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Roller Burnishing & Surface Reforming Tool

SUPEROLL











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.





Superolls achieve all if you want to.



How?

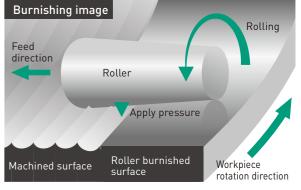
"To press and smooth out surface instead of grinding."

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.

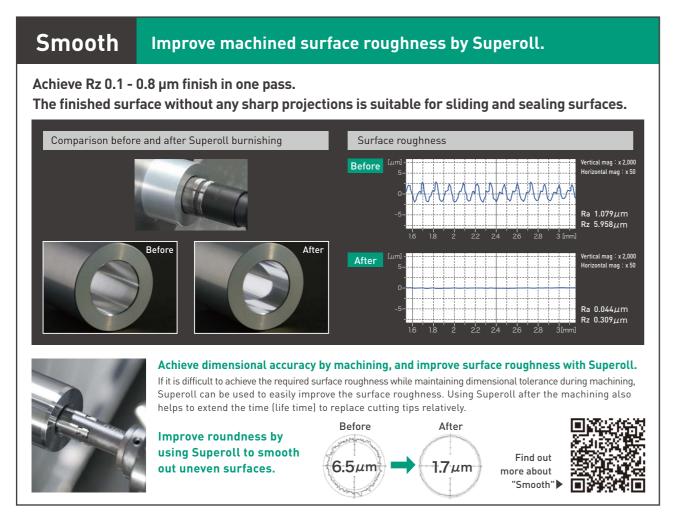


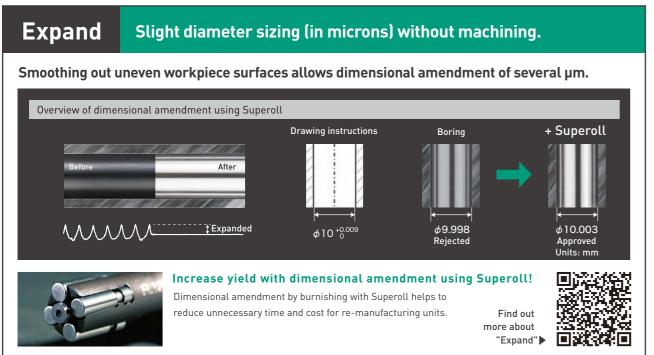




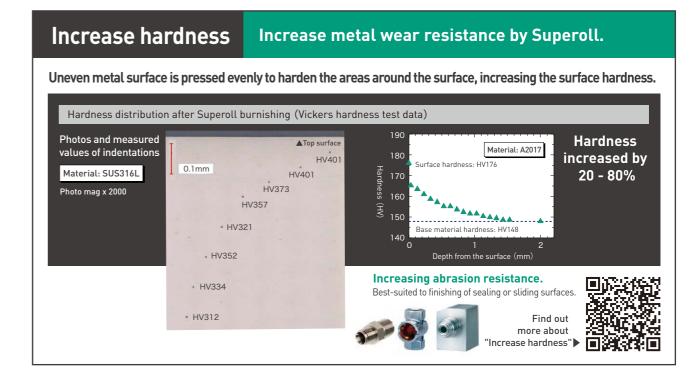


Benefits of burnishing with Superoll.





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 Fatigue test piece fragment cross-section (Close-up photos) 200 MPa, fractures at 106 times 280 Mpa, fractures at 6 x 106 times 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 Workpiece life time increased 5 - 100 times 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. Shot peening 1000 more about Depth from the surface (µm) "Increase strength"



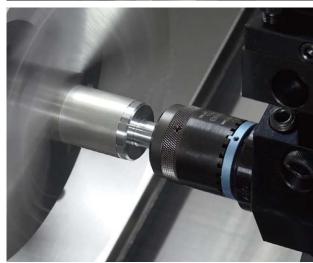
Superoll types

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.



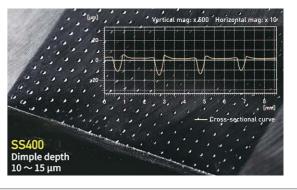
Re-forming Type

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.

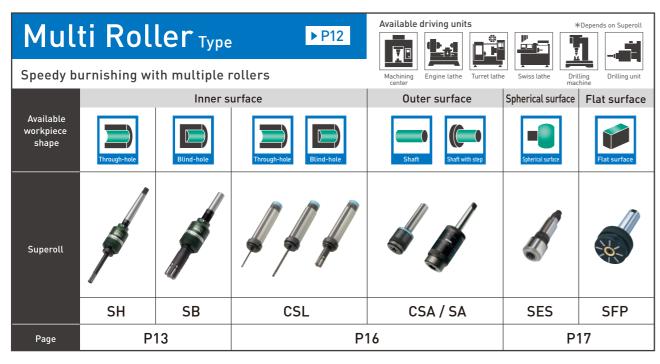
Ideal for burnishing high-hardness materials of HRC40 - 60 that roller types have difficulty finishing.

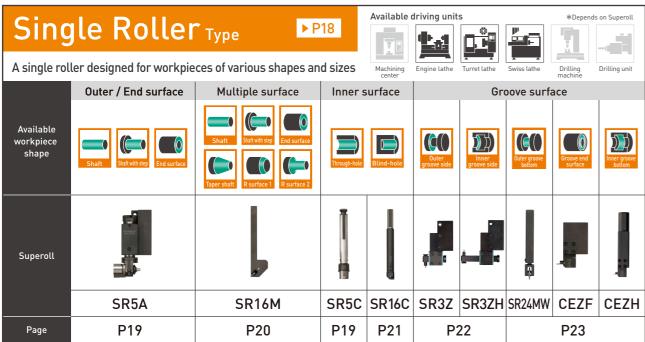
The diamond tip has a throw-away design that allows for easy replacement.





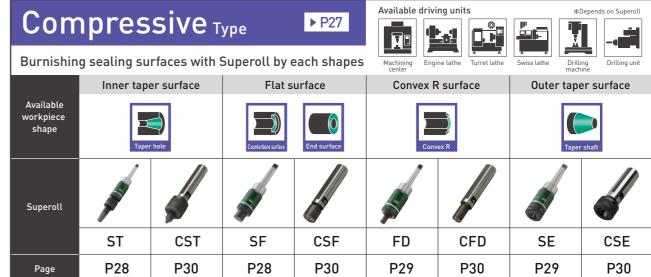
Select suitable Superoll in accordance with your purpose, Superoll selection conditions like workpiece shape and driving units. Please refer to each Superoll introduction pages which are indicated below.

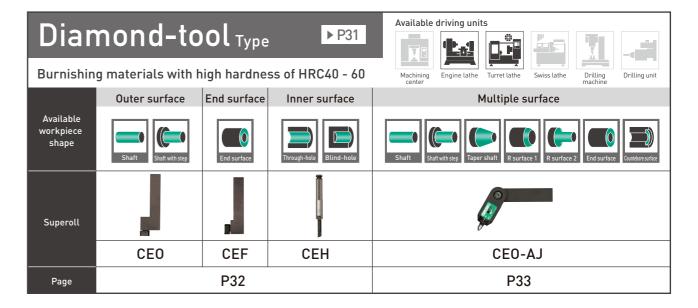


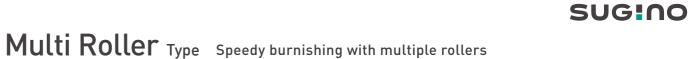


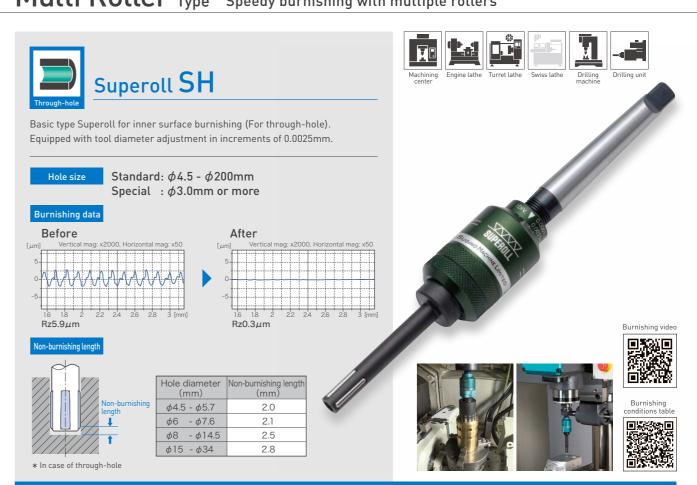
















Multi Roller Type

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.







CSL

CSL



CSA/SA









Flat surface





Multi Roller Type Speedy burnishing with multiple rollers

Superoll SH & SB selection chart (For hole size $\phi 4.5 - \phi 34$ mm)

Tool diameter

10.45 - 11.05

10.95 - 11.55

11.45 - 12.05

11.95 - 12.55

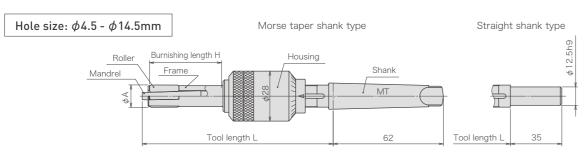
12.45 - 13.05

12.95 - 13.55

1345 - 1405

13.95 - 14.55

14.45 - 15.05



Tool length L

Burnishing Tool model adjustment range Housing Roller Shank shank type shank type Mandrel Min. - Max. Q'ty Through-hole Blind-hole Morse taper Straight mm mm mm hrough-hole SH450 4.45 - 4.80 R001 M001 SH475 4.70 - 5.05 R001 M002 4.95 M002 SH500 - 5.30 Standard 118 R002 5.20 - 5.55 M003 SH525 R002 SH550 5.45 - 5.80 R003 M002 SH575 5.70 - 6.05 R003 M003 SH600 (L) 5.95 - 6.45 R004 M004 (L) Standard 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) 7.55 - 8.05 SH760 (L) R005 M006 (L) SH800 (L) SB800 (L) 7.95 - 8.55 R006 B006 M007 (L) B006 S01R SH850 (L) SB850 (L) 8.45 - 9.05 R006 M008 (L) SH900 (L) SB900 (L) 8.95 - 9.55 R007 B007 M007 (L) SH950 (L) M008 (L) R007 B007 SB950 (L) 9.45 - 10.05 SH1000 (L) SB1000 (L) 9.95 - 10.55 R007 B007 M009 (L) Standard 118 Standard 115

R008

R008

R008

R009

R009

R010

R010

R010

B008

B008

B008

B009

B009

B009

B010

B010

B010

M008 (L)

M009 (L)

M010 (L)

M009 (L)

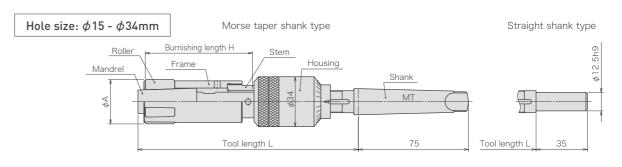
M010 (L)

M011 (L)

M010 (L)

M011 (L)

M012 (L)



Units: mm

Tool model		Tool diameter	Burnishing	Tool le	ngth L				Par	t No.			
1 001 r	model	adjustment range A	length H	Morse taper shank type	Straight shank type	Housing		Roller		Mandrel	Stem	Sha	ink
Through-hole	Blind-hole	Min Max.	mm	mm	mm	_	Through-hole	Blind-hole	Q'ty	iviariurei	Stem	Morse taper	Straight
SH1500 (L)	SB1500 (L)	14.9 - 16.1					R011	B011		M013 (L)	E1 (L)		
SH1600 (L)	SB1600 (L)	15.9 - 17.1					R011	B011		M014 (L)	E2 (L)		
SH1700 (L)	SB1700 (L)	16.9 - 18.1					R011	B011	4	M015 (L)	E3 (L)		
SH1800 (L)	SB1800 (L)	17.9 - 19.1	Standard	Standard 130 Long Long 150 230	30 127 ong Long	Long 227	R012	B012		M014 (L)	E2 (L)	S02 (MT2)	S02R
SH1900 (L)	SB1900 (L)	18.9 - 20.1] 30				R012	B012		M015 (L)	E3 (L)		
SH2000 (L)	SB2000 (L)	19.9 - 21.1					R011	B011		M016 (L)	E4 (L)		
SH2100 (L)	SB2100 (L)	20.9 - 22.1	150		230 227		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					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	6	M021 (L)	E7 (L)		
SH2800 (L)	SB2800 (L)	27.9 - 29.1	Standard	Standard			R012	B012		M022 (L)	E7 (L)		
SH2900 (L)	SB2900 (L)	28.9 - 30.1	70	150	147		R012	B012		M023 (L)	E8 (L)		
SH3000 (L)	SB3000 (L)	29.9 - 31.1	Long	Long	Long		R013	B013		M022 (L)	E8 (L)		
SH3100 (L)	SB3100 (L)	30.9 - 32.1	150	230	227		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

SB1050 (L)

SB1100 (L)

SB1150 (L)

SB1200 (L)

SB1250 (L)

SB1300 (L)

SB1350 (L)

SB1400 (L)

SH1050 (L)

SH1100 (L)

SH1150 (L)

SH1200 (L)

SH1300 (L)

SH1350 (L)

SH1400 (L)



■ 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.

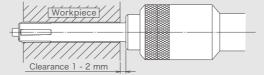


Units: mm

Part No.

■ 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)							
		450- 575	70	90	120	150				
-		600- 760			120	150	180	210		
	SH/SB	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.

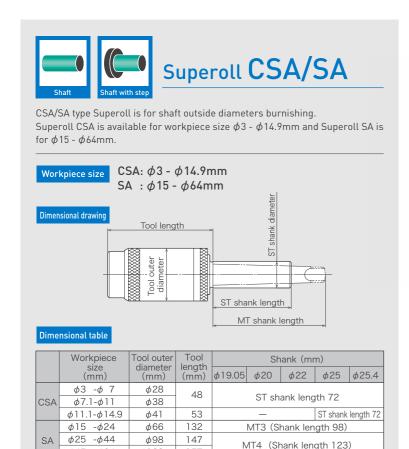
Please refer to the chamfer size chart on the right for details.

\^\Chap
Change
20,3

	Т	ool model	Chamfer Size		
. [SB	800-1450	C0.5 or more		
	3D	1500-3400	C1 or more		

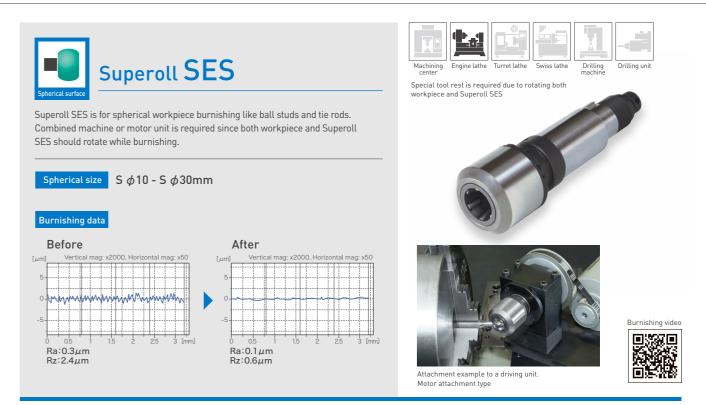
Multi Roller Type Speedy burnishing with multiple rollers



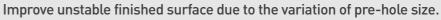


φ45 -φ64 φ128 157













Superoll MAC

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

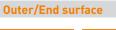




Single Roller Type

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.





SR5A

SR16M













SR24MW



SR16M



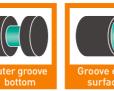






SR3Z





CEZF





CEZH

SUGINO

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







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



Rz4.4µm Rz0.6µm

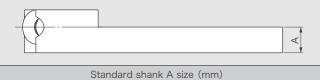
Roller tip R size

Before

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

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

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



10	12	16	20	25	25.4
	ail about a dime		, please scan th	e two-dimensio	nal 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.



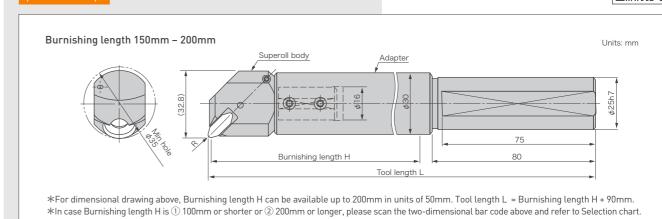












Roller can contact to a bottom surface, which reduces non-burnishing length as long as possible. Non-burnishing length is the same as the roller tip R size.

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



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

Item	Groove range (mm)				
item	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



	Roughne	ess (μm)
Material	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

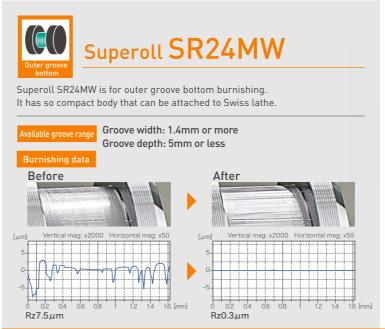






















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Re-forming Type

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

-MAC SB-MAC

Forming micro dimple surfac







Shaft with step

BPSR

SUGINO

Re-forming Type Forming plateau structure surfaces

Superoll MAC



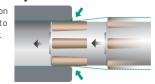
Working pressure adjustment function

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.

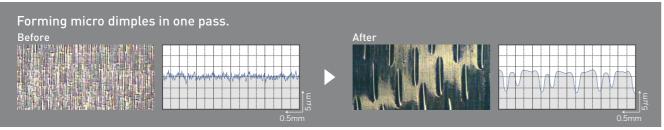




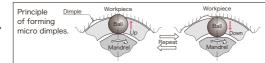


Re-forming Type Forming plateau structure surfaces

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 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.

Steel: ϕ 5mm or more

Aluminum · Copper: ϕ 4mm or more



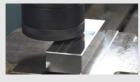


BPP is a micro dimples forming Superoll by attaching a machining center or milling machine. BPP can form dot pattern micro dimples on flat surface, and gain the same effect as hand scraping.



No limitation

(If there is any steps, arisen at the boundary.)













BPSR

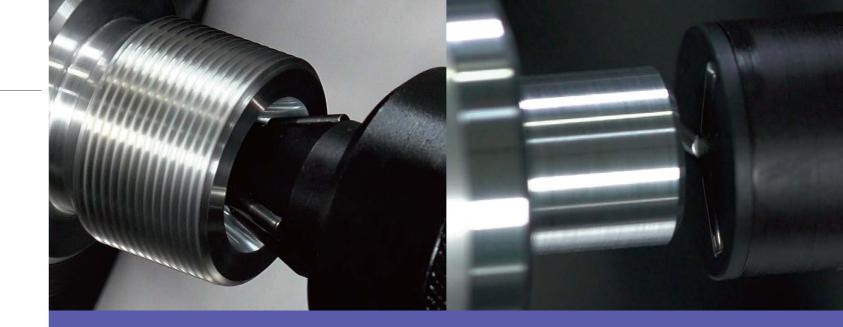
BPSR is a micro dimples forming Superoll for outer surface and the design is based on Superoll SR5A.

It can be burnishing various diameters and workpieces by attaching to lathes.

ϕ 10mm 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.





Convex R surface



CFD

Flat end surface



CSF





CSE

Compressive Type Burnishing sealing surfaces with Superoll by each shapes















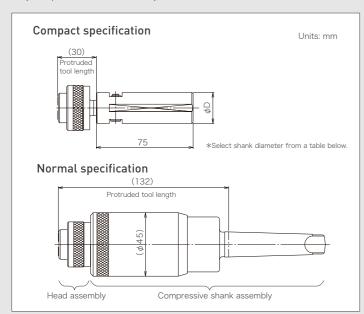
*Superoll SE is designed in accordance with customer's workpiece. For detailed specification, contact your nearest sales office by using the catalog inquiry sheet, or use the inquiry form on our website.

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.



Superoll	Protruded tool length (mm)	Shank diameter D (mm)	Shank length (mm)
CST	Around 40 – 60	φ19.05	
CSF	Around 25 – 60	φ20	75
CFD	Around 25 – 60	φ22 φ25	73
CSE	Around 25 – 60	φ25.4	

*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.

















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

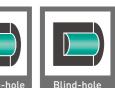


Multiple surface

CEO















CEO-AJ

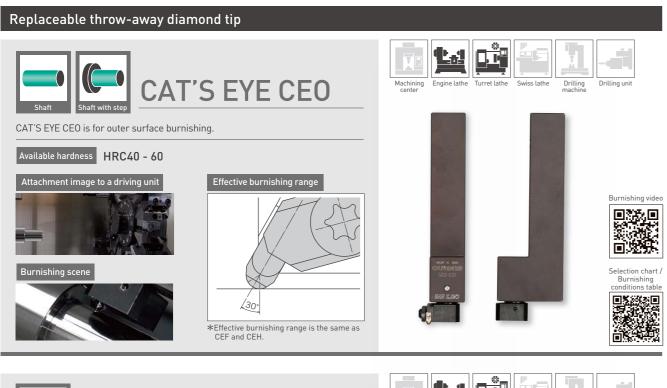
31 30 SUGINO MACHINE LIMITED

Inner surface

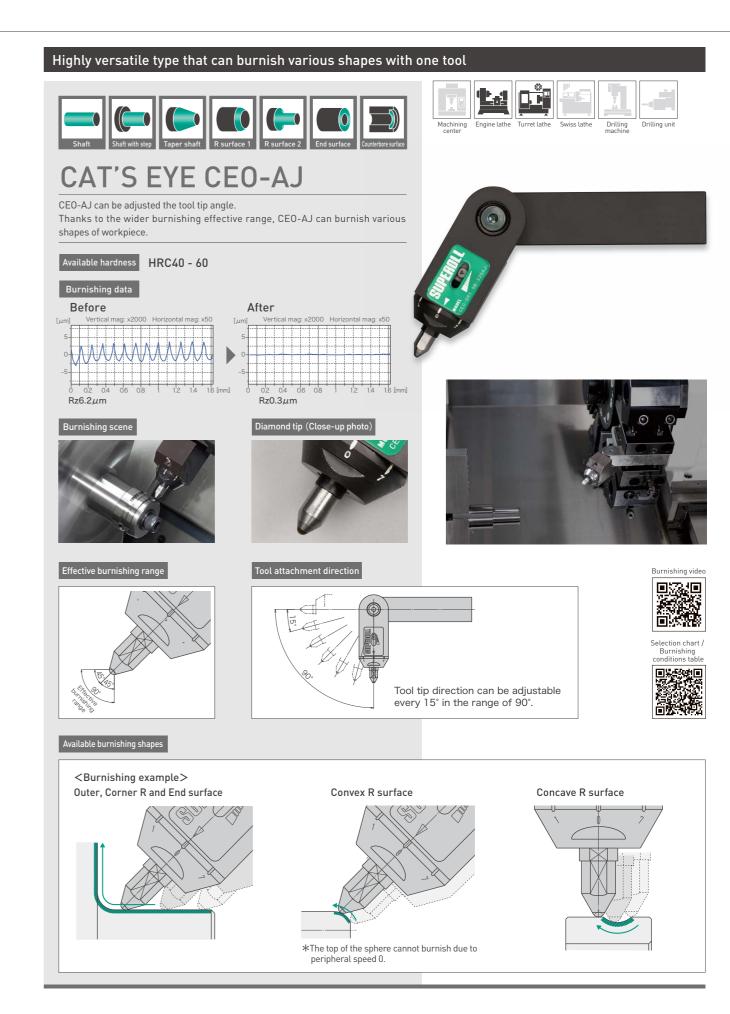


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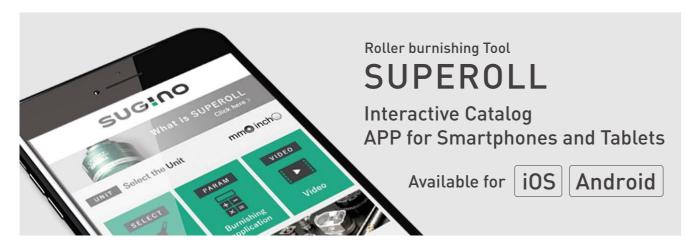
Diamond-tool Type Burnishing materials with high hardness of HRC40 - 60











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





for Android





How to use the App

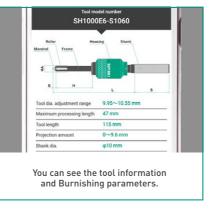












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Superoll Inquiry Sheet

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:							
hon	е							

• Fill in the following contents.

Workpiece name							
Workpiece material							_
Workpiece hardness			(HRC, I	HV, HB	, Others)
Workpiece form (Circle one.)	1	2	3	4	(5)	6	>> W
Diameter ϕ D1	φ		То	leran	ce		
Diameter ϕ D2	φ Tolerance		_				
Length L			То	lerand	ce		
Interference height H	Tolerance						
Corner R							_
Angle θ°	degree		Т	Tolerance			_
Required shank form							_
Tool length limitation (shank length not included)							_
Driving unit in use							_

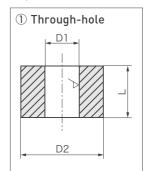
Work configuration	on
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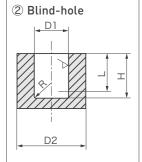
*P

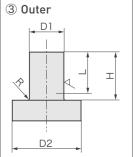
Fax

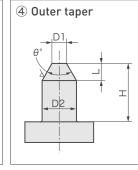
E-mail Address

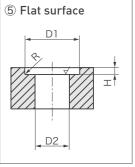
Special tools for work configurations not shown below can be produced.

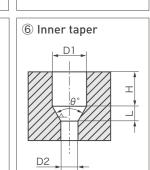












Clarify the unit. (e.g., µm, mm, Rz, HRC, HV, HB)

Others

Improvement of surface roughness

· Hardness improvement

Dimensional correction

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 preference	Attached / Not attached			

Remarks

Purpose of use

 \square Visit by our salesperson (Check here if requesting.)