

TM

RAPID

KNURLING TOOLS & TOOL HOLDERS



*Analysing, Innovating And Providing The Best
Solutions To Customers By Adding Value In
Engineering Products*





Ecommerce Platform

Introducing **knurlingindia.com**

The official e-commerce platform for Rapid Knurling Products



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Knurling wheels features

- Rapid knurls have very good run-out accuracy. Face run-out and O.D. run-out w.r.t. to I.D. is maintained up to 0.03 max.
- It offers HSS knurls with bore and face ground.
- Rapid knurling tools are having milled sharp edge profile.
- Knurls undergo special heat treatment process to achieve uniform material strength and uniform hardness.
- Long life of knurls ensures less deviation in dimensional accuracy of job and consistent knurling profile.
- Knurls are able to perform on various metals such as SS, Brass, PB, Alloy, MS, aluminium.
- Various sizes and pitches for knurls are readily available.
- Customized manufacturing of knurls is available.
- Rapid offers suitable tool holders for knurls.
- Wide range of form and cut knurling tools are provided by RAPID™ along with tool holder to perform all type of knurling application.
- Rapid is able to deliver knurls very quickly due to ready stock in single or bulk quantity.



Why Rapid?

	Other Knurls
Dimensional accuracy consistent	Dimensional accuracy inconsistent
Convenient for mass production work	Not Convenient for mass production work
Cost per part is cheaper	Cost per part is high
Knurling can be done on SS / Brass / PB / Alloy / MS	Knurling can be done on MS/ Brass
Variety of sizes & pitch*	Limited sizes & pitch
Customized manufacturing is possible*	Customized manufacturing is not possible
Knurling depth is much higher	Knurling depth is less
Fully formed knurling profile can be formed in job	Fully formed knurling profile cannot be formed in job

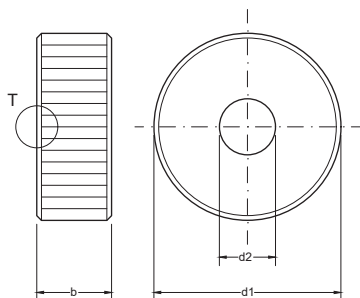
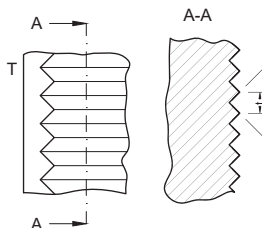
*Customized tools & holders are designed according to customers needs and requirements.

Pitches of the teeth of the knurls in mm

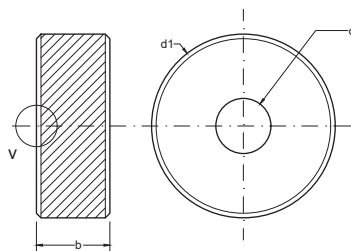
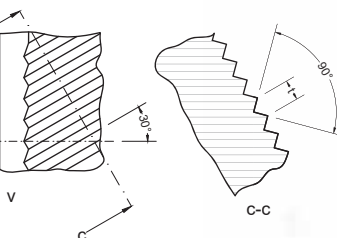
0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.2

1.5 | 1.6 | 1.8 | 2.0 | 2.5 mm

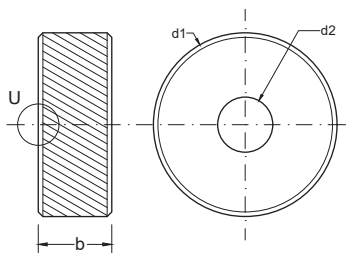
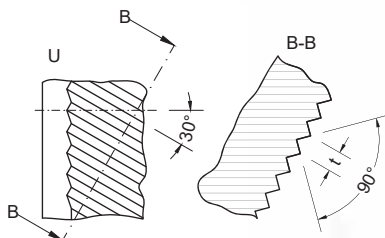
AA (STRAIGHT KNURLING WHEEL)



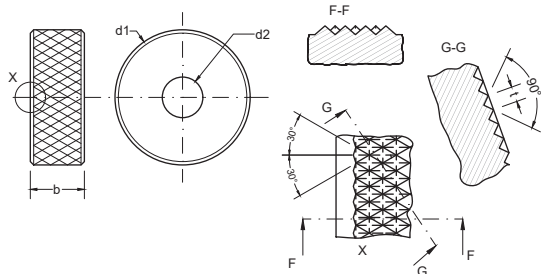
BL (LEFT HAND KNURLING WHEEL)



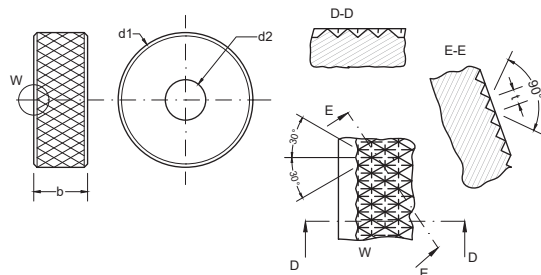
BR (RIGHT HAND KNURLING WHEEL)



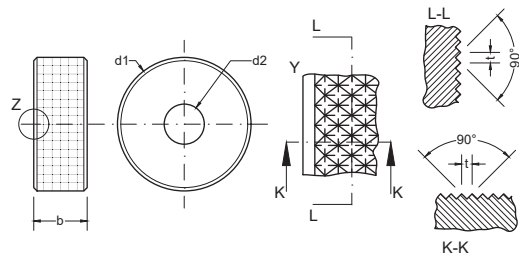
GE (MALE DIAMOND KNURLING WHEEL)



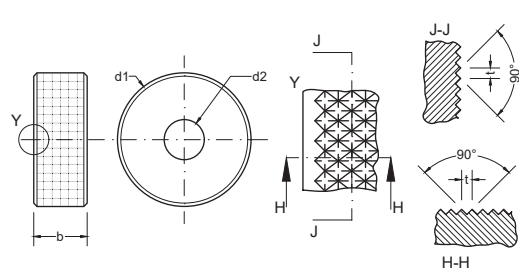
GV (FEMALE DIAMOND KNURLING WHEEL)



KE (MALE SQUARE KNURLING WHEEL)

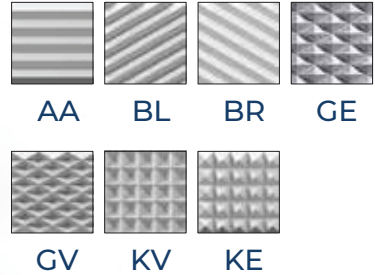


KV (FEMALE SQUARE KNURLING WHEEL)





KNURLING WHEELS



FORM KNURLS

Knurl Size :

10x04x04, 15x04x04, 20x08x06, 20x10x06

Knurl Pitch :

0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5, 1.6, 1.8, 2.0, 2.5
(0.1, 0.2, 0.3 Non-Standard size also available. Price on request)

Rapid Knurls Features :

- HSS knurls with Bore and Face ground
- Milled sharp Edge Profile
- better Form Profile
- Highest Productivity on ferrous & non ferrous material
- long life of tool on job which offer cost per part is negligible

*Further pitch sizes and customized knurling wheels available on demand

*Standard knurls are without chamfers



KNURLING WHEELS



CUT KNURLS

Knurl Size :

15x03x08, 21.5x5x10, 25x5x11, 25x6x11

Knurl Pitch :

0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5, 1.6, 1.8, 2.0, 2.5

Rapid Knurls Features :

- HSS knurls with Bore and Face ground
- Milled sharp Edge Profile For better cutting operations
- Reduced tool setup time
- Highest Productivity on ferrous & non ferrous material

SPECIAL KNURLS

Individual customer requirements call for expertise and flexibility. For this reason, special pitches and dimensions are available to our customers on request and in consultation with our Technical team.



COUNTER KNURLING WHEELS



COUNTER KNURLS

Knurl Size :
20x10x08C12

Knurl Pitch :
0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5, 1.6, 1.8, 2.0, 2.5
(0.1, 0.2, 0.3 Non-Standard size also available. Price on request)

Rapid Knurls Features :

- HSS knurls with Bore and Face ground
- Milled sharp Edge Profile
- better Form Profile
- Highest Productivity on ferrous & non ferrous material
- long life of tool on job which offer cost per part is negligible

*Further pitch sizes and customized knurling wheels available on demand

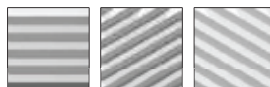
*Standard knurls are without chamfers

CONCAVE KNURLS



AA BL BR

CONVEX KNURLS



AA BL BR

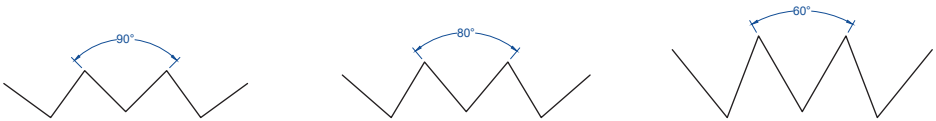
*Radial Knurls are manufactured as per client requirement

*Client will have to provide OD, ID, Width, Pitch & radial angle data

TOOTH FORM

A knurled tooth is V-shaped and the depth of the tooth is less than the depth of a theoretical V-form. The tooth has a rounded root and crest. The relationship between the actual depth of tooth to the theoretical V varies with the pitch of the teeth. On finer pitches, the tooth is a smaller proportion of the theoretical V-depth than coarser pitches. Also, female diamond patterns have shallower tooth depth than male diamond patterns.

RAPID offers 90° teeth angle as standard included pressure angle. As per customer requirement **RAPID** manufacture custom teeth angle such as 80° & 60°.



CIRCULAR AXIAL PITCH

Distance from tooth to tooth in mm.

TPI

Number of teeth per inch (measured on a linear inch) or is derived from 1" divided by the circular pitch.

DIAMETRAL PITCH

The number of teeth on the work divided by the theoretical work blank diameter.

FORMULAE:

$$\text{AXIAL PITCH (in mm)} = \frac{25.4}{\text{TPI}} \quad \text{or} \quad \text{AXIAL PITCH (in inch)} = \frac{1''}{\text{TPI}}$$

$$\text{AXIAL PITCH (in mm)} = \frac{25.4 \times 3.1416}{\text{DP}} \quad \text{or} \quad \text{AXIAL PITCH (in inch)} = \frac{1'' \times 3.1416}{\text{DP}}$$

CONVERSION CHART FOR STRAIGHT KNURLING:

TPI	AXIAL PITCH (in mm)	NEAREST STANDARD PITCH OFFERED BY RAPID
10	2.540	2.5
12	2.116	2.2
16	1.587	1.6
20	1.270	1.2
25	1.016	1.0
30	0.846	0.8
35	0.726	0.7
40	0.635	0.6
50	0.508	0.5
80	0.318	0.3

DP	AXIAL PITCH (in mm)	NEAREST STANDARD PITCH OFFERED BY RAPID
64	1.2468	1.2
96	0.8312	0.8
128	0.6234	0.6
160	0.4987	0.5

In-Feed Knurling (Plunge) (CNC -"X")

Straight or diamond knurling can be produced by using either one or two knurls mounted in a holder in the front or rear of the cross slide which applies direct pressure to the work. Diamond knurls require greater pressure than straight or diagonal knurls, sometimes placing prohibitive loads on both machine and work, causing damage to the machine.

End-Feed Knurling (To Chuck) (CNC -"Z")

Straight, Helical, or Diamond knurling may be produced with knurling holders mounted on the compound or turret. **KNURLS USED FOR FEED KNURLING SHOULD HAVE CHAMFERS.** Only straight and diagonal knurls can be used with the end-feeding knurling process. When producing helical and diamond knurling, the helical knurls are held in the holder to obtain the helical and/or diamond knurling as the knurls are fed over the blank.

TOOL SERIES **F101**

F101-20M200806



Machine Type :

Troub, Sliding Head, Lathe, Autolathe.

Suitable Method :

Plunge knurling, Feed knurling.

Features :

- Suitable for form knurling without swarf removal
- All knurling patterns can be formed
- Precise Carbide pin with ease of changing
- Accomodate RAPID knurls for better accuracy

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR GE



GV KV KE

Feed Knurling-



AA BL BR

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
F101-10M100404	10	10	100	10x04x04
F101-10M150404	10	10	100	15x04x04
F101-16M200806	16	16	140	20x08x06
F101-20M200806	20	20	125	20x08x06
F101-20M201006	20	20	125	20x10x06

FOR SLIDING HEAD, TROUB, AUTOLATHE

**TOOL
SERIES F104**

F104-10M150604



Machine Type :

Troub, Sliding Head, Lathe, Autolathe.

Suitable Method :

Plunge knurling, Feed knurling.

Features :

- Form knurling without swarf removal
- Suitable for small and delicate Parts
- All knurling patterns can be formed
- Precise Carbide pin with ease of changing
- accomodate RAPID knurls for better accuracy

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR GE



GV KV KE

Feed Knurling-



AA BL BR

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
F104-10M100404	10	10	100	10x04x04
F104-10M150604	10	10	100	15x06x04
F104-12.7M100404	12.7	12.7	100	10x04x04
F104-12.7M150604	12.7	12.7	100	15x06x04
F104-20M201206	20	20	125	20x12x06
F104-20M201506	20	20	125	20x15x06

TOOL SERIES **F102**

F102-20M200806



Machine Type :

Conventional And CNC Lathe, Automatic Short Turning Lathe, Turning/Milling Center.

Suitable Method :

Plunge Knurling, Feed Knurling.

Features :

- Integrated center height.
- All knurling patterns can be formed
- Precise carbide pin for ease of changing knurls
- Set Screws in Shank for correction of clearance angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR GE



GV KV KE

Feed Knurling-



AA BL BR

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL øxWxd
F102-16M200806	16	16	110	20x08x06
F102-20M200606	20	20	110	20x06x06
F102-20M200806	20	20	110	20x08x06
F102-20M201006	20	20	110	20x10x06
F102-20M201206	20	20	110	20x12x06
F102-25M200806	25	25	110	20x08x06
F102-25M201006	25	25	110	20x10x06
F102-25M201206	25	25	110	20x12x06
F102-25M201506	25	25	110	20x15x06

TSUGAMI, CITIZEN AND OTHER SLIDING HEAD MACHINES

TOOL SERIES **F102** Mini

F102m-12M100404



Machine Type :

Conventional And CNC Lathe, Automatic Short Turning Lathe, Sliding Head, CNC Lathe

Suitable Method :

Plunge Knurling, Feed Knurling.

Features :

- Integrated center height.
- All knurling patterns can be formed
- Precise carbide pin for ease of changing knurls
- Set Screws in Shank for correction of clearance angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR GE



GV KV KE

Feed Knurling-



AA BL BR

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
F102m-12M100404	12	12	100	10x04x04
F102m-12M100604	12	12	100	10x06x04
F102m-16M100404	16	16	140	10x04x04
F102m-16M100604	16	16	125	10x06x04
F102m-10M100404	10	10	125	10x04x04
F102m-16M100604	16	16	125	10x06x04
F102m-10m100404	10	10	125	10x04x04

TOOL SERIES **F103**

F103-20LR201008C12



Machine Type :

Conventional And CNC Lathe, Automatic Short Turning Lathe.

Suitable Method :

Plunge knurling, Feed knurling.

Features :

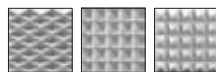
- Form knurling without swarf removal
- Integrated center height.
- All knurling patterns can be formed
- Suitable for knurling upto Shoulder
- Accomodate knurl from Either Left or Right Directions.
- Set Screws in Shank for correction of clearance angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR GE



GV KV KE

Feed Knurling-



AA BL BR

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
F103-20LR201008C12	20	20	110	20x10x08C12
F103-25LR201008C12	25	25	110	20x10x08C12

TOOL SERIES **F204**

F204-20M200806



Machine Type :

CNC machine, Troub, Sliding head, Lathe, Autolathe, Turning/Milling Center.

Suitable Method :

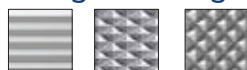
Plunge knurling, Feed knurling.

Features :

- Form knurling without swarf removal
- Integrated Center height
- Integrated carbide pin with ease of changing
- Adjustable rubber padding for self centering
- Set Screws for correction of clearance angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA GE 30° GE 45°

Feed Knurling-



AA GE 30° GE 45°

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL Ø x W x d
F204-20M200806	20	20	146	20x08x06
F204-20M201006	20	20	146	20x10x06
F204-20M201206	20	20	146	20x12x06
F204-25M200806	25	25	146	20x08x06
F204-25M201006	25	25	146	20x10x06
F204-25M201206	25	25	146	20x12x06

RAPIDTM FORM KNURLING TOOL HOLDER

TSUGAMI, CITIZEN & CNC SLIDING HEAD MACHINE

TOOL SERIES F204 Mini

F204m-12M050604



Machine Type :

Conventional & CNC, Automatic short turning lathe. Sliding Head CNC lathe

Suitable Method :

Plunge knurling, Feed knurling.

Features :

- Form knurling without swarf removal
- Integrated Center height
- Integrated carbide pin with ease of changing
- Adjustable rubber padding for self centering
- Set Screws for correction of clearance angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA GE 30° GE 45°

Feed Knurling-



AA GE 30° GE 45°

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL Ø x W x d
F204m-10LR100404	10	10	112	10x04x04
F204m-10LR100604	10	10	112	10x06x04
F204m-12LR100404	12	12	112	10x04x04
F204m-12LR100604	12	12	112	10x06x04
F204m-16LR100404	16	16	112	10x06x04
F204m-16LR100604	16	16	112	10x06x04

TOOL SERIES **F205**

F205-20LR201008C12



Machine Type :

CNC machine, Trough, Sliding head, Lathe, Autolathe, Turning/Milling Center.

Suitable Method :

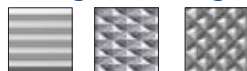
Plunge knurling, Feed knurling.

Features :

- Form knurling without swarf removal
- Integrated center height
- All knurling patterns can be formed
- Suitable for knurling up to shoulder
- Accommodate knurl from either left or right directions
- Set screws in shank for correction of clearance angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA GE 30° GE 45°

Feed Knurling-



AA GE 30° GE 45°

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
F205-20LR201008C12	20	20	148	20x10x08C12
F205-25LR201008C12	25	25	148	20x10x08C12

TOOL SERIES **I102**

I102-16D201008C12



Machine Type :

Conventional and CNC Lathe,
Automatic short turning lathe

Suitable Method :

Plunge knurling, Feed knurling.

Features :

- Form knurling without swarf removal
- Integrated Center height

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR GE



CV KV KE

Feed Knurling-



AA BL BR

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL Ø x W x d
i102-16D201008C12	16	16	140	20x10x08C12
i102-20D201008C12	20	20	140	20x10x08C12
i102-25D201008C12	25	25	140	20x10x08C12

TOOL SERIES **I104**

I104-16D201008C12



Machine Type :

Conventional and CNC Lathe,
Automatic short turning lathe

Suitable Method :

Plunge knurling, Feed knurling.

Features :

- Form knurling without swarf removal
- Integrated Center height
- Set Screws for correction of clearance angle
- Round shank held in boring holder

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR GE



GV KV KE

Feed Knurling-



AA BL BR

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ø x W x d
i104-16D201008C12	D16	-	140	20x10x08C12
i104-20D201008C12	D20	-	140	20x10x08C12
i104-25D201008C12	D25	-	140	20x10x08C12

TOOL SERIES **I201**

I201-32D201006



Machine Type :

CNC machine, Lathe, Auto-lathe,
Turning/Milling Center

Suitable Method :

Plunge knurling, Feed knurling

Features :

- Suitable for Internal knurling without swarf removal
- Heavy-duty internal double Knurling holder
- All knurling patterns can be formed
- Precise Carbide pin with ease of changing
- accommodate standard **RAPID™** knurls for better accuracy
- Round shank held in boring holder.

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR GE

Feed Knurling-



AA BL BR GE

TOOL NO.	A (mm)	MINIMUM BORE SIZE	L (mm)	KNURLING WHEEL ØxWxd
i201-32D200806	Ø32	Ø62	155	20x08x06
i201-32D201006	Ø32	Ø62	155	20x08x06
i201-25D200806	Ø25	Ø62	155	20x08x06
i201-25D201006	Ø25	Ø62	155	20x10x06

TOOL SERIES **S201**

S201-10M2000806



Machine Type :

Troub, Mini Lathe, Sliding head, AutoLathe, lathe, CNC machine.

Suitable Method :

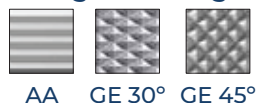
Plunge knurling, Feed knurling.

Features :

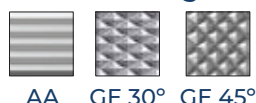
- Form knurling without swarf removal
- Minimises lateral pressure on workpiece
- Less strain on machine and workpiece
- Suitable for machining small and delicate parts
- Form knurling of thin-walled work pieces

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



Feed Knurling-



TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL Ø x W x d
S201-10M200806	10	10	60	20x08x06
S201-10M201006	10	10	60	20x10x06

TOOL SERIES **S206**

S206-12L100404



Machine Type :

Conventional And CNC Lathe, Automatic Short Turning Lathe, Sliding Head CNC Lathe.

Suitable Method :

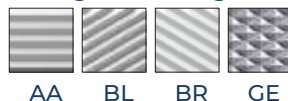
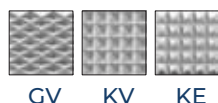
Plunge Knurling, Feed Knurling.

Features :

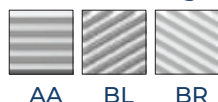
- Form Knurling without swarf removal
- Reduces lateral pressure on workpiece hence bending of workpiece is eliminated
- Suitable for knurling on smaller diameter and on pipe with thin thickness
- All knurling patterns can be formed

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



Feed Knurling-



TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
S206-12L100404	12	12	130	10x04x04
S206-12L100604	12	12	130	10x06x04
S206-12R100404	12	12	130	10x04x04
S206-12R100604	12	12	130	10x04x04
S206-10L100404	10	10	130	10x04x04
S206-10L100604	10	10	130	10x04x04
S206-10R100404	10	10	130	10x04x04
S206-10R100604	10	10	130	10x04x04

TOOL SERIES **CS203**

CS203-25M250511



Machine Type :

Lathe, Auto-lathe, Turning/Milling Center

Suitable Method :

Feed Knurling

Features :

- Cut knurling with material removal
- Heavy-duty Straddle Cut Knurling holder
- Minimal vibration in machine
- high quality visual profiles, close tolerances
- Reduction in Forces on Machine bearings
- Stable performance
- Ground lead screw to accommodate component of various diameter.

POSSIBLE PROFILE	KNURLING WHEEL USED	
		
GE	AA	AA

TOOL NO.	A (mm)	MINIMUM BORE SIZE	L (mm)	KNURLING WHEEL ØxWxd
CS203-25M250511	25 x 25	Ø 0-40	175	25x5x11
CS203-20M250511	20 x 20	Ø 0-40	175	25x5x11

* SPECIFY HELIX ANGLE

TOOL SERIES **T104**

T104-20M200806



Machine Type :

Troub, Sliding Head, Lathe, Autolathe.

Suitable Method :

Plunge knurling, Feed knurling.

Features :

- Form knurling without swarf removal
- Suitable for knurling on TAPER Diameter face
- All knurling patterns can be formed
- Precise Carbide pin with ease of changing
- accommodate RAPID knurls for better accuracy
- Adjustable knurling head for matching with taper angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR GE



GV

Feed Knurling-



AA BL BR

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
T104-20M200806	20	20	153	20x08x06
T104-20M201006	20	20	153	20x10x06
T104-20M250806	25	25	153	25x08x06
T104-20M251006	25	25	153	25x10x06
T104mini-12M100404	12	12	130	10x04x04
T104mini-12M100604	12	12	130	10x06x04



FACE KNURLING TOOL HOLDER

TOOL SERIES **TF101**

TF101-20LR201008C12



Machine Type :

Conventional And CNC Lathe, Automatic Short Turning Lathe.

Suitable Method :

Plunge Knurling.

Features :

- Form knurling without swarf removal
- Integrated center height
- Suitable for knurling on face
- Accomodate knurl from Either Left or Right Directions
- Set Screws in Shank for correction of clearance angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



AA BL BR

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
TF101-20LR251008C12	20	20	101	25x10x08C12
TF101-25LR251008C12	25	25	101	25x10x08C12



FORM SINGLE KNURLING LATHE TOOL HOLDER

TOOL
SERIES **LS1**

2008



Machine Type :

Troub, Sliding Head, Lathe, Autolathe

Suitable Method :

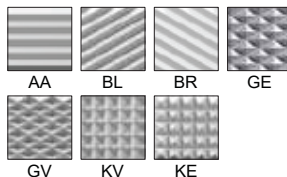
Plunge knurling, Feed Knurling

Features :

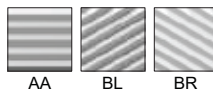
- Form knurling without swarf removal
- All knurling patterns can be formed
- Precise HARDENED pin with ease of changing
- Accomodate **RAPID™** knurls for better accuracy

POSSIBLE PROFILE:

PLUNGE KNURLING-



FEED KNURLING-



TOOL NO.	SHANK HEIGHT	SHANK WIDTH	TOTAL LENGTH	KNURLING WHEEL $\varnothing \times W \times d$
LS1-2008	20	20	100	20x08x06



FORM DOUBLE KNURLING LATHE TOOL HOLDER

TOOL
SERIES **LD1**

2508



Machine Type :

Troub, Sliding Head, Lathe, Autolathe

Features :

- Form knurling without swarf removal
- Heavy duty holder for maximum life
- Reducing time for repositioning of knurling head
- HARDENED pin with ease of changing
- Adjustable rubber padding for self centering
- Perfect for Feed Knurling

POSSIBLE PROFILE:

PLUNGE KNURLING-



AA



GE 30°



GE 45°

FEED KNURLING-



AA



GE 30°



GE 45°

TOOL NO.	SHANK HEIGHT	SHANK WIDTH	TOTAL LENGTH	KNURLING WHEEL ØxWxd
LD1-2508	25	20	150	20x08x06

TOOL SERIES **C102**

C102-25R21.50508



Machine Type :

CNC machine, Trough, Sliding head,
Lathe, Autolathe, SPM

Features :

- Cut knurling with material removal
- Integrated Center height
- Minimal vibration, high quality visual profiles, close tolerances
- Reduction in Forces on Machine bearings
- Movable head for fine adjustment of cutting angle
- Movable knurling head can be adjusted to use in either left or right direction

POSSIBLE PROFILE



RAA



RBL



RBR

KNURLING WHEEL USED



BL or BR



AA

LEFT
TURNING



AA

RIGHT
TURNING

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL Ø x W x d
C102-20L21.50508	20	20	125	21.5x05x08
C102-20R21.50508	20	20	125	21.5x05x08
C102-25L21.50508	25	25	125	21.5x05x08
C102-25R21.50508	25	25	125	21.5x05x08

TOOL SERIES **C210**

C210-25R21.50508



Machine Type :

CNC machine, Trough, Sliding head, Lathe, Auto-lathe, Turning/Milling Center

Features :

- Cut knurling with material removal
- Heavy-duty Double Cut Knurling holder
- Minimal vibration in machine high quality visual profiles, close tolerances
- Reduction in Forces on Machine bearings
- Movable head for fine adjustment of cutting angle
- Diameter scale for wheel adjustment to match component diameter

POSSIBLE PROFILE	KNURLING WHEEL USED	
		
GE	AA	AA

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
C210-20LR250608	20	20	150	25x06x08
C210-25LR250608	25	25	150	25x06x08

TOOL SERIES **C201**

C201-21.5L250511



Machine Type :

Troub, Sliding head, Lathe, SPM Autolathe.

Features :

- Cut knurling with material removal
- Heavy duty Double Cut Knurling holder
- Minimal vibration in machine
- high quality visual profiles, close tolerances
- Reduction in Forces on Machine bearings
- Movable head for fine adjustment of cutting angle
- Rotating Head ensures exact matching of center line

POSSIBLE PROFILE



GE

KNURLING WHEEL USED



AA



AA

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL Ø x W x d
C201-21.5L250511	21.5	28	138.5	25x05x11



SPECIAL KNURLING TOOL HOLDER

RAPID™ offers special knurling tools & holders. As per customer request and in consultation with our technical team, **RAPID™** manufactures tools which suites the specific need of customer application. Individual applications call for Special Customised tools.



T301 Three wheels Tool Holder



i103 Internal Knurling Tool Holder



SPECIAL KNURLING TOOL HOLDER



T201 Taper Knurling Tool Holder



M601 Six Wheels Tool Holder



SPECIAL KNURLING TOOL HOLDER



S211 Mini Straddle Knurling Tool Holder



i201 Heavy Duty Square Shank Internal Knurling Tool Holder



SPECIAL KNURLING TOOL HOLDER



T110 Taper Knurling Tool Holder

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**"Precision Unleashed:
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Mastery"**



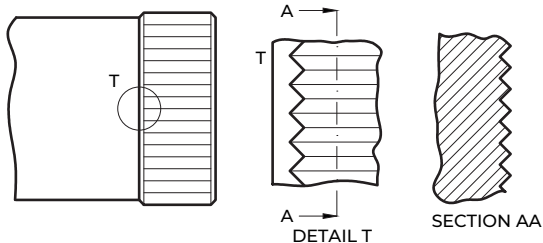
Scan Me !

KNURLING STANDARD

AS PER IS: 3403-1981 & DIN82

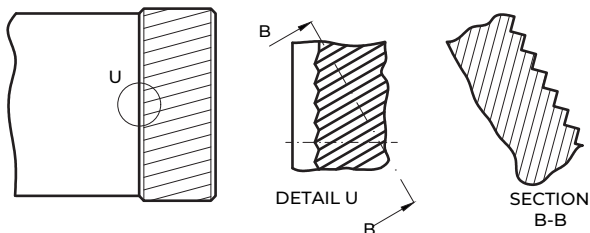
RAA

Knurling with grooves parallel to axis.



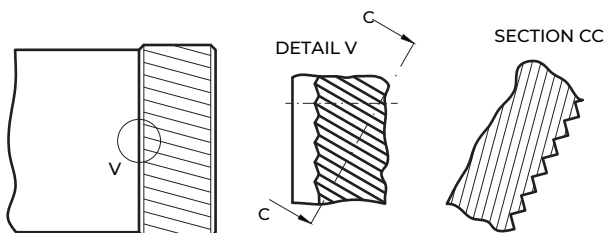
RBL

Left hand knurling.



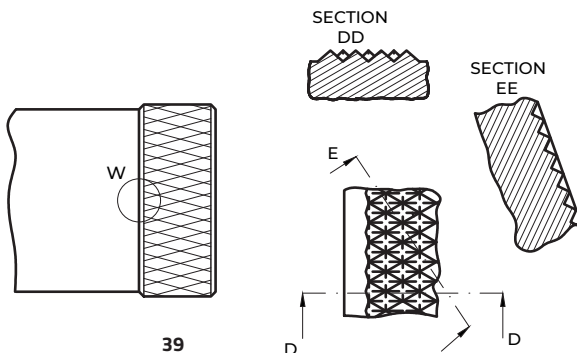
RBR

Right hand knurling.



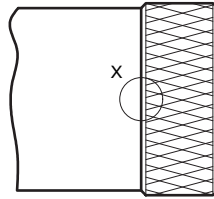
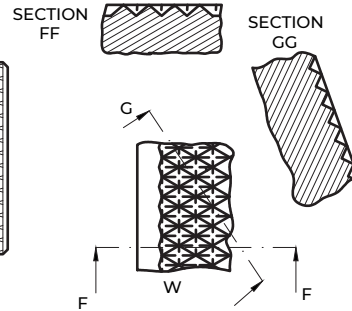
RGE

Left hand/Right hand knurling, Points raised.



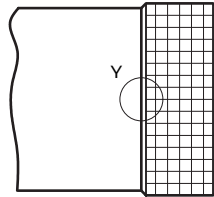
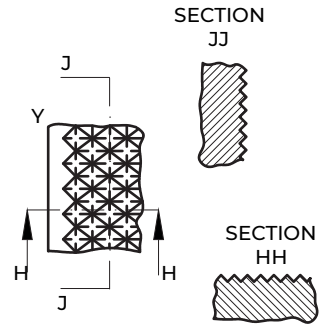
RGV

Left hand/Right
hand knurling,
Points indented.



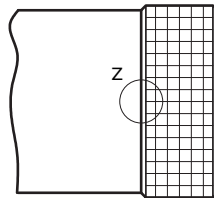
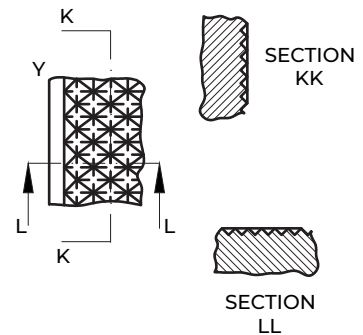
RKE

Cross knurling,
Points raised.



RKV

Cross knurling,
Points indented.



Type RAA - Knurl with grooves paralld to axis.

Type RBL - Left-hand knurl

Type RBR - Right-hand knurl

Type RGE - Left-hand/right-hand knurl, points raised

Type RGV - Left-hand/right-hand knurl, points indented

Type RKE - Cross-knurl, points raised

Type RKV - Cross-knurl, points indented.

KNURLING STANDARD

AS PER IS: 3403-1981 & DIN82

Profile Angle : Profile angle $\alpha = 90^\circ$

Pitch : P

Nominal Diameter $d1$: The nominal diameter $d1$ stated in the workshop drawing shall be the outside diameter of the finished knurl; this dimension is a function of the design.

Initial Diameter $d2$: The initial diameter $d2$ of the work piece prior to knurling shall be smaller than the nominal diameter $d1$, because the initial diameter undergoes enlargement through displacement of the material during the knurling operation.
The initial diameter $d2$ for knurls with profile angle $\alpha = 90^\circ$ can be calculated from the formulae in the following table, depending on the type of knurl and the size of pitch:

TYPE OF KNURL		INTL. DIA. $d2$
RAA	Knurl with grooves parallel to axis	$d1 - 0.5P$
RBL	Left-hand knurl	
RBR	Right-hand knurl	
RGE	Left-hand/right-hand knurl, points raised	$d1 - 0.67P$
RGV	Left-hand/right-hand knurl, points indented	$d1 - 0.33P$
RKE	Cross-knurl, points raised	$d1 - 0.67P$
RKV	Cross-knurl, points indented	$d1 - 0.33P$

The factors in the formulae, however, do not take into account the rounding of the grooves resulting from the knurling operation or the specific properties of the materials to be knurled.

Designation : A cross-knurl, points indented (Type RKV) with pitch $P = 0.8 \text{ mm}$ and conforming to this standard shall be designated as: **Knurl RKV 08 IS : 3468**



SPEED AND FEED CHART FOR FORM KNURLING

Material of Workpiece	Dia. for Workpiece	dia. of knuris	Vc (m/min)	f (mm/rev)				
				Radial feed	Axial mfeed for Pitch			
					0.3-0.6	0.6-1.2	1.2-1.6	1.6-2.0
Steel Upto 600 N/mm	<10	10	25-55	0.04-0.08	0.2	0.12	0.08	0.06
		15	25-55	0.04-0.08	0.26	0.16	0.12	0.08
	10-50	20	30-60	0.04-0.08	0.3	0.18	0.15	0.1
		20	30-60	0.04-0.08	0.3	0.18	0.15	0.1
	100-250	20	30-60	0.05-0.10	0.3	0.18	0.15	0.1
		25	30-60	0.05-0.10	0.4	0.26	0.16	0.12
	>250	25	30-60	0.05-0.10	0.4	0.26	0.16	0.12
		10	20-50	0.04-0.08	0.18	0.1	0.06	0.04
steel upto 900 N/mm	<10	15	20-50	0.04-0.08	0.24	0.14	0.1	0.06
		20	20-55	0.04-0.08	0.28	0.16	0.12	0.08
	10-50	20	20-55	0.04-0.08	0.28	0.16	0.12	0.08
		20	30-60	0.05-0.10	0.36	0.24	0.14	0.1
	100-250	25	30-60	0.05-0.10	0.36	0.24	0.14	0.1
		25	30-60	0.05-0.10	0.36	0.24	0.14	0.1
	>250	25	30-60	0.05-0.10	0.36	0.24	0.14	0.1
		10	20-40	0.04-0.08	0.14	0.08	0.06	0.04
stainless steel	<10	15	20-40	0.04-0.08	0.2	0.12	0.1	0.06
		20	25-50	0.04-0.08	0.25	0.15	0.12	0.08
	10-50	20	25-50	0.04-0.08	0.25	0.15	0.12	0.08
		20	25-50	0.05-0.10	0.26	0.17	0.11	0.08
	100-250	25	25-50	0.05-0.10	0.3	0.2	0.14	0.1
		25	25-50	0.05-0.10	0.3	0.2	0.14	0.1
	>250	25	25-50	0.05-0.10	0.3	0.2	0.14	0.1
		10	25-60	0.04-0.08	0.18	0.11	0.08	0.06
Aluminium	<10	15	30-65	0.04-0.08	0.25	0.16	0.13	0.09
		20	30-65	0.04-0.08	0.25	0.16	0.13	0.09
	10-50	20	35-70	0.05-0.10	0.31	0.23	0.15	0.1
		20	35-70	0.05-0.10	0.31	0.23	0.15	0.1
	100-250	25	35-70	0.05-0.10	0.38	0.25	0.16	0.11
		25	35-70	0.05-0.10	0.4	0.26	0.18	0.13
	>250	25	35-70	0.05-0.10	0.4	0.26	0.18	0.13
		10	35-75	0.04-0.08	0.25	0.15	0.1	0.08
Brass	<10	15	35-75	0.04-0.08	0.3	0.2	0.15	0.1
		20	45-90	0.04-0.08	0.4	0	0.2	0.15
	10-50	20	45-90	0.05-0.10	0.4	0.25	0.2	0.15
		20	45-90	0.05-0.10	0.4	0.25	0.2	0.15
	100-250	25	45-90	0.05-0.10	0.5	0.3	0.2	0.15
		25	45-90	0.05-0.10	0.5	0.3	0.2	0.15
	>250	25	45-90	0.05-0.10	0.5	0.3	0.2	0.15
		10	25-55	0.04-0.08	0.2	0.12	0.08	0.06
Bonze	<10	15	25-55	0.04-0.08	0.26	0.16	0.12	0.08
		20	30-60	0.04-0.08	0.26	0.16	0.12	0.08
	10-50	20	30-60	0.05-0.10	0.3	0.18	0.15	0.1
		20	30-60	0.05-0.10	0.3	0.18	0.15	0.1
	100-250	25	30-60	0.05-0.10	0.4	0.26	0.16	0.12
		25	30-60	0.05-0.10	0.4	0.26	0.16	0.12
	>250	25	30-60	0.05-0.10	0.4	0.26	0.16	0.12
		25	30-60	0.05-0.10	0.4	0.26	0.16	0.12



SPEED AND FEED CHART FOR CUT KNURLING

Material of Workpiece	Dia. of workpiece	Dia of Knurls	Vc (m/mm)		f(mm/rev)				
			Ftom	To	Radial Feed	Axial feed for Pitch			
						0.2 - 0.4	0.5 - 0.9	1.0 - 1.4	1.5 - 2.5
Free Cutting Steel	< 10	10	40	70	0.04 - 0.08	0.14	0.09	0.06	0.05
	10 - 40	20	50	90	0.05 - 0.10	0.20	0.13	0.1	0.07
	40 - 100	20	65	110	0.05 - 0.10	0.25	0.16	0.12	0.08
	100 - 250	20	65	110	0.05 - 0.10	0.30	0.2	0.13	0.09
	> 250	20	80	100	0.05 - 0.10	0.32	0.21	0.14	0.1
Stainless Steel	< 10	10	22	40	0.04 - 0.08	0.12	0.08	0.05	0.04
	10 - 40	20	30	50	0.05 - 0.10	0.17	0.11	0.09	0.06
	400 - 100	20	30	60	0.05 - 0.10	0.21	0.15	0.1	0.07
	100 -250	20	35	60	0.05 - 0.10	0.26	0.17	0.11	0.08
	> 250	32	45	55	0.05 - 0.10	0.27	0.18	0.12	0.09
Brass	< 10	10	55	100	0.04 - 0.08	0.15	0.09	0.06	0.05
	10 - 40	20	70	125	0.05 - 0.10	0.21	0.14	0.11	0.07
	400 - 100	20	90	155	0.05 - 0.10	0.26	0.19	0.13	0.08
	100 -250	20	90	155	0.05 - 0.10	0.32	0.21	0.14	0.09
	> 250	32	115	140	0.05 - 0.10	0.34	0.22	0.15	0.11
Aluminium	< 10	10	70	120	0.04 - 0.08	0.18	0.11	0.08	0.06
	10 - 40	20	80	150	0.05 - 0.10	0.25	0.16	0.13	0.09
	400 - 100	20	110	160	0.05 - 0.10	0.31	0.23	0.15	0.1
	100 -250	20	110	160	0.05 - 0.10	0.38	0.25	0.16	0.11
	> 250	32	130	150	0.05 - 0.10	0.40	0.26	0.18	0.13

$$\text{Turning Speed of Workpiece } N = \frac{(1000 \times V)}{(\pi \times D)}$$

These values are only for reference
Better results mau be obtained by tests carried out on machines

Problem	Cause	Solution
Knurling double tracking	<ol style="list-style-type: none"> 1. Circumference around blank is not an approximate multiple of the pitch of the knurl 2. Shallow depth 	<ol style="list-style-type: none"> 1. Force knurl in harder the first revolution 2. Change blank diameter +/- 0.1 3. Try slightly different pitch knurl 4. Grind or stone approximately 0.08 off the diameter of the knurl wheel 5. Order special knurl
Knurling flaking or slivered	<ol style="list-style-type: none"> 1. Knurling on stock material with scale 2. Over-rolling stock material 3. Knurl wheels too deep in the part 	<ol style="list-style-type: none"> 1. Turn off scale 2. Reduce number of revolutions the wheel is in contact with part 3. Reduce the depth of the knurl wheels
Knurl destruction	<ol style="list-style-type: none"> 1. Knurl wheels too deep in the part 2. Over-rolling stock material 3. RPM too fast causing wheels to seize 	<ol style="list-style-type: none"> 1. Reduce the depth of the knurl wheels 2. Reduce number of revolutions the wheel is in contact with part 3. Reduce speed and improve flow of coolant
Knurl wheel's poor tool life	<ol style="list-style-type: none"> 1. Knurling on stock material with scale 2. Over-rolling stock material 3. Knurling Stainless steel (302, 303, 304, 316, & 174ph) 4. Rolling semi-hardened steels 5. Stock run out excessive 6. Knurl wheels improperly hardened or of poor quality 7. Poor lubrication 8. Knurl wheels too deep in the part 	<ol style="list-style-type: none"> 1. Turn off scale 2. Reduce number of revolutions the wheel is in contact with part 3. Slow speeds and feeds 4. Use cobalt titanium nitrating knurl wheels 5. Machine parts concentric 6. Change knurl wheels 7. Increase lubrication 8. Reduce the depth of the knurl wheels
Uneven depth of knurl	<ol style="list-style-type: none"> 1. Center height not set 	<ol style="list-style-type: none"> 1. Adjust center height with shim or adjustment screws if the tool is adjustable
Twisted knurl pattern	<ol style="list-style-type: none"> 1. Center height not set 2. Knurl wheels not held square to part. 	<ol style="list-style-type: none"> 1. Adjust center height with shim or adjustment screws if the tool is adjustable 2. Indicate wheels during setup to make sure they are square to the part



ENQUIRY FORM FOR NON STANDARD REQUIREMENT

RAPID can manufacture almost any size and pitch of special knurling wheel to suit application and holder. We make knurling wheels and dies for all of the common attachments and holders. We can also make larger knurling wheels to fit any of the thread rolling machines in use today. If you have a part that requires special knurls, please call for best pricing and delivery.

In general, it's best to submit a drawing or sketch of required knurls, but if that's not practical, we'll need the following information in order to quote accurately.

Blank Diamter _____

Blank Material _____

Knurl Material _____

Knurl Diameter _____

Knurling Width _____

Knurling Profile _____

Helix Angle _____

Tooth Angle _____

Knurling Pitch _____

#Teeth _____

Coating **For Non Ferrous material :** _____

Nitriding coating

Hard Bond coating

For Ferrous material-

Tin coating





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