Roller Burnishing & Surface Reforming Tool

SUPEROLL

SUGINO
SUPER! TECHNOLOGY

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Q
question

What would you do about following if you want?

to create a superior sliding surface.

to make highly airtight sealing surface.

to make products with improved fatigue strength.

to improve surface roughness.

to bring a hole diameter into tolerance.

to stabilize machining.

SUGINO

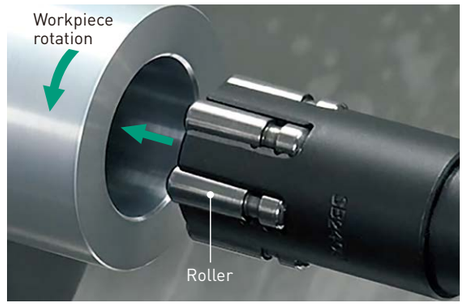
Superolls achieve all if you want to.

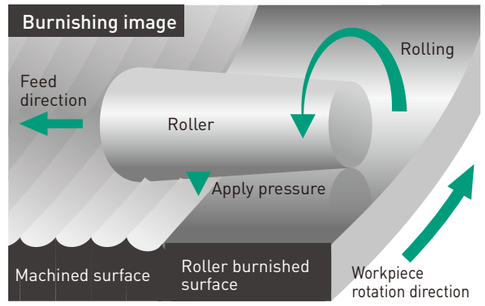
A
answer

How?

"To press and smooth out surface instead of grinding."

Superolls are roller burnishing tools that create smoother finishes by compressing machined peaks into machined valleys using precision rollers. Machined surface undergoes plastic deformation as they are compressed with rollers resulting in smooth and seamless finishes. Productivity is improved, precision finishes are created, abrasion resistance is maximized, and part surfaces with improved fatigue strength are achieved. Since parts can be given a precision finish easily and at low cost, Superolls are widely used worldwide for countless applications throughout the automotive industry, within the precision machinery market, chemical industry and parts manufactured for the home appliance markets.





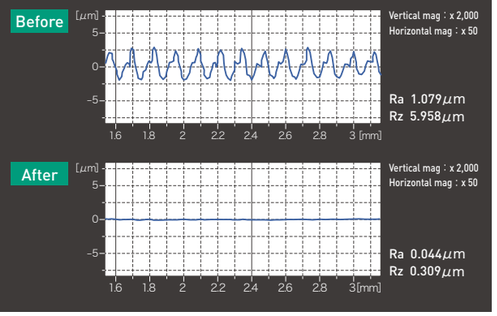
Benefits of burnishing with Superoll.

Smooth — Improve machined surface roughness by Superoll.

Achieve Rz 0.1 - 0.8 µm finish in one pass.
The finished surface without any sharp projections is suitable for sliding and sealing surfaces.

Comparison before and after Superoll burnishing

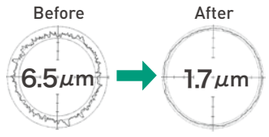
Surface roughness



Achieve dimensional accuracy by machining, and improve surface roughness with Superoll.

If it is difficult to achieve the required surface roughness while maintaining dimensional tolerance during machining, Superoll can be used to easily improve the surface roughness. Using Superoll after the machining also helps to extend the time (life time) to replace cutting tips relatively.

Improve roundness by using Superoll to smooth out uneven surfaces.

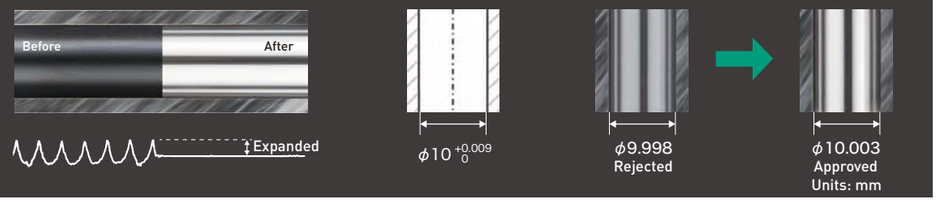


Find out more about "Smooth"▶

Expand — Slight diameter sizing (in microns) without machining.

Smoothing out uneven workpiece surfaces allows dimensional amendment of several µm.

Overview of dimensional amendment using Superoll



Increase yield with dimensional amendment using Superoll!

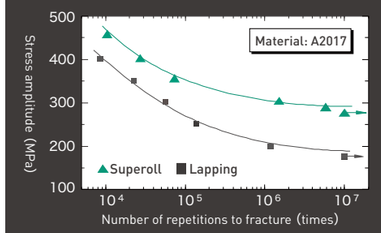
Dimensional amendment by burnishing with Superoll helps to reduce unnecessary time and cost for re-manufacturing units.

Find out more about "Expand"▶

Increase strength — Increase endurance life of workpiece with Superoll.

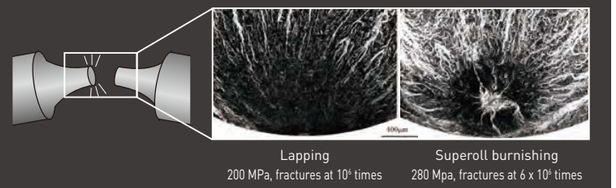
As residual stress in the compressive direction is induced at the surface, fatigue strength is increased by more than 30% using Superoll tools.

Fatigue test results realizing from rotary bending

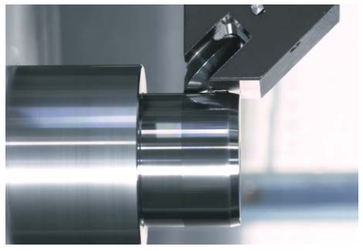


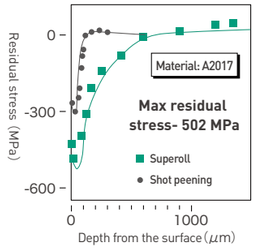
Workpiece life time increased 5 - 100 times

Fatigue test piece fragment cross-section (Close-up photos)



While destruction occurs from the surface with lapping, using Superoll means residual stress in the compressive direction remains on the surface. Thus the original point of destruction shifts to the inside and making fatigue failure less likely.





Improved fatigue strength.

Residual stress in the compressive direction can reach a deeper position than with shot peening, to help improve fatigue strength.

Find out more about "Increase strength"▶

Increase hardness — Increase metal wear resistance by Superoll.

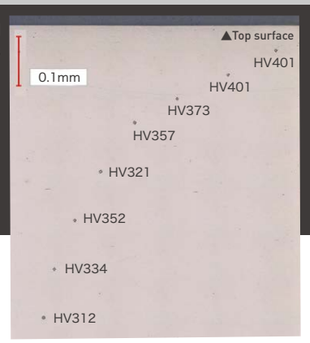
Uneven metal surface is pressed evenly to harden the areas around the surface, increasing the surface hardness.

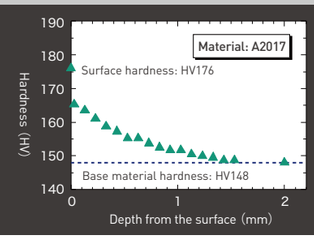
Hardness distribution after Superoll burnishing (Vickers hardness test data)

Photos and measured values of indentations

Material: SUS316L

Photo mag x 2000





Hardness increased by 20 - 80%

Increasing abrasion resistance.

Best-suited to finishing of sealing or sliding surfaces.

Find out more about "Increase hardness"▶

Superoll types

Multi Roller Type

Speedy burnishing with multiple rollers

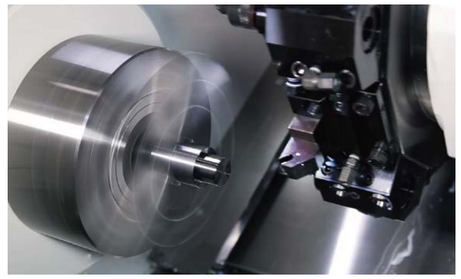
A type of Superoll for burnishing with multiple rollers. Multiple rollers are arranged to press and smooth a workpiece surface while burnishing at higher feed rates which is suitable for high production applications. In addition to inner surfaces, Multi Roller type Superolls are also available for outer shaft, spherical surfaces and flat surfaces.

A wide range of Superolls are available based on Multi Roller Type technology, including types with enhanced versatility, types for forming plateau structure surfaces, types suited to sealing surfaces, and types designed for materials with high hardness.

Single Roller Type

A single roller designed for workpieces of various shapes and sizes

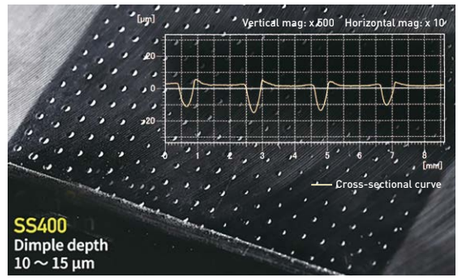
Single Roller type Superoll designed for use with lathes, for burnishing with a single roller.
Suited to workpieces of various different shapes and sizes, and ideal for high-mix low-volume production.



Re-forming Type

Forming plateau structure surfaces

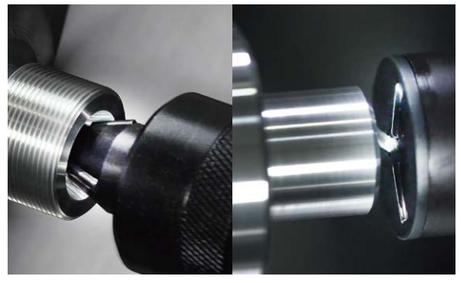
Re-forming type Superoll designed for forming surfaces with excellent sliding characteristics.
Presses and smooths any peaks remaining from pre-burnishing, and can optionally leave dimples to serve as oil pots.
This gives workpieces greater abrasion resistance and limits seizing.



Compressive Type

Burnishing sealing surfaces with Superoll by each shapes

Compressive type Superoll for finishing by applying loads with a spring embedded within Superoll.
Ideal for burnishing surfaces that requires sealing properties.
Compressive type Superoll is designed and manufactured to suit the shape of workpieces respectively like taper, flat and R surfaces.



Diamond-tool Type

Burnishing materials with high hardness of HRC40 - 60

Diamond-tool type Superoll for burnishing by pressing diamond tip to workpieces.
Ideal for burnishing high-hardness materials of HRC40 - 60 that roller types have difficulty finishing.
The diamond tip has a throw-away design that allows for easy replacement.

Superoll selection

Select suitable Superoll in accordance with your purpose, conditions like workpiece shape and driving units.
Please refer to each Superoll introduction pages which are indicated below.

Multi Roller Type ▶P12

Speedy burnishing with multiple rollers

Available driving units *Depends on Superoll
Machining center / Engine lathe / Turret lathe / Swiss lathe / Drilling machine / Drilling unit

Available workpiece shape	Inner surface				Outer surface		Spherical surface	Flat surface
	Through-hole	Blind-hole	Through-hole	Blind-hole	Shaft	Shaft with step	Spherical surface	Flat surface
Superoll								
	SH	SB	CSL		CSA / SA		SES	SFP
Page	P13		P16				P17	

Single Roller Type ▶P18

A single roller designed for workpieces of various shapes and sizes

Available driving units *Depends on Superoll
Machining center / Engine lathe / Turret lathe / Swiss lathe / Drilling machine / Drilling unit

Available workpiece shape	Outer / End surface			Multiple surface			Inner surface		Groove surface				
	Shaft	Shaft with step	End surface	Shaft	Shaft with step	End surface	Through-hole	Blind-hole	Outer groove side	Inner groove side	Outer groove bottom	Groove end surface	Inner groove bottom
				Taper shaft	R surface 1	R surface 2							
Superoll													
	SR5A			SR16M			SR5C	SR16C	SR3Z	SR3ZH	SR24MW	CEZF	CEZH
Page	P19			P20			P19	P21	P22		P23		

This App helps you to select the appropriate Superoll easily according to the workpiece dimension and material, etc.

SUPEROLL

Interactive Catalog
APP for Smartphones and Tablets
Available for iOS Android

▶P34

When you input the workpiece dimension and material, suitable Superoll will be suggested.
In case that various types of Superoll are suggested, please select the suitable one for your purpose, based on the ranking of the compared features.
Then, model, outside drawing and burnishing conditions according to your driving unit are shown after inputting shank size.
FAQ, technical information and our new product information are updated.

Re-forming Type ▶P24

Forming plateau structure surfaces

Available driving units *Depends on Superoll
Machining center / Engine lathe / Turret lathe / Swiss lathe / Drilling machine / Drilling unit

Available workpiece shape	Forming plateau structure surfaces		Forming micro dimples		
	Through-hole	Blind-hole	Through-hole	Flat surface	Shaft / Shaft with step
Superoll					
	SH-MAC	SB-MAC	BPH	BPP	BPSR
Page	P25		P26		

Compressive Type ▶P27

Burnishing sealing surfaces with Superoll by each shapes

Available driving units *Depends on Superoll
Machining center / Engine lathe / Turret lathe / Swiss lathe / Drilling machine / Drilling unit

Available workpiece shape	Inner taper surface		Flat surface		Convex R surface		Outer taper surface	
	Taper hole		Counterbore surface	End surface	Convex R		Taper shaft	
Superoll								
	ST	CST	SF	CSF	FD	CFD	SE	CSE
Page	P28	P30	P28	P30	P29	P30	P29	P30

Diamond-tool Type ▶P31

Burnishing materials with high hardness of HRC40 - 60

Available driving units
Machining center / Engine lathe / Turret lathe / Swiss lathe / Drilling machine / Drilling unit

Available workpiece shape	Outer surface		End surface	Inner surface		Multiple surface						
	Shaft	Shaft with step	End surface	Through-hole	Blind-hole	Shaft	Shaft with step	Taper shaft	R surface 1	R surface 2	End surface	Counterbore surface
Superoll												
	CEO		CEF	CEH		CEO-AJ						
Page	P32					P33						

Multi Roller Type

Speedy burnishing with multiple rollers

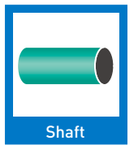
A type of Superoll for burnishing with multiple rollers. Multiple rollers are arranged to press and smooth a workpiece surface while burnishing at higher feed rates which is suitable for high production applications. In addition to inner surfaces, Multi Roller type Superoll are also available for outer shaft, spherical surfaces and flat surfaces.

Inner surface

SH
CSL

SB
CSL

Outer surface

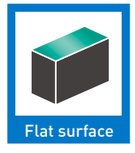


CSA/SA

Spherical surface

SES

Flat surface



SFP

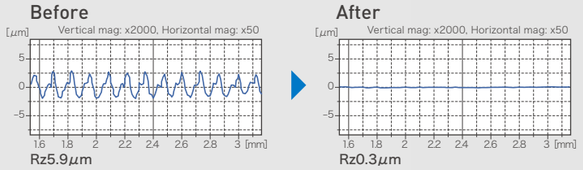
Multi Roller Type Speedy burnishing with multiple rollers

Superoll SH

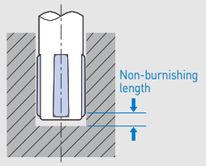
Basic type Superoll for inner surface burnishing (For through-hole).
Equipped with tool diameter adjustment in increments of 0.0025mm.

Hole size Standard: ϕ4.5 - ϕ200mm
Special : ϕ3.0mm or more

Burnishing data

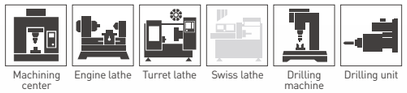


Non-burnishing length



Hole diameter (mm)	Non-burnishing length (mm)
ϕ4.5 - ϕ5.7	2.0
ϕ6 - ϕ7.6	2.1
ϕ8 - ϕ14.5	2.5
ϕ15 - ϕ34	2.8

∗ In case of through-hole



Burnishing video

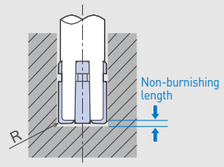
Burnishing conditions table

Superoll SB

Basic type Superoll for inner surface burnishing (For blind-hole).
Equipped with tool diameter adjustment in increments of 0.0025mm.

Hole size Standard: ϕ8.5 - ϕ200mm
Special : ϕ6.0mm or more

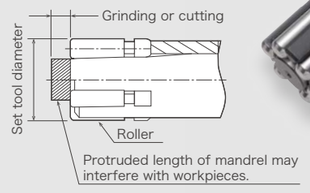
Non-burnishing length

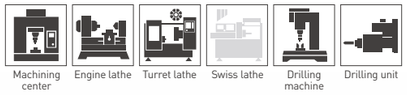


Roller	Hole size (mm)	Non-burnishing length (mm)
Standard	ϕ8 - ϕ14.5	1.5
	ϕ15 - ϕ34	1.8
R0.3	All size	0.8

∗Non-burnishing length can be reduced by using R0.3 type rollers.

Depending on a set tool diameter, a mandrel protruded length from a rollers tip may interfere with a bottom surface of workpieces. In that case, cut or grind the protruded length of mandrel by grinding or other means before using.





Burnishing video

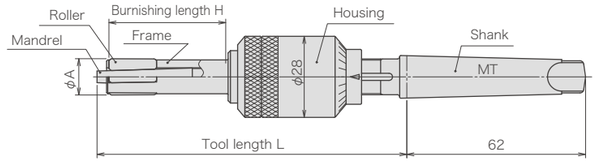
Burnishing conditions table

Multi Roller Type Speedy burnishing with multiple rollers

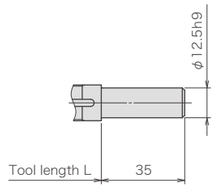
Superoll SH & SB selection chart (For hole size ϕ4.5 - ϕ34mm)

Hole size: ϕ4.5 - ϕ14.5mm

Morse taper shank type



Straight shank type

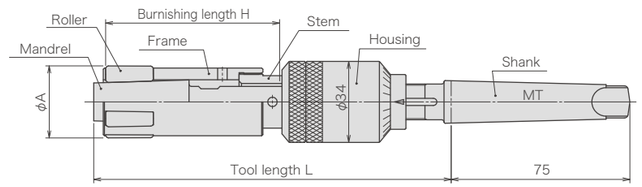


Units: mm

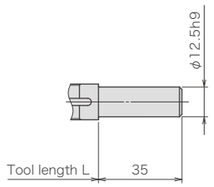
Tool model		Tool diameter adjustment range A	Burnishing length H	Tool length L		Part No.						
				Morse taper shank type	Straight shank type	Housing	Roller			Mandrel	Shank	
Through-hole	Blind-hole	Min. - Max.	mm	mm	mm	–	Through-hole	Blind-hole	Q'ty		Morse taper	Straight
SH450		4.45 - 4.80	Standard 50	Standard 118	Standard 115	HA1	R001		4	M001	S01 (MT1)	S01R
SH475		4.70 - 5.05					R001			M002		
SH500		4.95 - 5.30					R002			M002		
SH525		5.20 - 5.55					R002			M003		
SH550		5.45 - 5.80					R003			M002		
SH575		5.70 - 6.05					R003			M003		
SH600 (L)		5.95 - 6.45	Standard 50 Long 90	Standard 118 Long 158	Standard 115 Long 155		R004			M004 (L)		
SH640 (L)		6.35 - 6.85					R004			M005 (L)		
SH680 (L)		6.75 - 7.25					R004			M006 (L)		
SH720 (L)		7.15 - 7.65					R005			M005 (L)		
SH760 (L)		7.55 - 8.05					R005			M006 (L)		
SH800 (L)	SB800 (L)	7.95 - 8.55	Standard 50 Long 120	Standard 118 Long 188	Standard 115 Long 185		R006	B006		M007 (L)		
SH850 (L)	SB850 (L)	8.45 - 9.05					R006	B006		M008 (L)		
SH900 (L)	SB900 (L)	8.95 - 9.55					R007	B007		M007 (L)		
SH950 (L)	SB950 (L)	9.45 - 10.05					R007	B007		M008 (L)		
SH1000 (L)	SB1000 (L)	9.95 - 10.55					R007	B007		M009 (L)		
SH1050 (L)	SB1050 (L)	10.45 - 11.05					R008	B008		M008 (L)		
SH1100 (L)	SB1100 (L)	10.95 - 11.55					R008	B008		M009 (L)		
SH1150 (L)	SB1150 (L)	11.45 - 12.05					R008	B008		M010 (L)		
SH1200 (L)	SB1200 (L)	11.95 - 12.55					R009	B009		M009 (L)		
SH1250 (L)	SB1250 (L)	12.45 - 13.05					R009	B009		M010 (L)		
SH1300 (L)	SB1300 (L)	12.95 - 13.55					R009	B009		M011 (L)		
SH1350 (L)	SB1350 (L)	13.45 - 14.05					R010	B010		M010 (L)		
SH1400 (L)	SB1400 (L)	13.95 - 14.55					R010	B010		M011 (L)		
SH1450 (L)	SB1450 (L)	14.45 - 15.05					R010	B010		M012 (L)		

Hole size: ϕ15 - ϕ34mm

Morse taper shank type



Straight shank type



Units: mm

Tool model		Tool diameter adjustment range A	Burnishing length H	Tool length L		Part No.								
				Morse taper shank type	Straight shank type	Housing	Roller			Mandrel	Stem	Shank		
Through-hole	Blind-hole	Min. - Max.	mm	mm	mm	–	Through-hole	Blind-hole	Q'ty			Morse taper	Straight
SH1500 (L)	SB1500 (L)	14.9 - 16.1	Standard 50 Long 150	Standard 130 Long 230	Standard 127 Long 227	HA2	R011	B011	4	M013 (L)	E1 (L)	S02 (MT2)	S02R
SH1600 (L)	SB1600 (L)	15.9 - 17.1					R011	B011		M014 (L)	E2 (L)		
SH1700 (L)	SB1700 (L)	16.9 - 18.1					R011	B011		M015 (L)	E3 (L)		
SH1800 (L)	SB1800 (L)	17.9 - 19.1					R012	B012		M014 (L)	E2 (L)		
SH1900 (L)	SB1900 (L)	18.9 - 20.1					R012	B012		M015 (L)	E3 (L)		
SH2000 (L)	SB2000 (L)	19.9 - 21.1					R011	B011	6	M016 (L)	E4 (L)		
SH2100 (L)	SB2100 (L)	20.9 - 22.1					R011	B011		M017 (L)	E5 (L)		
SH2200 (L)	SB2200 (L)	21.9 - 23.1					R011	B011		M018 (L)	E6 (L)		
SH2300 (L)	SB2300 (L)	22.9 - 24.1					R012	B012		M017 (L)	E5 (L)		
SH2400 (L)	SB2400 (L)	23.9 - 25.1					R012	B012		M018 (L)	E6 (L)		
SH2500 (L)	SB2500 (L)	24.9 - 26.1	Standard 70 Long 150	Standard 150 Long 230	Standard 147 Long 227		R012	B012		M019 (L)	E7 (L)		
SH2600 (L)	SB2600 (L)	25.9 - 27.1					R012	B012		M020 (L)	E7 (L)		
SH2700 (L)	SB2700 (L)	26.9 - 28.1					R012	B012		M021 (L)	E7 (L)		
SH2800 (L)	SB2800 (L)	27.9 - 29.1					R012	B012		M022 (L)	E7 (L)		
SH2900 (L)	SB2900 (L)	28.9 - 30.1					R012	B012		M023 (L)	E8 (L)		
SH3000 (L)	SB3000 (L)	29.9 - 31.1					R013	B013		M022 (L)	E8 (L)		
SH3100 (L)	SB3100 (L)	30.9 - 32.1					R013	B013		M023 (L)	E8 (L)		
SH3200 (L)	SB3200 (L)	31.9 - 33.1					R013	B013		M024 (L)	E8 (L)		
SH3300 (L)	SB3300 (L)	32.9 - 34.1					R013	B013		M025 (L)	E8 (L)		
SH3400 (L)	SB3400 (L)	33.9 - 35.1					R013	B013		M026 (L)	E8 (L)		

■ Specifying tool model

SH ○○○○ L (S0○○) E.g.: SH720(S01)

SH: For through-hole
SB: For blind-hole

Tool model = Hole size x 100

L is added for long burnishing length.

Select from either Morse taper or Straight shank type.
Shanks other than the sizes listed in the selection chart above are also available as special types.
Please refer to the table below and contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.

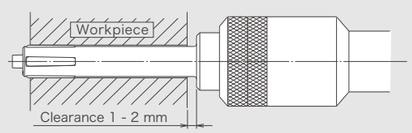
Tool Model		Recommended special shank sizes		
SH/SB	450-1450	ϕ10-60L	ϕ16-70L	
	1500-3400		ϕ16-70L	ϕ20-70L

■ About tool selections

- Select Tool model within the Tool diameter adjustment range A to suit the hole size.
- For hole sizes ø35 - ø200mm, please scan the two-dimensional bar code on the right and refer to the Superoll SH & SB selection chart.
- For request a special dimensions not included in the Superoll SH & SB selection chart, please contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.

■ About Burnishing length H

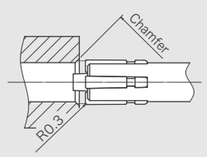
Select a Burnishing length H that retains 1 mm or more clearance between Superoll and workpiece. Burnishing lengths H other than standard or long specifications are also available as special types. Please refer to the table below and contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.



Tool Model		Recommended special burnishing length (mm)							
SH/SB	450- 575	70	90	120	150				
	600- 760			120	150	180	210		
	800-1450			120	150	180	210	240	
	1500-2400				150	180	210	240	
	2500-3400				150	180	210	240	270

■ Precaution with R0.3 type rollers for Superoll SB

When using R0.3 type rollers that reduce the non-burnishing length of blind-holes, the hole entrance must be chamfered to prevent interference between the roller tip and workpiece when inserting Superoll SB.
Please refer to the chamfer size chart on the right for details.



Tool model		Chamfer Size
SB	800-1450	C0.5 or more
	1500-3400	C1 or more

Multi Roller Type Speedy burnishing with multiple rollers

Superoll CSL

Through-hole / Blind-hole

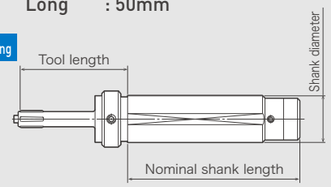
Machining center / Engine lathe / Turret lathe / Swiss lathe / Drilling machine / Drilling unit

Superoll CSL can be installed on Swiss lathe as the tool diameter adjustment mechanism is downsized from Superoll SH/SB.
Shank is standardized based on the typical CNC lathe.
While burnishing, using with normal rotation and switch to reverse rotation when retracting.

Hole size ϕ3 - ϕ14.9mm

Burnishing length Standard: 30mm
Long : 50mm

Dimensional drawing



Burnishing video

Selection chart / Burnishing conditions table

Overview dimension

Tool length (mm)	Standard	46				
	Long	66				
Shank diameter (mm)		ϕ19.05	ϕ20	ϕ22	ϕ25	ϕ25.4
Shank length (mm)		Nominal 75				
		Nominal 115				

Superoll CSA/SA

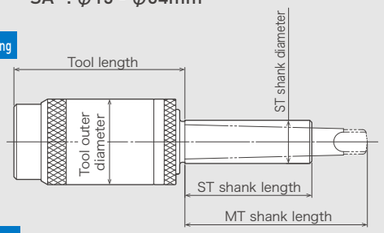
Shaft / Shaft with step

Machining center / Engine lathe / Turret lathe / Swiss lathe* *CSA type / Drilling machine / Drilling unit

CSA/SA type Superoll is for shaft outside diameters burnishing.
Superoll CSA is available for workpiece size ϕ3 - ϕ14.9mm and Superoll SA is for ϕ15 - ϕ64mm.

Workpiece size CSA: ϕ3 - ϕ14.9mm
SA : ϕ15 - ϕ64mm

Dimensional drawing



Burnishing video

Selection chart / Burnishing conditions table

Dimensional table

	Workpiece size (mm)	Tool outer diameter (mm)	Tool length (mm)	Shank (mm)				
				ϕ19.05	ϕ20	ϕ22	ϕ25	ϕ25.4
CSA	ϕ3 -ϕ 7	ϕ28	48	ST shank length 72				
	ϕ7.1-ϕ11	ϕ38						
	ϕ11.1-ϕ14.9	ϕ41	53	—			ST shank length 72	
SA	ϕ15 -ϕ24	ϕ66	132	MT3 (Shank length 98)				
	ϕ25 -ϕ44	ϕ98	147	MT4 (Shank length 123)				
	ϕ45 -ϕ64	ϕ128	157					

Superoll SES

Spherical surface

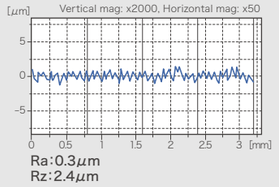
Machining center / Engine lathe / Turret lathe / Swiss lathe / Drilling machine / Drilling unit

Superoll SES is for spherical workpiece burnishing like ball studs and tie rods.
Combined machine or motor unit is required since both workpiece and Superoll SES should rotate while burnishing.

Spherical size S ϕ10 - S ϕ30mm

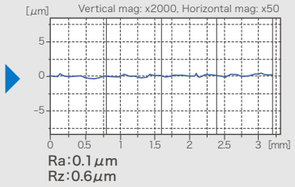
Burnishing data

Before



Ra:0.3μm
Rz:2.4μm

After



Ra:0.1μm
Rz:0.6μm

Special tool rest is required due to rotating both workpiece and Superoll SES

Attachment example to a driving unit.
Motor attachment type

Burnishing video

Superoll SFP

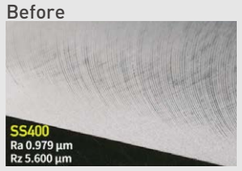
Flat surface

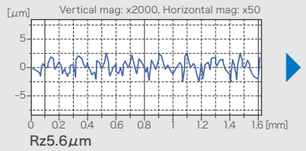
Machining center / Engine lathe / Turret lathe / Swiss lathe / Drilling machine / Drilling unit

Superoll SFP is suitable for extensive range of flat surface with similar procedure like a face milling. (Cross milling). Thus, unlimited burnishing range for width, Superoll SFP is suitable for mating or sealing surface.

Burnishing data

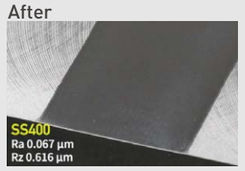
Before

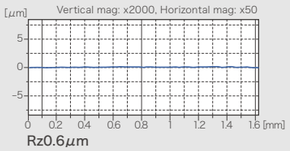




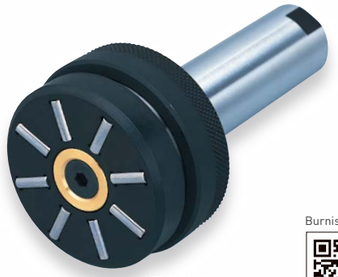
Rz5.6μm

After





Rz0.6μm



SFP40-S25 type

Burnishing video

Selection chart / Burnishing conditions table

Improve unstable finished surface due to the variation of pre-hole size.

Superoll MAC

Through-hole / Blind-hole

With automatic tool diameter adjustment feature, tool diameter automatically tracks the pre-hole size and achieves stable finished surface.

▶For more detail, please refer to page 25.

Single Roller Type

A single roller designed for workpieces of various shapes and sizes

Single Roller type Superoll designed for use with lathes, for burnishing with a single roller.
Suited for parts of various different shapes and sizes, and ideal for high-mix low-volume productions.

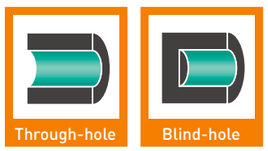
Outer/End surface

SR5A
SR16M

Multiple surface

SR16M

Inner surface



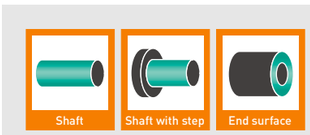
SR5C
SR16C

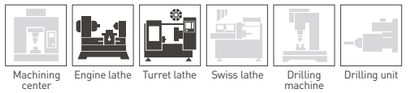
Groove surface

SR3Z | SR3ZH | SR24MW | CEZF | CEZH

SUGINO

Single Roller Type A single roller designed for workpieces of various shapes and sizes



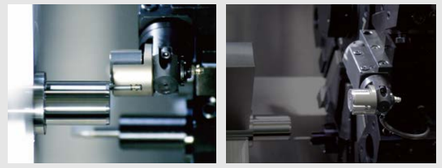


Superoll SR5A

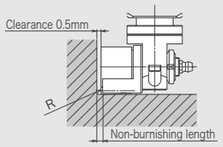
Superoll SR5A is suitable for not only outer surface (Shaft) finishing, but end surface.

Available burnishing range Workpiece size: ϕ10mm or more

Burnishing scene



Non-burnishing length

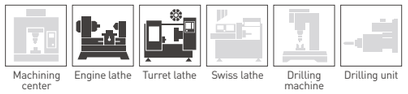


Roller	Non-burnishing length (mm)
Standard	1.8
R0.3	0.8

∗Non-burnishing length can be reduced by using R0.3 type rollers.

Burnishing video

Selection chart / Burnishing conditions table



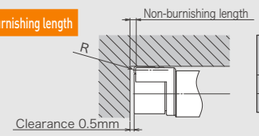
Superoll SR5C

Superoll SR5C is for inner surface burnishing. It's available for different size of workpieces with just only Superoll SR5C.

Available burnishing range Hole size: ϕ36mm or more
Max burnishing length: 100mm

Burnishing scene

Non-burnishing length



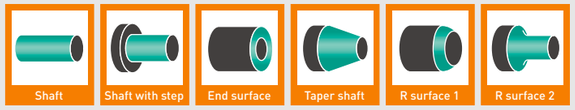
Roller	Non-burnishing length (mm)
Standard	1.8
R0.3	0.8

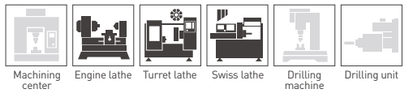
∗Non-burnishing length can be reduced by using R0.3 type roller.

Burnishing video

Selection chart / Burnishing conditions table

Single Roller Type A single roller designed for workpieces of various shapes and sizes





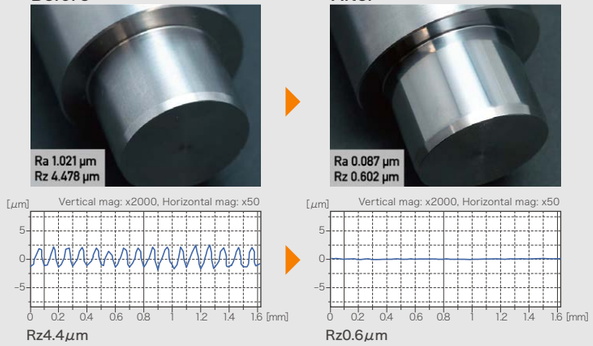
Superoll SR16M

Superoll SR16M is compact Superoll which can be attached to Swiss lathe. Without changing a tool posture, Superoll SR16M can burnish various shapes of outer and edge surface.

Available burnishing range No limitation (Except for small size cantilever)

Burnishing data

Before / After



Roller tip R size

Select Roller tip R size in accordance with workpiece or requested burnishing conditions.

Standard roller tip R size		
R0.2	R1.5	R3.0

Roller tip R size	Outer surface	End surface	Taper surface	R & Spherical surface	Non-burnishing length (mm)
R0.2	Available		Non available		None
R1.5	Available				1.5
R3.0	Available				3.0

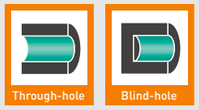
Shank

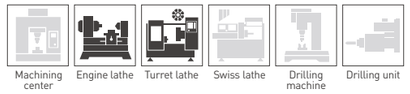
Standard shank A size (mm)					
10	12	16	20	25	25.4

∗For more detail about a dimension of shank, please scan the two-dimensional bar code on the right and refer to Dimensional drawing.
∗For request about special Shank size, contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.

Burnishing video

Selection chart / Burnishing conditions table





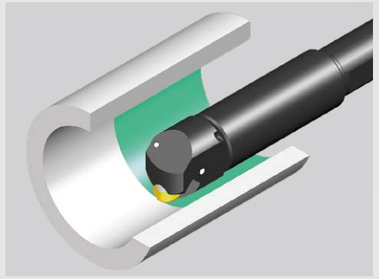
Superoll SR16C

Superoll SR16C is a versatile inner burnishing version tool of Superoll SR16M. For shank specification and Max burnishing length, contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.

Available burnishing range Hole size: ϕ35mm or more
∗Vary depending on the burnishing length.

Roller tip R The same as SR16M
∗For more detail, refer to page 20.

Burnishing image

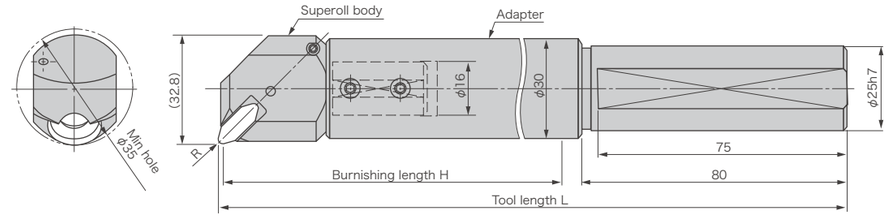


Selection chart

Specification example

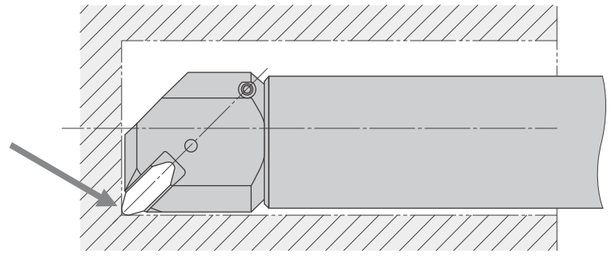
Burnishing length 150mm – 200mm

Units: mm



∗For dimensional drawing above, Burnishing length H can be available up to 200mm in units of 50mm. Tool length L = Burnishing length H + 90mm.
∗In case Burnishing length H is ① 100mm or shorter or ② 200mm or longer, please scan the two-dimensional bar code above and refer to Selection chart.

Roller can contact to a bottom surface, which reduces non-burnishing length as long as possible.
Non-burnishing length is the same as the roller tip R size.



Single Roller Type A single roller designed for workpieces of various shapes and sizes

Superoll SR3Z

Outer groove side

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

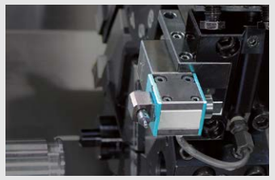
Superoll SR3Z is suitable for finishing groove side surface for attaching O-ring or seal ring.

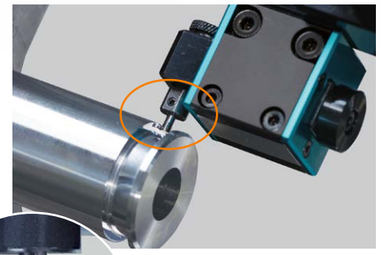
Available groove range

Item	Groove range (mm)	
	Standard	Special
Groove width	3.6 or more	2.2 or more
Groove depth	5.5 or less	*

*Special groove depth can be designed upon customer's request.

SR3Z attachment scene



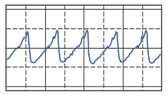
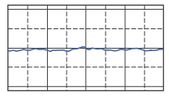
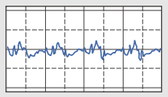
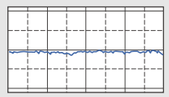
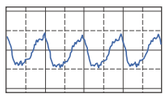
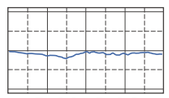


*Burnishing bottom surface is not available.

Burnishing video

Reference dimension / Burnishing conditions table

Burnishing data

Material	Roughness (μm)	
	Before	After
SCM440	 Ra1.0 Rz4.4	 Ra0.1 Rz0.7
SUS303	 Ra0.4 Rz2.3	 Ra0.1 Rz0.6
A5056	 Ra1.2 Rz4.5	 Ra0.1 Rz0.8

Superoll SR24MW

Outer groove bottom

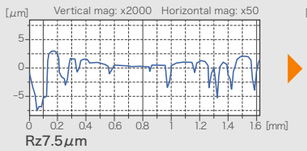
Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

Superoll SR24MW is for outer groove bottom burnishing.
It has so compact body that can be attached to Swiss lathe.

Available groove range Groove width: 1.4mm or more
Groove depth: 5mm or less

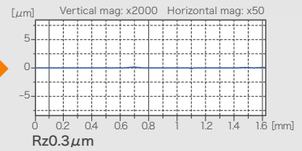
Burnishing data

Before



Rz7.5μm

After



Rz0.3μm

Burnishing video

Reference dimension / Burnishing conditions table

Superoll CEZF

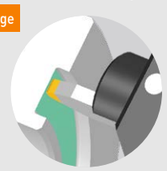
Groove end surface

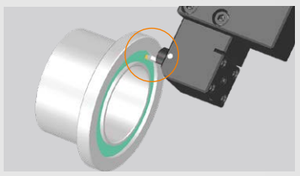
Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

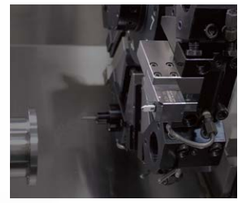
Superoll CEZF is for groove end surface burnishing.
The shape of diamond tip which can avoid the interference with groove curvature reduces non-burnishing area.

Available groove range Groove width: 1.4mm or more
Groove depth: It can be designed upon customer's request.
Groove size: ϕ40mm or more (In case the groove depth 2mm or less)

Burnishing image







Reference dimension / Burnishing conditions table

Superoll SR3ZH

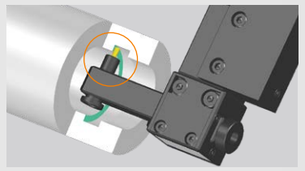
Inner groove side

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

Superoll SR3ZH is suitable for finishing inner groove side surface.

Available groove range Groove width: 3.6mm or more
Groove depth: 5mm or less
Hole size: ϕ40mm or more

Burnishing image



Reference dimension / Burnishing conditions table

Superoll CEZH

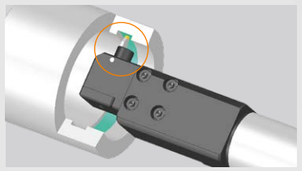
Inner groove bottom

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

Superoll CEZH is for inner groove bottom burnishing and also suitable for groove bottom located at back side.

Available groove range Groove width: 1.4mm or more
Groove depth: It can be designed upon customer's request.
Hole size: ϕ68mm or more

Burnishing image



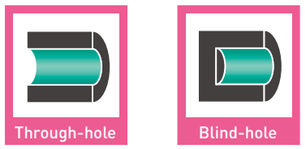
Reference dimension / Burnishing conditions table

Re-forming Type

Forming plateau structure surfaces

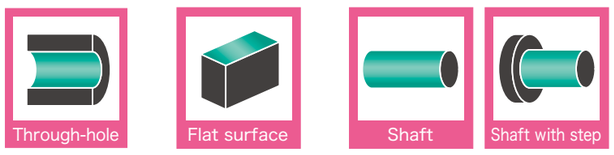
Re-forming type Superoll designed for forming surfaces with excellent sliding characteristics.
Presses and smooths any peaks remaining from pre-burnishing,
and can optionally leave dimples to serve as oil pots.
This gives workpieces greater abrasion resistance and limits seizing.

Forming plateau structure surfaces



SH-MAC　SB-MAC

Forming micro dimple surface

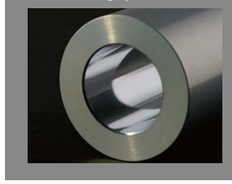


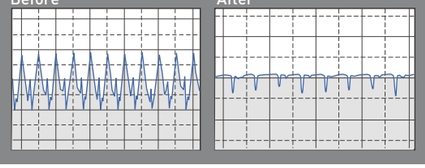
BPH　BPP　BPSR

Re-forming Type Forming plateau structure surfaces

Superoll MAC

Forming plateau structure surfaces in one pass after machining.



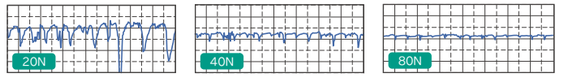


Protruding peaks that cause sliding resistance
Rpk 3.208μm ⇒ 0.050μm

Protruding dimples that form oil pots.
Rvk 1.311μm ⇒ 1.295μm

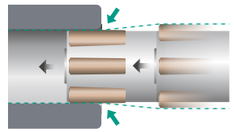
Working pressure adjustment function

Working pressure can be adjusted arbitrarily, which makes dimples depth of finished surface adjustable.



Automatic tool diameter adjustment feature

Tool diameter tracks to the reduction direction with in a range of up to 0.2mm from a setting tool diameter.



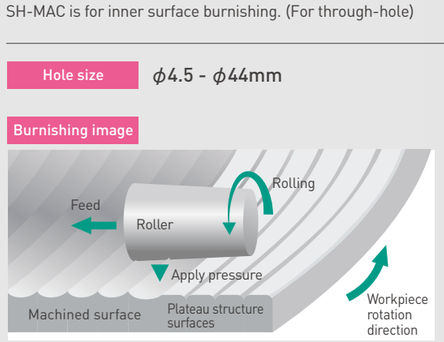
SH-MAC

Through-hole

SH-MAC is for inner surface burnishing. (For through-hole)

Hole size　ϕ4.5 - ϕ44mm

Burnishing image



Burnishing video　Selection chart / Burnishing conditions table

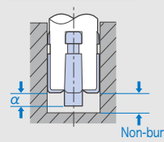
SB-MAC

Blind-hole

SB-MAC is for inner surface burnishing. (For blind-hole)

Hole size　ϕ8 - ϕ44mm

Non-burnishing length



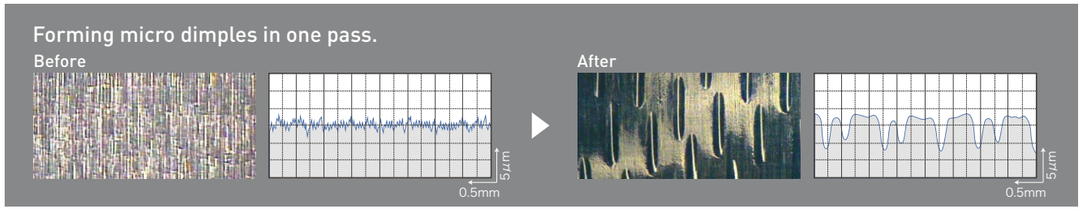
Roller specification	Hole diameter (mm)	Non-burnishing length (mm)
Standard	ϕ8-ϕ14.5	1.5+α
	ϕ15-ϕ44	1.8+α
R0.3	All sizes	0.8+α

*Depending on the setting tool diameter, the mandrel protruded length from the roller tip may interfere with the bottom surface of workpieces. In that case, cut or grind the protruded length of the mandrel by grinding or other means before using. For more details, please scan the two-dimensional bar code on the right and refer to Selection chart & Burnishing conditions.

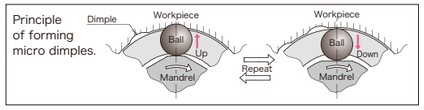
Burnishing video　Selection chart / Burnishing conditions table

Re-forming Type Forming plateau structure surfaces

Superoll BP (Micro dimples forming Superoll)



Superoll BP can form micro dimples (dent) of a few μm depth on a metal surface.
It allows to form micro dimples at high speed by giving predetermined rotation and feed, and projecting balls embedded in it regularly.



BPH

Through-hole

BPH is a micro dimples forming Superoll for inner surface and the design is based on Superoll SH.
BPH can form specific pattern of micro dimples at inner surface in one pass.

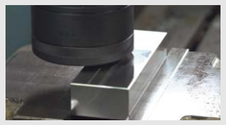
Hole size Steel: ϕ5mm or more
Aluminum・Copper: ϕ4mm or more

BPP

Flat surface

BPP is a micro dimples forming Superoll by attaching a machining center or milling machine. BPP can form dot pattern micro dimples on flat surface, and gain the same effect as hand scraping.

Available burnishing range No limitation
(If there is any steps, non-burnishing area will be arisen at the boundary.)



Burnishing video

BPSR

Shaft
Shaft with step

BPSR is a micro dimples forming Superoll for outer surface and the design is based on Superoll SR5A.
It can be burnishing various diameters and workpieces by attaching to lathes.

Workpiece size ϕ10mm or more
(Available diameter varies depending on workpiece length.)

Compressive Type

Burnishing sealing surfaces with Superoll by each shapes

Compressive type Superoll for finishing by applying loads with a spring embedded within Superoll.
Ideal for burnishing surfaces that requires sealing properties.
Compressive type Superoll is designed and manufactured to suit the shape of workpieces respectively like taper, flat and R surfaces.

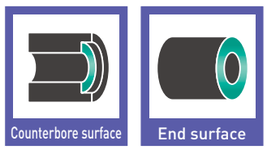
Inner taper surface

ST
CST

Convex R surface

FD
CFD

Flat end surface



SF
CSF

Outer taper surface

SE
CSE

Compressive Type Burnishing sealing surfaces with Superoll by each shapes

Superoll ST

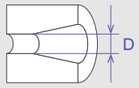
Taper hole

Superoll ST is suitable for sealing surface burnishing like valve seats.

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

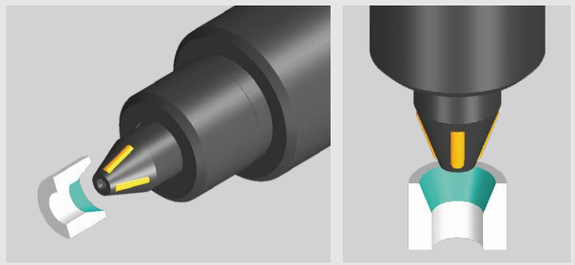
For compact type, refer to page 30.

Hole size

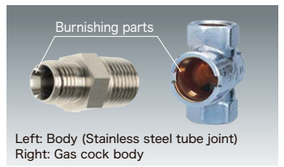


D: ϕ3mm or more

Burnishing image



Burnishing example



Left: Body (Stainless steel tube joint)
Right: Gas cock body

Superoll ST overview

*Superoll ST is designed in accordance with customer's workpiece. For detailed specification, contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.

Superoll SF

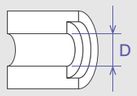
Counterbore surface | End surface

Superoll SF is suitable for sealing surface burnishing like spline hub, flange surface of joint, clutch parts, semiconductor valves and so on.

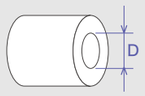
Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

For compact type, refer to page 30.

Available size

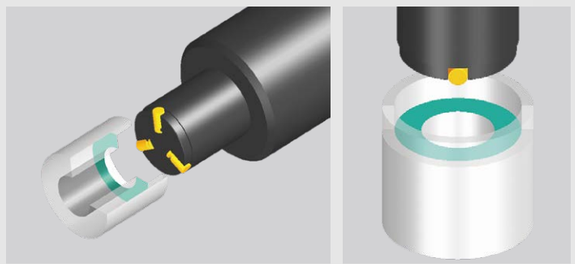


D: ϕ5.5mm or more

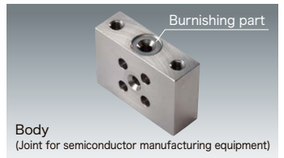


D: ϕ2mm or more

Burnishing image



Burnishing example



Body
(Joint for semiconductor manufacturing equipment)

Superoll SF overview

*Superoll SF is designed in accordance with customer's workpiece. For detailed specification, contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.

Superoll FD

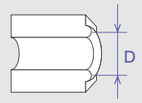
Convex R

Superoll FD is suitable for sealing surface burnishing like R sheet surface of piping joint.

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

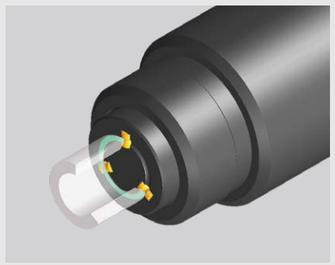
For compact type, refer to page 30.

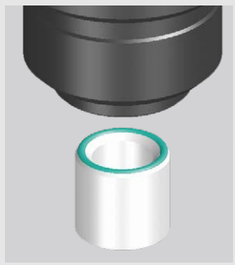
Convex R size



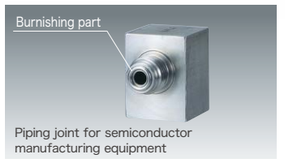
D: ϕ4mm or more

Burnishing image





Burnishing example



Piping joint for semiconductor manufacturing equipment

Superoll FD overview

*Superoll FD is designed in accordance with customer's workpiece. For detailed specification, contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.

Superoll SE

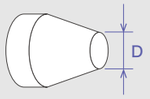
Taper shaft

Superoll SE is suitable for sealing surface burnishing like a joint and valve.

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

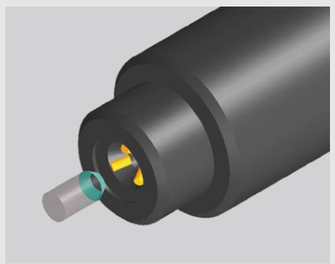
For compact type, refer to page 30.

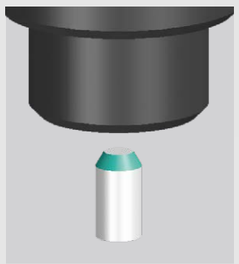
Small taper size



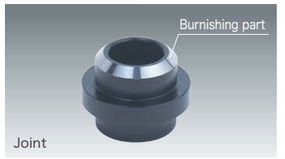
D: ϕ1.5mm or more

Burnishing image





Burnishing example



Joint

Superoll SE overview

*Superoll SE is designed in accordance with customer's workpiece. For detailed specification, contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.

Compressive Type Burnishing sealing surfaces with Superoll by each shapes

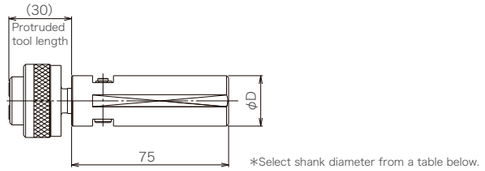
Superoll CST/CSF/CFD/CSE

These Superolls are compact type of compressive Superolls with shortening the protruded tool length and can be attached to Swiss lathe.

Head assembly is the same dimension as ST, SF, FD and SE respectively.
Only compressive shank assembly are miniaturized.

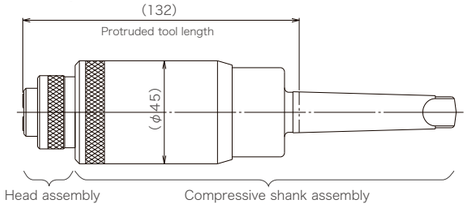
Compact specification

Units: mm



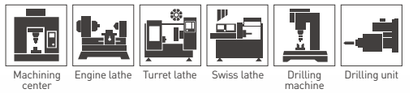
*Select shank diameter from a table below.

Normal specification



Superoll	Protruded tool length (mm)	Shank diameter D (mm)	Shank length (mm)
CST	Around 40 – 60	ϕ19.05 ϕ20 ϕ22 ϕ25 ϕ25.4	75
CSF	Around 25 – 60		
CFD	Around 25 – 60		
CSE	Around 25 – 60		

*Superoll CST, CSF, CFD and CSE are designed in accordance with customer's workpiece. For detailed specification, contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.



Taper hole

CST

Counterbore surface | End surface

CSF

Convex R

CFD

Taper shaft

CSE

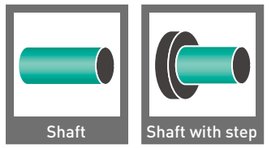
Burnishing video

Diamond-tool Type CAT'S EYE series

Burnishing materials with high hardness of HRC40 - 60

Diamond-tool type Superoll for finishing by pressing diamonds tip to workpieces.
Ideal for finishing high-hardness materials of HRC40 - 60 that roller type Superolls have difficulty finishing.
The diamond tip has a throw-away design that allows for easy replacement.

Outer surface

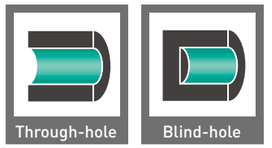


CEO

End surface

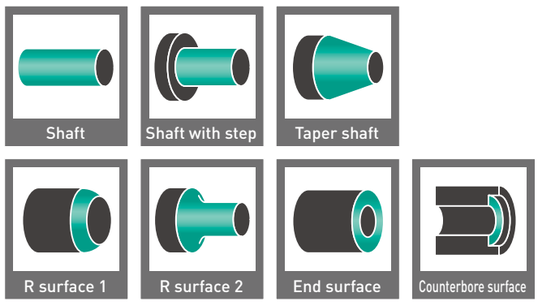
CEF

Inner surface



CEH

Multiple surface



CEO-AJ

Diamond-tool Type Burnishing materials with high hardness of HRC40 - 60

Replaceable throw-away diamond tip

Shaft | Shaft with step

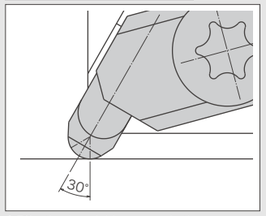
CAT'S EYE CEO

CAT'S EYE CEO is for outer surface burnishing.

Available hardness HRC40 - 60

Attachment image to a driving unit

Effective burnishing range



*Effective burnishing range is the same as CEF and CEH.

Burnishing scene

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

Burnishing video

Selection chart / Burnishing conditions table

End surface

CAT'S EYE CEF

CAT'S EYE CEF is for end surface burnishing.

Available hardness HRC40 - 60

Effective burnishing range The same as above CAT'S EYE CEO.

Burnishing scene

Diamond tip (Close-up photo)

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

Selection chart / Burnishing conditions table

Through-hole | Blind-hole

CAT'S EYE CEH

CAT'S EYE CEH is for inner surface burnishing.

Available hardness HRC40 - 60

Effective burnishing range The same as above CAT'S EYE CEO.

Burnishing scene

Diamond tip (Close-up photo)

CEH-4D1
(Hole size: ϕ20mm or more)

CEH-2D1
(Hole size: ϕ13mm or more)

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

Burnishing video

Selection chart / Burnishing conditions table

Highly versatile type that can burnish various shapes with one tool

Shaft | Shaft with step | Taper shaft | R surface 1 | R surface 2 | End surface | Counterbore surface

Machining center | Engine lathe | Turret lathe | Swiss lathe | Drilling machine | Drilling unit

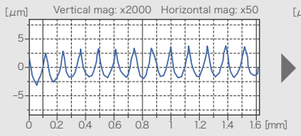
CAT'S EYE CEO-AJ

CEO-AJ can be adjusted the tool tip angle.
Thanks to the wider burnishing effective range, CEO-AJ can burnish various shapes of workpiece.

Available hardness HRC40 - 60

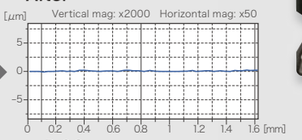
Burnishing data

Before



Rz6.2μm

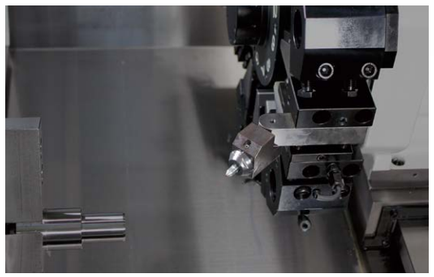
After



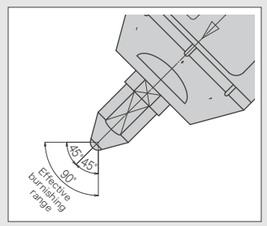
Rz0.3μm

Burnishing scene

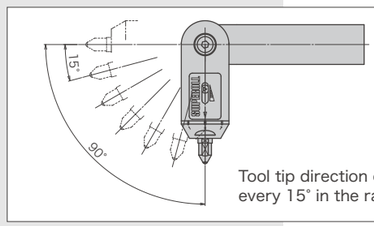
Diamond tip (Close-up photo)



Effective burnishing range



Tool attachment direction



Tool tip direction can be adjustable every 15° in the range of 90°.

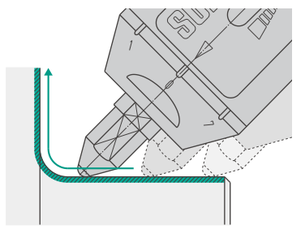
Burnishing video

Selection chart / Burnishing conditions table

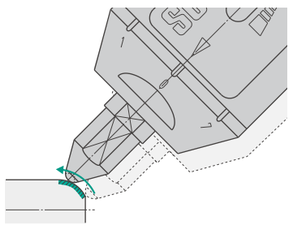
Available burnishing shapes

<Burnishing example>

Outer, Corner R and End surface

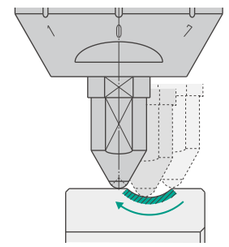


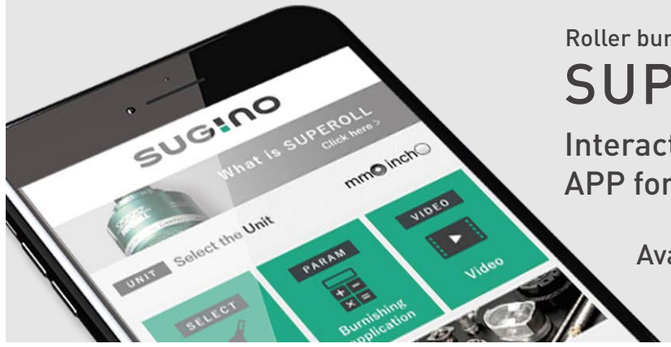
Convex R surface



*The top of the sphere cannot burnish due to peripheral speed 0.

Concave R surface





Roller burnishing Tool

SUPEROLL

Interactive Catalog
APP for Smartphones and Tablets

Available for iOS Android

This App helps you to select the appropriate Superoll easily according to the workpiece dimension and material, etc.

When you input the workpiece information such as dimension and material, suitable Superoll will be suggested.
In case that various types of Superoll are suggested, please select the suitable one for your purpose, based on the ranking of the compared features.
Then, model, outside drawing and burnishing conditions according to your driving unit are shown after inputting shank size.
FAQ, technical information and our new product information are updated.

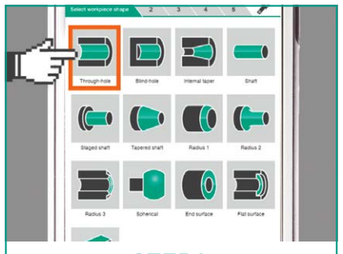
for iOS

Download on the App Store

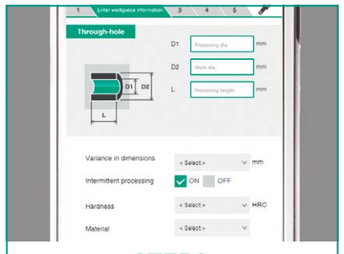
for Android

GET IT ON Google Play

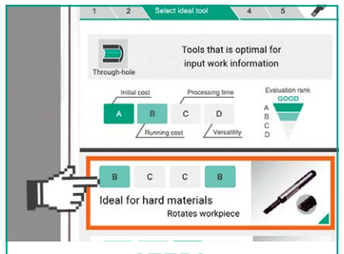
How to use the App



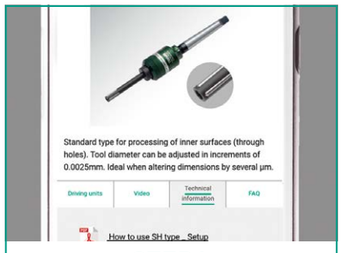
STEP1
Select your workpiece shape to burnish.



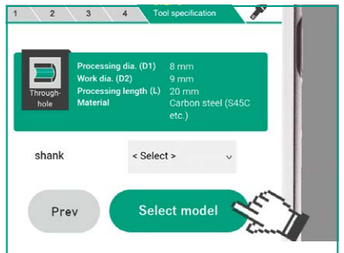
STEP2
Input dimensions, materials and workpiece information.



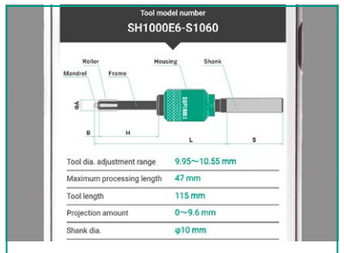
STEP3
Compare the features and select the tool.



STEP4
Check out the tool details from video and technical information.



STEP5
Select the tool specifications such as Shank size, Handed direction etc..



You can see the tool information and Burnishing parameters.

Some contents require user registration (Free of charge).

Superoll Inquiry Sheet

Contact us
SUGINO MACHINE LIMITED Kakegawa Plant
E-mail tool@sugino.com

● Contact information （Fields with ＊ are required.）

＊Name	
＊Company Name	
Division	
＊Company Address	

Requested response due date:

＊Phone	
Fax	
E-mail Address	

● Fill in the following contents.

Workpiece name	
Workpiece material	
Workpiece hardness	(HRC, HV, HB, Others)
Workpiece form (Circle one.)	① ② ③ ④ ⑤ ⑥ ▶▶ Work configuration
Diameter φD1	φ Tolerance
Diameter φD2	φ Tolerance
Length L	Tolerance
Interference height H	Tolerance
Corner R	
Angle θ°	degree Tolerance
Required shank form	
Tool length limitation (shank length not included)	
Driving unit in use	
Purpose of use (Circle one or more.)	・Improvement of surface roughness ・Hardness improvement ・Dimensional correction ・Others

● Clarify the unit. （e.g., µm, mm, Rz, HRC, HV, HB）

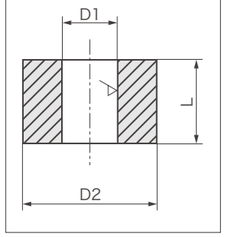
Surface roughness	Before burnishing	After burnishing
Hardness improvement	Before burnishing	After burnishing
Dimensional correction	Before burnishing	After burnishing
Other accuracy	Before burnishing	After burnishing
Work piece drawing (Please attach a drawing of the work in order to check interference between the tool and the work.)	Attached / Not attached	

Remarks

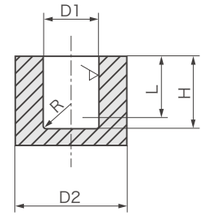
☐ Visit by our salesperson （Check here if requesting.）

Special tools for work configurations not shown below can be produced.

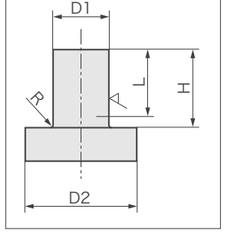
① Through-hole



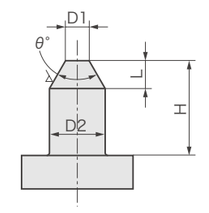
② Blind-hole



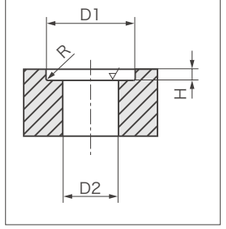
③ Outer



④ Outer taper



⑤ Flat surface



⑥ Inner taper