



P R E M I U M

KNURLING  
T O O L S





a brand name of Hommel+Keller

# AT THE FOREFRONT!

Tools used in knurling technology always have special requirements with respect to quality, precision, stability and especially technological know-how. For your benefit we are relaunching the time-proven QUICK brand: since 2018 the high-end brand of Hommel+Keller Präzisionswerkzeuge GmbH for exceptionally precise knurling tools. Because here, design is combined with functionality and innovation with experience. QUICK develops, produces and markets knurling tools of first-rate quality and is therefore your specialist for solutions with a profile.

**FORMING AND CUTTING:** The QUICK product spectrum offers innovative solutions for diverse knurling technology applications. For both form knurling and cut knurling tools, QUICK fulfils the most stringent quality standards and masters even difficult tasks with ease.

**TOOLS IN ACTION:** QUICK is used wherever absolute precision and first-rate surface quality are needed. In the automotive sector, for example, in mechanical engineering, in the manufacture of timepieces and in many other industries. Our selection of knurling profiles will impress you – and your customers, too.

**CONVINCING QUALITY:** Precision and premium quality – that is our passion and what motivates us to deliver maximum performance every day. And simultaneously a promise to our customers. Because you are good only if we are. We think ahead, to continuously develop customer-oriented innovations and to find new solutions. Our goal: joint success.

**ANYWHERE IN THE WORLD:** Take advantage of our services: A global sales network and customer proximity, excellent on-site technical support, as well as fast spare parts availability and tool maintenance.

**COMMUNITY:** What makes us special: We not only have excellent technological competence, but also know the needs of our customers very well. For you, that means: Whether in production or processing – at Hommel+Keller you will receive professional service at all times. And you will always find your personal contact person, who will respond to your concerns in a flexible and customer-oriented manner.





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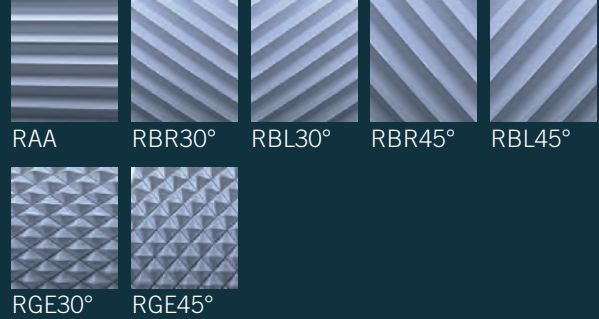
As a global leader in knurling technology Hommel+Keller manufactures products of superior quality based on decades of experience, always with the incentive of continuous improvement. Our premium brand, which can look back on a long and proud history, is custom tailored to the requirements of our customers.



In knurling technology there are two different processes: cut knurling and form knurling.

Both processes have their special applications and areas of utilisation.

Possible knurling profiles on workpiece:



## CUT KNURLING

Cut knurling is a machining process that uses cutting. The material is removed while being supplied at an axial feed rate. This process can therefore also be used for thin-walled or soft materials, as well as hard-to-machine materials.

## ADDED VALUES

- Maximum precision and surface quality, therefore especially suitable for visible knurling
- Knurling of thin-walled workpieces is possible without deformation
- Time savings due to faster cutting speed and feed rate
- Machining of virtually all materials, including grey cast iron and plastic
- Zero or only minimal alteration of the workpiece diameter
- Minimal surface compaction

# CUT KNURLING




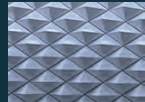


# OVERVIEW OF CUT KNURLING

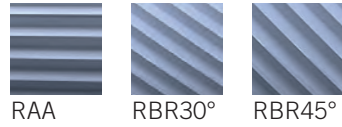
With the product finder for cut knurling you can find your desired QUICK product even faster. You receive all relevant tool data, as well as possible profiles, the corresponding knurling wheels and the possible direction of machining at a glance.

| Tool series  | Workpiece Ø [mm]       | Profile on workpiece                        | Profile on knurling wheel   |
|--|------------------------|---|---|
| <br>C601<br>(LA/FL)               | 1.5 – 12               | RAA<br>RBR30°<br>RBR45°                     | 1 x BR30°<br>1 x AA<br>1 x BL15°  |
| <br>C602<br>(LA/KF)               | 1.5 – 12               | RGE30°<br>RGE45°                            | 2 x AA<br>1 x BR15° / 1 x BL15°   |
| <br>C611<br>(A1/FL)<br>(A2/FL)   | 3 – 50<br>5 – 250      | RAA<br>RBR30°<br>RBL30°<br>RBR45°<br>RBL45° | Right-hand use:<br>1 x BR30°<br>1 x AA<br>1 x BL15°<br>Left-hand use:<br>1 x BL30°<br>1 x AA<br>1 x BR15° |
| <br>C612<br>(A1/KF)<br>(A2/KF)  | 3 – 50<br>5 – 250      | RGE30°<br>RGE45°                            | 2 x AA<br>1 x BR15° / 1 x BL15°   |
| <br>C621<br>(M/FL)              | 20 – 3000              | RAA<br>RBR30°<br>RBR45°                     | 1 x BR30°<br>1 x AA<br>1 x BL15°  |
| <br>C622<br>(MI/KF)<br>(MII/KF) | 20 – 1000<br>30 – 3000 | RGE30°<br>RGE45°                            | 2 x AA<br>1 x BR15° / 1 x BL15°   |
| <br>C693<br>(STR-A)             | 3.5 – 20               | RGE30°<br>RGE45°                            | 3 x AA<br>1 x BR15° / 2 x BL15° or<br>2 x BR15° / 1 x BL15°   |



| Shank [mm]              | Knurling wheel Ø [mm] | Knurling   |  RAA |  RBL |  RBR |  RGE |
|-------------------------|-----------------------|--|---|--|---|---|
| 10 / 12                 | 8.9                   | Starting at the workpiece<br>Starting after plunge cut | ●<br>●  | –<br>–   | ●<br>●  | –<br>–  |
| 10 / 12                 | 8.9                   | Starting at the workpiece<br>Starting after plunge cut | –<br>–  | –<br>–   | –<br>–  | ●<br>●  |
| 10 / 12 / 16<br>20 / 25 | 14.5<br>21.5          | Starting at the workpiece<br>Starting after plunge cut | ●<br>●  | ●<br>●   | ●<br>●  | –<br>–  |
| 10 / 12 / 16<br>20 / 25 | 14.5<br>21.5          | Starting at the workpiece<br>Starting after plunge cut | –<br>–  | –<br>–   | –<br>–  | ●<br>●  |
| 27                      | 42                    | Starting at the workpiece<br>Starting after plunge cut | ●<br>●  | –<br>–   | ●<br>●  | –<br>–  |
| 40<br>57                | 32<br>42              | Starting at the workpiece<br>Starting after plunge cut | –<br>–  | –<br>–   | –<br>–  | ●<br>●  |
| Ø15<br>Ø20<br>Ø25       | 14.5                  | Starting at the workpiece<br>Starting after plunge cut | –<br>–  | –<br>–   | –<br>–  | ●<br>–  |

# CUT KNURLING TOOL C601




## ADDED VALUES

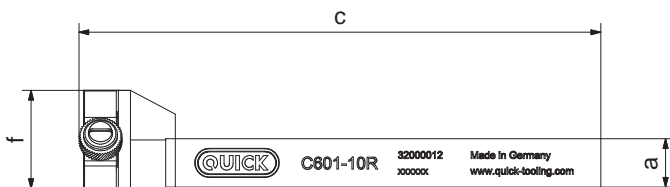
- Developed for minimal installation space and maximum stability
- Designed for smallest workpiece diameters
- User-friendly handling

| Order no. | Model    | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |     |      |    |      |
|-----------|----------|------------------|---------------------------------|-----------------|----|-----|------|----|------|
|           |          |                  |                                 | a               | b  | c   | d    | e  | f    |
| 32000012  | C601-10R | 1.5 – 12         | 8.9 x 2.5 x 4                   | 10              | 10 | 108 | 23.5 | 20 | 20,3 |
| 32000014  | C601-12R | 1.5 – 12         | 8.9 x 2.5 x 4                   | 12              | 12 | 108 | 23.5 | 20 | 22   |

Left-hand version of all shank dimensions available on request.

## E-KIT

| Order no. |  |
|-----------|---|
| 22BHR0506 |   |



# CUT KNURLING TOOL C602



RGE30°



RGE45°


## ADDED VALUES

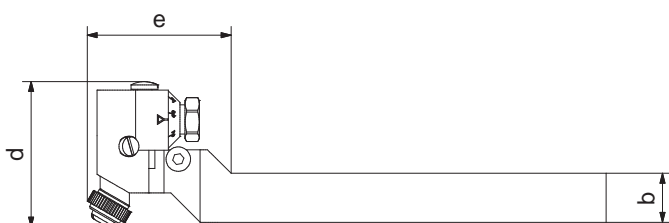
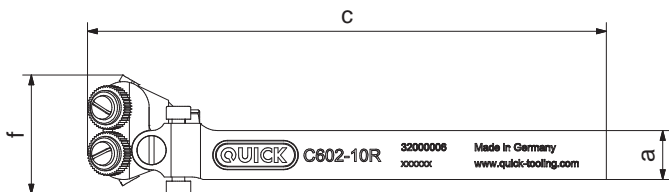
- Developed for minimal installation space and maximum stability
- Designed for smallest workpiece diameters
- Easy fine adjustment of the knurl holder

| Bestell-Nr. | Model    | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |     |      |      |      |
|-------------|----------|------------------|---------------------------------|-----------------|----|-----|------|------|------|
|             |          |                  |                                 | a               | b  | c   | d    | e    | f    |
| 32000006    | C602-10R | 1.5 – 12         | 8.9 x 2.5 x 4                   | 10              | 10 | 106 | 29.7 | 29.4 | 24.3 |
| 32000008    | C602-12R | 1.5 – 12         | 8.9 x 2.5 x 4                   | 12              | 12 | 106 | 29.7 | 29.4 | 24.3 |

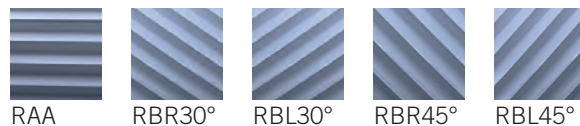
Left-hand version of all shank dimensions available on request.

## E-KIT

|           |   |
|-----------|---|
| Order no. |  |
| 22BHR0506 |   |



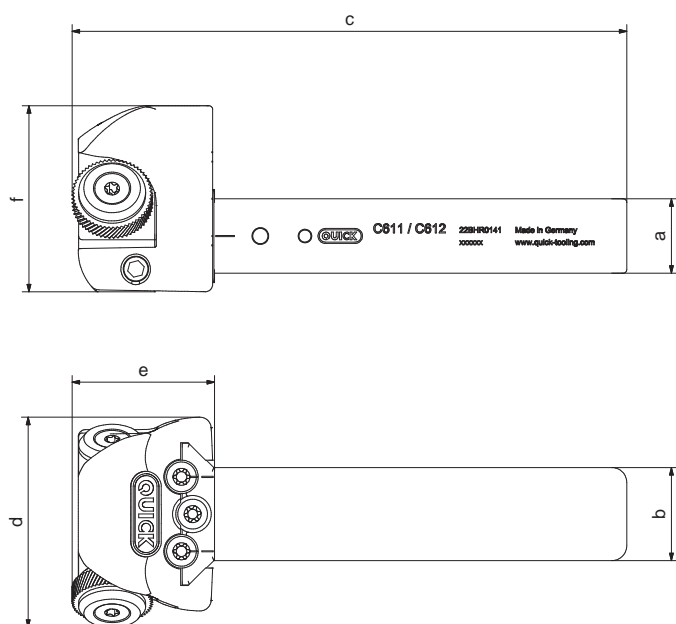
# CUT KNURLING TOOL C611




## ADDED VALUES

- Adaptable, patented QUICK cooling unit
- Multifunctional: For use in front of and behind the rotation centre
- Flexible shank variation
- Head and shank fully exchangeable due to compatible interface

| Order no. | Model    | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |     |      |      |    |
|-----------|----------|------------------|---------------------------------|-----------------|----|-----|------|------|----|
|           |          |                  |                                 | a               | b  | c   | d    | e    | f  |
| 32000037  | C611-10M | 3 – 50           | 14.5 x 3 x 5                    | 10              | 16 | 106 | 35   | 25.6 | 32 |
| 32000038  | C611-12M | 3 – 50           | 14.5 x 3 x 5                    | 12              | 16 | 106 | 35   | 25.6 | 32 |
| 32000039  | C611-16M | 3 – 50           | 14.5 x 3 x 5                    | 16              | 16 | 106 | 35   | 25.6 | 32 |
| 32000043  | C611-20M | 5 – 250          | 21.5 x 5 x 8                    | 20              | 25 | 149 | 56.5 | 38.3 | 50 |
| 32000044  | C611-25M | 5 – 250          | 21.5 x 5 x 8                    | 25              | 25 | 149 | 56.5 | 38.3 | 50 |




## E-KIT

| Order no. | Knurling wheel (Ø x w x b) [mm] |  |
|-----------|---------------------------------|---|
| 22BHR0507 | 14.5 x 3 x 5                    |   |
| 22BHR0508 | 21.5 x 5 x 8                    |   |

## ADAPTER

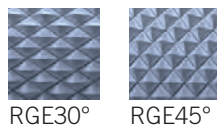
| Order no. | Description     |  |
|-----------|-----------------|---|
| 22BHR0152 | Adapter 10 x 10 |   |
| 22BHR0151 | Adapter 12 x 12 |   |
| 22BHR0150 | Adapter 16 x 16 |   |

## COOLANT NOZZLE

| Order no. | Knurling wheel (Ø x w x b) [mm] |  |
|-----------|---------------------------------|---|
| 22BHR0145 | 14.5 x 3 x 5                    |   |
| 22BHR0136 | 21.5 x 5 x 8                    |   |

The adjustable coolant nozzle ensures the precise supply of coolant to the workpiece and the knurling wheels.

# CUT KNURLING TOOL C612

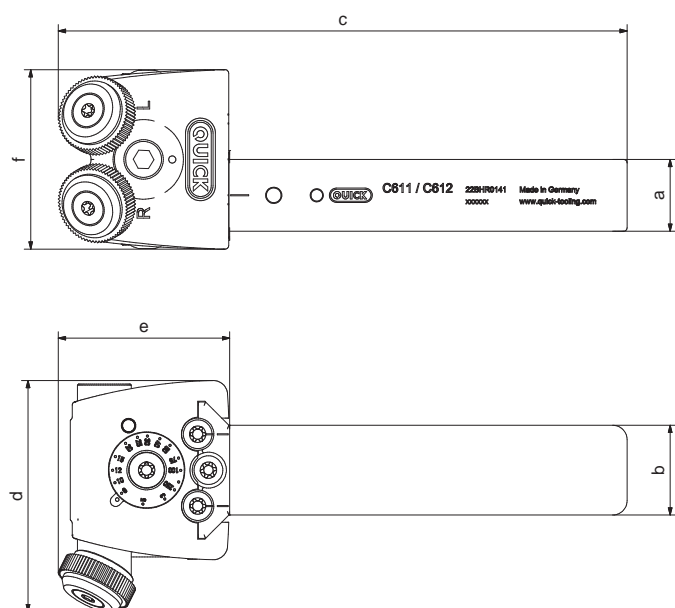


RGE30° RGE45°

## ADDED VALUES

- Adaptable, patented QUICK cooling unit
- Multifunctional: For use in front of and behind the rotation centre
- Flexible shank variation
- Head and shank fully exchangeable due to compatible interface
- Synchronised knurl holder for adjusting the working range

| Order no. | Model    | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |     |      |      |      |
|-----------|----------|------------------|---------------------------------|-----------------|----|-----|------|------|------|
|           |          |                  |                                 | a               | b  | c   | d    | e    | f    |
| 32000034  | C612-10M | 3 – 50           | 14.5 x 3 x 5                    | 10              | 16 | 115 | 36   | 34.7 | 35.8 |
| 32000035  | C612-12M | 3 – 50           | 14.5 x 3 x 5                    | 12              | 16 | 115 | 36   | 34.7 | 35.8 |
| 32000036  | C612-16M | 3 – 50           | 14.5 x 3 x 5                    | 16              | 16 | 115 | 36   | 34.7 | 35.8 |
| 32000041  | C612-20M | 5 – 250          | 21.5 x 5 x 8                    | 20              | 25 | 158 | 64.4 | 47.7 | 50   |
| 32000042  | C612-25M | 5 – 250          | 21.5 x 5 x 8                    | 25              | 25 | 158 | 64.4 | 47.7 | 50   |



## E-KIT

| Order no. | Knurling wheel (Ø x w x b) [mm] |  |
|-----------|---------------------------------|--|
| 22BHR0507 | 14.5 x 3 x 5                    |  |
| 22BHR0508 | 21.5 x 5 x 8                    |  |

## ADAPTER

| Order no. | Description     |  |
|-----------|-----------------|--|
| 22BHR0149 | Adapter 10 x 10 |  |
| 22BHR0148 | Adapter 12 x 12 |  |
| 22BHR0147 | Adapter 16 x 16 |  |

## COOLANT NOZZLE

| Order no. | Knurling wheel (Ø x w x b) [mm] |  |
|-----------|---------------------------------|--|
| 22BHR0145 | 14.5 x 3 x 5                    |  |
| 22BHR0136 | 21.5 x 5 x 8                    |  |

The adjustable coolant nozzle ensures the precise supply of coolant to the workpiece and the knurling wheels.

# CUT KNURLING TOOL C621



RAA



RBR30°




RBR45°

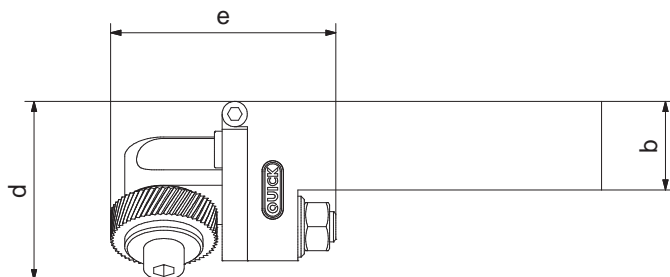
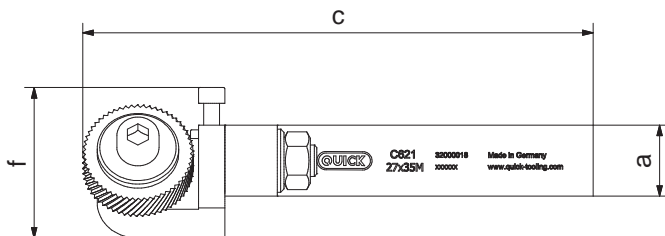
## ADDED VALUES

- Designed for the largest possible working ranges
- Ideal for heavy-duty and roll turning lathes etc.
- Maximum stability due to solid construction

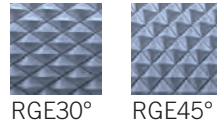
| Order no. | Model    | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |     |      |    |      |
|-----------|----------|------------------|---------------------------------|-----------------|----|-----|------|----|------|
|           |          |                  |                                 | a               | b  | c   | d    | e  | f    |
| 32000018  | C621-27R | 20 – 3000        | 42 x 12 x 18                    | 27              | 35 | 194 | 70.5 | 89 | 57.2 |

## E-KIT

| Order no. |  |
|-----------|---|
| 22BHR0510 |   |



# CUT KNURLING TOOL C622




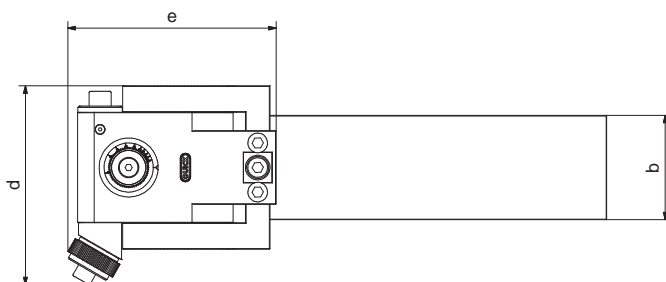
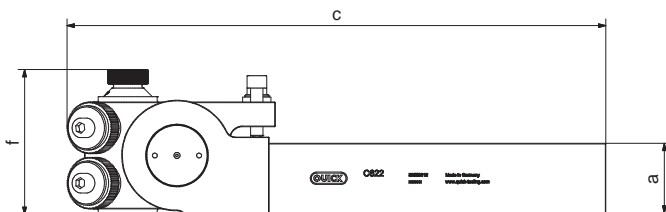
## ADDED VALUES

- Designed for the largest possible working ranges
- Ideal for heavy-duty and roll turning lathes etc.
- Maximum stability due to solid construction
- Synchronised knurl holder for adjusting the working range

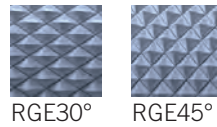
| Order no. | Model    | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |       |       |       |     |
|-----------|----------|------------------|---------------------------------|-----------------|----|-------|-------|-------|-----|
|           |          |                  |                                 | a               | b  | c     | d     | e     | f   |
| 32000015  | C622-40R | 20 – 1000        | 32 x 8 x 14                     | 40              | 45 | 275.5 | 109   | 115.5 | 79  |
| 32000016  | C622-57R | 30 – 3000        | 42 x 12 x 18                    | 57              | 85 | 438.5 | 161.5 | 169.5 | 118 |

## E-KIT

| Order no. | Knurling wheel (Ø x w x b) [mm] |  |
|-----------|---------------------------------|---|
| 22BHR0509 | 32 x 8 x 14                     |   |
| 22BHR0511 | 42 x 12 x 18                    |   |



# CUT KNURLING TOOL C693




RGE30° RGE45°

## ADDED VALUES

- Knurl holders individually adjustable
- Maximum process stability
- All knurling processes can be used by conversion of the knurl holder jaws
- Suitable for very small installation spaces due to compact design

| Order no. | Model | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |    |    |    |        |
|-----------|-------|------------------|---------------------------------|-----------------|----|----|----|----|--------|
|           |       |                  |                                 | d max.          | e  | j  | k  | l  | n max. |
| 32000030  | C693  | 3.5 – 20         | 14.5 x 3 x 5                    | 75              | 57 | 20 | 54 | 20 | 38     |


## E-KIT

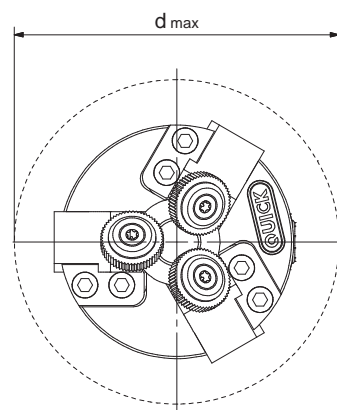
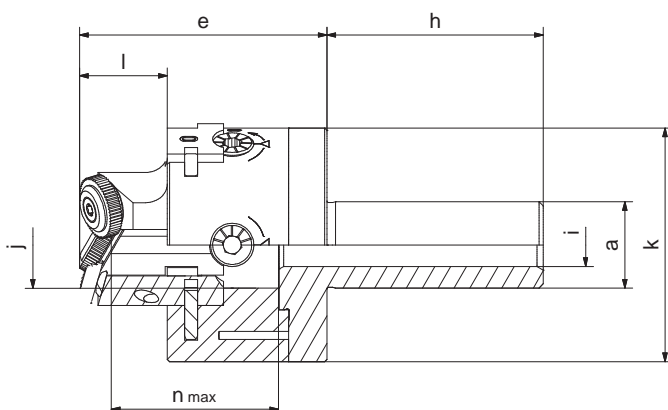
| Order no. |   |
|-----------|---|
| 22BHR0507 |  |

## SHANK

| Order no. | Ø „a“ [mm] | Bore „i“ [mm] | Length „h“ [mm] |   |
|-----------|------------|---------------|-----------------|---|
| 22BHR0119 | 15         | 9             | 50              |  |
| 22BHR0121 | 20         | 10            | 50              |   |
| 22BHR0122 | 25         | 15            | 50              |   |

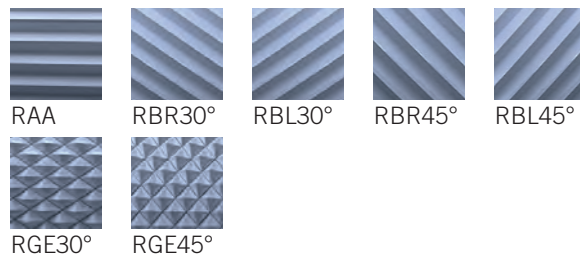
## JAWS

| Order no. | Description                    | Tool |   |
|-----------|--------------------------------|------|---|
| 22BHR0490 | Form knurling                  | F791 |  |
| 22BHR0537 | Form knurling up to a shoulder | F792 |   |





# CUT KNURLING TOOL SET C610



## ADDED VALUES

- All common knurl profiles can be produced
- Maximum user flexibility due to numerous possible combinations of head and shank
- Additional, patented QUICK cooling unit for optimised chip flow

| Order no. | Model | Shank [mm]   | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] |
|-----------|-------|--------------|------------------|---------------------------------|
| 32000040  | C611  | 10 / 12 / 16 | 3 – 50           | 14.5 x 3 x 5                    |
|           | C612  |              | 3 – 50           | 14.5 x 3 x 5                    |


Coolant nozzle (order no. 22BHR0145) included in set.

| Order no. | Model | Shank [mm] | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] |
|-----------|-------|------------|------------------|---------------------------------|
| 32000045  | C611  | 20 / 25    | 5 – 250          | 21.5 x 5 x 8                    |
|           | C612  |            | 5 – 250          | 21.5 x 5 x 8                    |

Coolant nozzle (order no. 22BHR0145) included in set.


## E-KIT

| Order no. | Knurling wheel (Ø x w x b) [mm] |
|-----------|---------------------------------|
| 22BHR0507 | 14.5 x 3 x 5                    |
| 22BHR0508 | 21.5 x 5 x 8                    |



## ADAPTER

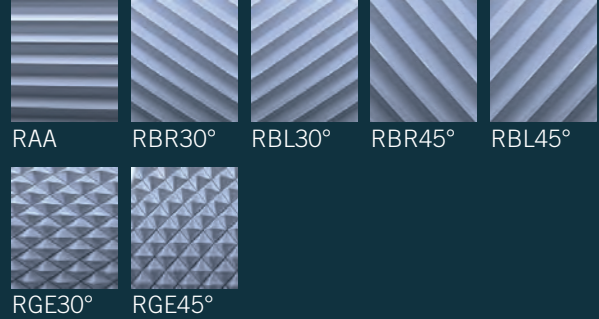
| Order no. | Description     | Tool |
|-----------|-----------------|------|
| 22BHR0152 | Adapter 10 x 10 | C611 |
| 22BHR0151 | Adapter 12 x 12 | C611 |
| 22BHR0150 | Adapter 16 x 16 | C611 |
| 22BHR0149 | Adapter 10 x 10 | C612 |
| 22BHR0148 | Adapter 12 x 12 | C612 |
| 22BHR0147 | Adapter 16 x 16 | C612 |



In knurling technology there are two different processes: cut knurling and form knurling.

Both processes have their special applications and areas of utilisation.

Possible knurling profiles on the workpiece:



## FORM KNURLING

In form knurling the surface of the workpiece is adapted in a non-cutting process. Cold forming is used to shape the material, which limits its use to materials that are suitable for cold forming.

## ADDED VALUES

- Machining of the workpiece by cold forming, which compresses the surface of the workpiece
- Knurling is possible all the way to a workpiece shoulder
- All knurling profiles according to DIN 82 can be produced
- Knurling is possible at any position on the workpiece
- Knurling of inner and end faces is possible
- Conical knurling is possible





# FORM KNURLING



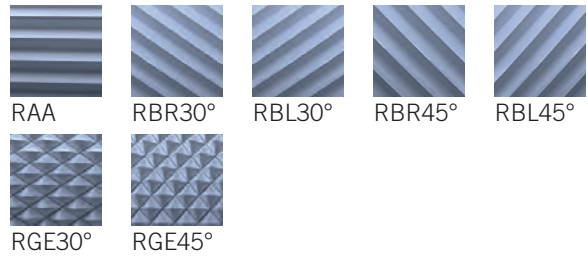
# OVERVIEW OF FORM KNURLING

With the product finder for form knurling you can find your desired QUICK product even faster. You receive all relevant tool data, as well as possible profiles, the corresponding knurling wheels and the possible direction of machining at a glance.

| Tool series   | Workpiece Ø [mm]                | Profile on workpiece   | Profile on knurling wheel   |  |
|---|---------------------------------|--|---|--|
|  <p>F711</p>       | <p>2.5 – 24</p> <p>7 – 120</p>  | <p>RAA</p> <p>RBR30°</p> <p>RBL30°</p> <p>RBR45°</p> <p>RBL45°</p> <p>RGE30°</p> <p>RGE45°</p> | <p>Single-wheel:</p> <p>1 x AA</p> <p>1 x BL30°</p> <p>1 x BR30°</p> <p>1 x BL45°</p> <p>1 x BR45°</p>  | <p>Double-wheel:</p> <p>2 x AA</p> <p>2 x BL30°</p> <p>2 x BR30°</p> <p>2 x BL45°</p> <p>2 x BR45°</p> <p>1 x BR30°/<br/>1 x BL30°</p> <p>1 x BR45°/<br/>1 x BL45°</p> |
|  <p>F712 (B0)</p> | <p>3.5 – 50</p> <p>7 – 120</p>  | <p>RAA</p> <p>RBR30°</p> <p>RBL30°</p> <p>RBR45°</p> <p>RBL45°</p> <p>RGE30°</p> <p>RGE45°</p> | <p>Single-wheel:</p> <p>1 x AA</p> <p>1 x BL30°</p> <p>1 x BR30°</p> <p>1 x BL45°</p> <p>1 x BR45°</p>  | <p>Double-wheel:</p> <p>2 x AA</p> <p>2 x BL30°</p> <p>2 x BR30°</p> <p>2 x BL45°</p> <p>2 x BR45°</p> <p>1 x BR30°/<br/>1 x BL30°</p> <p>1 x BR45°/<br/>1 x BL45°</p> |
|  <p>F751</p>     | <p>5 – 20</p> <p>0 – 15</p>     | <p>RAA</p> <p>RBR30°</p> <p>RBL30°</p> <p>RBR45°</p> <p>RBL45°</p> <p>RGE30°</p> <p>RGE45°</p> | <p>2 x AA</p> <p>2 x BL30°</p> <p>2 x BR30°</p> <p>2 x BL45°</p> <p>2 x BR45°</p> <p>1 x BR30° / 1 x BL30°</p> <p>1 x BR45° / 1 x BL45°</p>   |  |
|  <p>F761</p>     | <p>10 – 45</p>                  | <p>RAA</p> <p>RBR30°</p> <p>RBL30°</p> <p>RBR45°</p> <p>RBL45°</p> <p>RGE30°</p> <p>RGE45°</p> | <p>2 x AA</p> <p>2 x BL30°</p> <p>2 x BR30°</p> <p>2 x BL45°</p> <p>2 x BR45°</p> <p>1 x BR30° / 1 x BL30°</p> <p>1 x BR45° / 1 x BL45°</p>   |  |
|  <p>F791</p>     | <p>1.8 – 20</p> <p>2.6 – 20</p> | <p>RAA</p> <p>RBR30°</p> <p>RBL30°</p> <p>RBR45°</p> <p>RBL45°</p> <p>RGE30°</p> <p>RGE45°</p> | <p>3 x AA</p> <p>3 x BL30°</p> <p>3 x BR30°</p> <p>3 x BL45°</p> <p>3 x BR45°</p> <p>1 x BR30° / 2 x BL30° or<br/>1 x BL30° / 2 x BR30°</p> <p>1 x BR45° / 2 x BL45° or<br/>1 x BL45° / 2 x BR45°</p> |  |
|  <p>F792</p>     | <p>2.6 – 20</p>                 | <p>RAA</p> <p>RBR30°</p> <p>RBL30°</p> <p>RBR45°</p> <p>RBL45°</p> <p>RGE30°</p> <p>RGE45°</p> | <p>3 x AA</p> <p>3 x BL30°</p> <p>3 x BR30°</p> <p>3 x BL45°</p> <p>3 x BR45°</p> <p>1 x BR30° / 2 x BL30° or<br/>1 x BL30° / 2 x BR30°</p> <p>1 x BR45° / 2 x BL45° or<br/>1 x BL45° / 2 x BR45°</p> |  |

| Shank [mm]        | Knurling wheel Ø [mm] | Knurling   |  |  |  |  |
|-------------------|-----------------------|--|--|---|---|---|
|                   |                       |  | RAA  | RBL   | RBR   | RGE   |
| 10 / 12           | 10                    | Workpiece centre/without plunge cut (radial)       | ●  | ●   | ●   | ●   |
|                   |                       | Starting at workpiece beginning                    | ●  | ●   | ●   | ●   |
|                   |                       | Starting in centre of workpiece/after plunge cut   | ●  | ●   | ●   | ●   |
| 20 / 25           | 20                    | Starting in centre of workpiece/without plunge cut | ●  | ●   | ●   | ●   |
|                   |                       | Up to a shoulder                                   | –  | –   | –   | –   |
|                   |                       | Starting at workpiece beginning up to the collar   | –  | –   | –   | –   |
| 10 / 12           | 15                    | Workpiece centre/without plunge cut (radial)       | ●  | ●   | ●   | ●   |
|                   |                       | Starting at workpiece beginning                    | ●  | ●   | ●   | ●   |
|                   |                       | Starting in centre of workpiece/after plunge cut   | ●  | ●   | ●   | ●   |
| 20 / 25           | 20                    | Starting in centre of workpiece/without plunge cut | ●  | ●   | ●   | ●   |
|                   |                       | Up to a shoulder                                   | ●  | ●   | ●   | ●   |
|                   |                       | Starting at workpiece beginning up to the collar   | ●  | ●   | ●   | ●   |
| 12                | 10                    | Workpiece centre/without plunge cut (radial)       | ●  | ●   | ●   | ●   |
|                   |                       | Starting at workpiece beginning                    | ●  | ●   | ●   | ●   |
|                   |                       | Starting in centre of workpiece/after plunge cut   | ●  | ●   | ●   | ●   |
|                   |                       | Starting in centre of workpiece/without plunge cut | ●  | ●   | ●   | ●   |
|                   | 15                    | Up to a shoulder                                   | –  | –   | –   | –   |
|                   |                       | Starting at workpiece beginning up to the collar   | –  | –   | –   | –   |
| 20 / 25           | 20 / 25               | Workpiece centre/without plunge cut (radial)       | ●  | ●   | ●   | ●   |
|                   |                       | Starting at workpiece beginning                    | ●  | ●   | ●   | ●   |
|                   |                       | Starting in centre of workpiece/after plunge cut   | ●  | ●   | ●   | ●   |
|                   |                       | Starting in centre of workpiece/without plunge cut | ●  | ●   | ●   | ●   |
|                   |                       | Up to a shoulder                                   | –  | –   | –   | –   |
|                   |                       | Starting at workpiece beginning up to the collar   | –  | –   | –   | –   |
| Ø15<br>Ø20<br>Ø25 | 10                    | Workpiece centre/without plunge cut (radial)       | –  | –   | –   | –   |
|                   |                       | Starting at workpiece beginning                    | ●  | ●   | ●   | ●   |
|                   |                       | Starting in centre of workpiece/after plunge cut   | –  | –   | –   | –   |
|                   |                       | Starting in centre of workpiece/without plunge cut | –  | –   | –   | –   |
|                   | 15                    | Up to a shoulder                                   | –  | –   | –   | –   |
|                   |                       | Starting at workpiece beginning up to the collar   | –  | –   | –   | –   |
| Ø15<br>Ø20<br>Ø25 | 15                    | Workpiece centre/without plunge cut (radial)       | –  | –   | –   | –   |
|                   |                       | Starting at workpiece beginning                    | ●  | ●   | ●   | ●   |
|                   |                       | Starting in centre of workpiece/after plunge cut   | –  | –   | –   | –   |
|                   |                       | Starting in centre of workpiece/without plunge cut | –  | –   | –   | –   |
|                   |                       | Up to a shoulder                                   | –  | –   | –   | –   |
|                   |                       | Starting at workpiece beginning up to the collar   | ●  | ●   | ●   | ●   |

# FORM KNURLING TOOL F711



## ADDED VALUES

- All common knurl profiles can be produced
- Single plus double roller system for maximum flexibility
- Firmly defined centre height
- Adjustment of alignment is possible

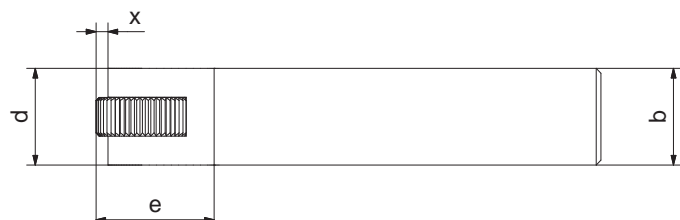
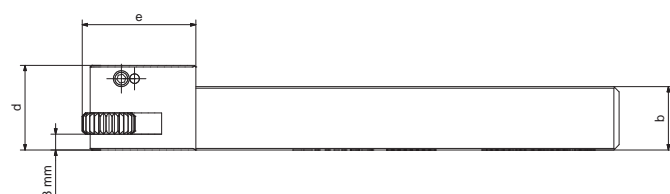
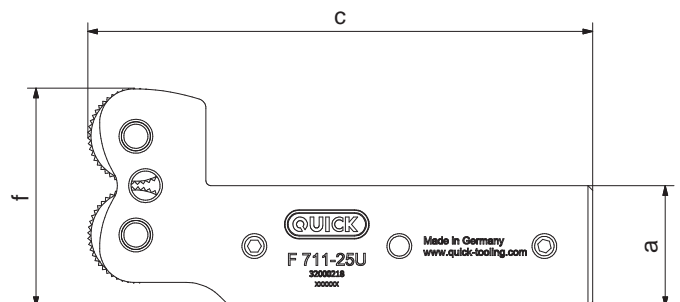
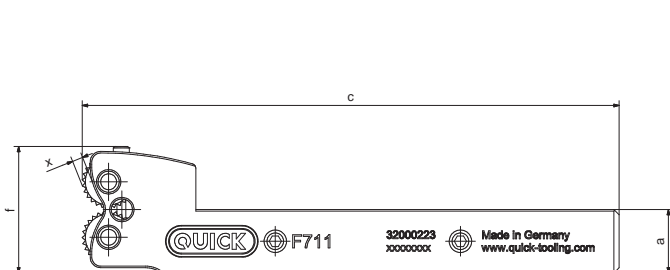
| Order no. | Model    | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |       |      |      |      |     |
|-----------|----------|------------------|---------------------------------|-----------------|----|-------|------|------|------|-----|
|           |          |                  |                                 | a               | b  | c     | d    | e    | f    | x   |
| 32000226  | F711-10R | 2.5 – 24         | 10 x 4 x 4                      | 10              | 10 | 101.5 | 16.5 | 21.5 | 24   | 2   |
| 32000223  | F711-12R | 2.5 – 24         | 10 x 4 x 4                      | 12              | 12 | 101.5 | 16.5 | 21.5 | 24   | 2   |
| 32000217  | F711-20U | 7 – 120          | 20 x 8 x 6                      | 20              | 20 | 104.5 | 20   | 24.5 | 40.4 | 2.5 |
| 32000218  | F711-25U | 7 – 120          | 20 x 8 x 6                      | 25              | 20 | 104.5 | 20   | 24.5 | 45.2 | 2.5 |

Left-hand version of shank dimensions 10 and 12 mm available on request.

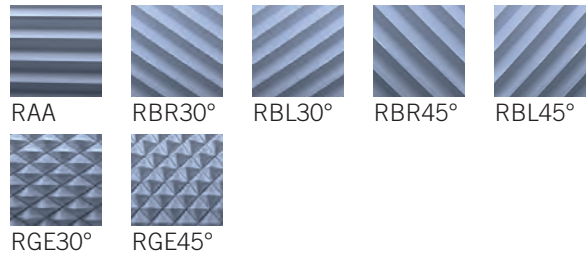
For the **single-wheel** use of this tool (shank size 10 or 12 mm) you may insert a knurling wheel measuring 15 x 4 x 4 mm. The maximum workpiece Ø is then extended to 50 mm.

## SPARE PART

| Order no. | Knurling wheel (Ø x w x b) [mm] |  |
|-----------|---------------------------------|--|
| 06TER1036 | 10 x 4 x 4                      |  |
| 06TER0965 | 20 x 8 x 6                      |  |



# FORM KNURLING TOOL F712



## ADDED VALUES


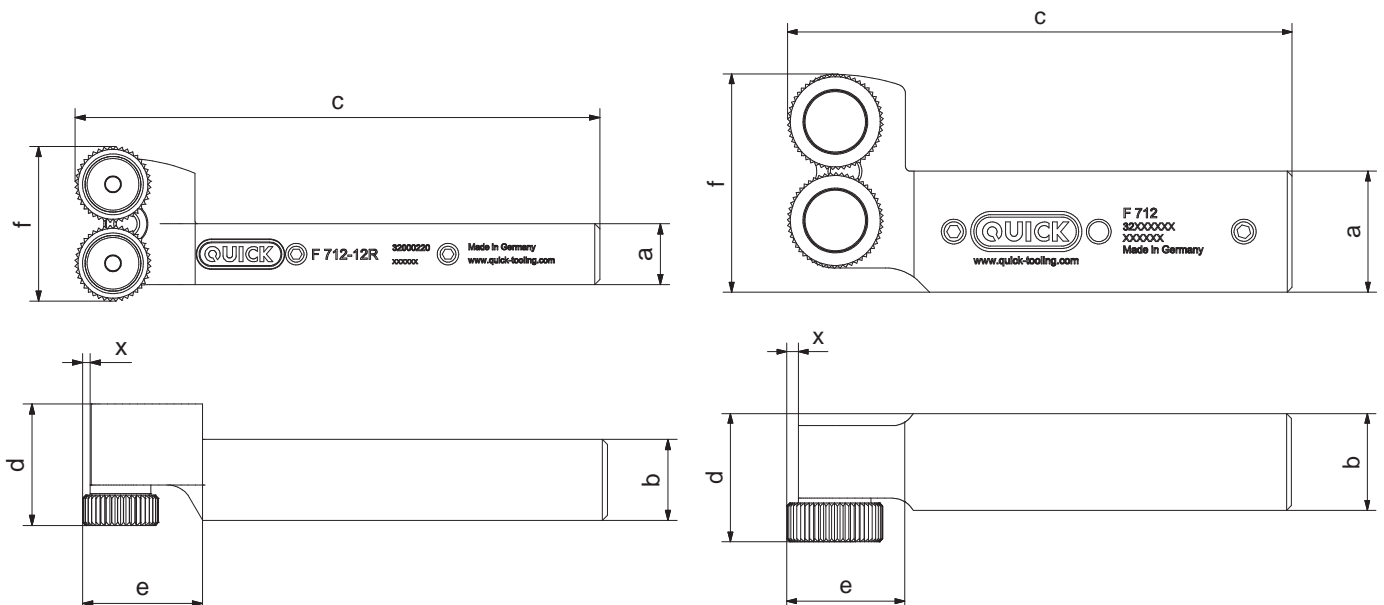
- Knurling up to a shoulder
- All common knurl profiles can be produced
- Single plus double roller system for maximum flexibility
- Firmly defined centre height
- Adjustment of alignment is possible

| Order no. | Model    | Workpiece $\varnothing$ [mm] | Knurling wheel ( $\varnothing \times w \times b$ ) [mm] | Dimensions [mm] |    |       |      |      |      |     |
|-----------|----------|------------------------------|---|-----------------|----|-------|------|------|------|-----|
|           |          |                              |   | a               | b  | c     | d    | e    | f    | x   |
| 32000219  | F712-10R | 3.5 – 50                     | 15 x 6 x 6A11   | 10              | 16 | 104.5 | 24   | 23,7 | 30.6 | 1.5 |
| 32000220  | F712-12R | 3.5 – 50                     | 15 x 6 x 6A11   | 12              | 16 | 104.5 | 24   | 23,7 | 30.6 | 1.5 |
| 32000209  | F712-20U | 7 – 120                      | 20 x 8 x 6A13   | 20              | 20 | 104.5 | 26.5 | 24.5 | 40.4 | 2.5 |
| 32000210  | F712-25U | 7 – 120                      | 20 x 8 x 6A13   | 25              | 20 | 104.5 | 26.5 | 24.5 | 45.2 | 2.5 |

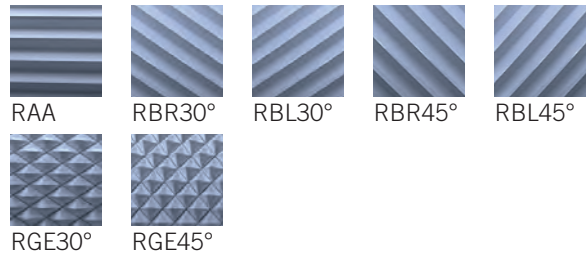
Left-hand version of shank dimensions 10 and 12 mm available on request.

## E-KIT

| Order no. | Knurling wheel ( $\varnothing \times w \times b$ ) [mm] |
|-----------|---|
| 22BHR0548 | 15 x 6 x 6A11   |
| 22BHR0538 | 20 x 8 x 6A13   |

# FORM KNURLING TOOL F751



## ADDED VALUES

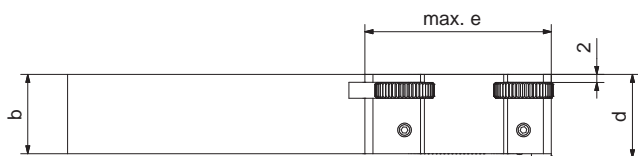
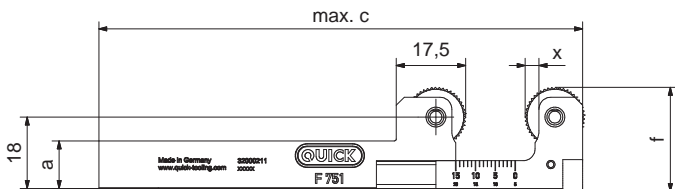
- High process stability due to tangential machining
- Special design for Swiss-type lathes
- Eliminates double workplace allocation in the slide unit
- User-friendly handling

| Order no. | Model    | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |          |    |         |    |     |
|-----------|----------|------------------|---------------------------------|-----------------|----|----------|----|---------|----|-----|
|           |          |                  |                                 | a               | b  | c        | d  | e       | f  | x   |
| 32000211  | F751-12R | 5 – 20           | 10 x 4 x 4                      | 12              | 20 | max. 122 | 21 | max. 47 | 26 | 1   |
|           |          | 0 – 15           | 15 x 4 x 4                      |                 |    |          |    |         |    | 3.5 |

Left-hand version available on request.

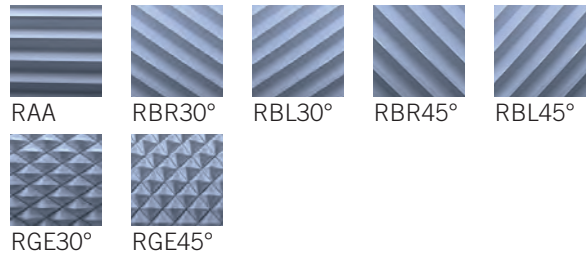
## SPARE PART

| Order no. |   |
|-----------|---|
| 06TER0964 |  |





# FORM KNURLING TOOL F761



## ADDED VALUES

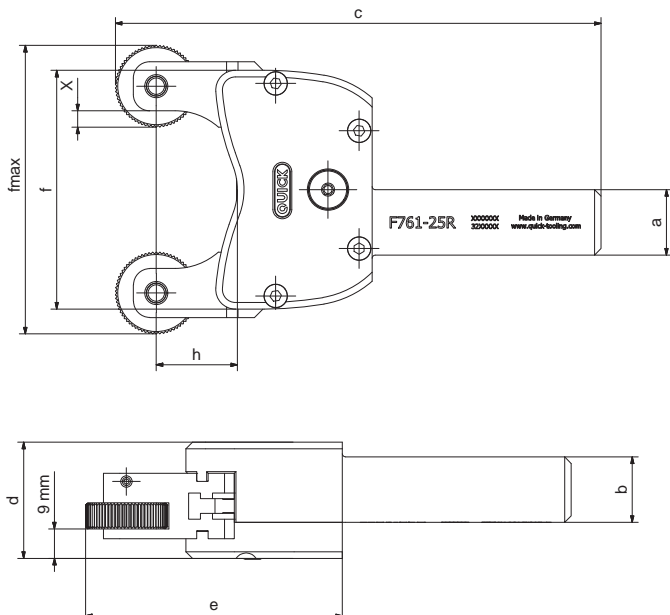
- High process stability due to tangential machining
- Knurl holders can be adjusted via synchronous spindle
- Force neutralisation due to tangential position

| Order no. | Model    | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |       |      |      |    |        |    |     |
|-----------|----------|------------------|---------------------------------|-----------------|----|-------|------|------|----|--------|----|-----|
|           |          |                  |                                 | a               | b  | c     | d    | e    | f  | f max. | h  | x   |
| 32000221  | F761-20R | 10 – 45          | 20 x 8 x 6                      | 20              | 20 | 148.5 | 35.5 | 78.5 | 73 | 94     | 25 | 2.5 |
|           |          |                  | 25 x 8 x 6                      |                 |    |       |      |      |    |        |    | 5   |
| 32000225  | F761-25R | 10 – 45          | 20 x 8 x 6                      | 25              | 25 | 148.5 | 35.5 | 78.5 | 73 | 94     | 25 | 2.5 |
|           |          |                  | 25 x 8 x 6                      |                 |    |       |      |      |    |        |    | 5   |

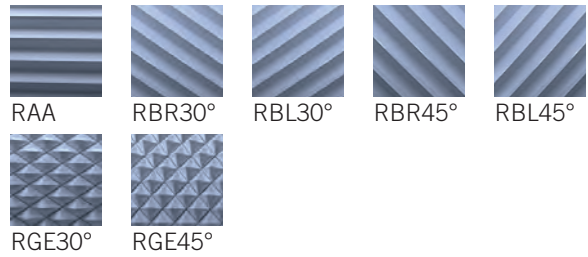
Left-hand version available on request.

## SPARE PART

| Order no. |  |
|-----------|---|
| 06TER0965 |   |



# FORM KNURLING TOOL F791



## ADDED VALUES

- Knurl holders individually adjustable
- Maximum process stability
- All knurling processes can be used by exchanging the knurl holder jaws
- Suitable for very small installation spaces due to compact design
- Force reduction due to three-point machining

| Order no. | Model | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |    |    |    |        |     |
|-----------|-------|------------------|---------------------------------|-----------------|----|----|----|----|--------|-----|
|           |       |                  |                                 | d max.          | e  | j  | k  | l  | n max. | x   |
| 32000072  | F791  | 1.8 – 20         | 10 x 4 x 4                      | 75              | 53 | 20 | 54 | 16 | 32     | 1   |
|           |       | 2.6 – 20         | 15 x 4 x 4                      |                 |    |    |    |    |        | 3.5 |

## SPARE PART

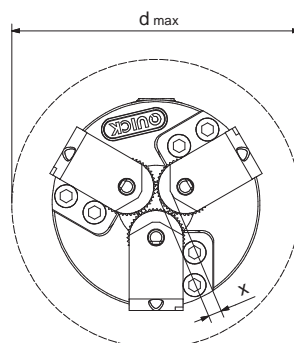
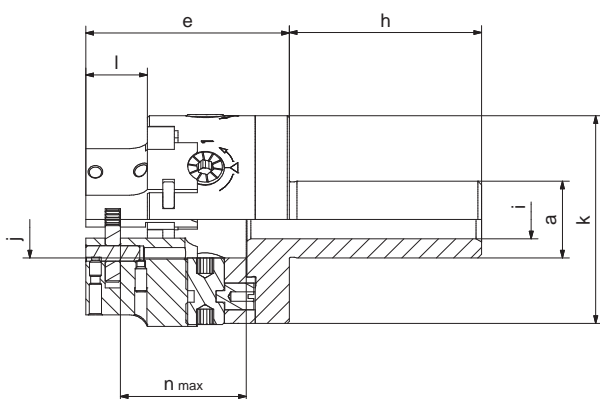
| Order no. |  |
|-----------|--|
| 21BHR1306 |  |

## SHANK

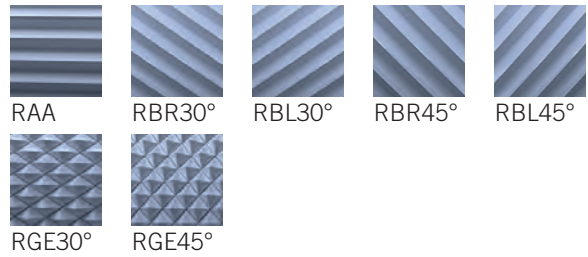
| Order no. | Ø „a“ [mm] | Bore „i“ [mm] | Length „h“ [mm] |  |
|-----------|------------|---------------|-----------------|--|
| 22BHR0119 | 15         | 9             | 50              |  |
| 22BHR0121 | 20         | 10            | 50              |  |
| 22BHR0122 | 25         | 15            | 50              |  |

## JAWS

| Order no. | Description                    | Tool |  |
|-----------|--------------------------------|------|--|
| 22BHR0537 | Form knurling up to a shoulder | F792 |  |
| 22BHR0536 | Cut knurling                   | C693 |  |



# FORM KNURLING TOOL F792




## ADDED VALUES


- Knurl holders individually adjustable
- Maximum process stability
- All knurling processes can be used by exchanging the knurl holder jaws
- Suitable for very small installation spaces due to compact design
- Knurling up to a shoulder

| Order no. | Model | Workpiece Ø [mm] | Knurling wheel (Ø x w x b) [mm] | Dimensions [mm] |    |    |    |    |        |     |
|-----------|-------|------------------|---------------------------------|-----------------|----|----|----|----|--------|-----|
|           |       |                  |                                 | d max.          | e  | j  | k  | l  | n max. | x   |
| 32000206  | F792  | 2.6 – 20         | 15 x 6 x 6A11                   | 75              | 54 | 20 | 54 | 17 | 37     | 1.5 |


### E-KIT

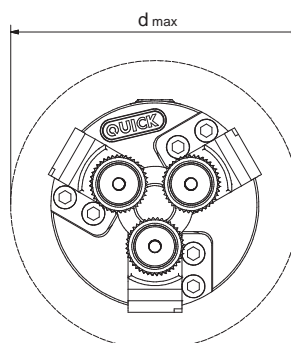
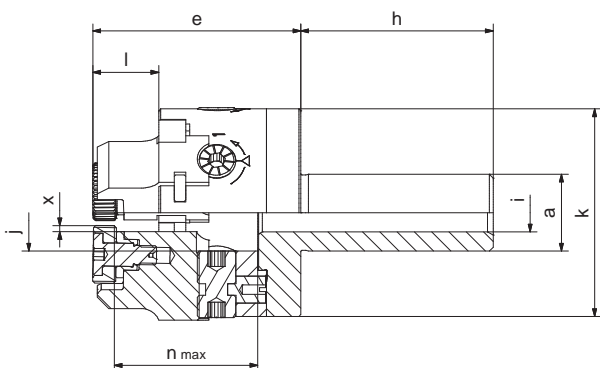
| Order no. |   |
|-----------|---|
| 22BHR0548 |  |

### SHANK

| Order no. | Ø „a“ [mm] | Bore „i“ [mm] | Length „h“ [mm] |   |
|-----------|------------|---------------|-----------------|---|
| 22BHR0119 | 15         | 9             | 50              |  |
| 22BHR0121 | 20         | 10            | 50              |   |
| 22BHR0122 | 25         | 15            | 50              |   |

### JAWS

| Order no. | Description   | Tool |   |
|-----------|---------------|------|---|
| 22BHR0490 | Form knurling | F791 |  |
| 22BHR0536 | Cut knurling  | C693 |   |



# KNURLING WHEELS






# CUTTING PROCESS

QUICK knurling wheels for cutting processes are manufactured of PM.

## Surface treatment PVD coatings

For cutting processes we recommend different PVD coatings, since they can have a positive effect on the life of the knurling wheels. The following variants are available on request.

| PVD coating | Colour sample  | Suitable for   |
|-------------|--|--|
| Q-Dur       |  | Cold-work steel/hot-work steel/<br>high-speed steels/tempering<br>steels (alternative) |
| Q-Blue      |  | Stainless steels/high-speed<br>steels/tempering steels/<br>titanium alloys             |
| Q-Gold      |  | Aluminium and brass alloys   |

# NON-CUTTING PROCESS

QUICK knurling wheels for non-cutting processes are manufactured of PM.

## Surface treatment TENIFER® salt-bath nitriding heat treatment

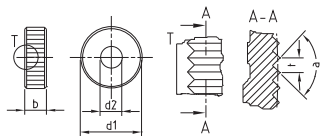
For non-cutting processes we recommend the TENIFER® method, since the salt-bath nitrocarburising process achieves high case hardness.

# PROFILES AND PITCHES

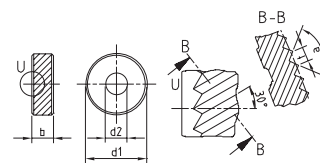
DIN 403 describes and specifies the knurling profile on the knurling wheel.

DIN 403 defines form knurling types AA, BL and BR. Knurling wheels that deviate from DIN 403 are considered special knurling tools and are custom manufactured by Hommel+Keller based on customer drawings.

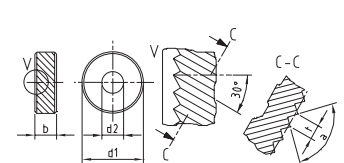
AA | Knurling wheel with axially parallel grooves



BL | Left-hand knurling wheel



BR | Right-hand knurling wheel



The knurling profile on the knurling wheel according to DIN 403 is based on the desired knurling profile on the workpiece (DIN 82) and the toolholder that is used. The knurling pitch prefers to the distance between tooth crests. The pitches = 0.5/0.6/0.8/1.0/1.2/1.6 are standard according to DIN 403. The Hommel+Keller product spectrum includes other pitches as well.

# KNURLING WHEELS FOR CUTTING



AA



BL15°



BR15°



BL30°



BR30°

Ground profile, no chamfer, profile angle 90° – PM

| Ø    | Dimensions [mm] |      | Profile | Pitches [mm] |
|------|-----------------|------|---------|--------------|
|      | Width           | Bore |         |              |
| 8.9  | 2.5             | 4    | AA      | ⊙            |
|      |                 |      | BL15°   | □            |
|      |                 |      | BR15°   | □            |
|      |                 |      | BL30°   | ⊙            |
|      |                 |      | BR30°   | ⊙            |
| 14.5 | 3               | 5    | AA      | ○            |
|      |                 |      | BL15°   | ■            |
|      |                 |      | BR15°   | ■            |
|      |                 |      | BL30°   | □            |
|      |                 |      | BR30°   | □            |
| 21.5 | 5               | 8    | AA      | ●            |
|      |                 |      | BL15°   | ●            |
|      |                 |      | BR15°   | ●            |
|      |                 |      | BL30°   | ●            |
|      |                 |      | BR30°   | ●            |
| 32   | 8               | 14   | AA      | ◆            |
|      |                 |      | BL15°   | ◆            |
|      |                 |      | BR15°   | ◆            |
| 42   | 12              | 18   | AA      | ◆            |
|      |                 |      | BL15°   | ◆            |
|      |                 |      | BR15°   | ◆            |
|      |                 |      | BL30°   | ❖            |
|      |                 |      | BR30°   | ❖            |

## STANDARD PITCHES

|   |   |
|---|---|
| ● | 0.5 / 0.6 / 0.8 / 1.0 / 1.2 / 1.5 / 1.6 / 2.0 |
| ○ | 0.4 / 0.5 / 0.6 / 0.8 / 1.0 / 1.2             |
| ⊙ | 0.3 / 0.4 / 0.5 / 0.6 / 0.8 / 1.0             |
| ■ | 0.5 / 0.6 / 0.8 / 1.0 / 1.2                   |
| □ | 0.4 / 0.5 / 0.6 / 0.8 / 1.0                   |
| ◆ | 1.5 / 2.0 / 2.5 / 3.0                         |
| ❖ | 1.5 / 2.0 / 3.0                               |

# KNURLING WHEELS FOR FORMING



AA



BL30°



BR30°



BL45°



BR45°

Milled profile, 45° chamfer, profile angle 90° – PM

| Ø  | Dimensions [mm] |      | Profile | Pitches [mm] |
|----|-----------------|------|---------|--------------|
|    | Width           | Bore |         |              |
| 10 | 4               | 4    | AA      | ⊙            |
|    |                 |      | BL30°   | ⊙            |
|    |                 |      | BR30°   | ⊙            |
|    |                 |      | BL45°   | □            |
|    |                 |      | BR45°   | □            |
| 15 | 4               | 4    | AA      | ⊙            |
|    |                 |      | BL30°   | □            |
|    |                 |      | BR30°   | □            |
| 15 | 6               | 6A11 | AA      | ⊙            |
|    |                 |      | BL30°   | ⊙            |
|    |                 |      | BR30°   | ⊙            |
|    |                 |      | BL45°   | ⊙            |
|    |                 |      | BR45°   | ⊙            |
| 20 | 8               | 6    | AA      | ●            |
|    |                 |      | BL30°   | ○            |
|    |                 |      | BR30°   | ○            |
|    |                 |      | BL45°   | ■            |
|    |                 |      | BR45°   | ■            |
| 20 | 8               | 6A13 | AA      | ○            |
| 25 | 8               | 6    | AA      | ○            |

## STANDARD PITCHES

|   |   |
|---|---|
| ● | 0.3 / 0.4 / 0.5 / 0.6 / 0.8 / 1.0 / 1.2 / 1.5 / 2.0 |
| ○ | 0.5 / 0.6 / 0.8 / 1.0 / 1.2 / 1.5                   |
| ⊙ | 0.3 / 0.4 / 0.5 / 0.6 / 0.8 / 1.0                   |
| ■ | 0.6 / 0.8 / 1.0 / 1.2 / 1.5 / 2.0                   |
| □ | 0.5 / 0.6 / 0.8 / 1.0                               |

# TECHNOLOGY

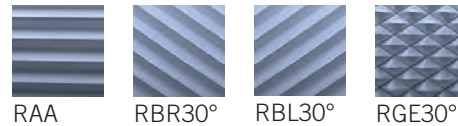




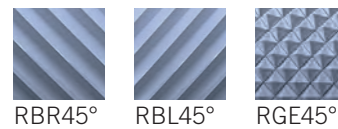
# IMPORTANT INFORMATION

## KNURLING PROFILES

Knurling profiles according to DIN 82



Additional profiles



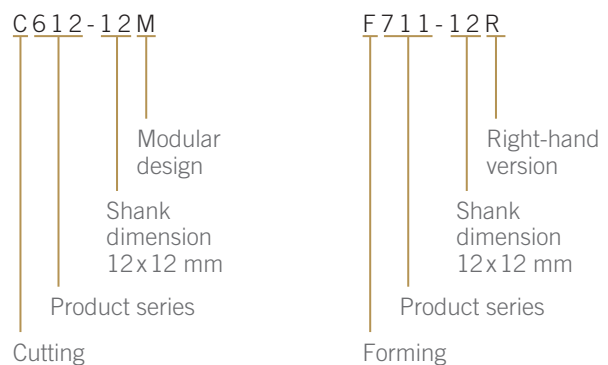
## DOVETAIL GUIDE

- Modular shank design: Shank can be exchanged quickly and easily by means of the dovetail guide
  1. Shank sizes 10 x 16 / 12 x 16 / 16 x 16 mm are suitable for the small knurling head
  2. Shank sizes 20 x 25 / 25 x 25 mm are suitable for the large knurling head
- Eccentric clamping
- For shank sizes 10 x 16 / 12 x 16 / 16 x 16 mm and 20 x 25 / 25 x 25 mm there is an adaptable coolant nozzle

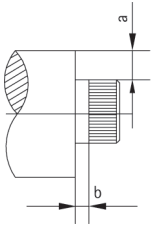


## EXPLANATION OF MODEL DESIGNATIONS

Each QUICK tool has a particular designation. The following explanation is provided for your convenience.



# INFLUENCING FACTORS



Please note that due to the inclination of the knurling wheels, cut knurling tools cannot be used for knurling all the way to a shoulder.

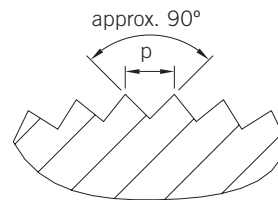
| a  | b 8.9 | b 14.5 | b 21.5 | b 32 | b 42 |
|----|-------|--------|--------|------|------|
| 1  | 1.0   | 1.3    | 2.0    | 1.5  | 1.8  |
| 2  | 2.5   | 1.8    | 2.6    | 2.5  | 3.0  |
| 3  | 3.0   | 2.2    | 3.0    | 3.1  | 4.3  |
| 4  | 3.0   | 2.6    | 3.8    | 3.8  | 5.7  |
| 5  | 3.0   | 2.8    | 4.5    | 4.5  | 6.7  |
| 6  | 3.0   | 3.1    | 4.7    | 5.1  | 7.5  |
| 7  | 3.0   | 3.1    | 5.0    | 6.2  | 8.1  |
| 8  | 3.0   | 3.1    | 5.3    | 7.6  | 8.6  |
| 9  | 3.0   | 3.1    | 5.3    | 9.4  | 9.1  |
| 10 | 3.0   | 3.1    | 5.3    | 9.8  | 9.5  |
| 11 | 3.0   | 3.1    | 5.3    | 10.4 | 9.8  |
| 12 | 3.0   | 3.1    | 5.3    | 10.6 | 10.1 |
| 13 | 3.0   | 3.1    | 5.3    | 10.8 | 12.2 |
| 14 | 3.0   | 3.1    | 5.3    | 11.1 | 13.1 |
| 15 | 3.0   | 3.1    | 5.3    | 11.1 | 13.6 |
| 16 | 3.0   | 3.1    | 5.3    | 11.1 | 14.1 |
| 17 | 3.0   | 3.1    | 5.3    | 11.1 | 14.4 |
| 18 | 3.0   | 3.1    | 5.3    | 11.1 | 14.6 |
| 19 | 3.0   | 3.1    | 5.3    | 11.1 | 14.8 |

# OPTIMISATION OF KNURLING

To guarantee optimal results, we recommend that you read the operating manual carefully before using our products. Correct assembly and handling of the tool will save you set-up time and allow you to achieve your desired results.

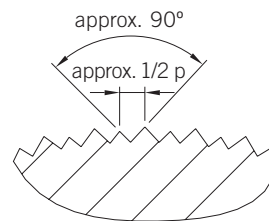
## The pitch corresponds to the workpiece circumference

In many cases the user does not notice the relationship between the pitch and the workpiece circumference. The knurling wheel can compensate the distortion of the pitch to produce optimal knurling results (see figure).



## The pitch does not correspond to the workpiece circumference at all, or is not optimal

This is an extreme case. The knurling wheel cannot compensate the unfavourable relationship between the pitch and the workpiece circumference, or the profile is heavily distorted. In the worst case this can result in “double knurling”. This happens when the knurling wheel does not engage in the knurling profile after one workpiece rotation, but instead engages in between. This is evident in the finer pitch of the knurling (see figure).



**The knurling quality and the tool life can be improved substantially by optimising the knurling by changing the rough-turn diameter, the cutting values and/or the pitch.**

### 1. Correction of the rough-turn diameter and the cutting values until optimal knurling is achieved.

If a correction is not possible due to inability to comply with the tolerances, then:

### 2. Check whether the pitch can be changed.

If it is not possible to change the pitch, it is necessary to manufacture a special knurling wheel with optimised pitch (defined number of teeth/outer diameter of knurling wheel).

Consultation is provided by the Hommel+Keller application engineer on the basis of a workpiece drawing and information about the machine.

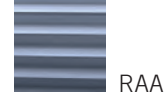
The calculation of the optimal pitch is conducted on the basis of approximate formulas. Due to influencing factors (such as differences in materials) further optimisation may be necessary.

# MATERIAL DISPLACEMENT IN FORM KNURLING

Our empirical values for enlargement of the workpiece diameter

Knurling profile acc. to DIN 82: RAA (knurling profile on the workpiece)

Knurling wheels acc. to DIN 403: AA (knurling profile on knurling wheel)

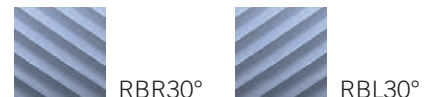


| Material           | Workpiece Ø [mm] | Pitch [mm]                             |      |      |      |      |      |      |      |      |      |      |
|--------------------|------------------|--|------|------|------|------|------|------|------|------|------|------|
|                    |                  | 0.3                                    | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 1.0  | 1.2  | 1.5  | 1.6  | 2.0  |
|                    |                  | Enlargement of workpiece diameter [mm] |      |      |      |      |      |      |      |      |      |      |
| Free-cutting steel | 5                | 0.08                                   | 0.14 | 0.18 | 0.22 | 0.27 | 0.29 | 0.35 | 0.50 | –    | –    | –    |
|                    | 15               | 0.08                                   | 0.14 | 0.18 | 0.23 | 0.30 | 0.40 | 0.44 | 0.50 | 0.60 | 0.65 | 0.70 |
|                    | 25               | 0.08                                   | 0.15 | 0.23 | 0.24 | 0.28 | 0.35 | 0.44 | 0.53 | 0.62 | 0.70 | 0.98 |
| Stainless steel    | 5                | 0.10                                   | 0.15 | 0.20 | 0.25 | 0.28 | 0.30 | 0.42 | 0.41 | –    | –    | –    |
|                    | 15               | 0.10                                   | 0.15 | 0.19 | 0.25 | 0.30 | 0.34 | 0.45 | 0.51 | 0.60 | –    | –    |
|                    | 25               | 0.10                                   | 0.14 | 0.20 | 0.26 | 0.31 | 0.33 | 0.43 | 0.50 | 0.62 | –    | –    |
| Brass              | 5                | 0.08                                   | 0.12 | 0.18 | 0.20 | 0.21 | 0.22 | 0.25 | 0.28 | –    | –    | –    |
|                    | 15               | 0.10                                   | 0.14 | 0.20 | 0.26 | 0.28 | 0.29 | 0.35 | 0.41 | 0.44 | 0.48 | 0.55 |
|                    | 25               | 0.10                                   | 0.15 | 0.20 | 0.25 | 0.28 | 0.30 | 0.36 | 0.43 | 0.46 | 0.50 | 0.53 |
| Aluminium          | 5                | 0.09                                   | 0.15 | 0.19 | 0.23 | 0.28 | 0.30 | 0.41 | 0.40 | –    | –    | –    |
|                    | 15               | 0.10                                   | 0.15 | 0.19 | 0.26 | 0.29 | 0.33 | 0.45 | 0.51 | 0.57 | 0.65 | –    |
|                    | 25               | 0.09                                   | 0.15 | 0.19 | 0.26 | 0.29 | 0.32 | 0.45 | 0.52 | 0.59 | 0.65 | 0.75 |

Important notice: This information represents empirical values. Deviations are possible.

Knurling profile acc. to DIN 82: RBL30°/RBR30° (knurling profile on workpiece)

Knurling wheels acc. to DIN 403: BR30°/BL30° (knurling profile on knurling wheel)



| Material           | Workpiece Ø [mm] | Pitch [mm]                             |      |      |      |      |      |      |      |      |      |      |
|--------------------|------------------|--|------|------|------|------|------|------|------|------|------|------|
|                    |                  | 0.3                                    | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 1.0  | 1.2  | 1.5  | 1.6  | 2.0  |
|                    |                  | Enlargement of workpiece diameter [mm] |      |      |      |      |      |      |      |      |      |      |
| Free-cutting steel | 5                | 0.11                                   | 0.15 | 0.20 | 0.24 | 0.28 | 0.34 | 0.45 | 0.55 | –    | –    | –    |
|                    | 15               | 0.11                                   | 0.15 | 0.22 | 0.26 | 0.30 | 0.35 | 0.45 | 0.52 | 0.67 | 0.73 | 0.85 |
|                    | 25               | 0.11                                   | 0.14 | 0.23 | 0.25 | 0.28 | 0.36 | 0.45 | 0.56 | 0.70 | 0.72 | 0.90 |
| Stainless steel    | 5                | 0.09                                   | 0.14 | 0.19 | 0.25 | 0.31 | 0.34 | 0.45 | 0.52 | –    | –    | –    |
|                    | 15               | 0.12                                   | 0.20 | 0.23 | 0.31 | 0.35 | 0.40 | 0.51 | 0.62 | 0.66 | 0.73 | 0.97 |
|                    | 25               | 0.12                                   | 0.18 | 0.24 | 0.27 | 0.37 | 0.39 | 0.49 | 0.59 | 0.80 | 0.84 | 0.96 |
| Brass              | 5                | 0.10                                   | 0.14 | 0.20 | 0.23 | 0.24 | 0.28 | 0.33 | 0.37 | –    | –    | –    |
|                    | 15               | 0.10                                   | 0.15 | 0.21 | 0.23 | 0.24 | 0.31 | 0.41 | 0.47 | 0.53 | 0.55 | 0.63 |
|                    | 25               | 0.11                                   | 0.15 | 0.22 | 0.22 | 0.25 | 0.30 | 0.40 | 0.45 | 0.55 | 0.61 | 0.68 |
| Aluminium          | 5                | 0.12                                   | 0.14 | 0.21 | 0.24 | 0.29 | 0.34 | 0.41 | 0.51 | –    | –    | –    |
|                    | 15               | 0.12                                   | 0.18 | 0.23 | 0.26 | 0.36 | 0.40 | 0.50 | 0.56 | 0.56 | 0.61 | 0.75 |
|                    | 25               | 0.12                                   | 0.18 | 0.25 | 0.28 | 0.37 | 0.39 | 0.50 | 0.58 | 0.77 | 0.82 | 0.96 |

36 Important notice: This information represents empirical values. Deviations are possible.

Knurling profile acc. to DIN 82: RGE30° (knurling profile on the workpiece)

Knurling wheels acc. to DIN 403: BR30°+ BL30° (knurling profile on knurling wheel)



RGE30°

| Material           | Workpiece Ø [mm] | Pitch [mm]                             |      |      |      |      |      |      |      |      |      |      |
|--------------------|------------------|--|------|------|------|------|------|------|------|------|------|------|
|                    |                  | 0.3                                    | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 1.0  | 1.2  | 1.5  | 1.6  | 2.0  |
|                    |                  | Enlargement of workpiece diameter [mm] |      |      |      |      |      |      |      |      |      |      |
| Free-cutting steel | 5                | 0.12                                   | 0.16 | 0.20 | 0.25 | 0.33 | 0.41 | 0.55 | 0.65 | –    | –    | –    |
|                    | 15               | 0.13                                   | 0.22 | 0.30 | 0.32 | 0.35 | 0.41 | 0.52 | 0.62 | 0.67 | 0.81 | 0.95 |
|                    | 25               | 0.12                                   | 0.18 | 0.28 | 0.32 | 0.35 | 0.38 | 0.55 | 0.67 | 0.77 | 0.87 | 0.98 |
| Stainless steel    | 5                | 0.11                                   | 0.20 | 0.25 | 0.30 | 0.36 | 0.39 | 0.55 | 0.55 | –    | –    | –    |
|                    | 15               | 0.10                                   | 0.14 | 0.21 | 0.24 | 0.29 | 0.34 | 0.43 | 0.53 | 0.66 | 0.72 | 0.88 |
|                    | 25               | 0.11                                   | 0.13 | 0.20 | 0.25 | 0.28 | 0.32 | 0.44 | 0.52 | 0.67 | 0.70 | 0.83 |
| Brass              | 5                | 0.12                                   | 0.13 | 0.16 | 0.20 | 0.24 | 0.28 | 0.32 | 0.38 | –    | –    | –    |
|                    | 15               | 0.12                                   | 0.16 | 0.18 | 0.24 | 0.28 | 0.30 | 0.39 | 0.40 | 0.48 | 0.52 | 0.63 |
|                    | 25               | 0.12                                   | 0.17 | 0.22 | 0.23 | 0.27 | 0.30 | 0.38 | 0.41 | 0.48 | 0.50 | 0.63 |
| Aluminium          | 5                | 0.10                                   | 0.15 | 0.21 | 0.25 | 0.33 | 0.36 | 0.50 | 0.57 | –    | –    | –    |
|                    | 15               | 0.11                                   | 0.14 | 0.20 | 0.25 | 0.28 | 0.33 | 0.43 | 0.54 | 0.67 | 0.71 | 0.89 |
|                    | 25               | 0.11                                   | 0.15 | 0.22 | 0.25 | 0.29 | 0.34 | 0.44 | 0.53 | 0.68 | 0.69 | 0.88 |

Important notice: This information represents empirical values. Deviations are possible.

# GUIDELINES FOR CUTTING SPEED AND FEED RATE

Cut knurling – cutting process

| Material              | Workpiece Ø<br>[mm] | Knurling wheel Ø<br>[mm]    | Vc [m/min] |     | f [mm/U] |      |            |      |                |                |
|-----------------------|---------------------|-----------------------------|------------|-----|----------|------|------------|------|----------------|----------------|
|                       |                     |                             |            |     | Radial   |      | Axial      |      |                |                |
|                       |                     |                             |            |     |          |      | Pitch [mm] |      |                |                |
|                       |                     |                             |            |     | from     | to   | from       | to   | > 0.3<br>< 0.5 | > 0.5<br>< 1.0 |
| Free-cutting<br>steel | < 10                | 8.9 / 14.5 / 21.5           | 40         | 70  | 0.04     | 0.08 | 0.20       | 0.13 | 0.08           | 0.07           |
|                       | 10 – 40             | 8.9 / 14.5 / 21.5 / 32 / 42 | 50         | 90  | 0.05     | 0.10 | 0.28       | 0.18 | 0.14           | 0.10           |
|                       | 40 – 100            | 14.5 / 21.5 / 32 / 42       | 65         | 110 | 0.05     | 0.10 | 0.35       | 0.25 | 0.17           | 0.11           |
|                       | 100 – 250           | 21.5 / 32 / 42              | 65         | 110 | 0.05     | 0.10 | 0.42       | 0.28 | 0.18           | 0.13           |
|                       | > 250               | 32 / 42                     | 80         | 100 | 0.05     | 0.10 | 0.45       | 0.29 | 0.20           | 0.14           |
| Stainless<br>steel    | < 10                | 8.9 / 14.5 / 21.5           | 22         | 40  | 0.04     | 0.08 | 0.14       | 0.09 | 0.06           | 0.05           |
|                       | 10 – 40             | 8.9 / 14.5 / 21.5 / 32 / 42 | 30         | 50  | 0.05     | 0.10 | 0.20       | 0.13 | 0.10           | 0.07           |
|                       | 40 – 100            | 14.5 / 21.5 / 32 / 42       | 35         | 60  | 0.05     | 0.10 | 0.25       | 0.18 | 0.12           | 0.08           |
|                       | 100 – 250           | 21.5 / 32 / 42              | 35         | 60  | 0.05     | 0.10 | 0.29       | 0.20 | 0.13           | 0.09           |
|                       | > 250               | 32 / 42                     | 45         | 55  | 0.05     | 0.10 | 0.31       | 0.21 | 0.14           | 0.10           |
| Brass                 | < 10                | 8.9 / 14.5 / 21.5           | 55         | 100 | 0.04     | 0.08 | 0.22       | 0.14 | 0.09           | 0.08           |
|                       | 10 – 40             | 8.9 / 14.5 / 21.5 / 32 / 42 | 70         | 125 | 0.05     | 0.10 | 0.31       | 0.20 | 0.15           | 0.11           |
|                       | 40 – 100            | 14.5 / 21.5 / 32 / 42       | 90         | 155 | 0.05     | 0.10 | 0.39       | 0.28 | 0.18           | 0.12           |
|                       | 100 – 250           | 21.5 / 32 / 42              | 90         | 155 | 0.05     | 0.10 | 0.46       | 0.31 | 0.20           | 0.14           |
|                       | > 250               | 32 / 42                     | 115        | 140 | 0.05     | 0.10 | 0.49       | 0.32 | 0.22           | 0.15           |
| Aluminium             | < 10                | 8.9 / 14.5 / 21.5           | 70         | 120 | 0.04     | 0.08 | 0.12       | 0.08 | 0.05           | 0.04           |
|                       | 10 – 40             | 8.9 / 14.5 / 21.5 / 32 / 42 | 80         | 150 | 0.05     | 0.10 | 0.17       | 0.11 | 0.08           | 0.06           |
|                       | 40 – 100            | 14.5 / 21.5 / 32 / 42       | 110        | 160 | 0.05     | 0.10 | 0.21       | 0.15 | 0.10           | 0.07           |
|                       | 100 – 250           | 21.5 / 32 / 42              | 110        | 160 | 0.05     | 0.10 | 0.25       | 0.17 | 0.11           | 0.08           |
|                       | > 250               | 32 / 42                     | 130        | 150 | 0.05     | 0.10 | 0.27       | 0.18 | 0.12           | 0.08           |

Important notice: This information represents reference values. The optimal values are to be found in the application. Ensure effective cooling/lubrication to prevent chips from being rolled into the profile and to prolong the life of the knurling wheels.

Form knurling – non-cutting process

| Material           | Workpiece Ø [mm] | Knurling wheel Ø [mm] | Vc [m/min] |    | f [mm/U] |      |                |                |                |                |
|--------------------|------------------|-----------------------|------------|----|----------|------|----------------|----------------|----------------|----------------|
|                    |                  |                       |            |    | Radial   |      | Axial          |                |                |                |
|                    |                  |                       | from       | to |          |      | Pitch [mm]     |                |                |                |
|                    |                  |                       |            |    | from     | to   | > 0.3<br>< 0.5 | > 0.5<br>< 1.0 | > 1.0<br>< 1.5 | > 1.5<br>< 2.0 |
| Free-cutting steel | < 10             | 10 / 15 / 20          | 20         | 50 | 0.04     | 0.08 | 0.14           | 0.09           | 0.06           | 0.05           |
|                    | 10 – 40          | 10 / 15 / 20 / 25     | 25         | 55 | 0.05     | 0.10 | 0.20           | 0.13           | 0.10           | 0.07           |
|                    | 40 – 100         | 15 / 20 / 25          | 30         | 60 | 0.05     | 0.10 | 0.25           | 0.18           | 0.12           | 0.08           |
|                    | 100 – 250        | 20 / 25               | 30         | 60 | 0.05     | 0.10 | 0.30           | 0.20           | 0.13           | 0.09           |
| Stainless steel    | < 10             | 10 / 15 / 20          | 15         | 40 | 0.04     | 0.08 | 0.12           | 0.08           | 0.05           | 0.04           |
|                    | 10 – 40          | 10 / 15 / 20 / 25     | 20         | 50 | 0.05     | 0.10 | 0.17           | 0.11           | 0.09           | 0.06           |
|                    | 40 – 100         | 15 / 20 / 25          | 25         | 50 | 0.05     | 0.10 | 0.21           | 0.15           | 0.10           | 0.07           |
|                    | 100 – 250        | 20 / 25               | 25         | 50 | 0.05     | 0.10 | 0.26           | 0.17           | 0.11           | 0.08           |
| Brass              | < 10             | 10 / 15 / 20          | 30         | 75 | 0.04     | 0.08 | 0.15           | 0.09           | 0.06           | 0.05           |
|                    | 10 – 40          | 10 / 15 / 20 / 25     | 40         | 85 | 0.05     | 0.10 | 0.21           | 0.14           | 0.11           | 0.07           |
|                    | 40 – 100         | 15 / 20 / 25          | 45         | 90 | 0.05     | 0.10 | 0.26           | 0.19           | 0.13           | 0.08           |
|                    | 100 – 250        | 20 / 25               | 45         | 90 | 0.05     | 0.10 | 0.32           | 0.21           | 0.14           | 0.09           |
| Aluminium          | < 10             | 10 / 15 / 20          | 25         | 60 | 0.04     | 0.08 | 0.18           | 0.11           | 0.08           | 0.06           |
|                    | 10 – 40          | 10 / 15 / 20 / 25     | 30         | 65 | 0.05     | 0.10 | 0.25           | 0.16           | 0.13           | 0.09           |
|                    | 40 – 100         | 15 / 20 / 25          | 35         | 70 | 0.05     | 0.10 | 0.31           | 0.23           | 0.15           | 0.10           |
|                    | 100 – 250        | 20 / 25               | 35         | 70 | 0.05     | 0.10 | 0.38           | 0.25           | 0.16           | 0.11           |

Important notice: This information represents reference values. The optimal values are to be found in the application. Ensure effective cooling/lubrication to prevent chips from being rolled into the profile and to prolong the life of the knurling wheels.



## QUICK – a brand name of Hommel+Keller



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