BÖNI AG. MARKING AND KNURLING TOOLS.

COMPLETE CATALOGUE

www.boeni-ag.com

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MARKING AND KNURLING OF HIGHEST QUALITY.

THE COMPANY

Böni AG is a family run enterprise now in its 3rd generation. Ever since its foundation in 1933 it has been committed to its own development and manufacture of precision tools for the metal working industry. During its long years of experience in the field of precision tools, the company was able to specialize in the manufacture of marking tools (for CNC machines) and knurling tools.

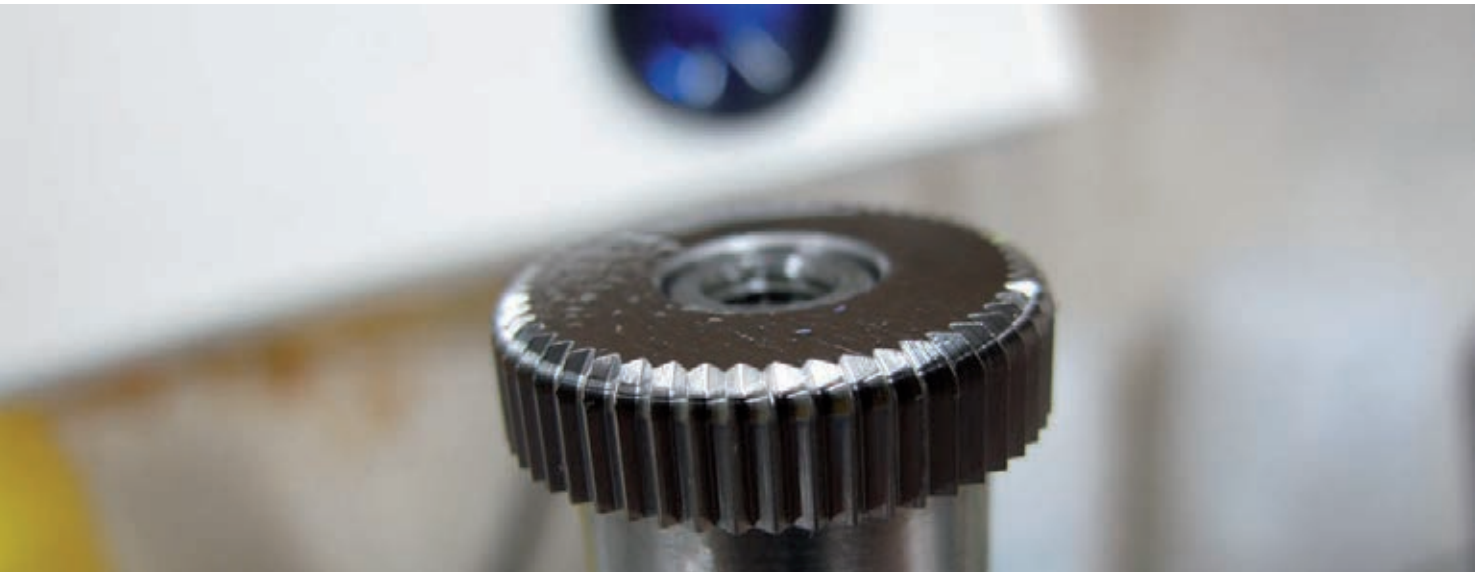
Today's increased demands on quality and tool life constantly require highest stress on machines and tools. A comprehensive line of standard tools successfully meets these requirements and thus enables our customers to gain a decisive edge over their competitors. The provision of knurling and marking tools for turned parts has been one of our core competencies for many years.

Our vast range of products allows you to process your workpieces in an efficient and economical manner. In case of any particular requirements which cannot be met by the use of standard tools we are, through our know-how, in a position to develop solution oriented tools to meet your exact needs.

We start where other manufacturers stop.

BÖNI AG.
Marking and knurling of highest quality.

WE START WHERE OTHER MANUFACTURERS STOP.



Marking tools are tools used for marking the workpiece to be processed directly on CNC-controlled machines in a fast and cost-effective way.

In this process, tools are developed that way to be capable of being used on different machines such as automatic lathes, multi-spindle machines or very conventional CNC lathes. The tools are produced with square clamping shanks or on request also supplied with other exceptions such as e.g. with VDI arbors, HSK tapers or Capto mounting.

A large range of marking wheels for marking at the circumference, circular markings at the end face or for markings on plane surfaces is also available for delivery like markings directly at a collar or in grooves. In this process, the customer may choose either fixed engraved marking wheels or marking wheels with exchangeable characters. The range is such comprehensive that you better have an overview of options on our overview on pages 10 and 11. For further information regarding the individual tools and marking wheels please refer to pages 12-24.

Knurling tools are equipped with knurling wheels and applied in turning lathes for applying an interlocking on the circumference of a rotationally symmetric workpiece.

The workpiece material usually determines whether the workpiece shall be processed only by cold distortion by means of forming knurling wheels or by cutting using cutting wheels. Since knurls are usually produced for torque transmission or for decoration purposes, they must accordingly achieve the best possible surface quality.

For achieving this best possible quality we rely on a tangential functioning of the knurling tools. An 180° arrangement of the knurling wheels above the centre of the workpiece avoids any harmful side pressure influencing the workpiece and consequently the component is processed evenly. Knurling tools are available as a modular system and the customer may choose for the optimal tool combination. A large range of tools and standardized knurling wheels is also part of our scope of delivery as the option of customer-oriented solutions. We are sure our technicians will have the perfect solution for you. For getting a general idea please refer to our overview on pages 28 and 29. For further information about the individual tools and knurling wheels please have a look at pages 30-37.

Conical knurls according to DIN 72386 requiring compliance with an exact number of teeth, angles and cone diameter can be produced by means of Böni taper knurling tools and taper knurling wheels. For further information please refer to page 38.

TECHNOLOGY MARKING

MARKING TOOLS FOR PROCESSING MACHINES

In regards to product liability it is considered to be understood that workpieces are marked with their pertaining production data, suppliers' specifications, lot number, logos, material quality, date or other relevant information in order to ensure complete manufacturing documentation.

Workpieces produced on CNC lathes, multi-spindle machines, sliding headstock automatic lathes can be directly marked on the machine using Böni marking tools. It doesn't matter whether they are required to mark one or several characters, one, two or three lines.

Our marking tools mainly operate according to the principle of the resilient marking wheel. After the marking wheel having been pressed into the rotating workpiece, the marking wheel rotates until end of text. After that, the tool is taken away from the workpiece and the installed spring provides for a rapid reset of the marking wheel to its starting position. The tool is ready for marking again. This entire process happens in a split second. There are various standard tools available for peripheral or flat marking.

Important advantages of marked workpieces:

- Identification of workpieces.
- Differentiation from other providers and/or no-name products.
- Retraceability of the product up to the supplier.
- Batch separation and batch traceability.

There are different marking variants available on the market for applying marking, either by laser, needle embosser, inkjet printer, etching etc.

However, all of them feature the same disadvantages:

- Workpieces must be transported from the production machine to the marking machine via a transport route.
- Workpieces are stored temporarily until being ready for marking.
- Clamping devices must be produced for fixing workpieces for the marking process.
- The marking machine must be established.
- Danger of confusion in case of similar components.

SET A MARK. WITH BÖNI.

Markings by means of Böni marking tools directly on the manufacturing machine have important advantages over other labeling methods:

- Separate mounting or clamping processes are not required at all since the workpiece is already clamped on the manufacturing machine.
- Processing time per marking is shorter than 1 second.
- Marking tool is set up like a lathe tool.
- Manual changeover to separate machine for marking is dispensed with.
- No additional handling fees such as travel and idle times.
- No additional set-up time.
- Workpiece leaves the machine finished marked, no danger of confusion.
- Uniform marking and marking quality.
- Reduction of unit costs.
- Reduction in operating expenses.

Advantages of Böni marking tools over other products or manufacturers:

- Low investment costs.
- Tools equipped with needle bearing and/or axial bearing.
- Solid construction.
- No risk of double marking with the resilient system.
- Shortest marking time of all marking systems available.
- All marking wheels and segments are made from high-quality tool steel, ensuring high compressive strength and consequently excellent tool life.
- Durable marking of workpieces, even readable in case of rusting.
- Customer-oriented solutions realizable.

Our strength is providing problem solutions where a standard tool is not the ideal solution.

Ask our technicians for a solution, maybe we have the right thing for you.

TECHNOLOGY MARKING

WHAT IS MARKING?

Marking is a mechanical process during which a stamp is pressed into a material by applying force. Due to the forces exerted by the stamp on the workpiece, the material is formed. This is called cold forming.

Consequently, by applying suitable stamps it is possible to press in a marking on a workpiece such as item numbers, logos, serial numbers or charge numbers. So the workpieces are durably marked and seamless traceability is ensured.

Marking options:

There are many ways for marking workpieces.
Here a small selection:

- Manual marking punch
- Electrolytic marking (etching)
- Inkjet printer
- Laser
- Engraving
- Electrical engraving

  etc.

However, all the procedures mentioned above have one thing in common, they are time-consuming and do not happen directly on the production machine.

Example:

The turned parts are completely produced on a lathe without any marking. The following variants are available:

- Marking of the workpieces is done on another machine: Marking machines involve high investment costs and it must be considered how rapidly a marking can be applied on the workpiece. Transit and wait times require consideration. Being able to stretch the workpiece requires suitable clamping devices or appliances which also cause high investment costs.
- Machine operator marks during machine run time: The workpieces are marked by means of a manual marking punch. The parts are irregularly deeply marked, oblique and do not show any unique distances, so optically insufficient.

The solution of the problems mentioned and cost reduction is: Böni marking tools.

Marking workpieces is mandatory for the production machine for the purpose of time and cost saving. When producing turned parts on lathes the marking process may be included as an additional operation with the versatility and rapidity playing an important part.

SET A MARK. WITH BÖNI.

Versatility:

Böni marking tools are so versatile that there are hardly any limits. Rotationally symmetric components may be stamped at the periphery, in grooves, in the corner, on a plane surface, in a plane groove, in the drill, a cone, an edge break or even on a hexagonal surface. You can select between two marking wheels which are fixed engraved or marking wheels where individual characters can be exchanged. The range of different marking tools is very complex and so is our advisory service as well. Not only marking on lathes can be realized. Stamping tools on milling machines achieve saving of time for constantly recurring markings.

Rapidity:

Time is our most precious commodity, so we utilize time. Our tools are designed that way that marking is durably marked in a component within shortest time. Thanks to this technology we are in the position to apply a marking on the workpiece within milliseconds.

Example with calculation basis:

Workpiece diameter: 30mm, cutting metres 20m/Min., length of text: 70mm. Rotational speed calculated for the workpiece: ~ 212 rotations/min. During one minute, the workpiece rotates 212 times and so covers a way of 19980mm in a minute (circumference (Ø 30*Pi) x rotational speed). Per 1mm distance the workpiece requires 0.003 seconds (60 sec. /19980mm). The distance of 70mm requires a marking time of ~0.21 seconds (70mm length of text x 0.003 sec./mm).

The actual marking process takes just the fraction of a second. For clarification:

For 60 rotations per minute a rotation takes one second. If a text is required to be marked at the circumference of a workpiece taking up about 90° of the circumference, this marking takes 0.25 seconds.

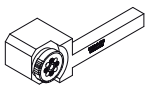
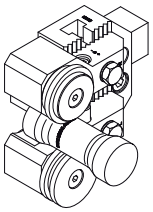
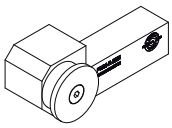
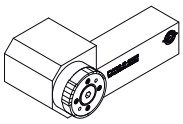
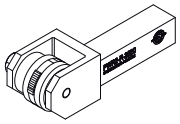
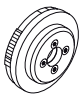
Our recommendations for cutting metres for the marking wheels are workpiece-material-related, but are in the range of 15–60m/min.

Please find tools for the spring loaded system on pages 17–24.

SYSTEM OVERVIEW MARKING TOOLS

RADIAL MARKING

RADIAL MARKING IN GROOVES

PW02	Tangential marking tool with counter roller. Marking wheels like PW05 apart from Ø 57mm	PW05	PW06 Heavy Duty	PWR2
				
 4/402072  4/402078		 4/402082  4/401399  4/401814 with Ø 35/5  4/401970 with Ø 35E	 4/401511  4/401866  4/402405
		Special accessories  4/401815 with Ø 35/6.5  4/401815 with Ø 35/3.25  4/402316 with Ø 44/6.5  4/402176 with Ø 57/5  4/402198 with Ø 57/5 and text ring Ø 57/5  4/402244 with 2 x Ø 35/5	 4/402435

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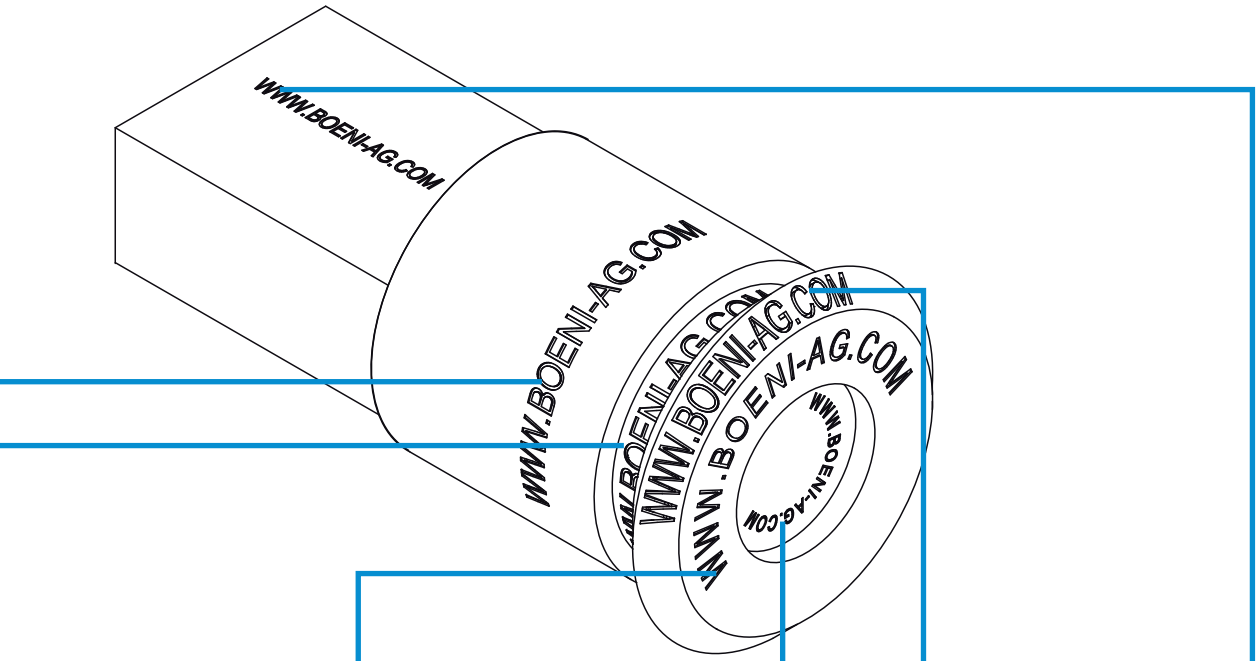
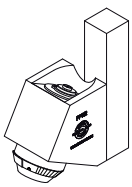
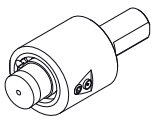
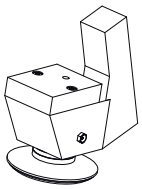
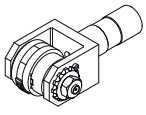


FLAT MARKING

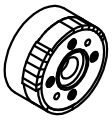
FLAT MARKING IN GROOVES

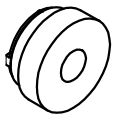
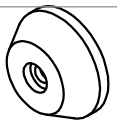
CONE MARKING

SURFACE MARKING

PPW2 Roll marking tool			PWBAZ2 Surface marking tool
			
 4/402233  4/402217  4/402326  4/402262  4/402487			 4/401511  4/401866  4/402405

OVERVIEW MARKING WHEELS

Marking wheel	Product details	View
4/401399	**Marking wheel engraved from solid dia. 35mm** ○ Letters, numbers, special characters as well as logos in different type heights possible. ○ Single line marking or multiple line marking. ○ Flexible type heights up to max. 14mm.	
4/402082	**Marking wheel engraved from solid dia. 40mm** ○ Letters, numbers, special characters as well as logos in different type heights possible. ○ Single line marking or multiple line marking. ○ Flexible type heights up to max. 14mm. ○ Marking in a groove.	
4/401814L **4/401814R**	**Marking wheel for exchangeable segments dia. 35mm or 44mm** ○ Turning the segments allows alternating between 2 different character orientations. ○ Standard segments dia. 35mm with type heights of 2.5mm, 3mm and 4mm. ○ Other types available on request. Max. type height 4mm. ○ Extension segments dia. 44mm for marking in a groove or behind a shaft collar. ○ Type heights up to 4mm possible.	
4/401970L **4/401970R**	**Corner marking wheel for exchangeable segments dia. 35mm or 44mm** ○ Corner marking wheels allow direct marking on a corner or a shaft collar without having to give up the flexibility of individual segments or multi character segments. ○ Standard comer marking segments dia. 35mm for single line marking. Type heights up to 5.5mm possible. ○ Extension corner marking segments dia. 44mm for independent marking in a groove or behind a shaft collar. Type heights up to 5.5mm possible.	
4/402072	**Marking wheel engraved from solid dia. 24mm** ○ Letters, numbers, special characters as well as logos in different type heights possible. ○ Single line marking or multiple line marking. ○ Flexible type heights up to max. 7mm.	
4/402078R **4/402078L**	**Corner marking wheel for exchangeable segments dia. 24mm** ○ Standard comer marking segments dia. 24mm for single line marking. ○ Type heights up to 3mm possible.	
4/401511	**Marking wheel engraved from solid dia. 30mm** This marking wheel is ideally suited for marking of series parts which require precise repeatability. The text is firmly engraved in the wheel and cannot be changed anymore. ○ Letters, numbers, special characters as well as logos up to 14mm type height. ○ Single line marking or multiple line marking.	
4/401866L **4/401866R**	**Marking wheel for exchangeable segments dia. 30mm** This marking wheel allows the text to be flexibly incorporated by means of individual segments or word segments according to requirements. Turning the segments allows alternating between 2 different character orientations. ○ Standard segments dia. 30mm with type heights of 2.5mm, 3mm and 4mm. Other types available on request. ○ Max. type height 4mm.	

Marking wheel	Product details	View
4/402405R **4/402405L**	**Marking wheel for exchangeable segments dia. 35mm** This marking wheel allows the text to be flexibly incorporated by means of individual segments or word segments according to requirements. Turning the segments allows alternating between 2 different character orientations. - Standard segments dia. 35mm with type heights of 2.5mm, 3mm and 4mm. Other types available on request. - Max. type height 4mm. - Extension segments dia. 44mm for marking in a groove or behind a shaft collar.	
4/402435	**Marking wheel engraved from solid dia. 35mm** This marking wheel is ideally suited for marking of series parts which require precise repeatability. The text is firmly engraved in the wheel and cannot be changer anymore. - Letters, numbers, special characters as well as logos up to 14mm type height. - Single line marking or multiple line marking.	
4/402217	**Flat marking wheel from solid dia. 35mm** This marking wheel is ideally suited for marking of series parts which require precise repeatability. The text is firmly engraved in the wheel and cannot be changer anymore. - Letters, numbers, special characters as well as logos up to 10mm type height. - Single line marking or multiple line marking. - Working area dia. 30–500mm.	
4/402233R **4/402233L**	**Flat marking wheel for exchangeable segments dia. 35mm** This marking wheel allows the text to be flexibly incorporated by means of individual segments or word segments according to requirements. - Standard segments dia. 35mm with type heights of 2.5mm, 3mm and 4mm. Other types available on request. - Max. type height 5mm. - Working area dia. 30–500mm.	
4/402326	**Flat marking wheel from solid dia. 40mm** This marking wheel is ideally suited for marking of series parts which require precise repeatability. The text is firmly engraved in the wheel and cannot be changer anymore. - Letters, numbers, special characters as well as logos up to 6mm type height. - Single line marking or multiple line marking. - Working area dia. 30–500mm.	
4/402262	**Flat marking wheel from solid dia. 35mm** This marking wheel is ideally suited for marking of series parts which require precise repeatability. The text is firmly engraved in the wheel and cannot be changer anymore. - Letters, numbers, special characters as well as logos up to 6mm type height. - Single line marking or multiple line marking. - Working area dia. 15–500mm.	
4/402487	**Flat marking wheel from solid dia. 35mm** This marking wheel is ideally suited for marking of series parts which require precise repeatability. The text is firmly engraved in the wheel and cannot be changer anymore. - Letters, numbers, special characters as well as logos up to 3mm type height. - Single line marking or multiple line marking. - Working area dia. 10–100mm	

Please refer to price list for desired character segments. For further information regarding the selection of optimal marking wheels we will be pleased to send you a supplementary sheet containing the technical dimension with regard to marking on a corner (a collar). We would, of course, also be glad to personally advise you in this conjunction.

LETTER BASE MARKING WHEELS

Technical annex and important informations on marking wheels and segments

1. Fonts
Special engraving fonts are available to engrave the marking wheels and the segments. A typeface similar to the DIN 1451 font is used as our standard font. This standard font offers various widths and, according to space requirements or length of text, the following widths are available for selection.

- **Tight letter spacing**
- **Tight medium letter spacing**
- **Medium letter spacing**

Other fonts and special characters can be manufactured on request. Please send your inquiry. As regards logos and special characters, a DXF drawing or a vector file is needed. Non-digital files will be charged at cost.

2. Font height
The font height is determined at the marking wheel on the engraving point. The height is measured via the points of engraving. The font height at the marked workpiece is consequently not identical with the font height on the marking wheel. The exact font height at the workpiece considerably depends on the marking depth and the flank angle of the font. If an exact font height requires consideration, a manufacturing allowance must be added at the workpiece and it must also be exactly complied with the marking depth.

3. Font width
In case of confined space conditions on the workpiece or smaller diameters using a tighter spacing may be required.

4. Marking depth at the workpiece
The marking depth essentially depends on the type height and the workpiece. Characters are usually marked with a depth of 0.05 – 0.3mm.

Marking depths exceeding 0.4mm are possible, but require separate production.

5. Edges spacing
The minimum distance from the marking wheel edge to the font is 0.5 mm.

6. Character spacing / Spaces / Transport point
The distance between characters and words should not exceed a certain size. This size depends on the diameter of the marking wheel as well as on the diameter of the workpiece. A rule of thumb is: Distance > 1mm is bridged by a transport point.

It has been proven to use a transport point instead of a space. It ensures safe transport of the marking wheel and serves for a better distinction between words and strings. In this context please also refer to point 10, Start dots / Transportation dots.

7. Font heights of exchangeable individual segments
For exchangeable individual segments we have agreed upon standard font heights.

Segments dia. 24mm: 1.5 and 2mm
Segments dia. 35mm and up: 2.5, 3 and 4mm

Other font heights producible on request.

8. Font heights in case of marking wheels engraved from the solid
For marking wheels engraved from the solid we start from font heights of 0.4mm and for technical reasons end at 14mm, whereby we do not recommend font heights above 10mm, due to the rapidly increasing pressure.

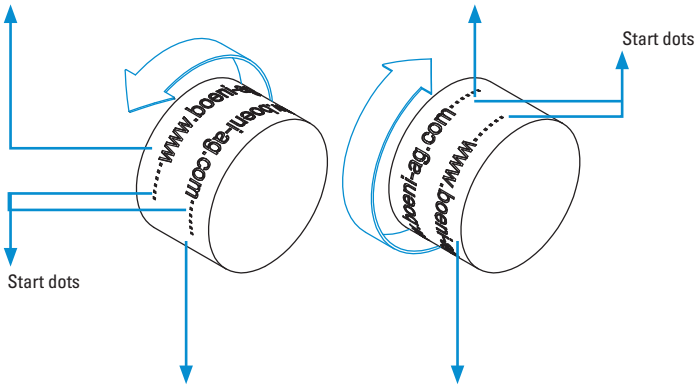
9. Font orientation
The position of marking on the workpiece requires prior clarification. For marking wheels engraved from the solid the font orientation cannot be changed afterwards. For some marking wheels for exchangeable segments font orientation can be changed by rotating the segments. In this context please refer to the note under marking wheels: Segments rotatable.

10. Start dots / Transportation dots
For being able to mark during a rotating spindle, six start dots are required to be applied in front of the text. These start dots bridge the time from the first contact of the marking wheel on the rotating workpiece up to achieving the marking depth. Marking directly with the effective text without start dots, the first character would be marked ony some one hundred millimetres deep while the last character has achieved the full marking depth. The consequence is an optically irregular and unattractive marking.

Marking during rotating spindle – only possible with start dots

Letter base right SFR
Rotational direction right M3 (ISO 6983)
Beginning of marking at the beginning of lettering
Start dots at the beginning of text required

Letter base right SFR
Rotational direction left M4 (ISO 6983)
Beginning of marking at the end of lettering
Start dots at the end of text required



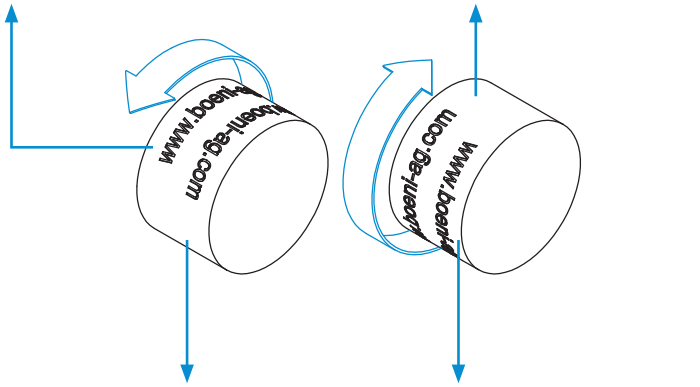
Letter base left SFL
Rotational direction right M3 (ISO 6983)
Beginning of marking at the end of lettering
Start dots at the end of text required

Letter base left SFL
Rotational direction left M4 (ISO 6983)
Beginning of marking at the beginning of lettering
Start dots at the beginning of text required

Marking with c-axis – Start dots not required

Letter base right SFR
Rotational direction right M3 (ISO 6983)
Beginning of marking at the beginning of lettering
No start dots required

Letter base right SFR
Rotational direction left M4 (ISO 6983)
Beginning of marking at the end of lettering
No start dots required



Letter base left SFL
Rotational direction right M3 (ISO 6983)
Beginning of marking at the end of lettering
No start dots required

Letter base left SFL
Rotational direction left M4 (ISO 6983)
Beginning of marking at the beginning of lettering
No start dots required

11. Floating knurl
Some workpieces may involve no start dots becoming visible on the workpiece for technical or optical reasons. Therefore, it is possible to apply a floating knurl at the marking wheel. Floating knurls can be removed by further processing or tapping the workpiece.

12. Plunging speed rate
Plunging the marking wheel into the workpiece should happen as fast as possible, best by means of the maximum feed speed G0.

13. Controlling the text length based on the downtime of the marking wheel at marking depth
After the marking wheel having achieved the marking depth it may be necessary to program a short dwell time (0.05 to 0.2 seconds). Without dwell time the marking wheel would not have sufficient time for unrolling the entire text length. The dwell time would keep the marking wheel at marking depth until the last character is marked into the workpiece. After that, the tool can immediately drive off the workpiece.

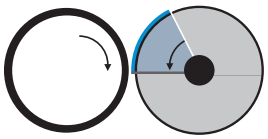
14. Marking thin-walled parts
Marking thin-walled or unstable workpieces requires special attention. For thin-walled workpieces it is recommended to utilize the entire material strength and to apply drillings after the marking process only.
Unstable workpieces may be rapidly pressed away owing to the marking pressure. Therefore, we would like to recommend using marking tools with counter roller for the workpiece being supported by the counter roller during marking.

RADIAL MARKING TOOLS

THE EQUAL

Diameter related marking.

Rotating marking tool



Marking wheel with engraving

TOOL VARIANTS

Left	Right	X	A	B	C	D	E	F	G	H	I Max. diameter	Dimension
RP1-L-0808	RP1-R-0808	8	6	75	15	6	5	2	16	5	21	20 x 5 x 6
RP1-L-1010	RP1-R-1010	10	6	75	15	6	5	2	16	5	21	20 x 5 x 6
RP1-L-1212	RP1-R-1212	12	6	75	15	6	5	2	16	5	21	20 x 5 x 6
RP1-L-1616	RP1-R-1616	16	6	75	15	6	5	2	16	5	21	20 x 5 x 6
RP2-L-0808	RP2-R-0808	8	6	75	15	6	5	2	16	8	21	20 x 8 x 6
RP2-L-1010	RP2-R-1010	10	6	75	15	6	5	2	16	8	21	20 x 8 x 6
RP2-L-1212	RP2-R-1212	12	6	75	15	6	5	2	16	8	21	20 x 8 x 6
RP2-L-1616	RP2-R-1616	16	6	75	15	6	5	2	16	8	21	20 x 8 x 6
RP3-L-0808	RP3-R-0808	8	6	75	17	8	6	2	16	5	24	20 x 5 x 8
RP3-L-1010	RP3-R-1010	10	6	75	17	8	6	2	16	5	24	20 x 5 x 8
RP3-L-1212	RP3-R-1212	12	6	75	17	8	6	2	16	5	24	20 x 5 x 8
RP3-L-1616	RP3-R-1616	16	6	75	17	8	6	2	16	5	24	20 x 5 x 8
RP4-L-0808	RP4-R-0808	8	6	75	17	8	6	2	16	8	24	20 x 8 x 8
RP4-L-1010	RP4-R-1010	10	6	75	17	8	6	2	16	8	24	20 x 8 x 8
RP4-L-1212	RP4-R-1212	12	6	75	17	8	6	2	16	8	24	20 x 8 x 8
RP4-L-1616	RP4-R-1616	16	6	75	17	8	6	2	16	8	24	20 x 8 x 8

Field of application:
- Marking on periphery, marking in grooves.

Types of machines:
- Suitable for all conventional and CNC controlled lathes.
- Sliding headstock automatic lathes.
- Cam controlled automatic lathes.
- Multispindle automatic lathes.

Properties:
- Marking system without return spring.
- Marking wheel dependant on workpiece diameter.
- Marking directly on a corner (collar) to a limited extent only.
- Marking behind a collar or in a groove possible.

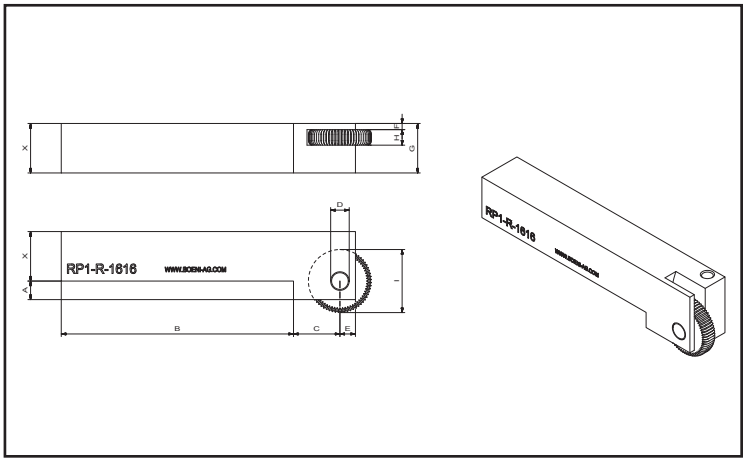
Tool:
- Special surface hardening allows for increased wear resistance of tool.
- Swing (center height) integrated in tool.
- Square shaft 8 x 8mm, 10 x 10mm, 12 x 12mm or 16 x 16mm.
- Hard metal bolt for wear reduction.

Marking wheels:
- Only available with marking wheels engraved from solid. The diameter of the marking wheel depends on the workpiece diameter and the marking depth and linked to the respective workpiece diameter.

ITEM NUMBER SYSTEMATICS

RP1-R-1616	**RP1**	-->	**Tool typ**
	R	-->	**Right execution**
	1616	-->	**Shank size 16 x 16mm**

DIMENSION



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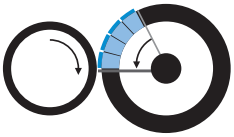
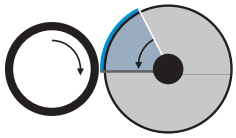
PW02 SMALL

Marking tool for lathes with restricted space conditions.

Resilient marking tool



Marking wheel with segments



Marking wheel with solid engraving

Field of application:
- Marking on periphery.
- Marking in grooves.
- Marking on hexagonal surfaces (only by means of C axis).
- Marking range starting from Ø3mm.

Types of machines:
- Suitable for all conventional and CNC controlled lathes.
- Sliding headstock automatic lathes.
- Cam controlled automatic lathes.
- Multispindle automatic lathes.

Properties:
- Marking system with return spring.
- Independent of workpiece diameter.
- Marking directly on a corner (collar) possible.
- Marking behind a collar or in a groove possible with solid engraved marking wheels or special marking segments.

Tool:
- Special surface hardening allows for increased wear resistance of tool.
- A precision needle bearing ensures smooth running and power absorption of the bearing shaft.
- Swing (center height) integrated in tool.

Marking wheels:
- Marking wheel engraved from solid, item N° 4/402072.
- Max. type height 7mm (dependent on material).
- Marking wheel for exchangeable segments. Item N° 4/402078. Max. type height 3mm.

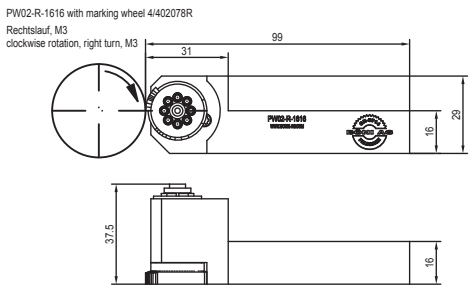
TOOL VARIANTS

Tool	Tool type	Execution	Shank size
PW02-L-1010	PW02	Left	10 x 10mm
PW02-R-1010	PW02	Right	10 x 10mm
PW02-L-1212	PW02	Left	12 x 12mm
PW02-R-1212	PW02	Right	12 x 12mm
PW02-L-1616	PW02	Left	16 x 16mm
PW02-R-1616	PW02	Right	16 x 16mm

ITEM NUMBER SYSTEMATICS

PW02-R-1616	**PW02**	-->	**Tool type**
	R	-->	**Right execution**
	1616	-->	**Shank size 16 x 16mm**

DIMENSION



PW05 STANDARD

Universal marking tool for lathes.

Resilient marking tool

Marking wheel with segments | Marking wheel with solid engraving

Field of application:
- Marking on periphery.
- Marking in grooves.
- Marking on hexagonal surfaces (only by means of C or Y axis).
- Marking range starting from Ø5mm.

Types of machines:
- Suitable for all conventional and CNC controlled lathes.
- Cam controlled automatic lathes.
- Multispindle automatic lathes.

Properties:
- Marking system with return spring.
- Independent of workpiece diameter.
- Marking directly on a corner (collar) possible.
- Marking behind a collar or in a groove, also with exchangeable segments.

Tool:
- Special surface hardening allows for increased wear resistance of tool.
- A precision needle bearing ensures smooth running and power absorption of the bearing shaft.
- Swing (center height) integrated in tool.

Marking wheels engraved from solid:
- Marking wheel dia-35mm, HSS, 4/401399. Max. type height 14mm (depending on material).
- Marking wheel dia-40mm, HSS, 4/402082. Max. type height 14mm (depending on material).
- Marking wheel dia. 44mm, HSS. Max. type height 14mm (depending on material).
- Marking wheel dia. 57mm, HSS. Max. type height 14mm (depending on material).
- Additional special marking wheels available on request.

Marking wheels for exchangeable segments:
- Marking wheels 4/401814 for segments dia. 35mm. Max. type height 4mm.
- Marking wheel 4/401970 for corner marking segments dia. 35mm. Max. type height 5mm.
- Marking wheel 4/401970 for corner marking segments dia. 40mm. Max. type height 4mm.
- Marking wheel 4/401970 for corner marking segments dia. 44mm. Max. type height 4mm.
- Marking wheels 4/402176 for segments dia. 57mm. Max. type height 4mm.
- Additional special marking wheels for exchangeable segments available on request.

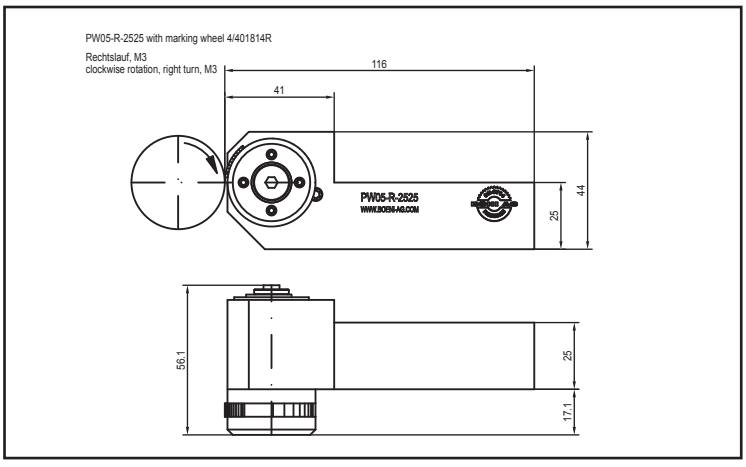
TOOL VARIANTS

Tool	Tool type	Execution	Shank size
PW05-L-1616	PW05	Left	16 x 16mm
PW05-R-1616	PW05	Right	16 x 16mm
PW05-L-2020	PW05	Left	20 x 20mm
PW05-R-2020	PW05	Right	20 x 20mm
PW05-L-2525	PW05	Left	25 x 25mm
PW05-R-2525	PW05	Right	25 x 25mm

ITEM NUMBER SYSTEMATICS

PW05-R-2020	**PW05**	-->	**Tool type**
	R	-->	**Right execution**
	2020	-->	**Shank size 20 x 20mm**

DIMENSION



PW06 HEAVY DUTY

Marking tool for lathes for challenging large types.

Resilient marking tool

Marking wheel with segments | Marking wheel with solid engraving

Field of application:
- Marking on periphery.
- Marking in grooves.
- Marking on hexagonal surfaces (only by means of C or Y axis).
- Marking range starting from Ø5mm.

Types of machines:
- Suitable for all conventional and CNC controlled lathes.
- Cam controlled automatic lathes.
- Multispindle automatic lathes.

Properties:
- Marking system with return spring.
- Independent of workpiece diameter.
- Marking directly on a corner (collar) possible.
- Marking behind a collar or in a groove, also with exchangeable segments.

Tool:
- Special surface hardening allows for increased wear resistance of tool.
- A precision needle bearing ensures smooth running and power absorption of the bearing shaft.
- Swing (center height) integrated in tool.

Marking wheels engraved from solid:
- Marking wheel dia-35mm, HSS, 4/401399. Max. type height 14mm (depending on material).
- Marking wheel dia-40mm, HSS, 4/402082. Max. type height 14mm (depending on material).
- Marking wheel dia. 44mm, HSS. Max. type height 14mm (depending on material).
- Marking wheel dia. 57mm, HSS. Max. type height 14mm (depending on material).
- Additional special marking wheels available on request.

Marking wheels for exchangeable segments:
- Marking wheels 4/401814 for segments dia. 35mm. Max. type height 4mm.
- Marking wheels 4/401815 for segments dia. 35mm. Max. type height 5.5mm.
- Marking wheel 4/401970 for corner marking segments dia. 35mm. Max. type height 5mm.
- Marking wheel 4/401970 for corner marking segments dia. 40mm. Max. type height 4mm.
- Marking wheel 4/401970 for corner marking segments dia. 44mm. Max. type height 4mm.
- Marking wheels 4/402176 for segments dia. 57mm. Max. type height 4mm.
- Additional special marking wheels for exchangeable segments available on request.

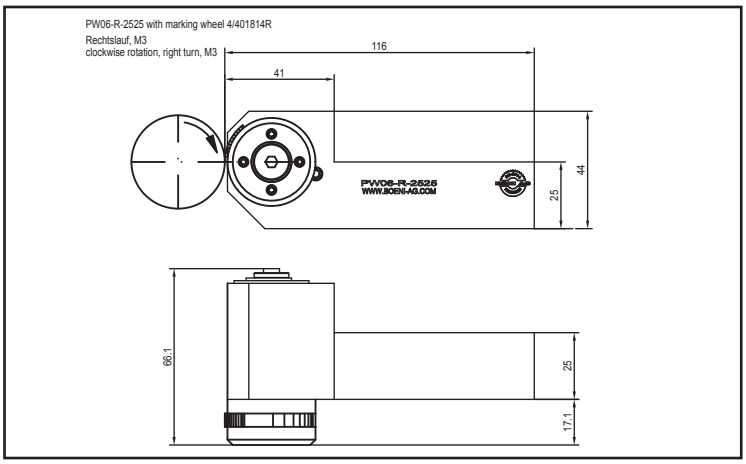
TOOL VARIANTS

Tool	Tool type	Execution	Shank size
PW06-L-1616	PW06	Left	16 x 16mm
PW06-R-1010	PW06	Right	16 x 16mm
PW06-L-2020	PW06	Left	20 x 20mm
PW06-R-1212	PW06	Right	20 x 20mm
PW06-L-2525	PW06	Left	25 x 25mm
PW06-R-1616	PW06	Right	25 x 25mm

ITEM NUMBER SYSTEMATICS

PW06-R-2020	**PW06**	-->	**Tool type**
	R	-->	**Right execution**
	2020	-->	**Shank size 20 x 20mm**

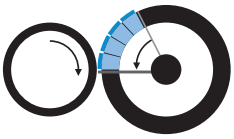
DIMENSION



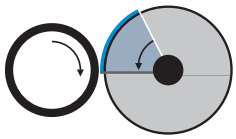
PWR2 ROCK SOLID

Marking tool, fork guided.

Resilient marking tool



Marking wheel with segments



Marking wheel with solid engraving

Field of application:
- Marking on periphery.
- Marking in grooves.
- Marking on hexagonal surfaces (only by means of C or Y axis)
- Straight marking on front faces (only engraved from solid).
- Marking range starting from Ø5mm.

Types of machines:
- Suitable for all conventional and CNC controlled lathes.
- Cam controlled automatic lathes.
- Multispindle automatic lathes.

Properties:
- Marking system with return spring.
- Independent of workpiece diameter.
- Marking directly on a corner (collar) to a limited extent only.
- Marking behind a collar or in a groove to a limited extent only.

Tool:
- Special surface hardening allows for increased wear resistance of tool.
- Swing (center height) integrated in tool.

Marking wheels engraved from solid:
- Marking wheel dia-30mm, HSS, 4/401511-12. Max. type height 14mm (depending on material).
- Marking wheel dia-35mm, HSS, 4/402435. Max. type height 14mm (depending on material).
- Additional special marking wheels available on request.

Marking wheels for exchangeable segments:
- Marking wheels 4/401866R and 4/401866L for segments dia. 30mm. Max. type height 4mm.
- Marking wheels 4/402405R and 4/402405L for segments dia. 35mm. Max. type height 4mm.
- Additional special marking wheels for exchangeable segments available on request.

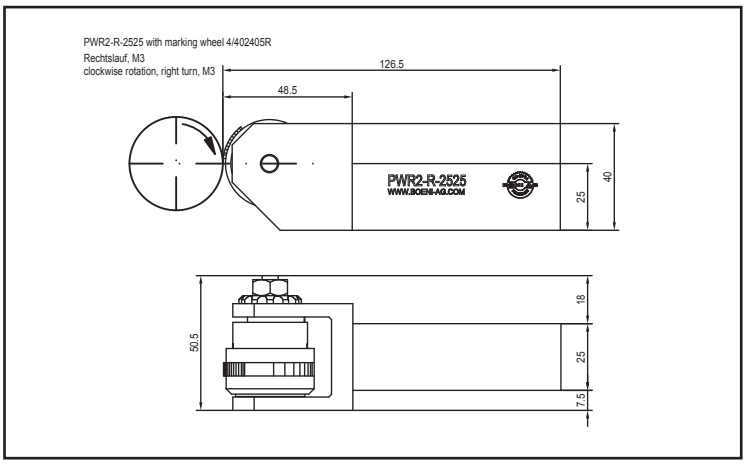
TOOL VARIANTS

Tool	Tool type	Execution	Shank size
PWR2-R-1616	PWR2	Right	16 x 16mm
PWR2-L-1616	PWR2	Left	16 x 16mm
PWR2-R-2020	PWR2	Right	20 x 20mm
PWR2-L-2020	PWR2	Left	20 x 20mm
PWR2-R-2525	PWR2	Right	25 x 25mm
PWR2-L-2525	PWR2	Left	25 x 25mm

ITEM NUMBER SYSTEMATICS

PWR2-R-2020	**PWR2**	-->	**Tool type**
	R	-->	**Right execution**
	2020	-->	**Shank size 20 x 20mm**

DIMENSION



PWBAZ2 THE FLAT

Marking tool, fork guided.

Resilient marking tool

Marking wheel with segments | Marking wheel with solid engraving

Field of application:
- Marking on even surfaces.

Types of machines:
- Suitable for all conventional and CNC controlled milling machines.

Properties:
- Marking system with return spring.

Tool:
- Special surface hardening allows for increased wear resistance of tool.

Marking wheels engraved from solid:
- Marking wheel dia-30mm, HSS, 4/401511-12. Max. type height 14mm (depending on material).
- Marking wheel dia-35mm, HSS, 4/402435. Max. type height 14mm (depending on material).
- Additional special marking wheels available on request.

Marking wheels for exchangeable segments:
- Marking wheels 4/401866R and 4/401866L for segments dia. 30mm. Max. type height 4mm.
- Marking wheels 4/402405R and 4/402405L for segments dia. 35mm. Max. type height 4mm.
- Additional special marking wheels for exchangeable segments available on request.

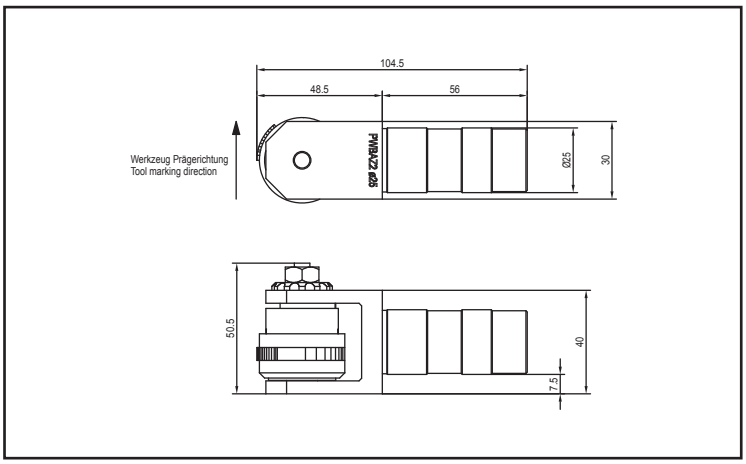
TOOL VARIANTS

Tool	Tool type	Execution	Straight shank size
PWBAZ2-16	PWBAZ2	Right	Ø 16mm
PWBAZ2-20	PWBAZ2	Right	Ø 20mm
PWBAZ2-25	PWBAZ2	Right	Ø 25mm

ITEM NUMBER SYSTEMATICS

PWBAZ2-20	**PWBAZ2**	-->	**Tool type**
	20	-->	**Straight shank size 20mm**

DIMENSION



PWGR2 HEAVY SENSIBLE

The tool for thin, unstable workpieces and/or pipes.
Marking Tool, fork guided.

Resilient marking tool

Marking wheel with segments | Marking wheel with solid engraving

Field of application:
- Marking on periphery.
- Marking in grooves.
- Marking on hexagonal surfaces (only by means of C axis or spindel indexing).
- Marking range Ø5–Ø45mm.

Types of machines:
- Suitable for all conventional and CNC controlled lathes.
- Cam controlled automatic lathes.
- Multispindle automatic lathes.

Properties:
- Marking system with return spring.
- Independent of workpiece diameter.
- Marking of unstable and thin-walled workpieces possible.
- Marking directly on a corner (collar) to a limited extent only.
- Marking behind a collar or in a groove to a limited extent only.

Tool:
- Special surface hardening allows for increased wear resistance of tool.
- Swing (center height) integrated in tool.

Marking wheels engraved from solid:
- Marking wheel dia-30mm, HSS, 4/401511-12. Max. type height 14mm (depending on material).
- Marking wheel dia-35mm, HSS, 4/402435. Max. type height 14mm (depending on material).
- Additional special marking wheels available on request.

Marking wheels for exchangeable segments:
- Marking wheels 4/401866R and 4/401866L for segments dia. 30mm. Max. type height 4mm.
- Marking wheels 4/402405R and 4/402405L for segments dia. 35mm. Max. type height 4mm.
- Additional special marking wheels for exchangeable segments available on request.

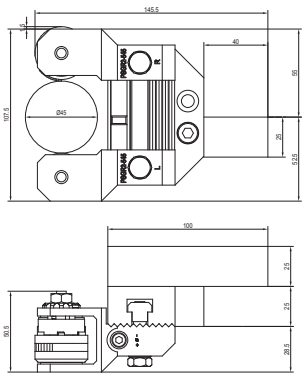
TOOL VARIANTS

Tool	Tool type	Execution	Shank size
PWGR2-R-1616	PWGR2	Right	16 x 16mm
PWGR2-L-1616	PWGR2	Left	16 x 16mm
PWGR2-R-2020	PWGR2	Right	20 x 20mm
PWGR2-L-2020	PWGR2	Left	20 x 20mm
PWGR2-R-2525	PWGR2	Right	25 x 25mm
PWGR2-L-2525	PWGR2	Left	25 x 25mm

ITEM NUMBER SYSTEMATICS

PWGR2-R-2020	**PWGR2**	-->	**Tool type**
	R	-->	**Right execution**
	2020	-->	**Shank size 20 x 20mm**

DIMENSION



PT045 SENSIBLE

Das Werkzeug für dünne, labile Werkstücke oder Rohre.

Resilient marking tool

Marking wheel with segments | Marking wheel with solid engraving

Field of application:
- Marking on periphery.
- Marking in grooves.
- Marking on hexagonal surfaces (only by means of C axis or indexing)
- Marking range Ø3–Ø45mm.

Types of machines:
- Suitable for all conventional and CNC controlled lathes

Properties:
- Marking system with return spring.
- Independent of workpiece diameter.
- Marking of unstable and thin-walled workpieces possible.
- Marking directly on a corner (collar) to a limited extent only.
- Marking behind a collar or in a groove to a limited extent only, also with exchangeable segments.

Tool:
- Special surface hardening allows for increased wear resistance of tool.
- A precision needle bearing ensures smooth running and power absorption of the bearing shaft.
- Swing (center height) integrated in tool.

Marking wheels engraved from solid:
- Marking wheel dia-35mm, HSS, 4/401399. Max. type height 14mm (depending on material).
- Marking wheel dia-40mm, HSS, 4/402082. Max. type height 14mm (depending on material).
- Additional special marking wheels available on request.

Marking wheels for exchangeable segments:
- Marking wheels 4/401814 for segments dia. 35mm. Max. type height 4mm.
- Marking wheel 4/401970 for corner marking segments dia. 35mm. Max. type height 5mm.
- Marking wheel 4/401970 for corner marking segments dia. 40mm. Max. type height 4mm.
- Additional special marking wheels for exchangeable segments available on request.

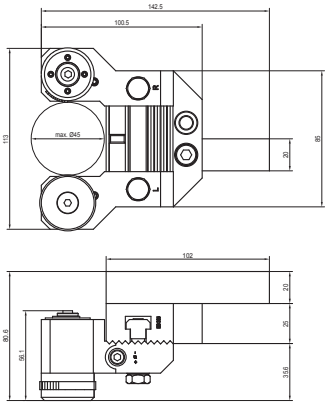
TOOL VARIANTS

Tool	Tool type	Execution	Shank size
PT045-R-1616	PT045	Right	16 x 16mm
PT045-L-1616	PT045	Left	16 x 16mm
PT045-R-2020	PT045	Right	20 x 20mm
PT045-L-2020	PT045	Left	20 x 20mm
PT045-R-2525	PT045	Right	25 x 25mm
PT045-L-2525	PT045	Left	25 x 25mm

ITEM NUMBER SYSTEMATICS

PT045-R-2020	**PT045**	-->	**Tool type**
	R	-->	**Right execution**
	2020	-->	**Shank size 20 x 20mm**

DIMENSION



PPW2 THE CIRCLE

Circular frontal marking on lathes.

Field of application:
- Circular marking on flat surfaces.

Types of machines:
- Suitable for all conventional and CNC controlled lathes.
- Cam controlled automatic lathes.
- Multispindle automatic lathes.

Properties:
- Marking system with return spring.
- Marking wheels depending on marking circle diameter.
- Marking range Ø5–Ø45mm.

Tool:
- Special surface hardening allows for increased wear resistance of tool.
- A precision needle bearing ensures smooth running and power absorption of the bearing shaft.
- Swing (center height) integrated in tool.

Marking wheels engraved from solid:
- Marking wheel dia. 35mm. marking area dia. 30–500mm, HSS, 4/402217. Max. type height 10mm (depending on material).
- Marking wheel dia. 40mm. marking area dia. 30–500mm, HSS, 4/402326. Max. type height 6mm (depending on material).
- Marking wheel dia. 35mm. marking area dia. 15–500mm, HSS, 4/402262. Max. type height 6mm (depending on material).
- Marking wheel dia. 35mm. marking area dia. 10–100mm, HSS, 4/402487. Max. type height 3mm (depending on material).

Marking wheels for exchangeable segments:
- Marking wheels 4/402233R and 4/402233L for flat marking segments PPS30. Standard up to type height 4mm. Marking area for segments dia. 30–500mm.
- Max. type height 5mm on request.

Resilient marking tool

Marking wheel with segments | Marking wheel with solid engraving

TOOL VARIANTS

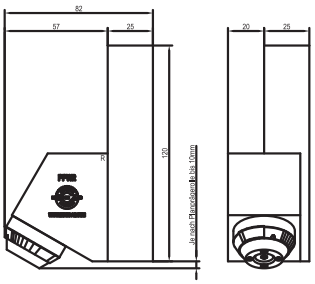
Tool	Tool type	Execution	Shank size
PPW2-R-1616	PPW2	Right	16 x 16mm
PPW2-L-1616	PPW2	Left	16 x 16mm
PPW2-R-2020	PPW2	Right	20 x 20mm
PPW2-L-2020	PPW2	Left	20 x 20mm
PPW2-R-2525	PPW2	Right	25 x 25mm
PPW2-L-2525	PPW2	Left	25 x 25mm

ITEM NUMBER SYSTEMATICS

PPW2-R-2020	**PPW2**	-->	**Tool type**
	R	-->	**Right execution**
	2020	-->	**shank size 20 x 20mm**

DIMENSION

PPW2-R-2525 with marking wheel 4/402233R



SPECIAL TOOLS

In addition to our comprehensive standard range of marking tools for processing machines we are also in a position to provide special solutions according to customer requirements. These application specific solutions serve to increase the profitability and efficiency of our customers in globally important technology markets.

Knurling profiles are applied more frequently than expected and producing them requires a certain know-how and above all ideal tools. Böni AG has decades of experience in the production of knurling tools and is your specialist for questions concerning knurling profiles. In industries such as e.g. automotive industry, electrical engineering, building services, mechanical engineering, medical technology, fitting industry or in many further trades products are nowaday provided with a knurling profile. As versatile as customers may be, as versatile are also requirements to quality and precision.

For the perfect profile standard tools might not be the best solution. This exactly is the aspect we have been pursuing at Böni AG for more than 30 years by producing customized marking tools and knurling wheels. Please do not hesitate and send us your inquiry, our technicians are looking forward to helping you.

KNURLING TOOLS

KNURLING TOOLS AND KNURLING WHEELS

During the seventies the company specialised in the production of knurling tools. The lateral knurling tools every popular at that time did not comply with the quality requirements of Böni AG and knurling results failed to convince also.

Further developments of knurling tools involved the tangential functioning of knurling tools. The knurling wheels have been arranged in the centre of the workpiece, 180 ° opposite. Consequently, there is almost no lateral pressure. So this enables knurling thin and long parts reliably. The overall work pressure during knurling is accepted by the tangentially arranged sliders. No harmful lateral pressure is exerted on the workpiece, the turning spindle and the ball screw of the lathe.

Nowadays, it is the utmost priority that expensive capital goods such as lathes are used carefully and best possible. So the objective is to achieve the best result by an ideal interaction of machine and tool. The further development of knurling tools in tangential construction exactly meets the requirements to modern and reliable precision tools and consequently achieves the very best cost-benefit factor.

There are two systems available on the market. On the one hand it is the lateral functioning in which one or two knurling wheels are laterally pressed into the workpiece, or the tangential functioning in which two or three knurling wheels are pressed into the material.

Disadvantages of lateral functioning of knurl pressing and knurl milling tools:

The functioning of lateral knurl pressing or knurl milling tools is anything but machine- and workpiece-sparing and has some distinctive disadvantages:

- Increased handling costs due to complicated and unreliable settings.
- Large, lateral and longlasting working pressure strains the machine and ball screw as well as the workpiece. Repair work of worn spindle ball bearings or spindles rapidly amounts to some 10,000 Euros.
- Due to the lateral pressure on the workpiece the workpiece may move which may result in an inferior, uneven knurl.
- Due to the bouncing of the workpiece during pressing laterally the knurl does not become cylindrical.

KNURL FORMING AND KNURL CUTTING. WITH BÖNI.

All these disadvantages can be avoided by selecting a tangential knurling tool. However, tangential functioning requires distinguishing between tools with 2 and 3 knurling wheels. Tangential tools with 3 knurling wheels allow to produce a knurl in the z-axis direction only. After knurling application, the tool is required to go back in the same position an so practically needs twice the working time. Or the tool utizlizes special equipment with the knurling wheels standing free after knurling in order to allow the tool running back quickly. For this purpose, the lathe requires a special fixture or connection for moving the knurling wheels of the tool in start position again.

With 2 knurling wheels and a tangential tool knurling is possible in the z-axis as well x-axis direction. Double knurling time is not applicable.

The modular standard knurling system of Böni AG always allows to compile the ideal tool combination. In doing so, by selecting the suitable knurling wheels it is possible to form (cold-rolled) or cut (milled) a knurl. In case of special requirements our technician will be available for customized tool solutions up to your demand.

Böni's knurling phylosophy

Knurling is a kind of processing involving great forces, whether rolling or cutting. These high forces cause a large lateral pressure acting on the workpiece and the machine. Since machine tools are expensive investment commodities, we would like to make processing as machine-saving as possible. We therefore rely on knurling in tangential procedure. In this process, two knurling wheels process the workpiece by 180 ° tangially to the turning centre, refer to picture 1.

Due to this arrangement of the knurling wheels no lateral pressure is exerted on the workpiece and the machine. The forces arising are taken by the knurling tool. A further enormous advantage of this processing is provided by knurling thin or long components. Due to the tangential processing the workpiece is always located between the knurling wheels without being pressed away. So a deviation in diameter during knurling will be avoided. For comparison: knurling laterally with one knurling wheel, refer to picture 2.

Knurling processing

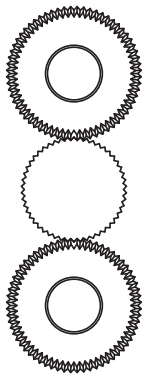
There are two knurling procedures for attaching a knurl at the workpiece. By knurl forming also called knurl rolling and knurl cutting, also called knurl milling.

Knurl forming, knurl rolling

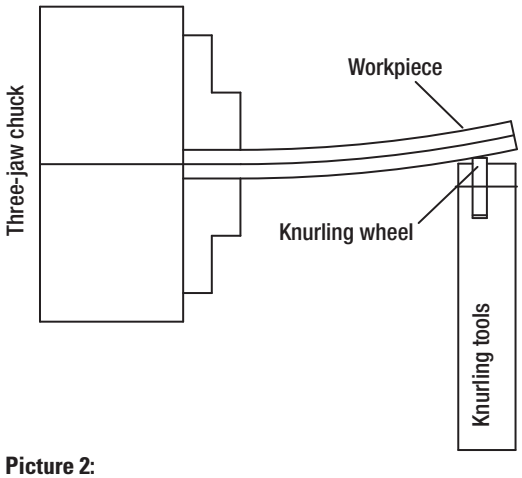
Knurl forming is the non-cutting processing and applicable for all cold forming materials. Due to the pressure exerted by the knurling wheel on the workpiece material, the material flows to the knurling wheel and forms the tip in the material. Milled knurls often feature an increased strength and decreased elongation at break. Forming makes the external diameter of the workpiece larger than the pre-machined diameter.

Knurl cutting

Knurl cutting is a chip removing process and is applied for all materials that are difficult to form such as plastics, brass without lead alloy, cast, heat-treated aluminium and chrome steel containing more than 16% chrome. The knurling wheels must be positioned obliquely to the axis of rotation for enabling the knurling wheel to execute cutting processing.

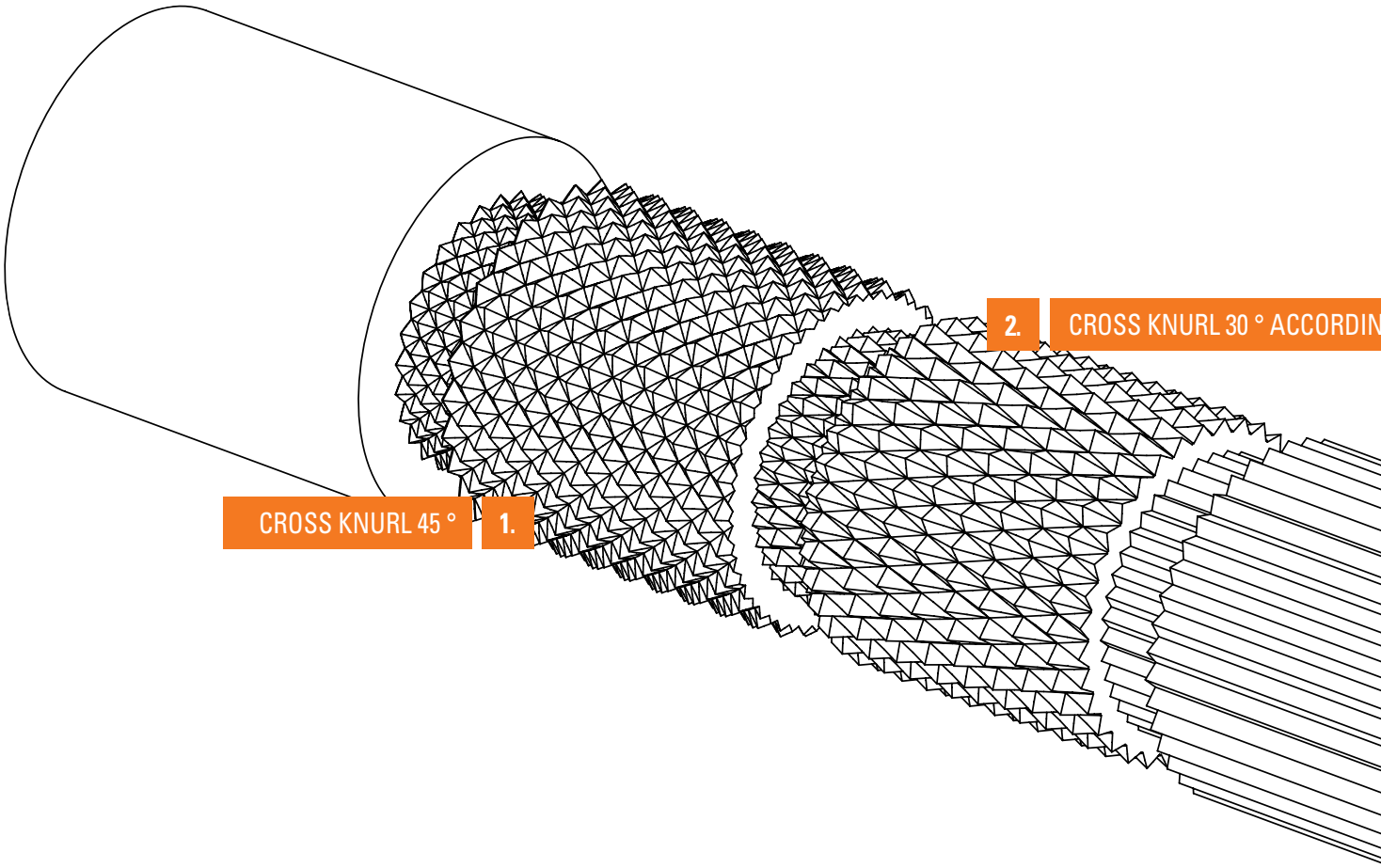


Picture 1:
Tangential functioning.
Two knurling wheels 180 ° tangentially to the turning centre.

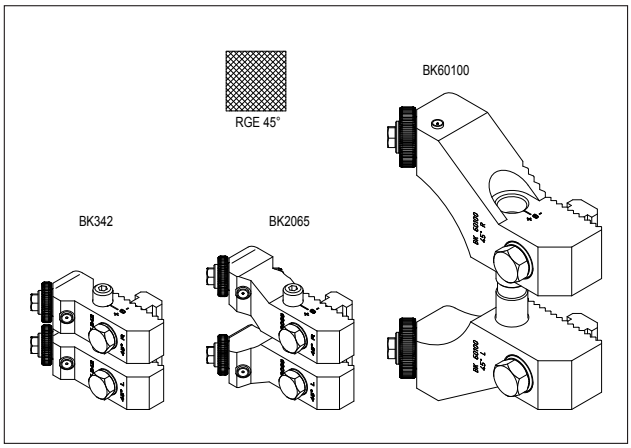


Picture 2:
Lateral mode of operation.
Owing to the pressure exerted by the knurling wheel on the workpiece, the workpiece bends away.

SYSTEM OVERVIEW KNURLING TOOLS

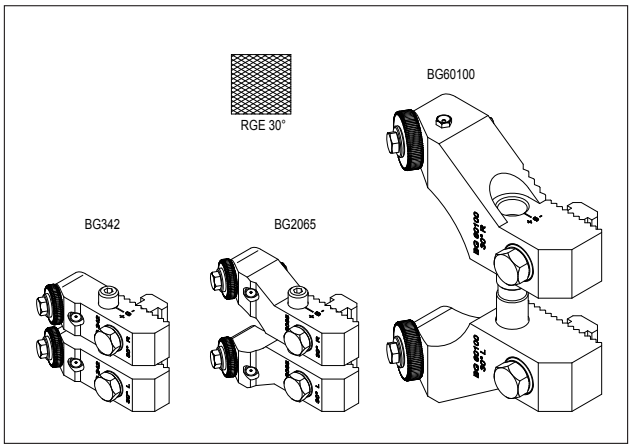


1. Cross Knurl 45 °



Forming and cutting processing: BK342, BK2065, BK60100

2. Cross knurl 30 ° according to DIN82 RGE



Forming and cutting processing: BG342, BG2065, BG60100

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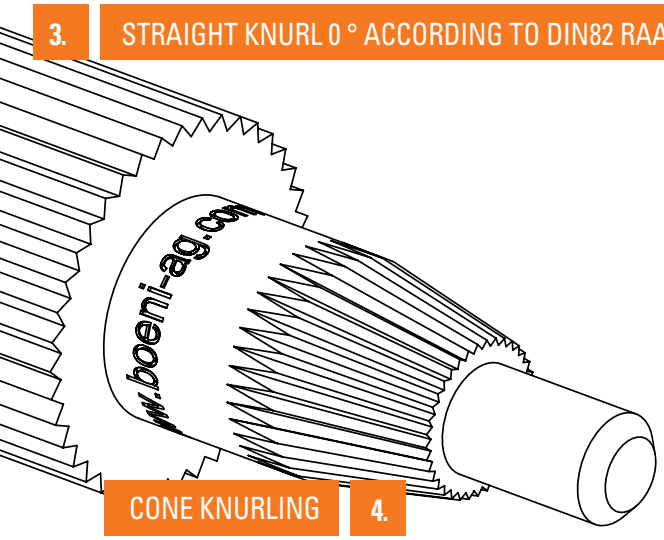
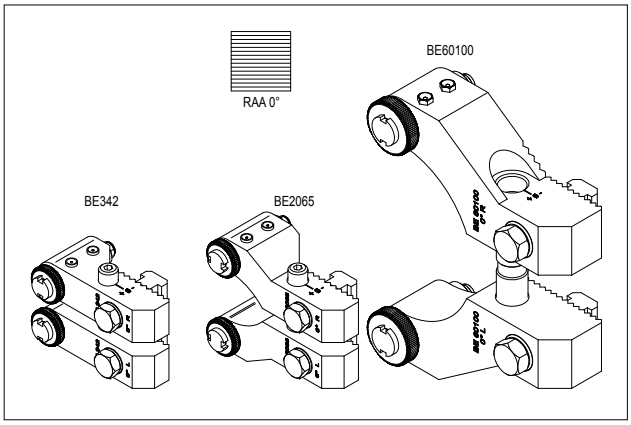
3. STRAIGHT KNURL 0 ° ACCORDING TO DIN82 RAA

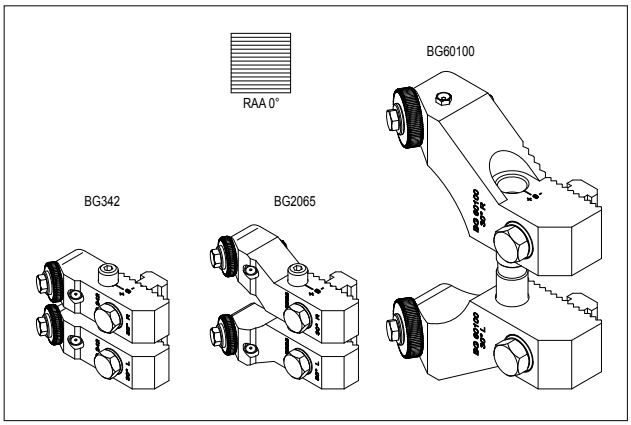


3. Straight knurl 0 ° according to DIN82 RAA

Forming processing



Cutting processing



Forming processing using: BE342, BE2065, BE60100 and
cutting processing using: BG342, BG2065, BG60100

4. Cone knurling (page 38)

CONE KNURLING 4.

STANDARD KNURLING WHEEL

DIN 403 describes and specifies the knurl profile at the knurling wheel with knurl profiles AA, BL, BR, GE, GV, KE and KV. Since the DIN does not provide any comprehensive specification, Böni knurling wheels are produced similar to DIN 403. We have extended the knurling wheels by further knurling wheel designations. Special knurling wheels of Böni AG are customized according to customer drawing.

View	Knurling profile	Description
	**SA**	Cutting wheel with sharp edges and axially parallel toothing, plunge and feed knurling possible. Creates positive knurl at the workpiece.
	**SR**	Cutting wheel with sharp edges and teething with right-hand twist. Plunge and feed knurling possible. Creates positive knurl at the workpiece.
	**SL**	Cutting wheel with sharp edges and teething with left-hand twist. Plunge and feed knurling possible. Creates positive knurl at the workpiece.
	**BO**	Rolling wheel with teethed radius and axially parallel teething. Plunge and feed knurling possible. Creates positive knurl at the workpiece.
	**EBO**	Corner- rolling knurling wheel with teethed radius and axially parallel teething. Plunge and feed knurling possible. Creates positive knurl at the workpiece.
	**EA**	Corner-rolling knurling wheel with bilateral chamfer and axially parallel toothing. Plunge and feed knurling possible. Creates positive knurl at the workpiece.
	**AA**	Rolling wheel with bilateral chamfer and axially parallel teething. Plunge and feed knurling possible Creates positive knurl at the workpiece.
	**BR**	Rolling wheel with bilateral chamfer and teething with right-hand twist. Plunge and feed knurling possible. Creates positive knurl at the workpiece.
	**BL**	Rolling wheel with bilateral chamfer and teething with left-hand twist Plunge and feed knurling possible. Creates positive knurl at the workpiece.
	**GE**	Left-hand, right-hand knurling wheel, points raised and left- and right-hand twist. Applicable in plunge procedure only. Creates a negative knurl at the workpiece.
	**KE**	Cross-knurl wheel, points raised, axial and radial grooves. Applicable in plunge procedure only. Creates a negative knurl at the workpiece.

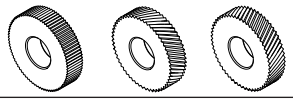
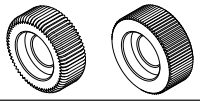
The following knurling wheels are not required using Böni tangential knurling tools. For these knurling-wheel types GV and KV the points are incorporated in the knurling wheel indented. Applying these knurling wheels involves enormous lateral forces which are not accepted by a counter roller or a second knurling wheel. The workpiece material may move away and an inferior knurl may develop. The same knurling profile RGE or RKE is achieved using a tangential knurling tool and standard knurling wheels. Therefore, these knurling wheels should only be used in case of extreme emergency. Prerequisite for applying these knurling wheels: The material must be capable of being cold-formed.

View	Knurling profile	Description
	**GV**	Left-hand, right-hand knurling wheel, points indented. Only applicable in plunge procedure. Applicable with the tool RP on page 16.
	**KV**	Cross-knurl wheel, points indented. Applicable in plunge procedure. Applicable with the tool RP on page 16.

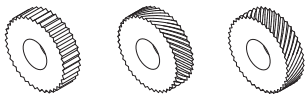
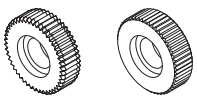
GENERAL OVERVIEW TYPES OF KNURLING

POSSIBLE KNURLING PROFILES AT THE WORKPIECE, SIMILAR TO DIN82.

View	Knurling profile	Knurl cutting	Knurl rolling
 RAA 0°	RAA, knurl with axially parallel grooves	30° slider set, 1x SL and 1X SR knurling wheel	0° slider set and 2x BO knurling wheel
 RBL 30°	RBL, left-hand knurl, spiral angle 30°	–	0° slider set and 2x BR30°
 RBL 45°	RBL, left-hand knurl, spiral angle 45°, not included in DIN 82	–	0° slider set and 2x BR45°
 RBR 30°	RBR, right-hand knurl, spiral angle 30°	–	0° slider set and 2x BL30°
 RBR 45°	RBR, right-hand knurl, spiral angle 45°, not included in DIN 82	–	0° slider set and 2x BL45°
 RGE 30°	RGE, left-right knurl, spiral angle 30°, points raised	30° slider set and 2x SA knurling wheel	30° slider set and 2x BO knurling wheel
 RGE 45°	RGE 45°, left-right-hand knurl, spiral angle 45°, left-right-hand knurl, points raised, not included in DIN 82	45° slider set and 2x SA knurling wheel	45° slider set and 2x BO knurling wheel
 RGV 30°	RGV, left-right-hand knurl, points indented, 30°	–	0° slider set, 1x GE30° knurling wheel and 1x counter roller
 RGV 45°	RGV, left-right-hand knurl, points indented, 45°, not included in DIN 82	–	0 ° slider set, 1x GE45° knurling wheel and 1x counter roller
 RKE	RKE, cross-hatched knurl, points raised, 90°	–	0 ° slider set, 1x BO knurling wheel and 1x knurling wheel with radial grooves
 RKV	RKV, cross-hatched knurl, points indented, 90°	–	0° slider set, 1x KE knurling wheel and 1x counter roller

View	Knurling wheel	Type	External diameter	Width	Drilling diameter	Pitch	for tool
	**Rolling knurling wheel type BO**	BO	20	5	8	0.5, 0.6, 0.8, 1.0, 1.2, 1.6	B65
	**Cutting knurling wheels type SA, SL and SR**	SA SR SL	20	5	8	0.5, 0.6, 0.8, 1.0, 1.2, 1.6	B65
	**Corner-rolling knurling wheel EBO and EA**	EBO EA	20	8	8	0.5, 0.6, 0.8, 1.0, 1.2, 1.6	B65

other pitch
on request

	**Rolling knurling wheel type BO**	BO	30	8	12	0.5, 0.6, 0.8, 1.0, 1.2, 1.6, 2.0	B100
	**Cutting knurling wheels type SA, SL and SR**	SA SL SR	30	8	12	0.5, 0.6, 0.8, 1.0, 1.2, 1.6, 2.0	B100
	**Corner-rolling knurling wheel EBO and EA**	EBO EA	30	9	12	0.5, 0.6, 0.8, 1.0, 1.2, 1.6, 2.0	B100

other pitch on
request

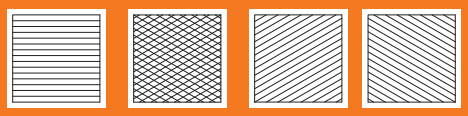
B65 THE LITTLE ONE

PRODUCT DETAILS FOR THE LITTLE ONE AND THE MEDIUM ONE

- Modular knurling tool for CNC or conventional lathes.
- Knurling range diam. 3–42mm and 20–65mm.
- Square shaft 16 x 16mm, 20 x 20mm or 25 x 25mm
- Selection between knurl forming or knurl cutting by applying modular slider sets for 0°, 30° or 45°.
- Knurling wheels arranged in needle roller bearing via bearing shaft.
- No bouncing or moving away of the workpiece.
- Tangential functioning, consequently no pressure on working or transverse spindle of the machine.
- Increased wear resistance thanks to special surface hardening.
- Machining direction as plunge knurling in x-axis and feed knurling in z-axis.
- Knurling profiles: RAA 0°, RGE 30° or RGE 45°.
- For knurling wheels sized diam. 20 mm: BO, SA, SR, SL, EBO, EA

KNURLING PROFILE

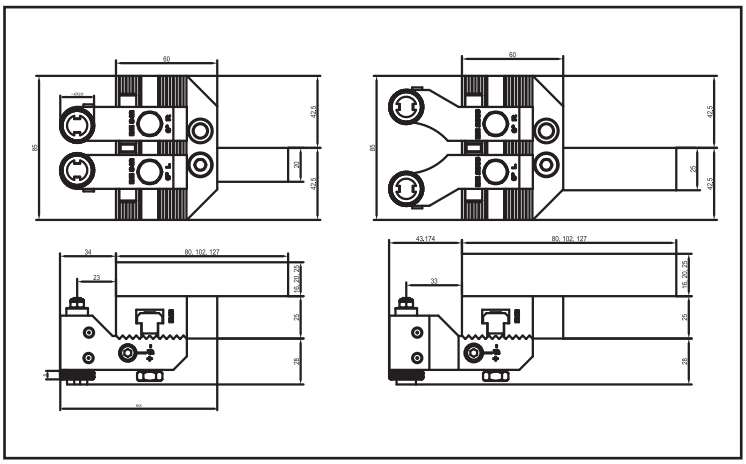
The modular construction allows for fast changeover of the tool. The clamping shaft and the knurling bar are the basis on which the slider sets are assembled. Depending on the material and type of knurling, slider sets of 0°, 30° or 45° can be selected.



RAA 0° **RGE 30°** **RBL 30°** **RBR 30°**

RGE 45° **RBL 45°** **RBR 45°**

DIMENSION



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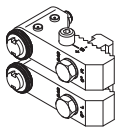
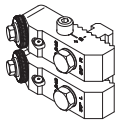
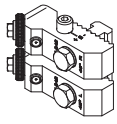
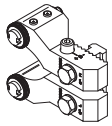
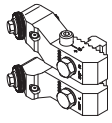
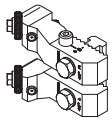
B65 THE MEDIUM ONE

TECHNICAL DETAILS

Basis	Number	Drawing	Knurling wheels
Clamping shaft 16 x 16mm	B1616		
Clamping shaft 20 x 20mm	B2020		
Clamping shaft 25 x 25mm	B2525		
Knurling rail working range Ø 3–65mm	BS365		

Knurling slide	Number	Drawing	Knurling wheels
Knurling slide 0°, working range Ø 3– 42mm	BE342		Knurling wheels diam. 20
Knurling slide 30°, working range Ø 3–42mm	BG342		Knurling wheels diam. 20
Knurling slide 45°, working range Ø 3–42mm	BK342		Knurling wheels diam. 20
Knurling slide 0°, working range Ø 20–65 mm	BE2065		Knurling wheels diam. 20
Knurling slide 30°, working range Ø 20–65mm	BG2065		Knurling wheels diam. 20
Knurling slide 45°, working range Ø 20–65mm	BK2065		Knurling wheels diam. 20

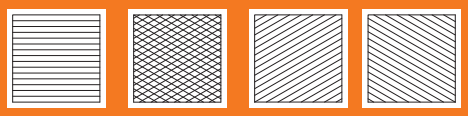
B100 THE LARGE ONE

PRODUCT DETAILS

- Modular knurling tool for CNC or conventional lathes.
- Knurling range diam. 60–100mm
- Square shaft 20 x 20mm, 25 x 25mm or 32 x 32mm
- Selection between knurl forming or knurl cutting by applying modular slider sets for 0°, 30° or 45°.
- Knurling wheels arranged in needle roller bearing via bearing shaft.
- No bouncing or moving away of the workpiece.
- Tangential functioning, consequently no pressure on working or transverse spindle of the machine.
- Increased wear resistance thanks to special surface hardening.
- Machining direction as plunge knurling in x-axis and feed knurling in z-axis.
- Knurling profiles: RAA 0°, RGE 30° or RGE 45°.
- For knurling wheels sized diam. 30 mm: BO, SA, SR, SL, EBO, EA

KNURLING PROFILE

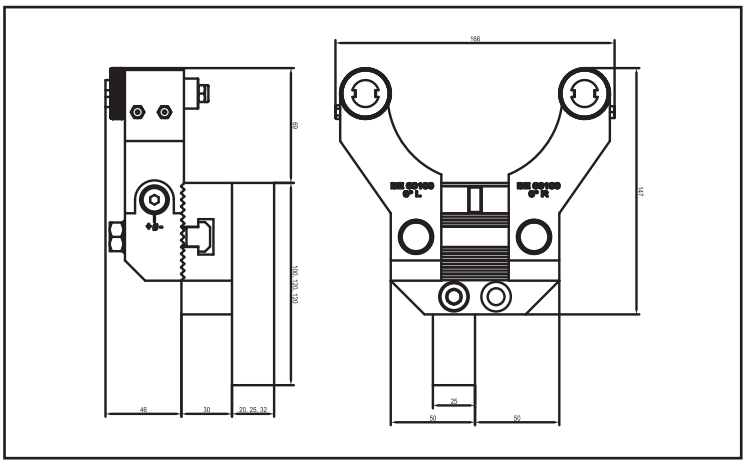
The modular construction allows for fast changeover of the tool. The clamping shaft and the knurling bar are the basis on which the slider sets are assembled.
Depending on the material and type of knurling, slider sets of 0°, 30° or 45° can be selected.



RAA 0° **RGE 30°** **RBL 30°** **RBR 30°**

RGE 45° **RBL 45°** **RBR 45°**

DIMENSION



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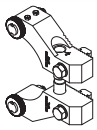
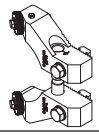
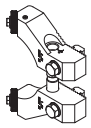
TECHNICAL DETAILS

Basis	Number	Drawing	Knurling wheels
Clamping shaft 20x20mm	B2020/100		
Clamping shaft 25x25mm	B2525/100		
Clamping shaft 32x32mm	B3232/100		
Knurling rail working range Ø 60–100mm	BS60100		
Knurling slide	**Number**	**Drawing**	**Knurling wheels**
Knurling slide 0°, working range Ø 60–100mm	BE60100		Knurling wheels diam. 30
Knurling slide 30°, working range Ø 60–100mm	BG60100		Knurling wheels diam. 30
Knurling slide 45°, working range Ø 60–100mm	BK60100		Knurling wheels diam. 30

OGER

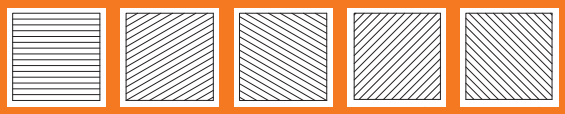
THE LITTLE PUSHER

Knurling tool for lateral knurling on machines with very resticted space conditions.

PRODUCT DETAILS

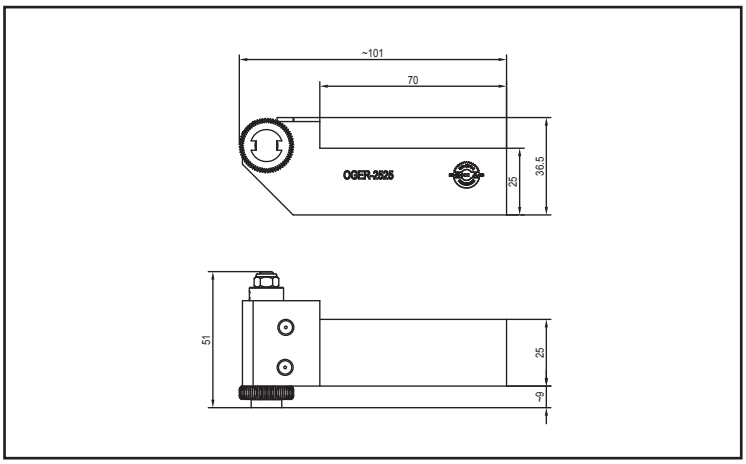
- Knurling wheels arranged in needle roller bearing via bearing shaft.
- Increased wear resistance thanks to special surface hardening.
- Machining direction as plunge knurling in x-axis and feed knurling in z-axis.
- Knurling profiles: RAA, RBL or RBR.
- For knurling wheels sized diam. 20 mm: BO, SA, SR, SL, EBO, EA

KNURLING PROFILE



RAA 0° | RBL 30° | RBR 30° | RBL 45° | RBR 45°

DIMENSION



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OHER

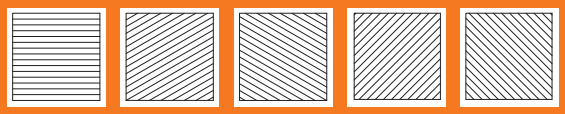
THE LARGE PUSHER

Knurling tool for lateral knurling on machines with very resticted space conditions.

PRODUCT DETAILS

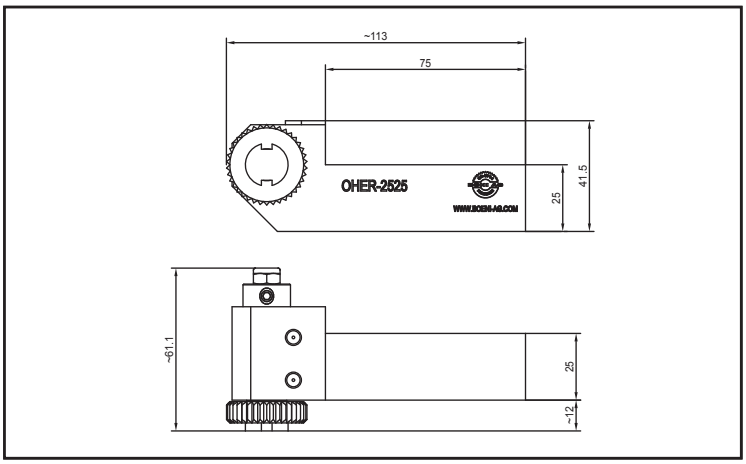
- Knurling wheels arranged in needle roller bearing via bearing shaft.
- Increased wear resistance thanks to special surface hardening.
- Machining direction as plunge knurling in x-axis and feed knurling in z-axis.
- Knurling profiles: RAA, RBL or RBR.
- For knurling wheels sized diam. 30 mm: BO, SA, SR, SL, EBO, EA

KNURLING PROFILE



RAA 0° | RBL 30° | RBR 30° | RBL 45° | RBR 45°

DIMENSION



TAPER KNURLING TOOL

Types of machines:

- Applicable on all conventional, cycle- and CNC-controlled lathes.
- Cam controlled automatic lathes.
- Multispindle automatic lathes.
- Rotary tables

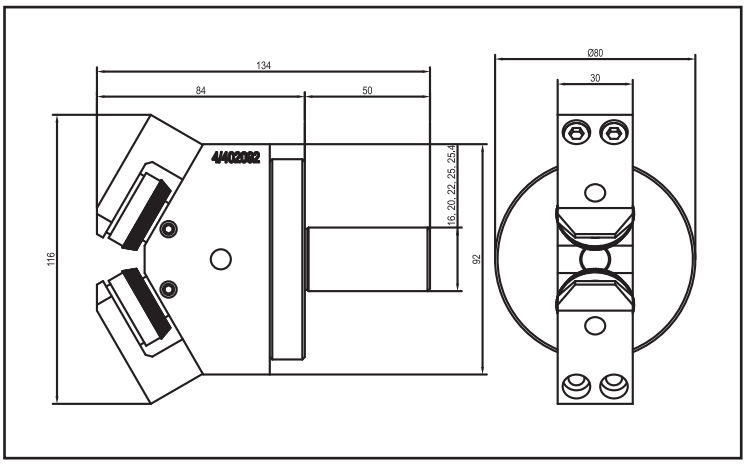
Properties:

- Best suitable for mass production of knurling cone attachment for front and rear wiper assemblies according to DIN72783.

Tool:

- Knurling wheels guided between carbide discs.
- Robust hard metal bolt as knurling wheel mount.
- Available with standard straight shanks Ø 16mm, Ø 20mm, Ø 25mm and Ø 25.4mm.
- All other tool mounts can be produced according to request.

DIMENSION



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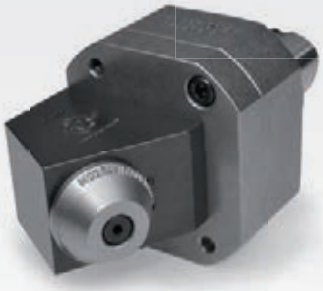
BÖNI AG. A MARKING FAMILY.

BÖNI.
JUST EFFICIENT!

BÖNI AG is a family-owned company run in the third generation today. Our decades of experience in the development and production of precision tools are the basis of our technologically leading marking and knurling tools.

Besides an extensive standard tool range our strengths are also custom-made solutions.These application specific solutions serve to increase the efficiency and profitability of our customers in globally important technology markets.

We would be pleased to also welcome you as our customers soon.



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