



KNURLING TOOLS & TOOL HOLDERS

www.knurlingwheels.com

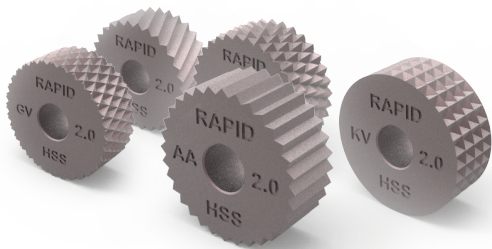


Analysing, Innovating And Providing The Best
Solutions To Customers By Adding Value In
Engineering Products.




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

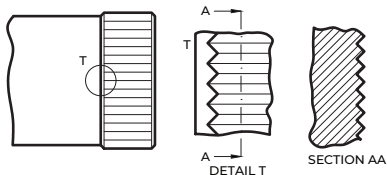
1.5 | 1.6 | 1.8 | 2.0 | 2.5 mm

KNURLING STANDARD

AS PER IS: 3403-1981 & DIN82

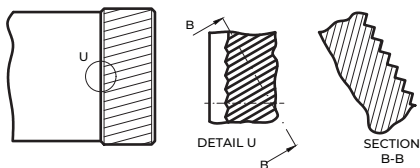
RAA

Knurling with grooves parallel to axis.



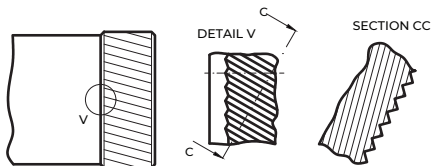
RBL

Left hand knurling.



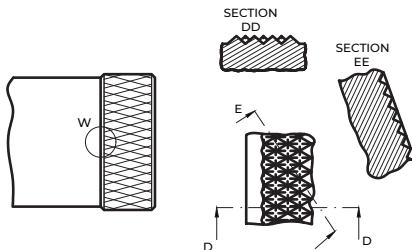
RBR

Right hand knurling.



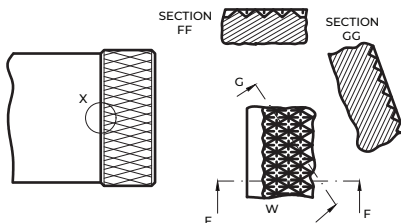
RGE

Left hand/Right hand knurling,
Points raised.



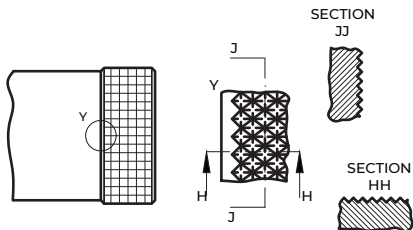
RGV

Left hand/Right
hand knurling,
Points indented.



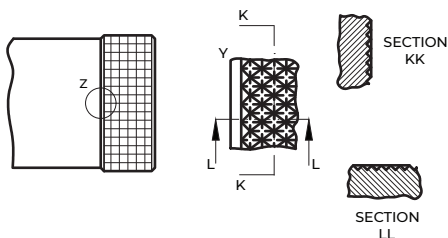
RKE

Cross knurling,
Points raised.



RKV

Cross knurling,
Points indented.



Type RAA - Knurl with grooves paralled 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 d_1 : The nominal diameter d_1 stated in the workshop drawing shall be the outside diameter of the finished knurl; this dimension is a function of the design.

Initial Diameter d_2 : The initial diameter d_2 of the work piece prior to knurling shall be smaller than the nominal diameter d_1 , because the initial diameter undergoes enlargement through displacement of the material during the knurling operation.

The initial diameter d_2 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:

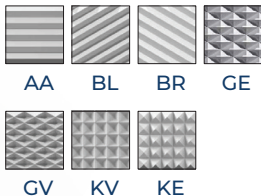
TYPE OF KNURL		INTL. DIA. d_2
RAA	Knurl with grooves parallel to axis	$d_1 - 0.5P$
RBL	Left-hand knurl	
RBR	Right-hand knurl	
RGE	Left-hand/right-hand knurl, points raised	$d_1 - 0.67P$
RGV	Left-hand/right-hand knurl, points indented	$d_1 - 0.33P$
RKE	Cross-knurl, points raised	$d_1 - 0.67P$
RKV	Cross-knurl, points indented	$d_1 - 0.33P$

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 $P = 0.8$ mm and conforming to this standard shall be designated as: **Knurl RKV 08 IS : 3468**



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 :

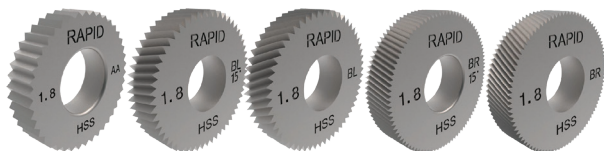
- HSS knurls with Bore and Face ground
- Milled sharp Edge Profile
- better Form Profile
- Highest Productivity on ferrous & non ferrous material
- long life of tool on job which offer cost per part is negligible

*Further pitch sizes and customized knurling wheels available on demand

*Standard knurls are without chamfers



KNURLING WHEELS



CUT KNURLS

Knurl Size :

15x03x08, 21.5x5x10

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.



FORM KNURLING TOOL HOLDER

TOOL SERIES **F101**

F101-20M200806



Machine Type :

Troub, Sliding Head, Lathe, Autolathe.

Suitable Method :

Plunge knurling, Feed knurling.

Features :

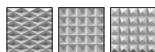
- Suitable for form knurling without swarf removal
- All knurling patterns can be formed
- Precise Carbide pin with ease of changing
- Accomodate RAPID knurls for better accuracy

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



FORM KNURLING TOOL HOLDER

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 :

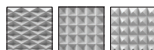
- Integrated center height.
- All knurling patterns can be formed
- Precise carbide pin for ease of changing knurls
- Set Screws in Shank for correction of clearance angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-

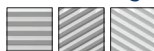


AA BL BR GE



GV KV KE

Feed Knurling-



AA BL BR

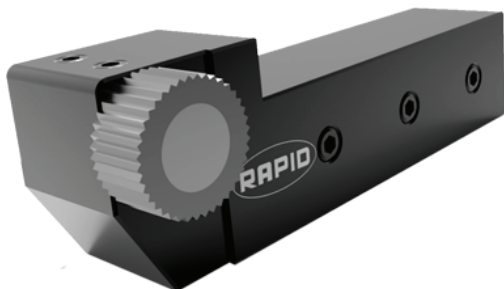
TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL ØxWxd
F102-16M200806	16	16	110	20x08x06
F102-20M200606	20	20	110	20x06x06
F102-20M200806	20	20	110	20x08x06
F102-20M201006	20	20	110	20x10x06
F102-20M201206	20	20	110	20x12x06
F102-25M200806	25	25	110	20x08x06
F102-25M201006	25	25	110	20x10x06
F102-25M201206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



FORM KNURLING TOOL HOLDER

TOOL SERIES **F103**

F103-20LR201008C12



Machine Type :

Conventional And CNC Lathe, Automatic Short Turning Lathe.

Suitable Method :

Plunge knurling, Feed knurling.

Features :

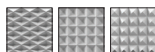
- Form knurling without swarf removal
- Integrated center height.
- All knurling patterns can be formed
- Suitable for knurling upto Shoulder
- Accomodate knurl from Either Left or Right Directions.
- Set Screws in Shank for correction of clearance angle

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



FORM KNURLING TOOL HOLDER

TOOL SERIES **F104**

F104-10M150604



Machine Type :

Troub, Sliding Head, Lathe, Autolathe.

Suitable Method :

Plunge knurling, Feed knurling.

Features :

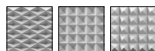
- Form knurling without swarf removal
- Suitable for small and delicate Parts
- All knurling patterns can be formed
- Precise Carbide pin with ease of changing
- accommodate RAPID knurls for better accuracy

POSSIBLE KNURLING PROFILE:

Plunge Knurling-

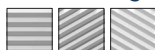


AA BL BR GE



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



FORM KNURLING TOOL HOLDER

TOOL SERIES **F202**

F202-25M200806



Machine Type :

Troub, Sliding Head, Lathe, Autolathe.

Suitable Method :

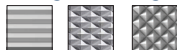
Plunge knurling, Feed knurling.

Features :

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

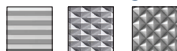
POSSIBLE KNURLING PROFILE:

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
F202-25M200806	25	20	185	20x08x06
F202-25M201006	25	20	185	20x10x06
F202-25M201206	25	20	185	20x12x06



FORM KNURLING TOOL HOLDER

TOOL SERIES **F204**

F204-20M200806



Machine Type :

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

Suitable Method :

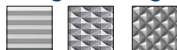
Plunge knurling, Feed knurling.

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



FORM KNURLING TOOL HOLDER

TOOL SERIES **F205**

F205-20LR201008C12



Machine Type :

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

Suitable Method :

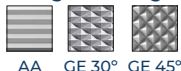
Plunge knurling, Feed knurling.

Features :

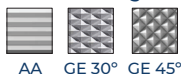
- Form knurling without swarf removal
- Integrated center height
- All knurling patterns can be formed
- Suitable for knurling up to Shoulder
- Accommodate knurl from Either Left or Right Directions
- Set Screws in Shank for correction of clearance angle

POSSIBLE KNURLING PROFILE:

Plunge Knurling-



Feed Knurling-



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



CUT KNURLING TOOL HOLDER

TOOL SERIES **C101**

C101-20R21.50508



Machine Type :

CNC machine, Troub, Sliding head, Lathe, Autolathe.

Features :

- Cut knurling with material removal
- Integrated Center height
- Built-in lock position of 30° for better accuracy
- Minimal vibration, high quality visual profiles, close tolerances
- Reduction in Forces on Machine bearings
- Reproducible Processes due to fixed Head

POSSIBLE PROFILE



RAA



RBL



RBR

KNURLING WHEEL USED



BL or BR



AA



AA

LEFT
TURNING

RIGHT
TURNING

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL Ø x W x d
C101-20R21.50508	20	20	125	21.5x05x08
C101-20L21.50508	20	20	125	21.5x05x08
C101-25R21.50508	25	25	125	21.5x05x08
C101-25L21.50508	25	25	125	21.5x05x08



CUT KNURLING TOOL HOLDER

TOOL SERIES **C102**

C102-20LR21.50508



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

BR



AA

LEFT
TURNING



AA

RIGHT
TURNING

TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL Ø x W x d
C102-20LR21.50508	20	20	126	21.5x05x08
C102-25LR21.50508	25	25	126	21.5x05x08



CUT KNURLING TOOL HOLDER

TOOL SERIES **C201**

C201-21.5L250511



Machine Type :

Troub, Sliding head, Lathe, SPM Autolathe.

Features :

- Cut knurling with material removal
- Heavyduty 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



FORM KNURLING TOOL HOLDER

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-



AA GE 30° GE 45°

Feed Knurling-



AA GE 30° GE 45°

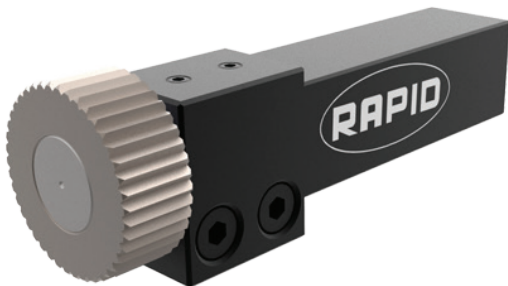
TOOL NO.	A (mm)	B (mm)	L (mm)	KNURLING WHEEL Ø x W x d
S201-10M200806	10	10	60	20x08x06
S201-10M201006	10	10	60	20x10x06



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



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.



**Taper Knurling
Tool Holder**



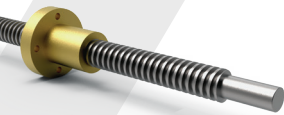
**Pipe Knurling
Tool Holder**



**Six Wheels Knurling
Tool Holder**



**Internal Knurling
Tool Holder**



AP^EX

Leadscrews

Apex offers a wide variety of single & multi start Lead screw to our clients that are exclusively used as vital part in several machines. The Leadscrew is designed to translate turning motion into linear motion. Apex Leadscrews are manufactured by Thread Forming, Thread cutting and Thread grinding process. Apex Leadscrews are manufactured in carbon steel, alloy steel as well as stainless steel.



Apex lead screw Features

- Apex offers accurate and precision lead screws.
- Apex lead screw assemblies are reliable, cost-effective linear actuation
- Apex screws outperform other actuation methods. Compared to bulky, noisy and expensive hydraulic or pneumatic actuator systems, Apex lead screws are compact, quiet, and very affordable.
- All tools are manufactured in-house hence LEAD TIME for delivery is reduced.
- Apex have off the shelf stock of standard Leadscrews.
- Standard lead screws are available in various pitches, different thread profile and in required length.
- Apex offers lead screw with standard flange nut or any special type nut.

Process Comparison

Process	Thread Forming	Thread Cutting	Thread Grinding
Price	Less	Medium	Expensive
Accuracy	Good	Better	Very precise
Profile finish	Accurate profile	Medium accurate	Very accurate
Run-out	Medium (up to 0.1)	Medium (up to 0.1)	Less (up to 0.03max)
Pitch accuracy per meter	300 µm	500 µm	50 µm
Production time for 1000 nos.	1-2 weeks	2-4 Weeks	5-9 Weeks
Screw material	MS, En8, SS303, SS304, SS316	EN8, EN19, WPS, EN24, EN36, SS303, SS304, SS316, SS410, SS420	All ferrous material

Availability of thread profile in Apex screw

Profile	Thread Forming	Thread Cutting	Thread Grinding
Trapezoidal profile	✓	✓	✓
ACME profile	✓	✓	✓
Metric profile	✓	✓	✓
Square profile	✗	✓	✗
Multi start (high helix)	✓	✓	✓

Apex screws provides lead-screws in following sizes :

1. Single start lead screw

Dia.	Available Pitch Sizes
8	1 / 1.5 / 2 / 2.5
10	0.8 / 1 / 1.5 / 2 / 2.5 / 3
12	0.8 / 1 / 1.5 / 2 / 2.5 / 3
16	0.8 / 1 / 1.5 / 2 / 2.5 / 3 / 4
20	0.8 / 1 / 1.5 / 2 / 2.5 / 3 / 4 / 5
24	0.8 / 1 / 1.5 / 2 / 2.5 / 3 / 4 / 5
25	0.8 / 1 / 1.5 / 2 / 2.5 / 3
30	0.8 / 1 / 1.5 / 2 / 2.5 / 3 / 6
32	0.8 / 1 / 1.5 / 2 / 2.5 / 3 / 6

2. Multi start lead screw

Screw no.	Dia.	Pitch	No. Of Start	Lead
5x5	5	1.25	4	5
8x8	8	2	4	8
10x4	10	2	2	4
10x12	10	3	4	12
15x25	15	4	6	24
16x16	16	2	8	16
16x20	16	4	5	20
24x10	24	-	-	10

Providing solutions for problems of those who come in touch with us.

Range Of Products



Bevel Gears



Ground Worm & Worm Shaft



Ground Worm & Worm Wheel



Spur Gears



Serration Cutter



Rack Pinion



Ground Gears



Hob Cutter



Thread Rolls



Helical Gears

Services Offered

Thread Grinding | Gear Grinding
Gear Hobbing | Thread Rolling.

Products & Services Offered:

- Thread Forming Of Screws, Worms & Leadscrews
- Leadscrews Profile: Square, ACME, Trapezoidal, Metric & Multistart
- Gears (Spur, Helical, Worm & Wormshaft)
 - Wormshaft & Worm Wheels
 - Circular Thread Rolling Dies
- Thread Grinding, Gear Grinding, Gear Hobbing, Thread Rolling.



Malkar
INDUSTRIES
Since 1972

Solution Provider For Knurling Operations

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