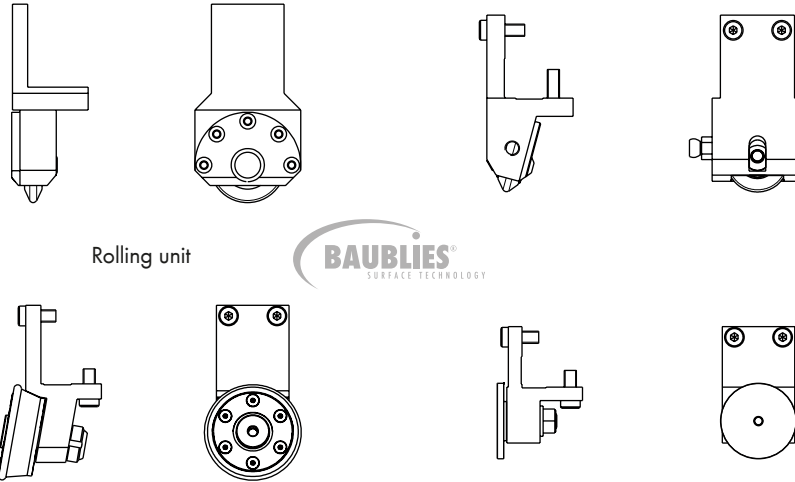




Modular single-roller tool system — Rolling unit for deep rolling



Technical details: Rolling unit for deep rolling

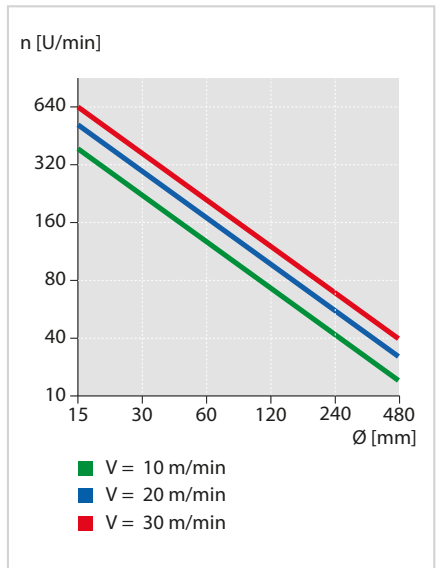


Rolling unit



Modular single-roller tool system

These rolling units are especially designed for work hardening. Maximum rolling force and relatively low rolling speed is used during this process. The rolling unit is adapted to the individual cases.



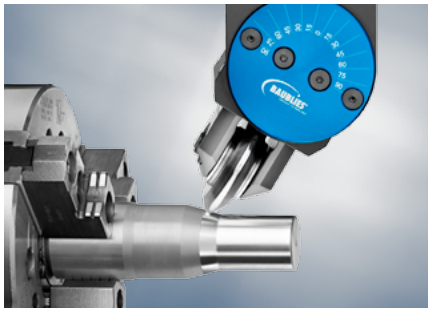
Modular single-roller tool for deep rolling

Application for work hardening of internal and external profiles

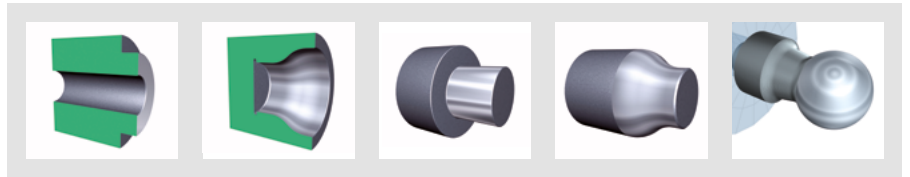
Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

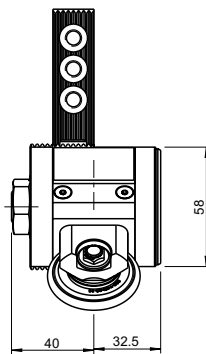
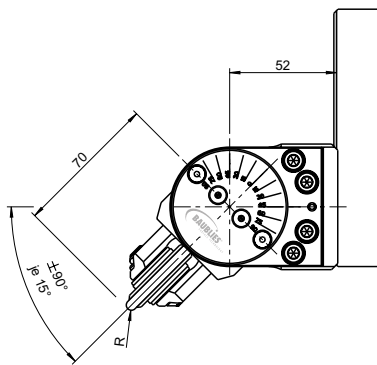
Speed	up to 30 m/min
Feed rate	0.05 – 0.3 mm/rev
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness up to 15 µm
Workpiece hardness	up to 45 HRC



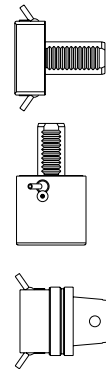
Variable single-roller burnishing tool for external use



Technical details: Variable single-roller burnishing tool for external use



Alternative:



Variable single-roller burnishing tools for external use

are non-intrinsic tools for smoothing and work hardening of shafts and external contours.

Advantages

- adjustable angle for various contours
- suitable for work hardening tasks
- universally useable

Variable single-roller burnishing tool for external use

Application	shafts and external contours, plane surfaces, cones, grooves, undercuts
Standard fixture	square shank 20/25/32/40 mm
Swiveling range	180°, Indexing 12 x 15°
Roller type form A/B	radius 2 mm

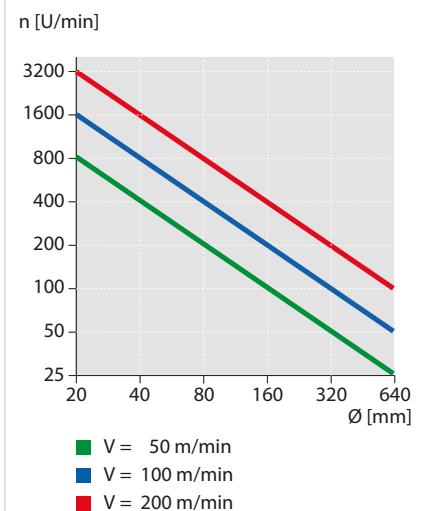
Options

- Fixtures VDI, HSK etc.
- Tailor made rollers

Application parameters

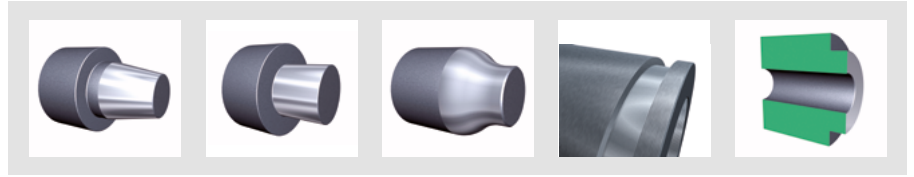
Please note that this information represents standard values which must be adapted to the individual cases.

Speed	up to 200 m/min
Feed rate	0.05 – 0.3 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Workpiece hardness	up to 45 HRC

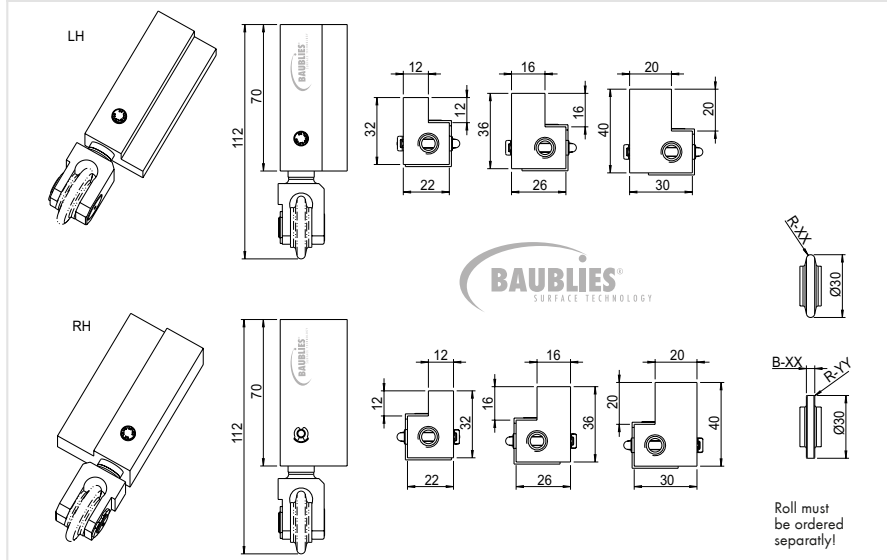




Slim shaped single-roller burnishing tools



Technical details: Slim shaped single-roller burnishing tool



Slim shaped single-roller burnishing tools for external use

are non-intrinsic tools for smoothing and work hardening of external contours. Internal springs generate the required rolling force. The value of the rolling force is defined by the preload of the tool.

The spring characteristics can be adapted to the requirements of the workpiece. The shape of the rollers is designed according to workpiece requirements.

Advantages

- slim design enables the application in small spaced machine tools for example swiss type lathe machine
- universally useable
- low investment
- fast return on investment

Single-roller burnishing tool for external use

Application	shafts and plane surfaces, cones, grooves, undercuts
Standard fixture	square shank 12/16/20 mm, left or right hand
Roller type form C/D	as required

Options

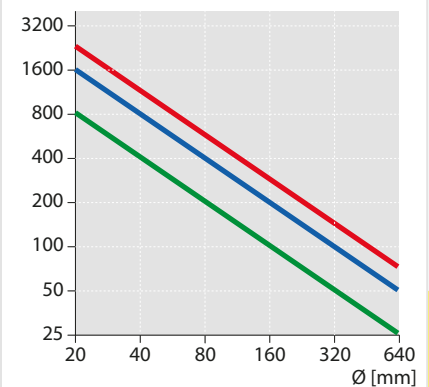
- Tailor made fixture
- Tailor made rollers

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

Speed	up to 150 m/min
Feed rate	0.05 – 0.3 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 3 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness up to 15 µm
Workpiece hardness	up to 45 HRC

n [U/min]



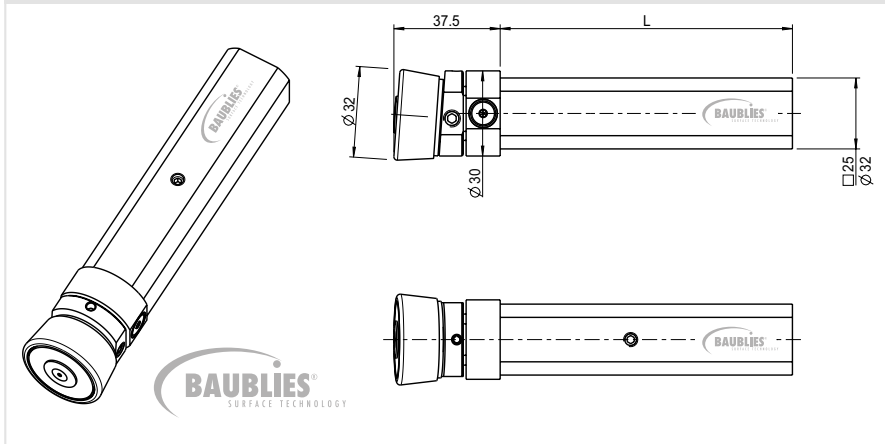
- V = 50 m/min
- V = 100 m/min
- V = 150 m/min



Single roller burnishing tool ERG-Special Boring-bar



Technical details: Single roller burnishing tool ERG-Special Boring-bar



Single roller burnishing tools ERG-Special Boring-bar

are non-intrinsic tool for smoothening and work hardening of holes and internal contours.

Advantages

- universally usable
- easy to use
- slim design
- fast return of investment

Single roller burnishing tool ERG-Special Boring-bar

Application	external/internal, cylindrical, contours
Diameter range	from 20 mm depending on the application, due to the rolling forces during the process, the stability of the workpiece and the clamping has to be ensured (e.g. by using tailstock or rest)

Options

Tailor made rollers/radii

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

Speed	up to 200 m/min
Feed rate	0.05 - 0.3 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 0.5 mm
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness up to (Rz) 15 µm
Workpiece hardness	up to 45 HRC

DIAMOND ROLLER BURNISHING TOOLS

**HARD AND FILIGREE:
SMOOTHING AND WORK-HARDENING,
EVEN IN SMALL DIAMETER AREAS**



A small diamond with a big effect

Diamond roller burnishing tools are a special feature of the Baublies product portfolio. They expand the range of applications of roller burnishing technology, as even hardened materials up to approximately 60 HRC can be roller burnished.

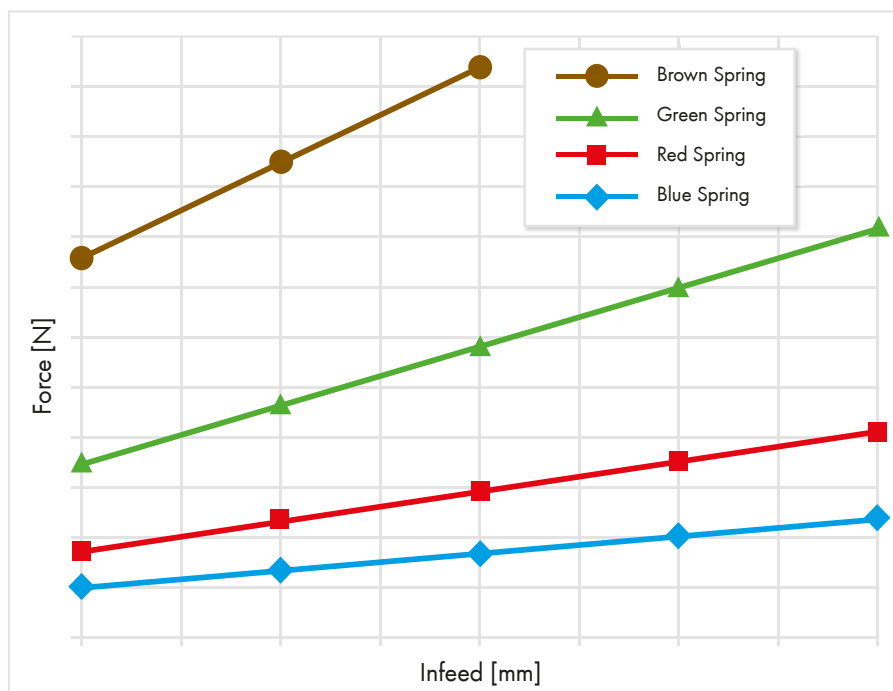
In the process a high-precision, micropolished diamond glides over the surface. As soon as the yield point of the material is exceeded, the profile peaks of the workpiece surface flow into the adjacent recesses in the μm range.

Compared to the machining by means of rollers the contact area between the workpiece and the diamond is much smaller. Therefore plastic cold working with a reduced influence of force can take place.

Roller burnishing and diamond roller burnishing: Impressive advantages

Surface roughnesses of under $R_z\ 1\ \mu\text{m}$, short cycle times and low investments with fast amortization make chipless roller burnishing or diamond roller burnishing a high-quality, cost effective alternative to any cutting process. In addition, the results achieved are impressive thanks to

- maximum process reliability
- hardened boundary layers
- increased fatigue strength
- larger contact area ratios due to plateau formation
- greater surface resistance to wearing and corrosion
- shifting of the material fatigue limits
- reduction of coefficients of sliding friction
- environmental friendliness due to a lack of waste products.



Spring load-deflection curve for Diamond burnishing tools – Classification Force – Spring Deflection

Diamond roller burnishing tools: for maximum precision

Baublies diamond roller burnishing tools advance into hardness and diameter areas in which conventional roller burnishing tools can not be used.

Baublies diamond roller burnishing tools can be designed extremely filigree, thus enabling the realization of internal contours from a diameter of 10 mm and micro-cone machining from approx. 0.1 mm. In this way virtually all contours – internally and externally – can be roller-burnished and deep-rolled.

Minimum machining forces protect the workpiece and make Baublies diamond roller burnishing tools the first choice for thin-walled components.

New combination tool reduces costs

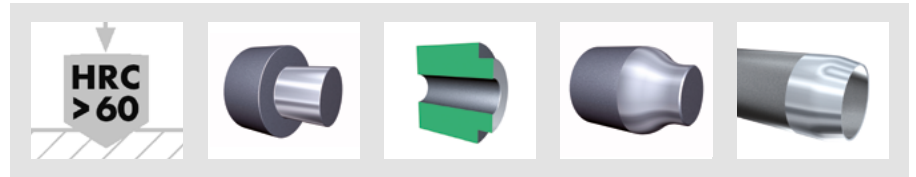
Save time and money, for example when machining connecting rod eyes. The new Baublies combination tool makes it possible with just one clamping: First the connecting rod eye is turned, then the tool is deflected, and on the return stroke the diamond roller burnishes and deep-rolls the surface in the μm range. Setup times are completely eliminated.

Advantages included

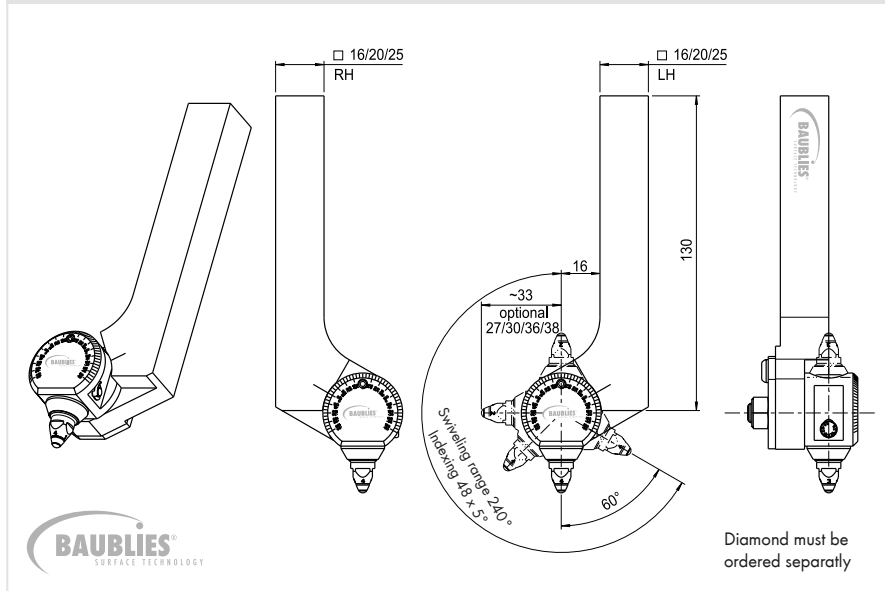
- top surface qualities
- smoothing harder surfaces than with conventional roller burnishing
- no need for additional equipment such as hydraulic units
- an unlimited diversity of individual solutions
- the multifunctionality of the tool



Variable diamond burnishing tool for external use



Technical details: Variable diamond burnishing tool for external use



Diamond burnishing tool for external use

Application	shafts and external contours
Standard fixture	square shank 16/20/25 mm left or right hand
Swiveling range	240°
Indexing	48 x 5°

Options

- Fixtures VDI, HSK etc.
- Tailor made diamond shape
- Assembly device

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

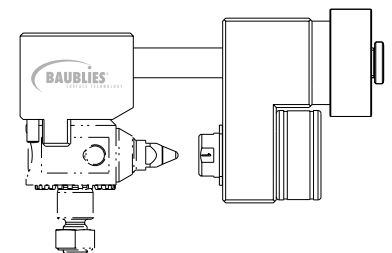
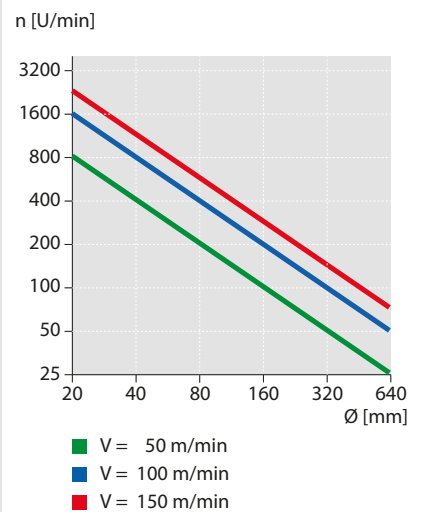
Speed	up to 150 m/min
Feed rate	0.05 – 0.2 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Suitable for hard machining	

Variable diamond burnishing tools for external use

are non-intrinsic tools for smoothing and work hardening of shafts and external contours. Due to the swiveling diamond these tools are quite versatile.

Advantages

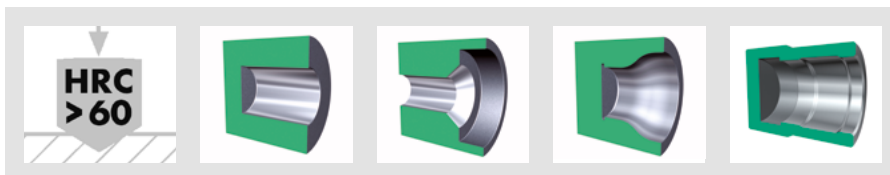
- universally useable
- suitable for hard machining and thin walled workpieces
- slim design enables the application in small spaced machine tools
- spring loaded diamond
- changeable diamond insert
- regrounding of the diamond is possible



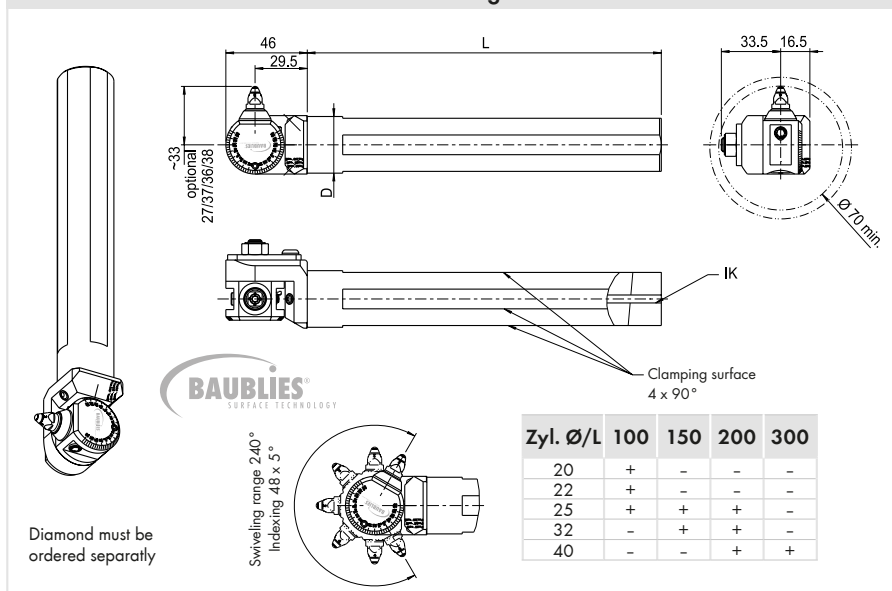
Assembly device



Variable diamond burnishing tool for internal use



Technical details: Variable diamond burnishing tool for internal use



Variable diamond burnishing tools for internal use

are non-intrinsic tools for smoothing and work hardening of shafts and internal contours. Due to the swiveling diamond these tools are quite versatile.

Advantages

- universally useable
- suitable for hard machining and thin walled workpieces
- slim design enables the application in small spaced machine tools
- spring loaded diamond
- changeable diamond insert
- regrinding of the diamond is possible

Variable diamond burnishing tool for internal use

Application	holes and internal contours
Standard fixture	cylindrical shank Ø 20/22/25/32/40 mm
Swiveling range	210°
Indexing	42 x 5°

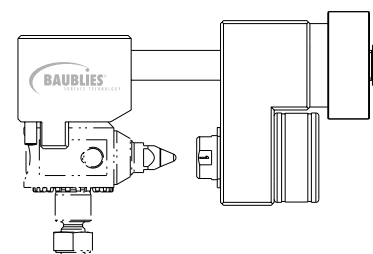
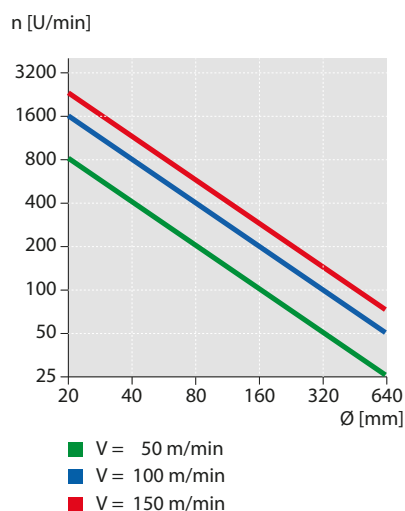
Options

- Fixture VDI, HSK etc.
- Tailor made diamond shape
- Assembly device

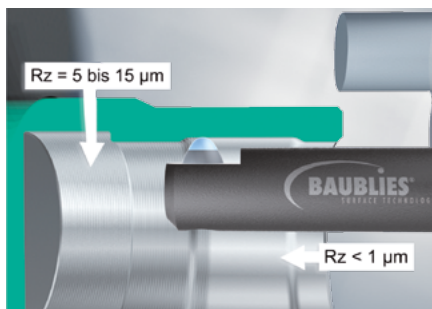
Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

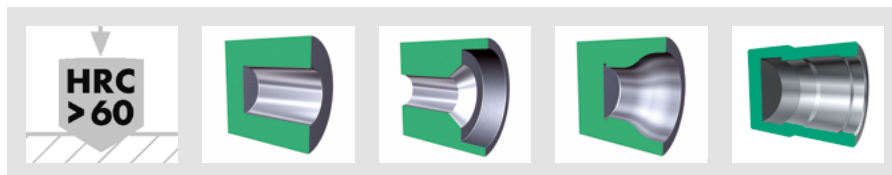
Speed	up to 150 m/min
Feed rate	0.05 – 0.2 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Suitable for hard machining	



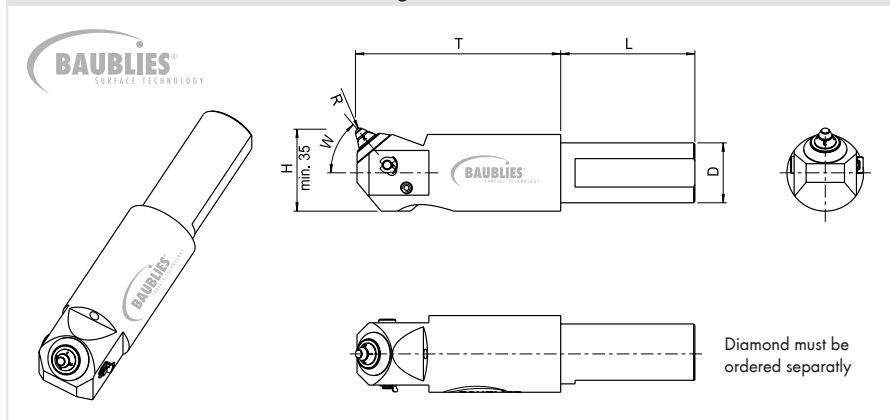
Assembly device



Diamond burnishing tool for internal use



Technical details: Diamond burnishing tool for internal use



Diamond burnishing tools for internal use are non-intrinsic tools for smoothing and work hardening of holes and internal contours.

Advantages

- universally useable
- suitable for hard machining and thin walled workpieces
- slim design enables the application in small spaced machine tools
- spring loaded diamond
- changeable diamond insert
- regrounding of the diamond is possible

Diamond burnishing tool for internal use

Application	holes and internal contours
Standard fixture	cylindrical shank Ø 20/25/32/40 mm
Swiveling range	210°
Indexing	42 x 5°

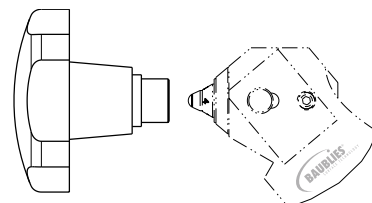
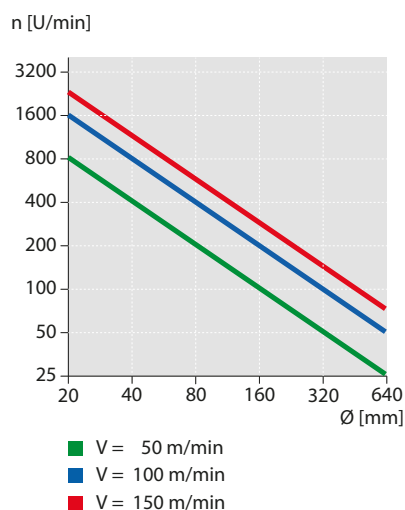
Options

- Fixture VDI, HSK etc.
- Tailor made diamond shape
- Assembly device
- Internal Coolant

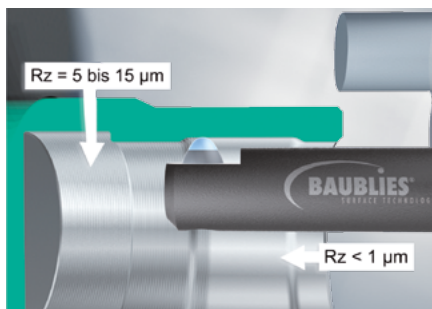
Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

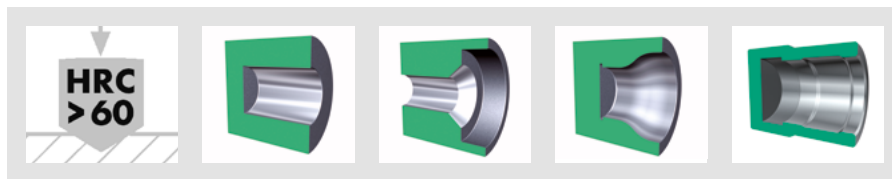
Speed	up to 150 m/min
Feed rate	0.05 – 0.2 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Suitable for hard machining	



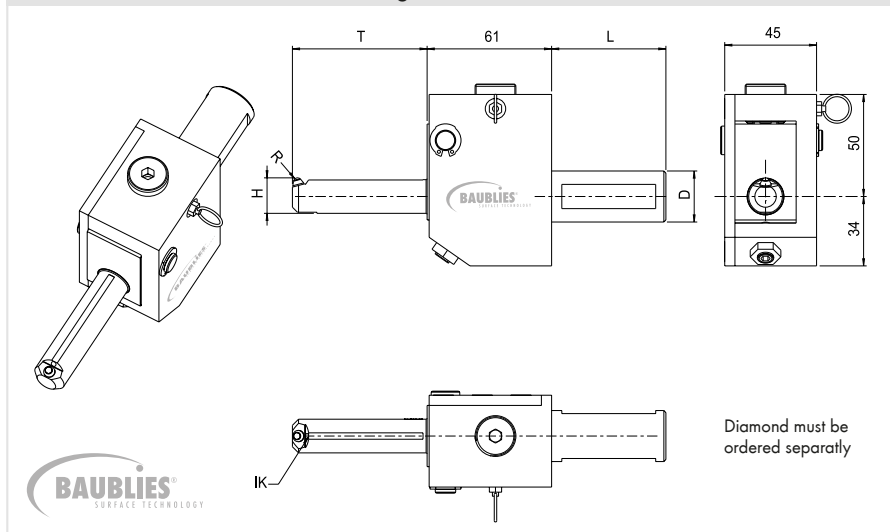
Assembly device



Diamond burnishing tool for internal use, with basic element



Technical details: Diamond burnishing tool for internal use, with basic element



Diamond burnishing tool for internal use, with basic element

Application	holes and internal contours
Standard fixture	cylindrical shank Ø 20/25/32/40 mm

Options

- Fixture VDI, HSK etc.
- Tailor made diamond shape

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

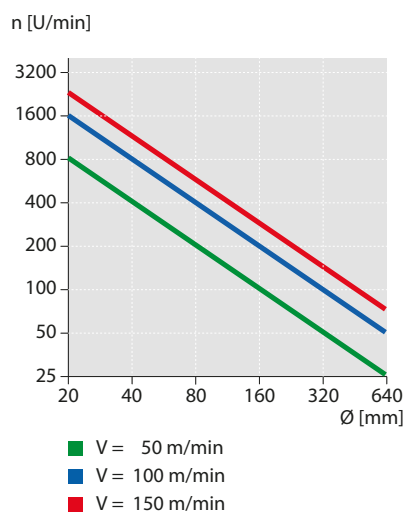
Speed	up to 150 m/min
Feed rate	0.05 – 0.2 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Suitable for hard machining	

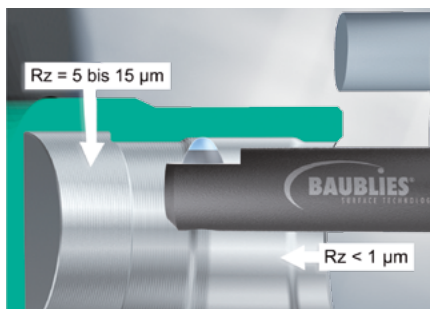
Diamond burnishing tools for internal use, with basic element

are non-intrinsic tools for smoothing and work hardening of holes and internal contours.

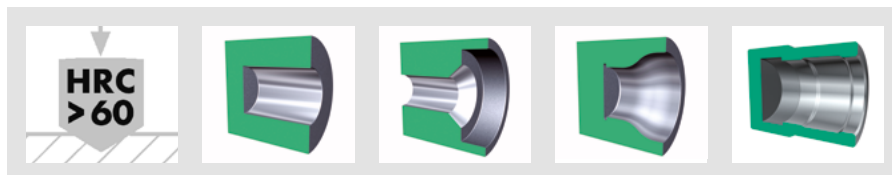
Advantages

- universally useable
- suitable for hard machining and thin walled workpieces
- spring loaded diamond
- changeable diamond insert
- regrinding of the diamond is possible

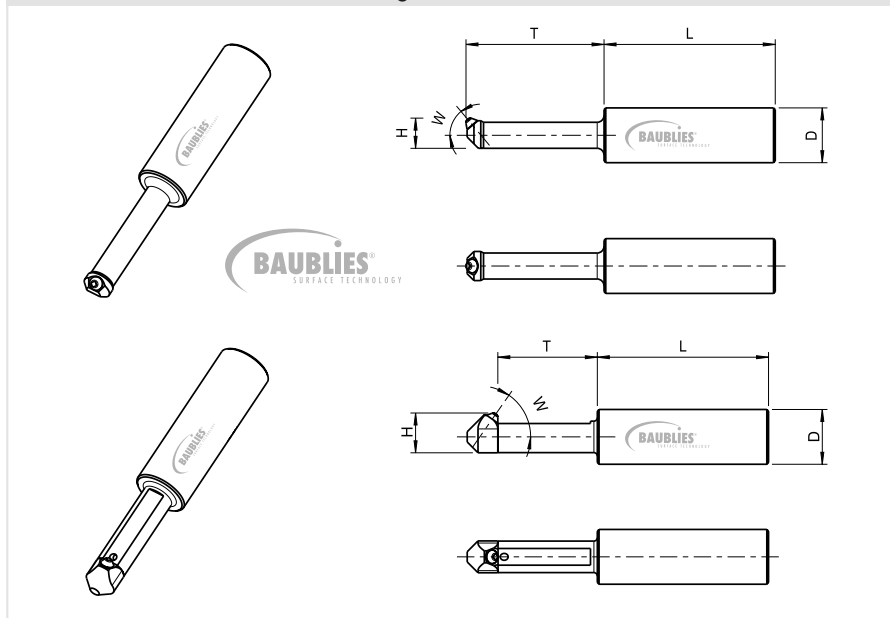




Diamond burnishing tool for internal use, fixed



Technical details: Diamond burnishing tool for internal use, fixed



Diamond burnishing tools for internal use are non-intrinsic (fixed not spring loaded) tools for smoothening and work hardening of holes and internal contours.

Advantages

- universally useable
- suitable for hard machining and thin walled workpieces
- slim design enables the application in small spaced machine tools
- changeable diamond insert
- regrinding of the diamond is possible

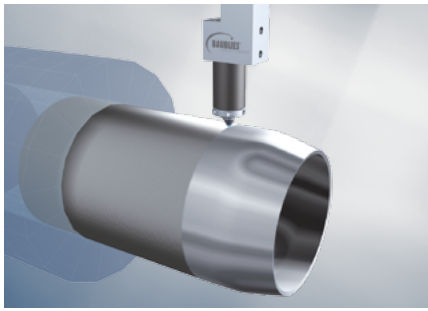
Diamond burnishing tool for internal use, fixed

Application	holes from \varnothing 6 mm and internal contours
Standard fixture	cylindrical shank \varnothing 5 mm (if required with clamping surface, Weldon or Whistle-Notch)
Length "L"	as required

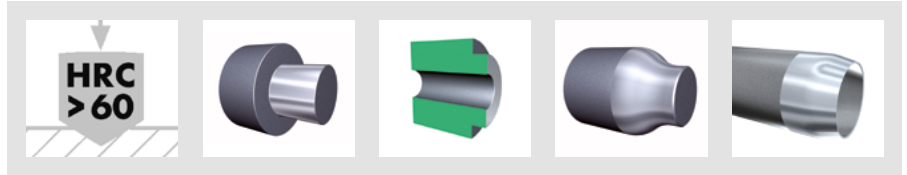
Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

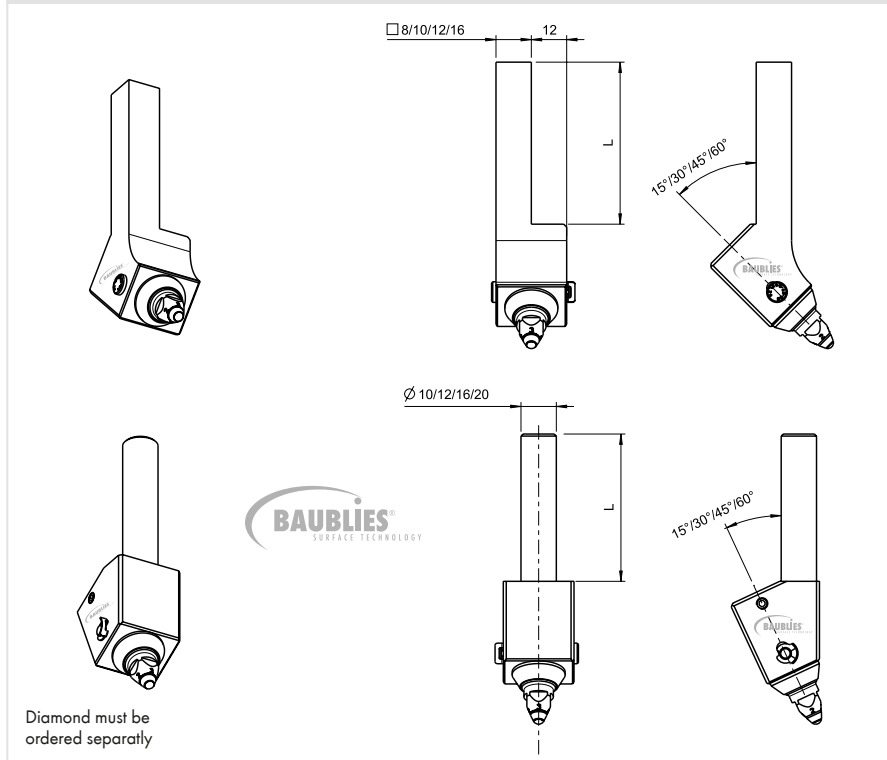
Speed	up to 150 m/min
Feed rate	0.05 – 0.2 mm/rev
Workpiece allowance	up to 0.015 mm
Lubrication	emulsion or oil; filtration of the lubricant ($< 40 \mu\text{m}$) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to $6 \mu\text{m}$
Suitable for hard machining	



Diamond burnishing tool for external use, compact



Technical details: Diamond burnishing tool for external use, compact



Diamond burnishing tool for external use, compact

Application	shafts and external contours
Standard-fixture	square shank, left or right hand, cylindrical shaft

Options

- Fixture as required
- Tailor made diamond shape
- Assembly device

Application parameters

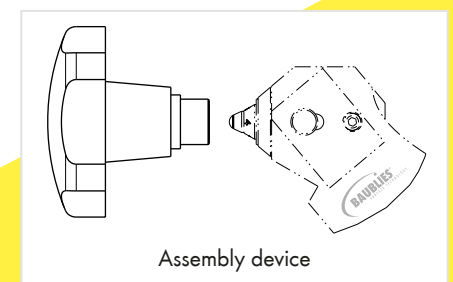
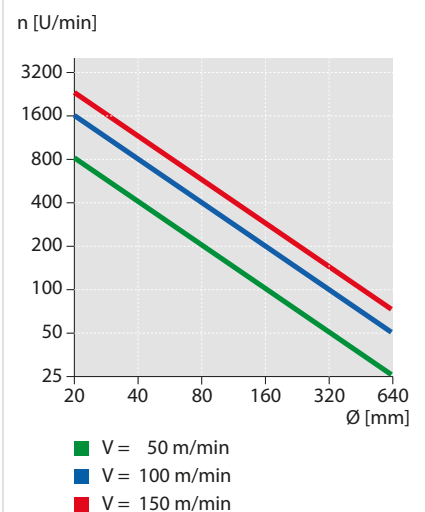
Please note that this information represents standard values which must be adapted to the individual cases.

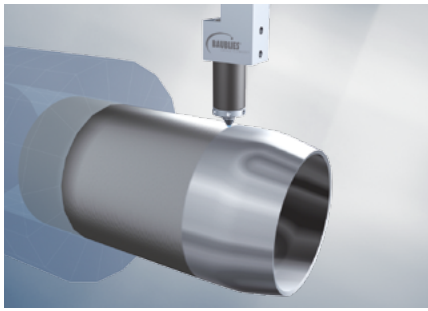
Speed	up to 150 m/min
Feed rate	0.05 – 0.2 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Suitable for hard machining	

Diamond burnishing tools for external use are non-intrinsic tool for smoothing and work hardening of holes and external contours.

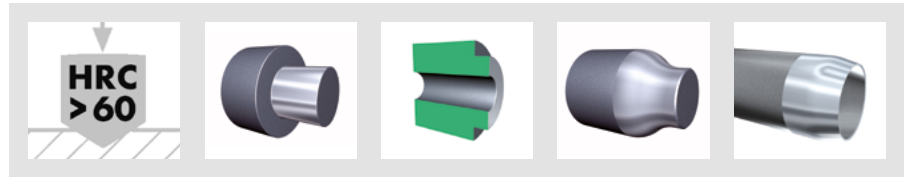
Advantages

- universally useable
- suitable for hard machining and thin walled workpieces
- slim design enables the application in small spaced machine tools
- spring loaded diamond
- changeable diamond insert
- regrinding of the diamond is possible

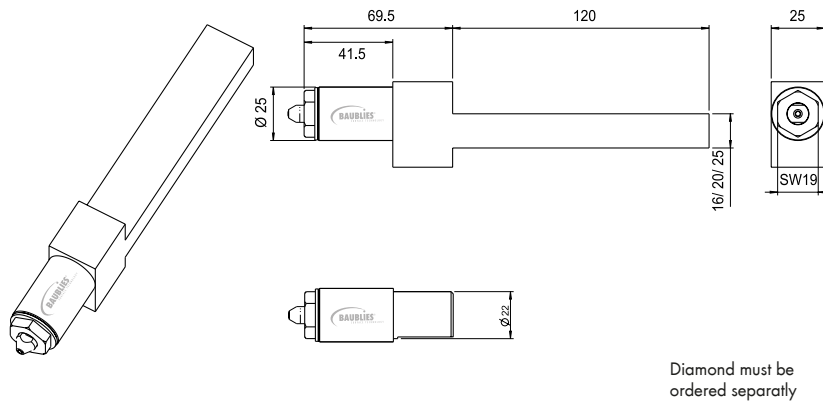




Diamond burnishing tool for external use, straight



Technical details: Diamond burnishing tool for external use, straight



Diamond burnishing tool for external use, straight

Application	Shafts and external contours
Standard-fixture	square shank 16/20/25 mm

Options

- Fixture VDI, HSK etc.
- Tailor made diamond shape

Application parameters

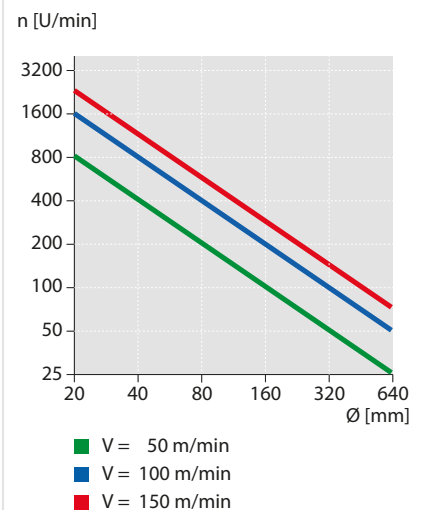
Please note that this information represents standard values which must be adapted to the individual cases.

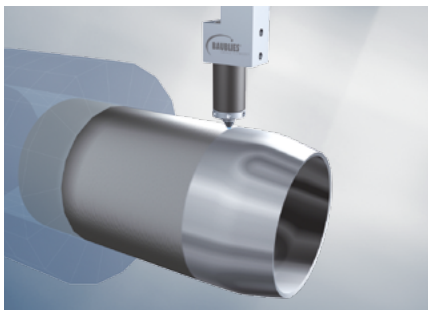
Speed	up to 150 m/min
Feed rate	0.05 – 0.2 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Suitable for hard machining	

Diamond burnishing tools for external use are non-intrinsic tool for smoothing and work hardening of holes and external contours.

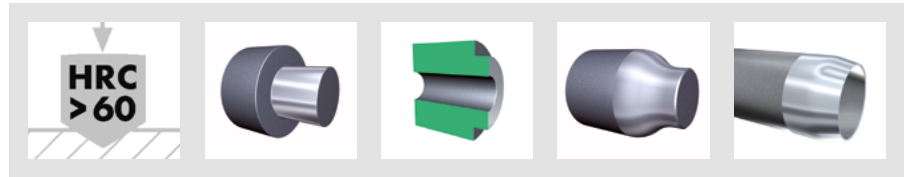
Advantages

- universally useable
- suitable for hard machining and thin walled workpieces
- slim design enables the application in small spaced machine tools
- spring loaded diamond
- changeable diamond insert
- regrinding of the diamond is possible

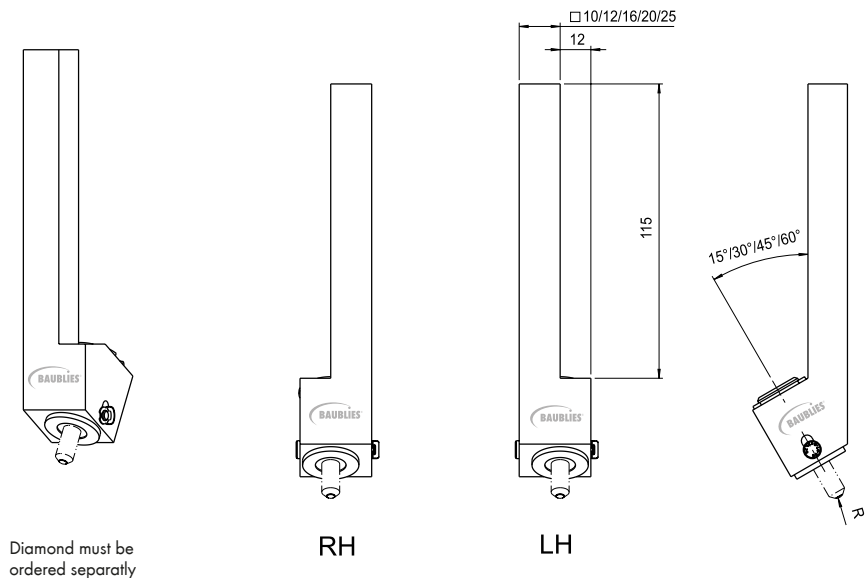




Diamond burnishing tool for external use, angle



Technical details: Diamond burnishing tool for external use, angle



Diamond burnishing tool for external use, angle

Application	Shafts and external contours
Standard-fixture	square shank 16/12/16/20/25 mm

Options

- Fixture VDI, HSK etc.
- Tailor made diamond shape
- Assembly device

Application parameters

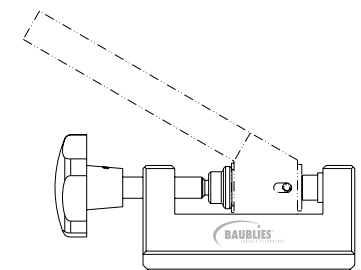
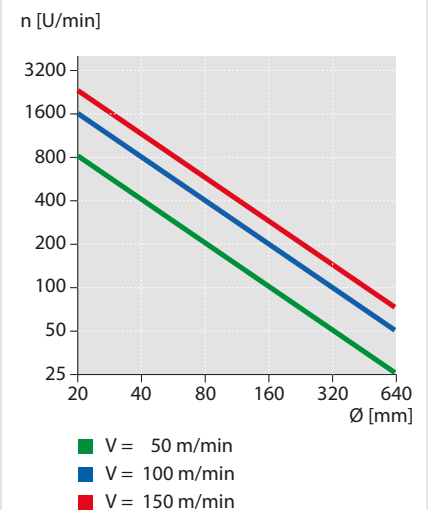
Please note that this information represents standard values which must be adapted to the individual cases.

Speed	up to 150 m/min
Feed rate	0.05 – 0.2 mm/rev
Workpiece allowance	up to 0.02 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Suitable for hard machining	

Diamond burnishing tool for external use are non-intrinsic tool for smoothing and work hardening of holes and external contours.

Advantages

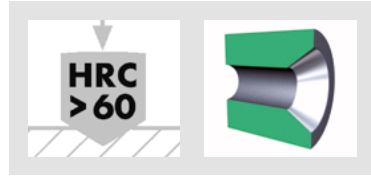
- universally useable
- suitable for hard machining and thin walled workpieces
- slim design enables the application in small spaced machine tools
- spring loaded diamond
- changeable diamond insert
- regrinding of the diamond is possible



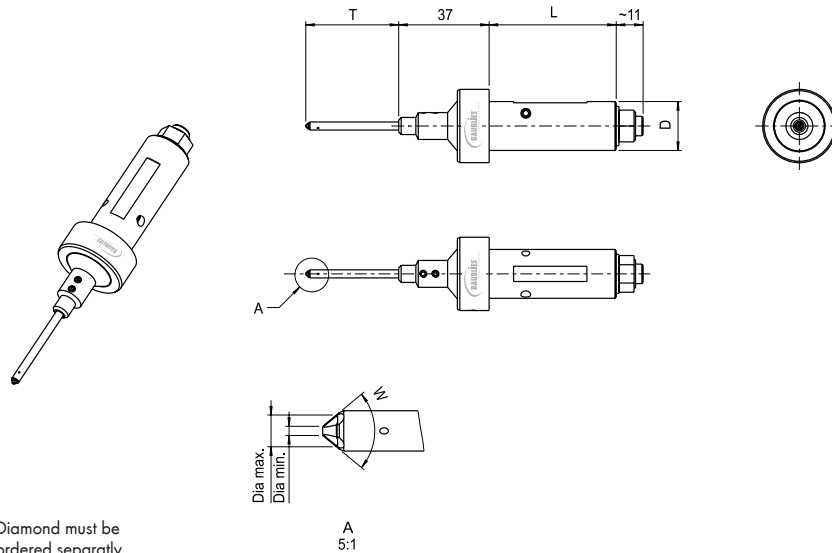
Assembly device



Diamond burnishing tool for internal small tapers



Technical details: Diamond burnishing tool for internal small tapers



Diamond burnishing tool for internal small tapers

Application	internal tapers from 0.1 mm
Standard-fixture	cylindrical shank

Options

- Fixture VDI, HSK etc.

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

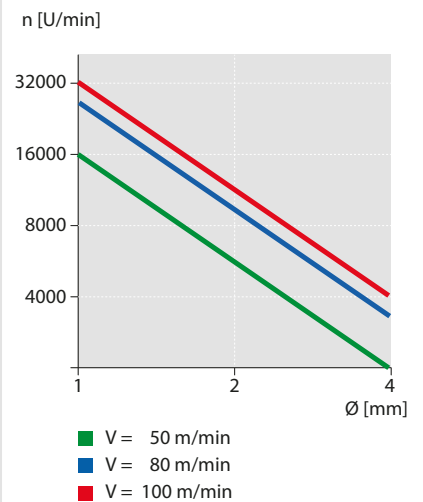
Speed	up to 100 m/min
Feed rate	0.05 – 0.2 mm/rev
Workpiece allowance	up to 0.005 mm
Tool pre-load	up to 1 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Suitable for hard machining	

Diamond burnishing tool for smoothening and strain hardening of small internal taper.

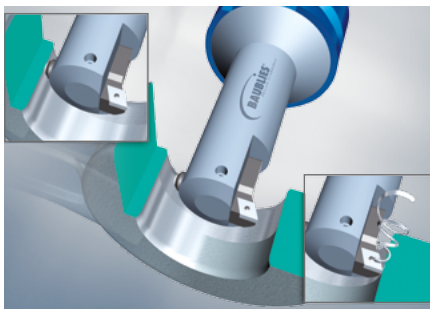
Internal springs generate the required force. The value of the force is defined by the preload of the tool. The spring characteristics can be adapted to the requirements of the workpiece.

Advantages

- suitable for hard machining
- spring loaded diamond
- changeable diamond insert
- regrounding of the diamond is possible



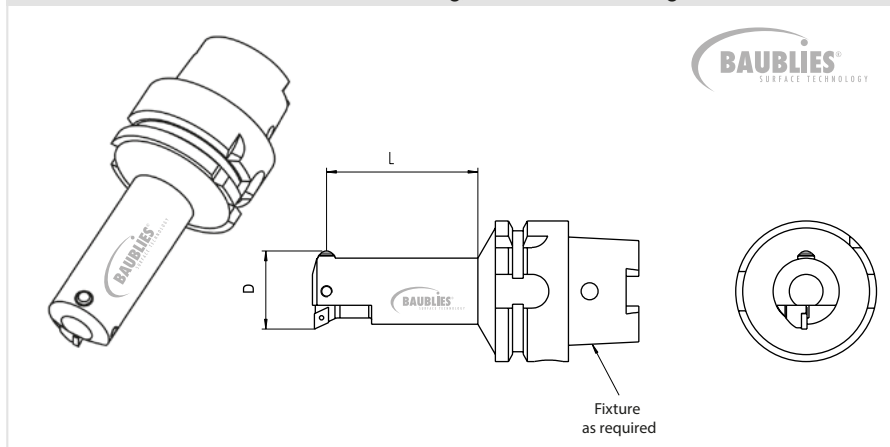




Combination tool, cutting/diamond burnishing



Technical details: Combination Tool, cutting/diamond burnishing



Combination tool, cutting/diamond burnishing

Combination diamond burnishing tools for cutting and smoothing internal contours in one cycle: At first the geometry is produced by the cutting edge and then this surface gets burnished by the diamond. This rotating tool is usually used together with an U-axis.

Advantages

- suitable for hard machining and thin walled workpieces
- economic complete machining in two steps
- changeable diamond insert
- regrounding of the diamond is possible

Combination tool, cutting/diamond burnishing

Application	cutting and smoothing internal contours with
Standard-fixture	cylindrical shank or morse taper

Options

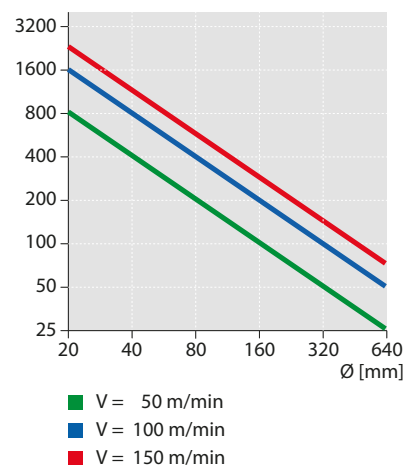
- Fixture VDI, HSK etc.

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

Speed	up to 150 m/min
Feed rate	0.05 – 0.15 mm/rev
Workpiece allowance	up to 0.01 mm
Lubrication	emulsion or oil; filtration of the lubricant (< 40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Suitable for hard machining	

n [U/min]



- V = 50 m/min
- V = 100 m/min
- V = 150 m/min

TAILOR MADE ROLLER BURNISHING TOOLS

SPECIAL TASKS REQUIRE
SPECIAL SOLUTIONS

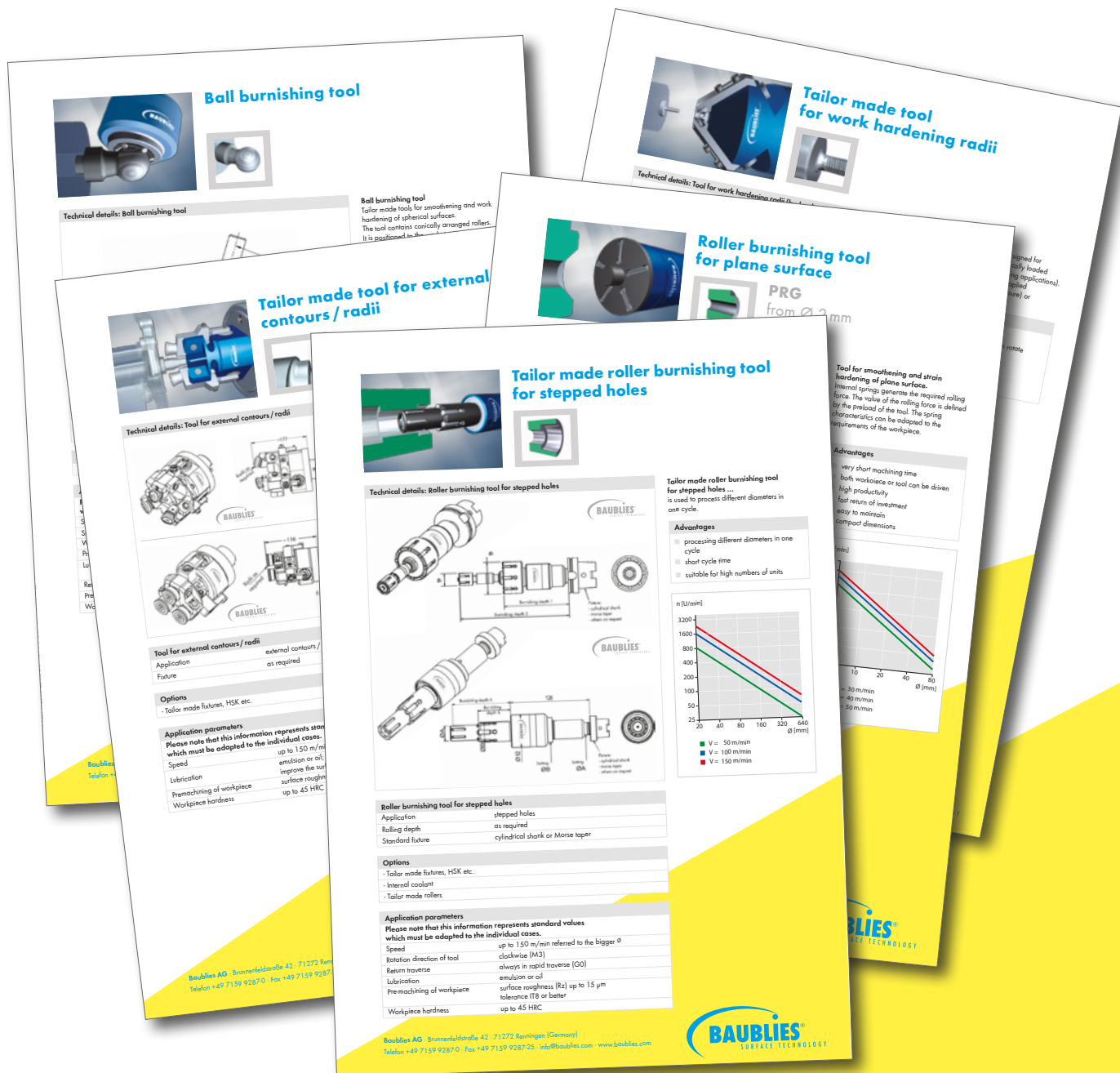


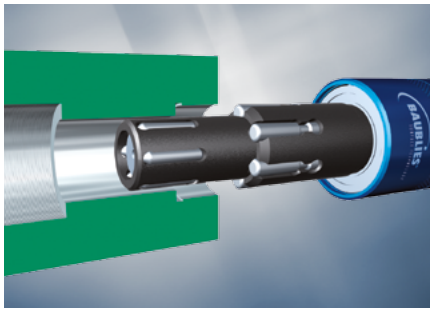
Tailor made roller burnishing tools

Most roller burnishing applications are covered by the broad range of our standard products. Sometimes there are

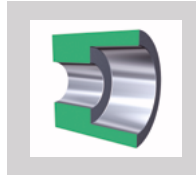
special requirements, however. Based on our know-how we are able to offer specific tool solutions which exactly meet your demands. This could be a completely tailor made tool or just an economical

modification of existing components. Our team of experienced specialists is looking forward to receive your individual requests and to work out a first target-oriented quotation.

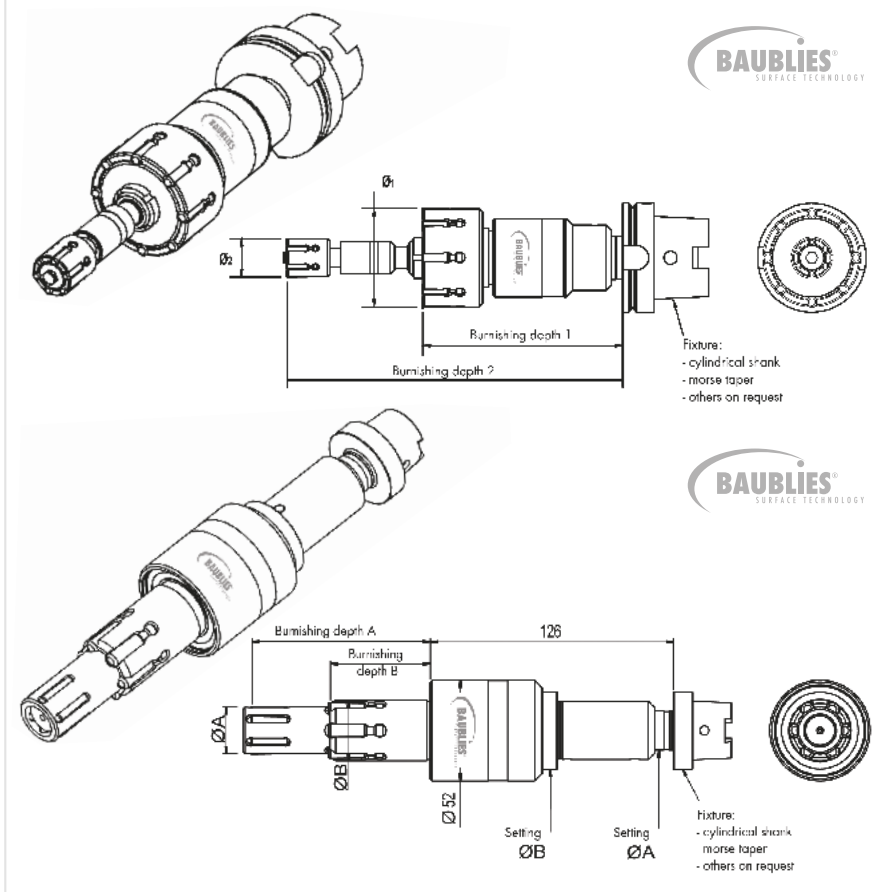




Tailor made roller burnishing tool for stepped holes



Technical details: Roller burnishing tool for stepped holes



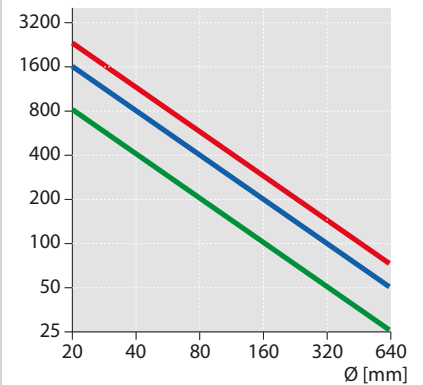
Tailor made roller burnishing tool for stepped holes ...

is used to process different diameters in one cycle.

Advantages

- processing different diameters in one cycle
- short cycle time
- suitable for high numbers of units

n [U/min]



- V = 50 m/min
- V = 100 m/min
- V = 150 m/min

Roller burnishing tool for stepped holes

Application	stepped holes
Rolling depth	as required
Standard fixture	cylindrical shank or Morse taper

Options

- Tailor made fixtures, HSK etc.
- Internal coolant
- Tailor made rollers

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

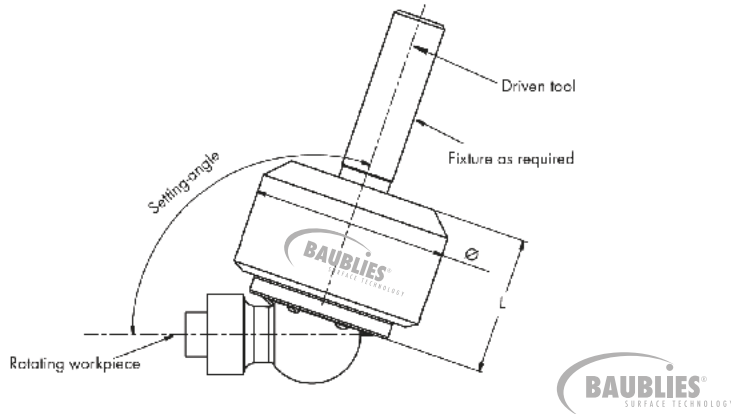
Speed	up to 150 m/min referred to the bigger Ø
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC



Ball burnishing tool



Technical details: Ball burnishing tool



Ball burnishing tool

Tailor made tools for smoothening and work hardening of spherical surfaces.

The tool contains conically arranged rollers. It is positioned to the workpiece under a defined setting-angle.

Both workpiece and tool must rotate. During this process the spherical surface is burnished „line by line“.

Advantages

- useable on lathe machines with driven tools
- very short machining time
- slim design
- fast return of investment
- low machining forces

Ball burnishing

Application	spherical surfaces
Rollers	as required
Fixture	cylindrical shaft

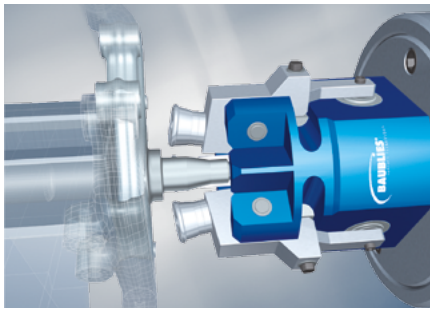
Options

- Tailor made fixtures, HSK etc.

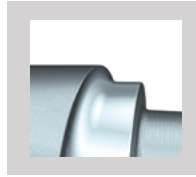
Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

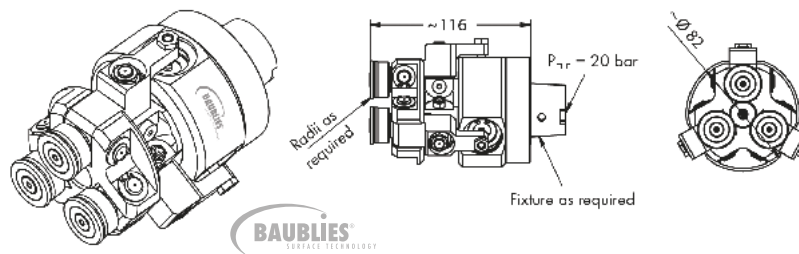
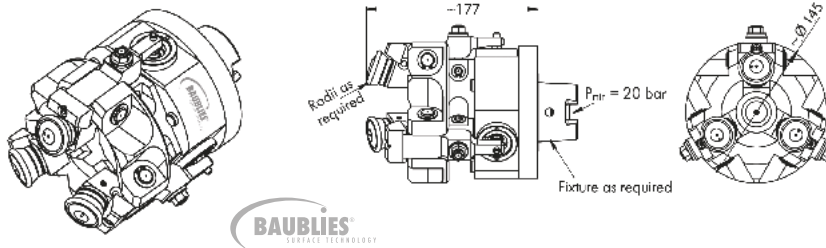
Speed tool	up to 3500 rpm
Speed workpiece	up to 500 rpm
Workpiece allowance	up to 0.02 mm
Processing time	2 – 3 sec.
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Retention time	5 – 20 revolutions
Premachining of workpiece	surface roughness (Rz) up to 10 µm
Workpiece hardness	up to 45 HRC



Tailor made tool for external contours / radii



Technical details: Tool for external contours / radii



Tool for external contours / radii

Application	external contours / radii
Fixture	as required

Options

- Tailor made fixtures, HSK etc.

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

Speed	up to 150 m/min
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Premachining of workpiece	surface roughness (Rz) up to 15 µm
Workpiece hardness	up to 45 HRC

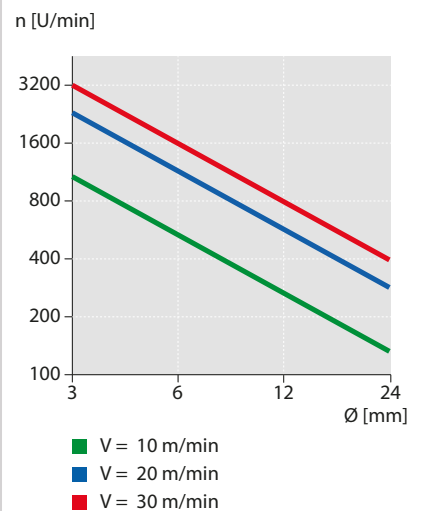
Tailor made tools

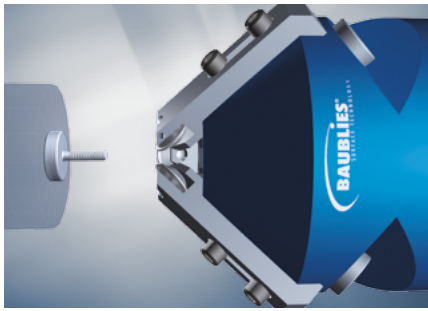
Smoothing and work hardening of external contours (e.g. radii, tapers, etc.).

The tool is rotating and the required rolling force is applied hydraulically (by coolant pressure) or mechanically (by connecting rod). During the rolling process the rollers follow the given workpiece contour.

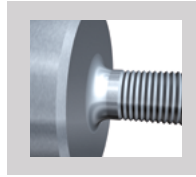
Advantages

- very short machining time
- high productivity
- low machining forces
- fast return of investment
- easy to maintain
- slim design

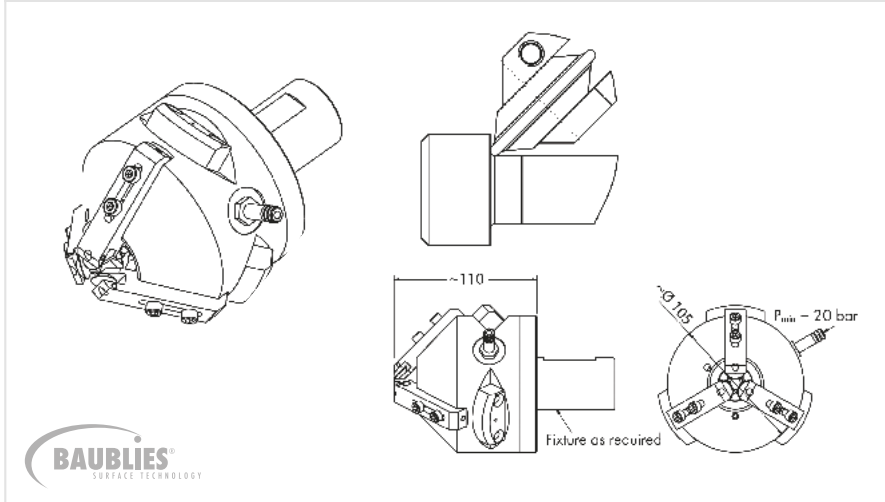




Tailor made tool for work hardening radii



Technical details: Tool for work hardening radii (hydraulic type)



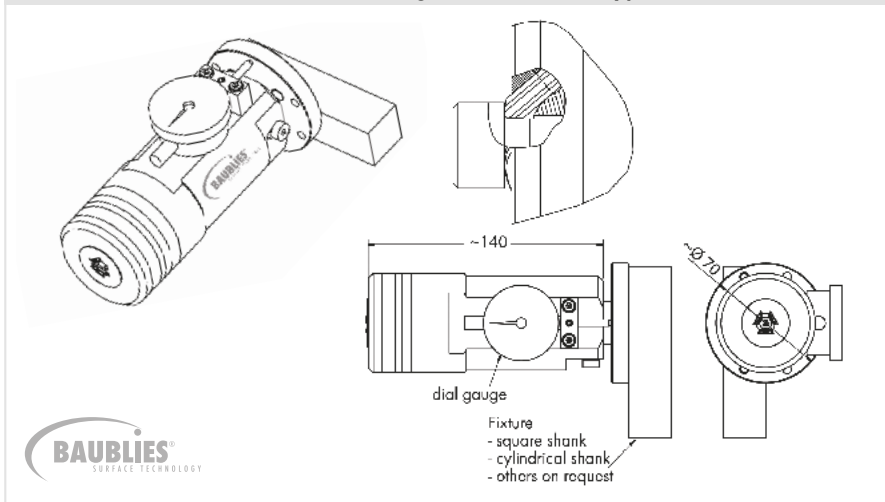
Tailor made tool for radii

These tools are especially designed for work hardening (e.g. dynamically loaded fasteners in aerospace or racing applications). The required rolling force is applied hydraulically (by coolant pressure) or mechanically.

Advantages

- very short machining time
- both tool or workpiece can rotate
- low machining forces
- fast return of investment
- easy to maintain
- slim design

Technical details: Tool for work hardening radii (mechanical type)



Tool for work hardening radii

Application	work hardening radii
Workpiece diameter	from Ø 3 mm

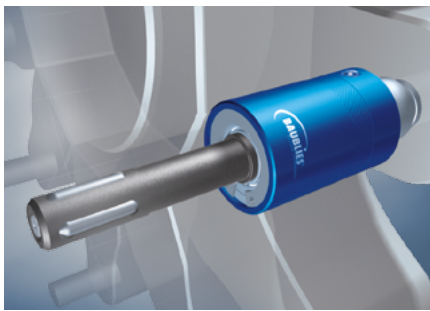
Options

- Tailor made fixtures, HSK etc..

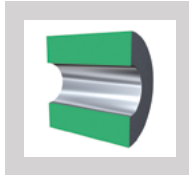
Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

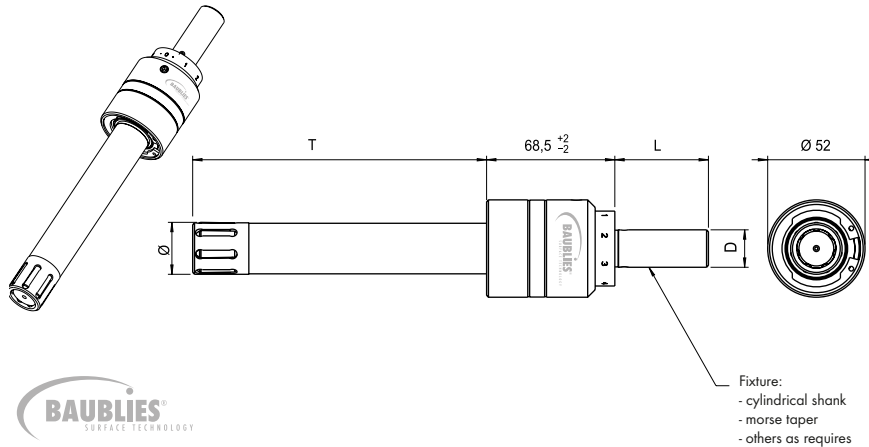
Speed	up to 30 m/min
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Premachining of workpiece	surface roughness (Rz) up to 15 µm
Workpiece hardness	up to 45 HRC



Internal roller burnishing tools IRG-Spezial usable for through hole



Internal roller burnishing tools IRG-Spezial



Internal roller burnishing tools

„tailor made through hole design“ are especially developed for through holes and suitable for use on virtually all common machines, e.g. lathe machines, both conventional and CNC machines.

Advantages

- very short machining time
- easy to maintain
- high productivity
- both workpiece or tool can rotate
- fast return of investment
- usable on all common machines (no special machine required)

Internal roller burnishing tool IRG-Spezial

Application	through hole
Standard fixture	cylindrical shank from Ø19.05 mm
Rolling depth "L"	as required
Diameter range	from 21 mm

Options

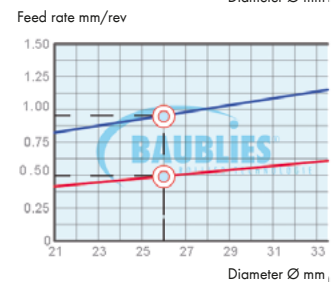
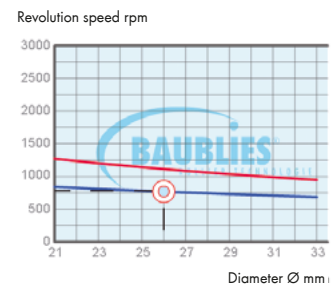
- Tailor made fixtures, HSK etc.
- Internal coolant
- Different number of rollers

Application parameters

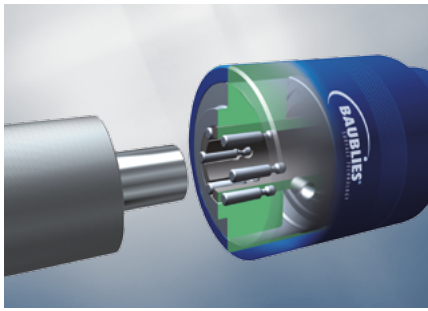
Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.02 mm
Tool preclamping	up to 0.05 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 12 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

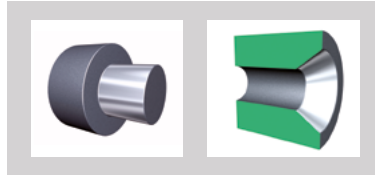
Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com). Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

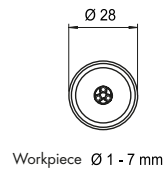
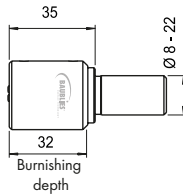
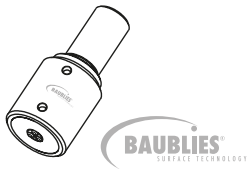


Multi - roller burnishing tools small design



Technical details: External roller burnishing tools small design

Application	shafts, also against shoulder
Diameter range	1.0 - 7.9 mm



Multi - roller burnishing tools „small design“

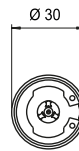
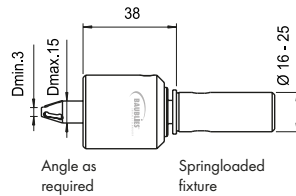
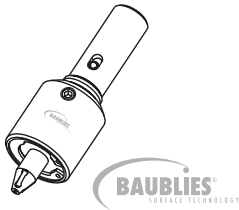
are especially developed for the use on small spaced machine tools like Swiss type lathe or rotary indexing machines.

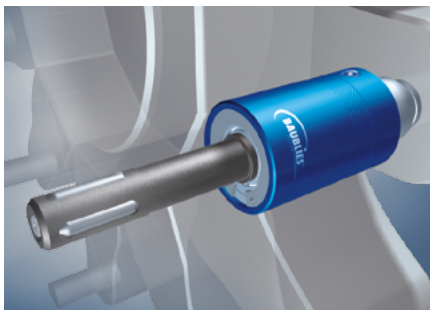
Advantages

- very short machining time
- high productivity
- both workpiece or tool can rotate
- fast return of investment
- slim design enables the application in small spaced machine tools

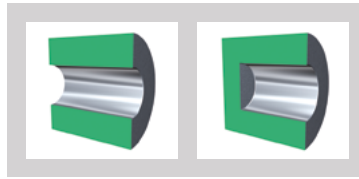
Technical details: Internal taper roller burnishing tools small design

Application	internal tapers
Durchmesserbereich	from 3 mm

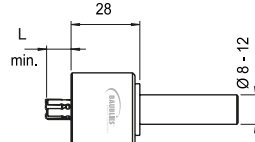




Internal roller burnishing tools IRG-Special small design



Internal roller burnishing tools IRG-Spezial



Internal roller burnishing tool IRG-Spezial

Application	blind hole and through hole
Standard fixture	cylindrical shank
Rolling depth "L"	as required
Diameter range	4 mm

Options

- Tailor made fixtures, HSK etc.
- Internal coolant from Ø 8 mm

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.02 mm
Tool preclamping	up to 0.03 mm
Rotation direction of tool	clockwise (M3)
Return traverse	always in rapid traverse (G0)
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Pre-machining of workpiece	surface roughness (Rz) up to 12 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC

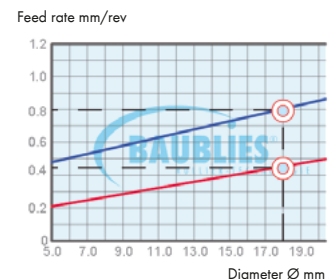
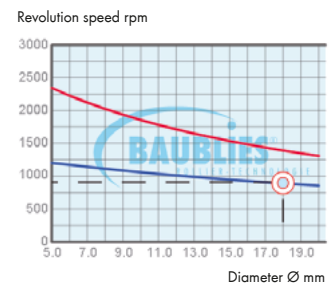
Internal roller burnishing tools „small design Swiss type“

are especially developed for the use on small spaced machine tools like Swiss type lathe or rotary indexing machines.

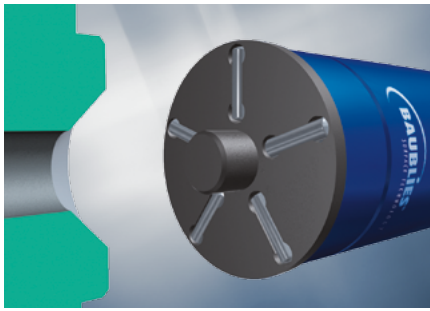
Advantages

- very short machining time
- easy to maintain
- high productivity
- fast return of investment
- usable on all common machines (no special machine required)

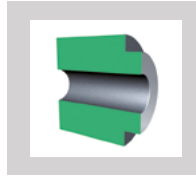
Machining parameters



For your specific application we recommend to use our interactive calculator for machining parameters. You can find it on the attached DVD or on our homepage (www.baublies.com). Please remember that these results are only guide values. Different machining conditions (e.g. pre-machining, material, lubrication...) may require different machining parameters.

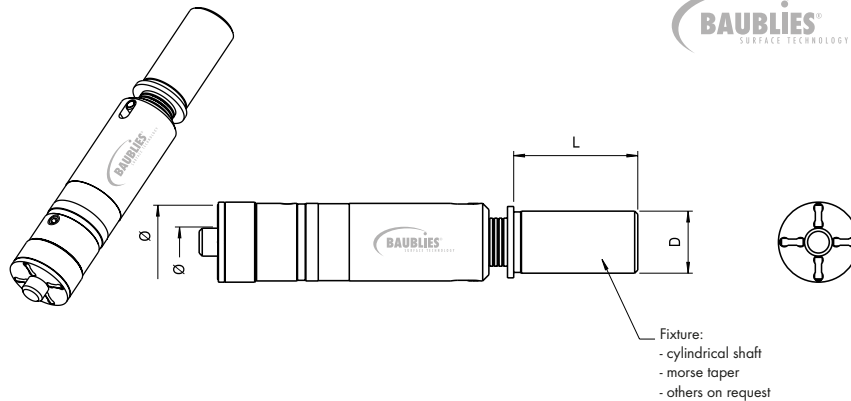


Roller burnishing tool for plane surface



PRG
from Ø 2 mm

Technical details: Type PRG from Ø 2 mm



Tool for smoothening and strain hardening of plane surface.

Internal springs generate the required rolling force. The value of the rolling force is defined by the preload of the tool. The spring characteristics can be adapted to the requirements of the workpiece.

Advantages

- very short machining time
- both workpiece or tool can be driven
- high productivity
- fast return of investment
- easy to maintain
- compact dimensions

Plane surface roller burnishing tool PRG

Application	plane surface from 2 mm
Standard fixture	cylindrical shank or Morse taper

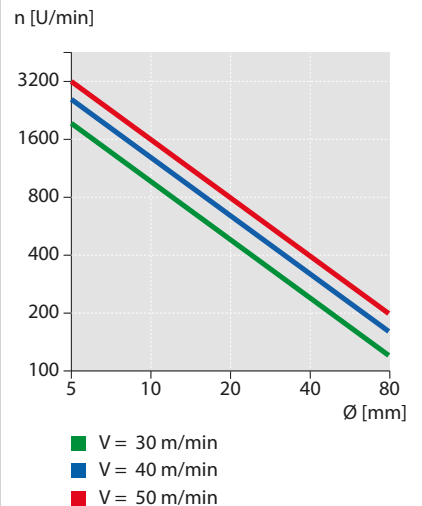
Options

- Tailor made fixtures, HSK etc.

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.01 mm
Tool preclamping	up to 4 mm
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Speed	up to 50m/min. referred to the biggest rolling diameter
Feed rate	0.1 – 0.3 mm/rev
Retention time	5 – 20 revolutions
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Workpiece hardness	up to 45 HRC

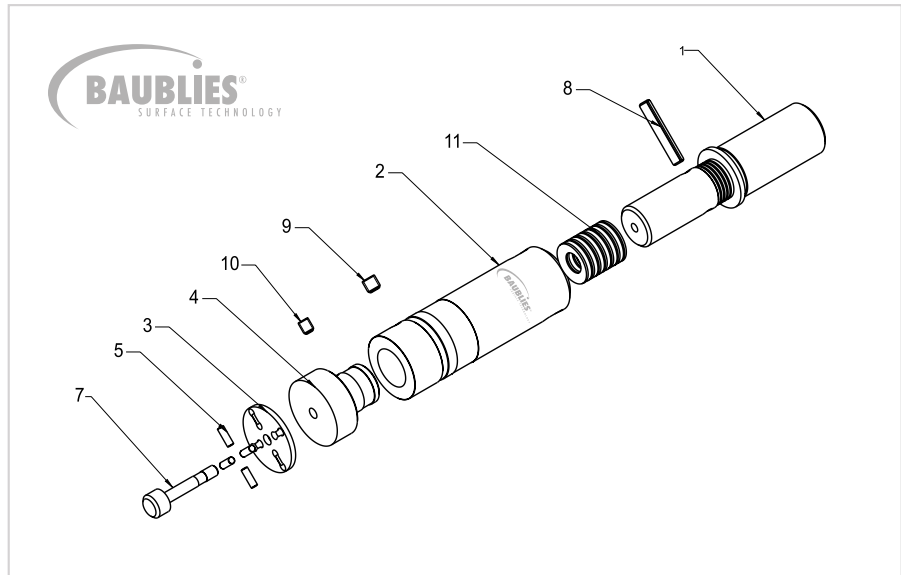


Tool assembly and handling

PRG

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage
- 4 Taper
- 5 Rollers
- 6 Rolling unit, conversion kit for other diameters including item(3)(4)(5)(7)
- 7 Axle
- 8 Pin
- 9 Clamping screw for taper
- 10 Clamping screw for axle
- 11 Spring



Changing components

Rollers

Loosen clamping screw (9) and lift out the cage (3) and the taper (4) towards the front. Loosen clamping screw (10) lift the cage with the axle from the taper. Replace the rollers (5) in sets and remount the unit.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly.

When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Loosen clamping screw (9) and lift out the cage (3) and the taper (4) towards the front. Loosen clamping screw (10) lift the cage with the axle (7) from the taper. Replace the taper and remount the unit.

Tip

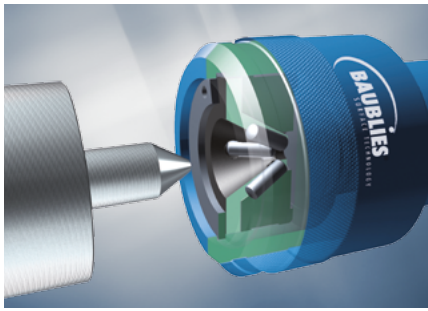
When replacing the taper, clean the cage and the roller. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

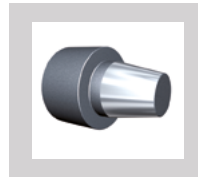
Loosen clamping screw (9) and lift out the cage (3) and the taper (4) towards the front. Loosen clamping screw (10) lift the cage with the axle (7) from the taper. Replace the cage and remount the components.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.

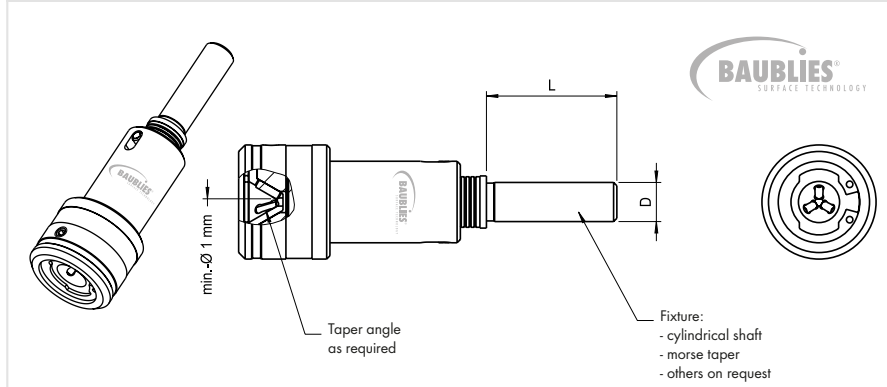


External taper roller burnishing tool



ARG-K
from Ø 1 mm

Technical details: Type ARG-K



Tool for smoothening and strain hardening of external tapers.

Internal springs generate the required rolling force. The value of the rolling force is defined by the preload of the tool. The spring characteristics can be adapted to the requirements of the workpiece.

Advantages

- very short machining time
- both workpiece or tool can be driven
- high productivity
- fast return of investment
- easy to maintain
- compact dimensions

External taper roller burnishing tool ARG-K

Application	external taper from 1 mm
Standard fixture	cylindrical shank or Morse taper

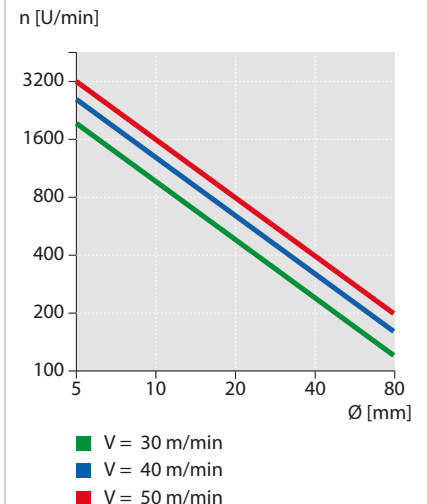
Options

- Tailor made fixtures, HSK etc.

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.01 mm
Tool preclamping	up to 4 mm
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Speed	up to 50 m/min. referred to the biggest rolling diameter
Feed rate	0.1 - 0.3 mm/rev
Retention time	5 - 20 revolutions
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Workpiece hardness	up to 45 HRC

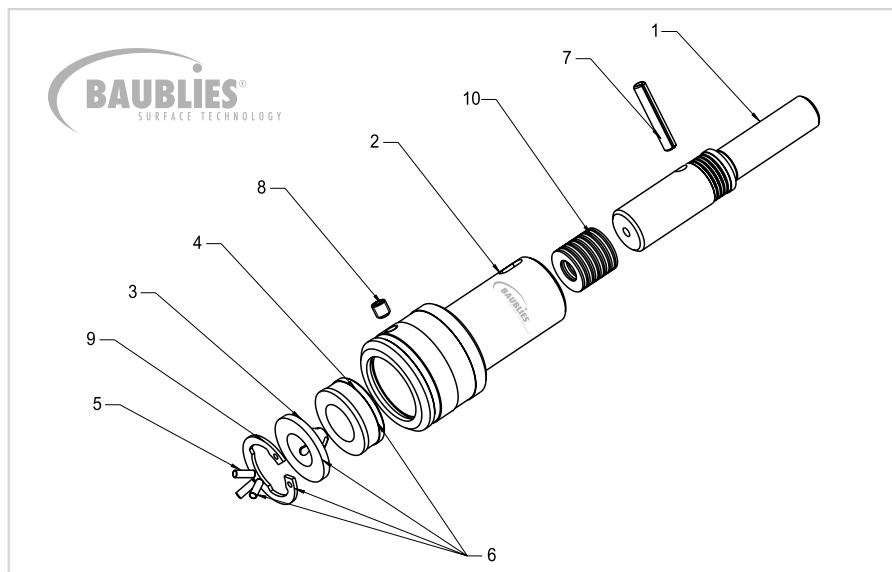


Tool assembly and handling

ARG-K

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Rollers
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Pin
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Spring



Changing components

Rollers

Remove the locking ring (9) and lift out the cage (3) towards the front until the rollers (5) are clear. Replace the rollers in sets and remount the components.

Taper

Please Note: The fixture is preloaded by the spring. Remove the locking ring (9) and lift out the cage (3) towards the front. Loosen the clamping screw (8). Disassemble taper (4) out of the sleeve (2).

Cage

Remove the locking ring (9) and lift out the cage (3) towards the front. Replace the cage and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly.

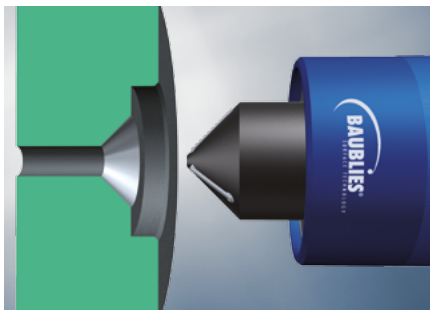
When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Tip

When replacing the taper, clean the cage and the roller. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.

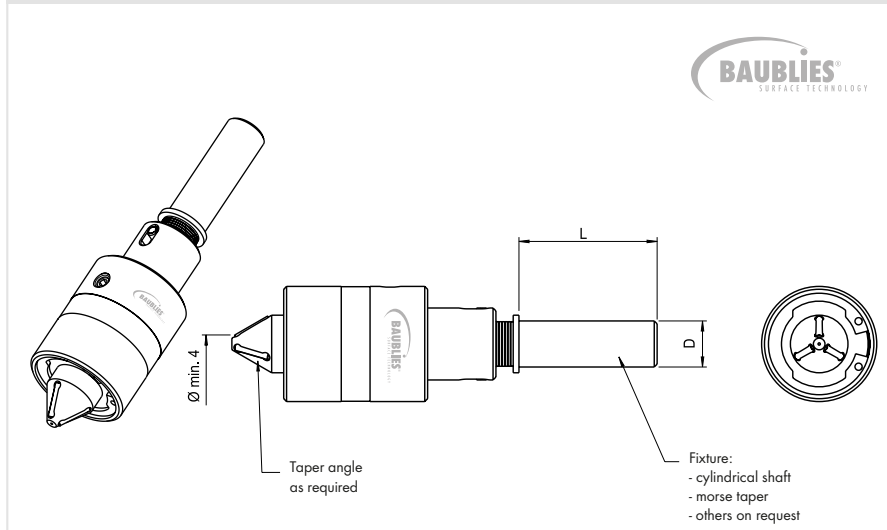


Internal taper roller burnishing tool



IRG-K
from Ø 4 mm

Technical details: Type IRG-K



Internal taper roller burnishing tool IRG-K

Application	internal taper from 4 mm
Standard fixture	cylindrical shank or Morse taper

Options

- Tailor made fixtures, HSK etc.

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

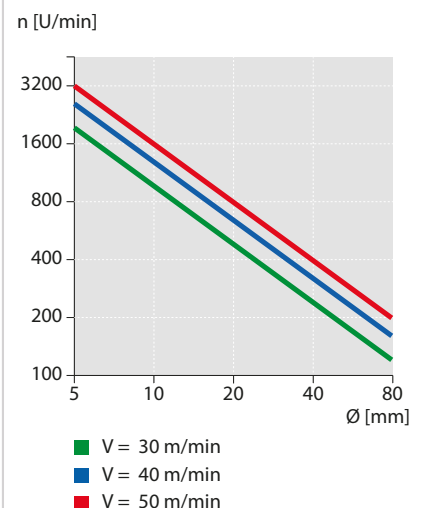
Workpiece allowance	up to 0.01 mm
Tool preclamping	up to 4 mm
Lubrication	emulsion or oil; filtration of the lubricant (<40 µm) can improve the surface quality and the tool life
Speed	up to 50 m/min. referred to the biggest rolling diameter
Feed rate	0.1 – 0.3 mm/rev
Retention time	5 – 20 revolutions
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm
Workpiece hardness	up to 45 HRC

Tool for smoothing and strain hardening of internal tapers.

Internal springs generate the required rolling force. The value of the rolling force is defined by the preload of the tool. The spring characteristics can be adapted to the requirements of the workpiece.

Advantages

- very short machining time
- both workpiece or tool can be driven
- high productivity
- fast return of investment
- easy to maintain
- compact dimensions

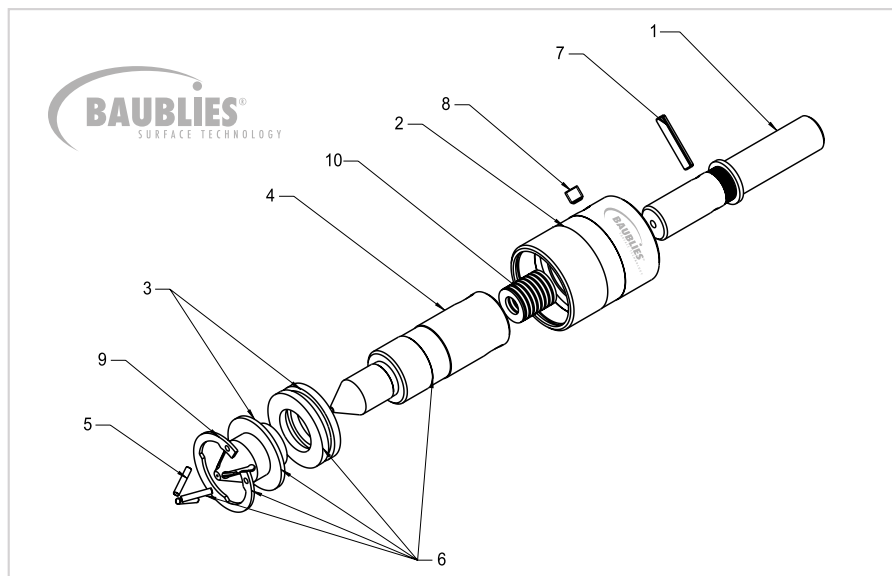


Tool assembly and handling

IRG-K

Parts list and assembly

- 1 Fixture
- 2 Sleeve
- 3 Cage, bearing assembly
- 4 Taper
- 5 Rollers
- 6 Rolling unit, conversion kit for other diameters including item (3)(4)(5)
- 7 Pin
- 8 Clamping screw for sleeve
- 9 Locking Ring
- 10 Spring



Changing components

Rollers

Remove the locking ring (9) and lift out the cage (3) towards the front until the rollers (5) are clear. Replace the rollers in sets and remount the components.

Tip

Coat the roller seats with some grease so that the rollers are held in place by the grease during the assembly.

When replacing the rollers, clean the cage and the taper. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or tapers can considerably reduce the service life of the rollers.

Taper

Please Note: The fixture is preloaded by the spring. Loosen the clamping screw (8) and lift out the taper (4) and the fixture (1) out of the sleeve (2). Remove the pin (7). Remove the fixture and the spring (10) from the taper. Coat the parts with some grease before reassembling.

Tip

When replacing the taper, clean the cage and the roller. Check them for damage, run-in marks, rough spots etc. and replace worn out components. Worn cages or rollers can considerably reduce the service life of the taper.

Cage

Remove the locking ring (9) and lift out the cage (3) towards the front. Replace the cage and remount the components.

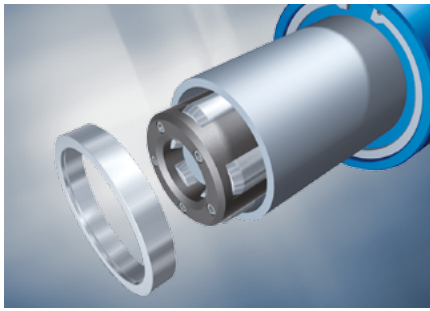
Tip

When replacing the cage, clean the tool interior and grease it lightly. Dirt particles, in particular chips, reduce the tool life and the quality of the roller burnishing results.

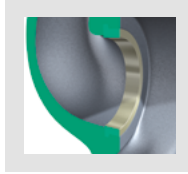
FORMING TOOLS

TOGETHER FOREVER:
FLANGING, CREASING AND
EXPANDING COMPONENTS

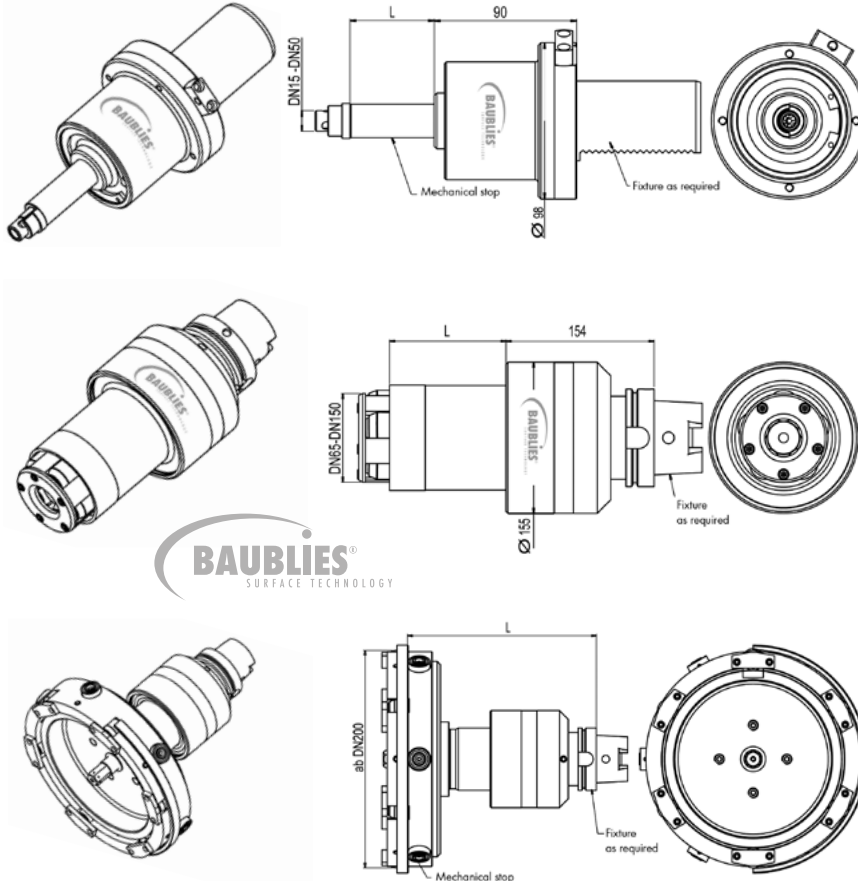




Expanding tool for valve bodies from nominal size DN 15



Technical details: Expanding tool

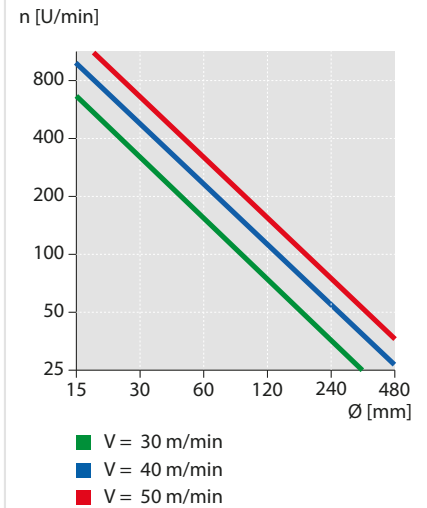


Expanding tools

Useable to connect valve seat rings into valve housings. The connection is form closed.

Advantages

- automatic processing is possible
- the valve seat ring is fixed, guided and positioned by the tool
- diameter range from DN 15 to DN 400 available



Expanding tool

Application form closed connection of valve seat rings into valve housings

Dimensions as required

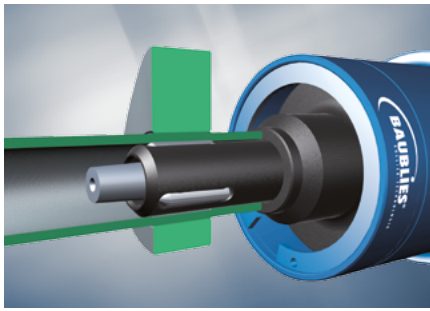
Options

- Tailor made fixtures, HSK etc.
- Internal Coolant

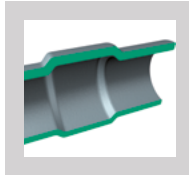
Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

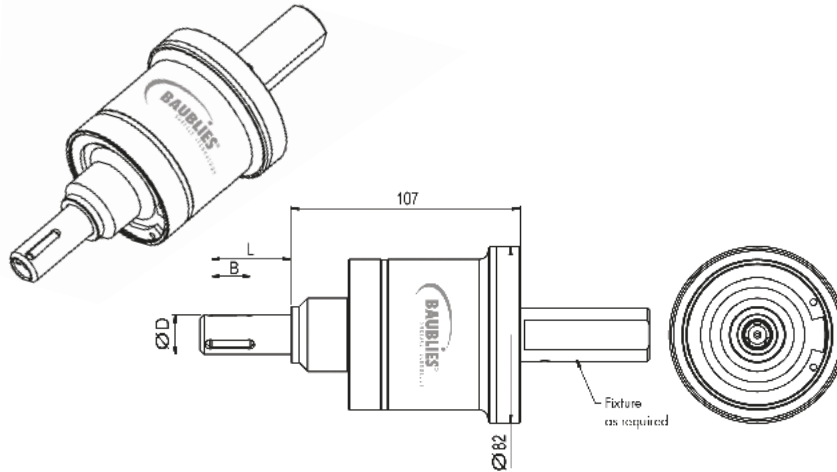
Speed	up to 70 m/min
Feed rate	0.5 mm/rev
Expansion of the valve seat	up to 3 mm
Lubrication	emulsion or oil



Expanding tool



Technical details: Expanding tool



Expanding tools

Useable for connecting parts.
The connection is form closed or force locked. These expanding tools can also create internal contours.

Advantages

- both tool or workpiece can rotate
- very short machining time
- slim design
- fast return of investment
- short cycle time
- easy to maintain
- useable on common machine types

Expanding tool

Application	connection of parts
Dimension	as required

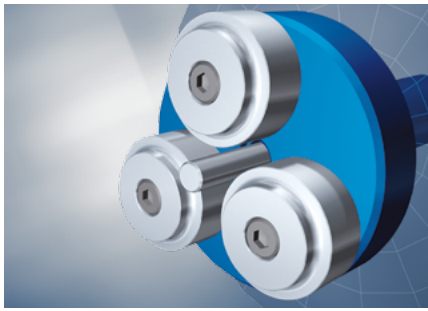
Options

- Tailor made fixtures, HSK etc.
- Internal Coolant

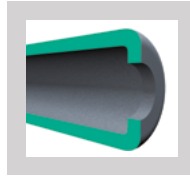
Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

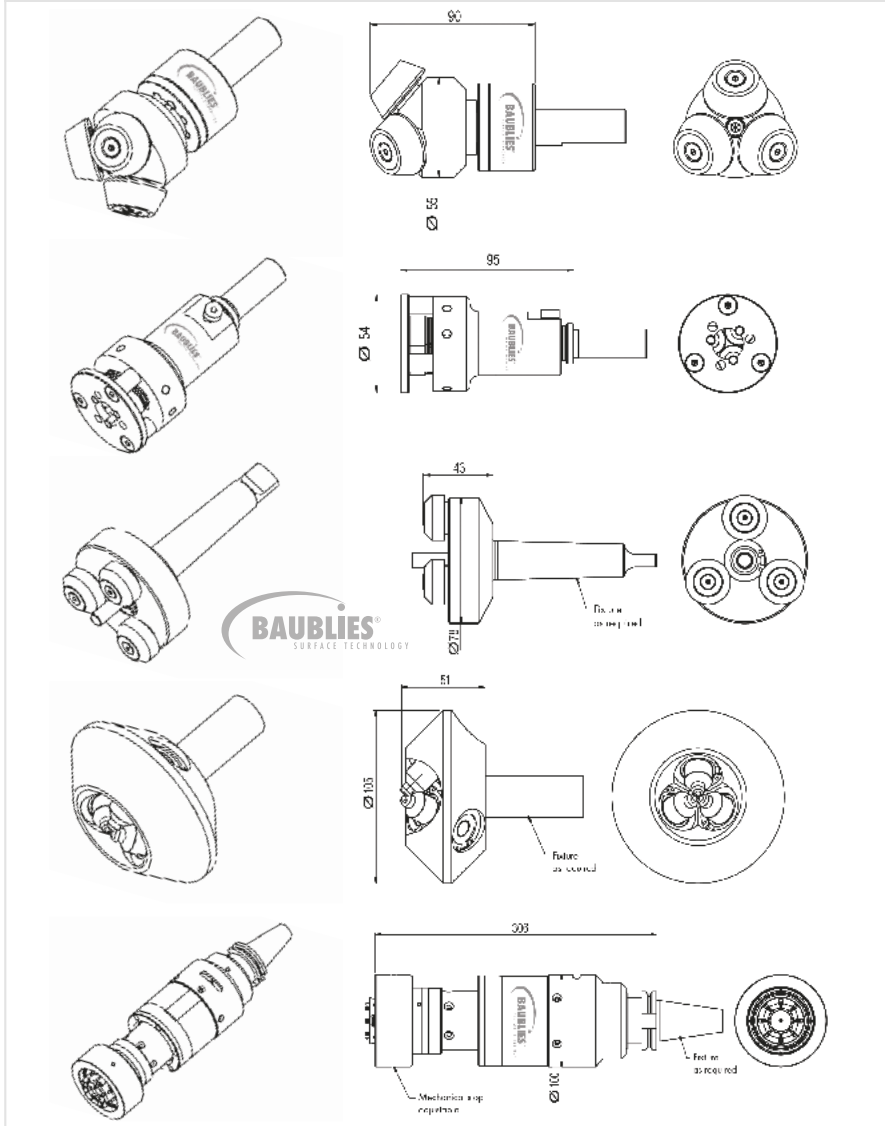
Speed	up to 30 m/min
Feed rate	0.5 mm/rev
Lubrication	emulsion or oil



Flanging tool



Technical details: Flanging tools



Flanging tool

Application	flanging of tube shaped parts
Dimension	as required

Options

- Tailor made fixtures, HSK etc.

Application parameters

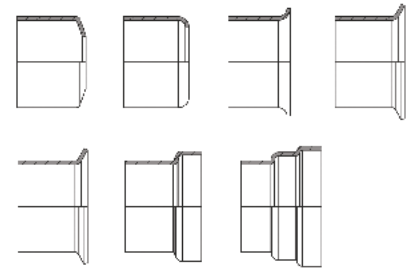
Please note that this information represents standard values which must be adapted to the individual cases.

Speed	up to 50 m/min
Feed rate	up to 0.5 mm/rev
Lubrication	emulsion or oil

Flanging tools

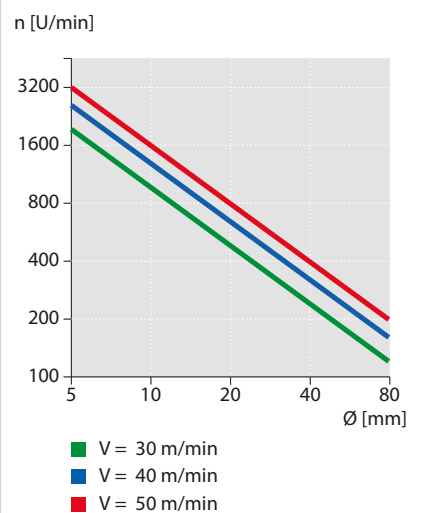
create various contours in thin walled parts (e.g. tubes).

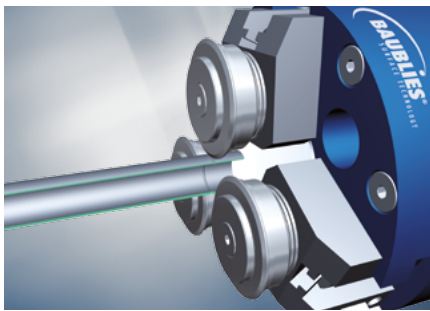
Examples of contours



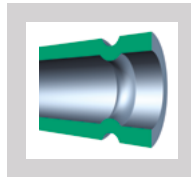
Advantages

- both tool or workpiece can rotate
- very short machining time
- slim design
- fast return of investment
- short cycle time
- easy to maintain
- useable on common machine types

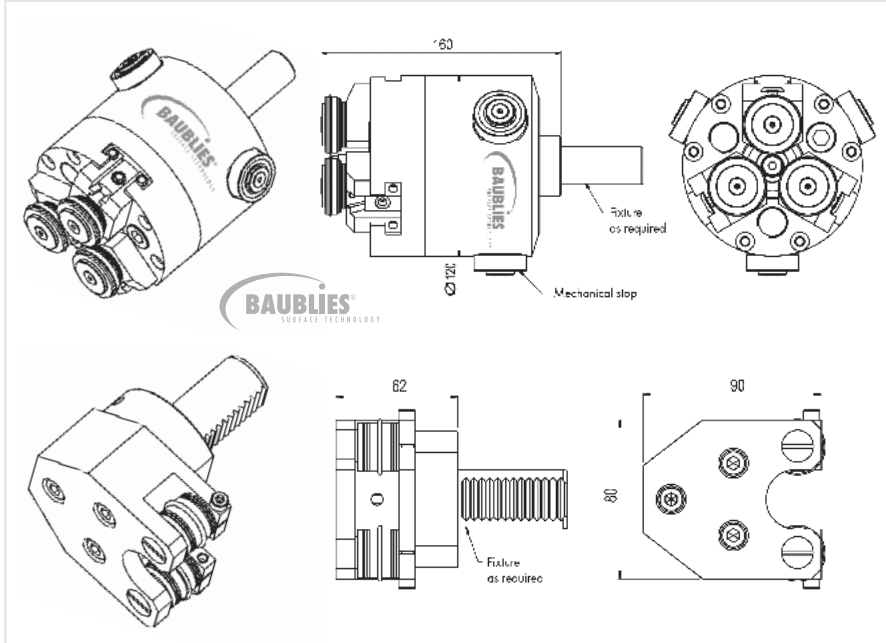




External creasing tool



Technical details: External creasing tool



External creasing tool

Application	forming of tube shaped parts
Dimension	as required

Options

- Tailor made fixtures, HSK etc.

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

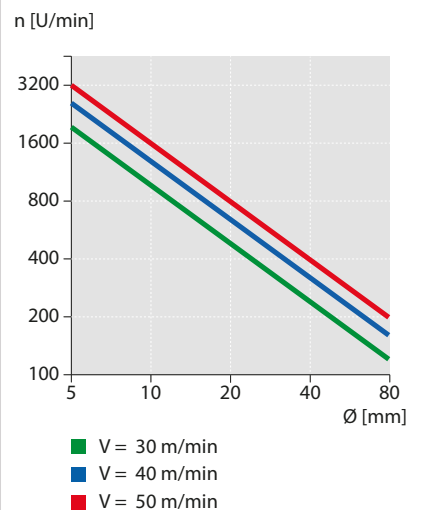
Speed	up to 50 m/min
Feed rate	up to 0.5 mm/rev
Lubrication	emulsion or oil

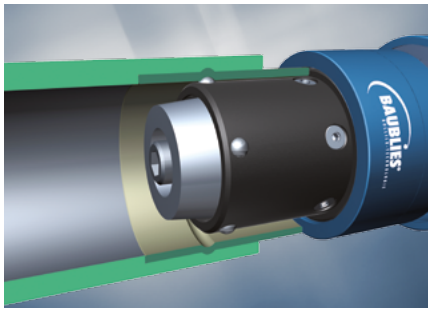
External creasing tools

are tailor made tools for external grooves in thin walled parts.

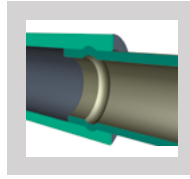
Advantages

- very short machining time
- short cycle time
- fast return of investment
- easy to maintain
- slim design
- useable on common machine types

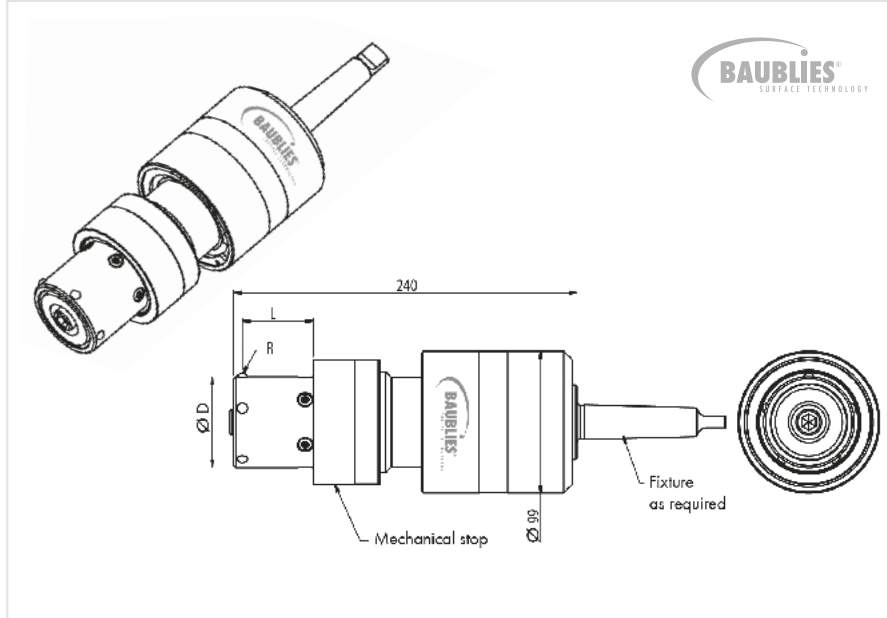




Internal creasing tool



Technical details: Internal creasing tool



Internal creasing tool

Application	forming of tube shaped parts
Dimension	as required

Options

- Tailor made fixtures, HSK etc.

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

Speed	up to 50 m/min
Feed rate	up to 0.5 mm/rev
Lubrication	emulsion or oil

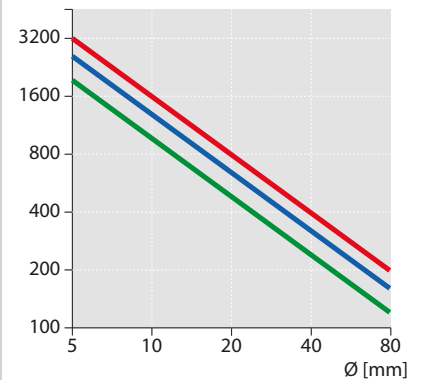
External creasing tools

are tailor made tools for external grooves in thin walled parts.

Advantages

- very short machining time
- both tool or workpiece can rotate
- short cycle time
- fast return of investment
- easy to maintain
- slim design
- useable on common machine types

n [U/min]



- V = 30 m/min
- V = 40 m/min
- V = 50 m/min

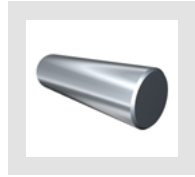
ROLLER BURNISHING MACHINE RM 2/35

PRECISE FINISHING OF EXTERNAL
DIAMETERS OF CYLINDRICAL
WORK PIECES



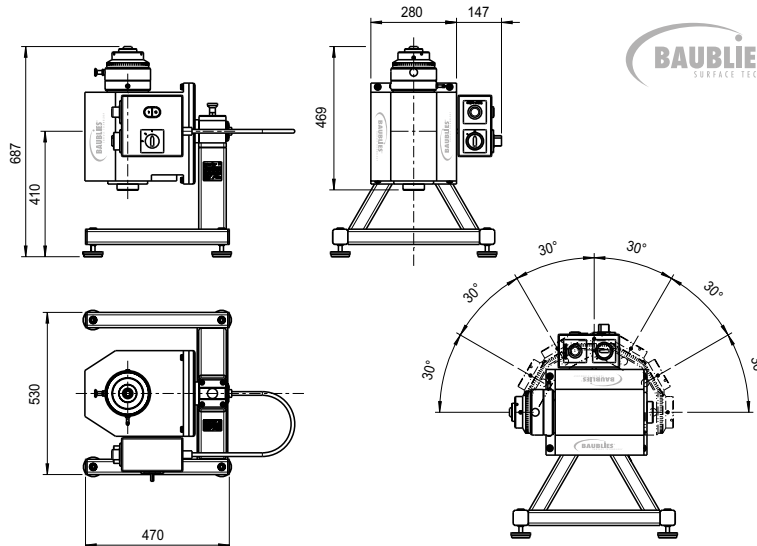


Roller burnishing machine for external diameters of cylindrical workpieces



RM 2/35
Ø 2 - 35 mm

Technical details: Roller burnishing machine RM 2/35



Roller burnishing machine RM2/35

The Baublies roller burnishing machine RM 2/35 allows the precise finishing of external diameters of cylindrical workpieces in a diameter range between 2 and 35 mm in through-feed method.

Advantages

- very short machining time
- fast return of investment
- wear-resistant surface due to material compression
- easy to maintain and to handle
- no grinding dust
- easy inclination of the machine in 30°-steps

Roller burnishing machine RM 2 /35

Application	shafts in through-feed method
Diameter range	from 2 - 35 mm
Motor speed	450/700/1400 rpm
Electrical connection	three phase 400 V, 50 Hz, 16 A
Inclination	180° (total) adjustable in steps of 30°
Weight	approx. 80 Kg

Options

Diameter range	< 2 mm or > 35 mm (max. 40 mm)
Motor speed	700/1400/2800 rpm
Different electrical connection	
Minimal lubrication spraying system	

Application parameters

Please note that this information represents standard values which must be adapted to the individual cases.

Workpiece allowance	up to 0.02 mm
Lubrication	oil
Pre-machining of workpiece	surface roughness (Rz) up to 15 µm tolerance IT8 or better
Workpiece hardness	up to 45 HRC