

Diameter Range:  
25,15 mm – 44,45 mm  
{.990" – 1.750"}



**MLS-1000 Mandrel Unit**

- 8 Honing Units
- 2G-P28-1000VA through 2G-P28-1625WD
- 1 SL-38 Mandrel Rack
- 1 2G-R28 Blind Hole Wedge
- 1 LN-570A Concentric Sleeve

**SLN-1000 Stone Assortment consists of 12 each of the following stones:**

12	P28A413	Stones	12	R28A413	Stones
12	P28A55	Stones	12	R28A55	Stones
12	P28A57	Stones	12	R28A57	Stones
12	P28A63	Stones	12	R28A63	Stones
12	P28J57	Stones	12	R28J57	Stones
12	P28J63	Stones	12	R28J63	Stones
12	P28J83	Stones	12	R28J83	Stones
12	P28J95	Stones	12	R28J95	Stones

Diameter Range:  
1/4" – 1.031" {Fractional  
Sizes Only}



**MLS-25S (Soft) or MLS-25H (Hardened) Mandrel Unit**

Order M-25S for honing most materials including hard steels; order M-25H for rough holes and very hard materials.

21 Honing Units

1 K8-245	1 K12-370	1 AK20-744UA
1 K8-260	1 K12-400	1 AK20-806UB
1 K8-275	1 K12-432	1 AK20-869UB
1 K8-290	1 K12-463	1 AK20-931UC
1 K10-308	1 K16-495	1 AK20-994UC
1 K10-323	1 K16-557	2 SL-30 Mandrel Racks
1 K10-339	1 K20-619	
1 K10-354	1 K20-681	

**SLN-250 Stone Assortment consists of 12 each of the following stones:**

12	K10A413	Stones	12	K16J57	Stones
12	K10A55	Stones	12	K16J63	Stones
12	K10A57	Stones	12	K16J83	Stones
12	K10A63	Stones	12	K16J95	Stones
12	K10J57	Stones	12	K20A413	Stones
12	K10J63	Stones	12	K20A55	Stones
12	K10J83	Stones	12	K20A57	Stones
12	K10J95	Stones	12	K20A63	Stones
12	K12A413	Stones	12	K20J57	Stones
12	K12A55	Stones	12	K20J63	Stones
12	K12A57	Stones	12	K20J83	Stones
12	K12A63	Stones	12	K20J95	Stones
12	K12J57	Stones	12	K8A413	Stones
12	K12J63	Stones	12	K8A55	Stones
12	K12J83	Stones	12	K8A57	Stones
12	K12J95	Stones	12	K8A63	Stones
12	K16A413	Stones	12	K8J57	Stones
12	K16A55	Stones	12	K8J63	Stones
12	K16A57	Stones	12	K8J83	Stones
12	K16A63	Stones	12	K8J95	Stones

# M Series Mandrel Sets

Diameter Range:  
43,94 mm – 66,68 mm  
{1.730" – 2.625"}



**MLS-1750 Mandrel Unit**

Assembled for open hole work—all necessary items included to convert units for blind hole work.

- 7 Honing Units
- |                           |                 |
|---------------------------|-----------------|
| 1 2G-P28-1750WE           | 1 2H-P28-2250WF |
| 1 2H-P28-1875WE           | 1 2H-P28-2375WG |
| 1 2H-P28-2000WF           | 1 2H-P28-2500WG |
| 1 2H-P28-2125WF           |                 |
| 1 2G-R28 Blind Hole Wedge |                 |
| 1 2H-R28 Blind Hole Wedge |                 |
| 1 SL-37 Mandrel Rack      |                 |

**SLN-1000 Stone Assortment consists of 12 each of the following stones:**

12	P28A413	Stones	12	R28A413	Stones
12	P28A55	Stones	12	R28A55	Stones
12	P28A57	Stones	12	R28A57	Stones
12	P28A63	Stones	12	R28A63	Stones
12	P28J57	Stones	12	R28J57	Stones
12	P28J63	Stones	12	R28J63	Stones
12	P28J83	Stones	12	R28J83	Stones
12	P28J95	Stones	12	R28J95	Stones

Diameter Range:  
18,90 mm – 26,19 mm  
{.744" – 1.031"}



**MLS-744 Mandrel Unit**

- 9 Honing Units AK20-744UA through AK20-944UC
- 1 SL-30 Mandrel Rack

**SLN-744 Stone Assortment consists of 12 each of the following stones:**

12	K20A413	Stones	12	K20J57	Stones
12	K20A55	Stones	12	K20J63	Stones
12	K20A57	Stones	12	K20J83	Stones
12	K20A63	Stones	12	K20J95	Stones

**Mandrel Storage Racks**  
**SL-30**

For Mandrels requiring separate adapters. Each rack holds 16 honing units. Includes drain pan.



**SL-38**

For lifetime honing units with 38,1 mm (1-1/2") diameter shank. Rack holds 8 units. Includes drain pan.



**SL-37**

For lifetime honing units with 44,4 mm (1-3/4") diameter shank. Rack holds 7 units. Includes drain pan.



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# Retractable Mandrels

The Sunnen KR and BLR series of honing mandrels with retractable stone assemblies ensure greater efficiency in virtually all bore sizing and finishing operations.

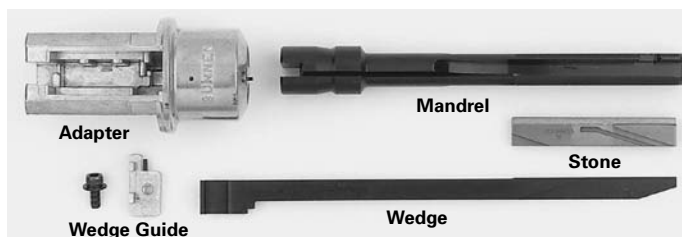


The new retractable KR mandrel series is available for diameter ranges from .185"-.744" (4,70-18,90 mm). The longer BLR series of retractable mandrels is also available for the same diameter range, and incorporates a longer stone.

Retractable mandrel and stone assemblies are available at the same price as the non-retractable mandrel units.

## Benefits of Sunnen's Retractable Mandrels:

- Stones are retracted from the cutting position for much easier loading and unloading of parts which increases production and lowers manufacturing costs.
- Stronger mandrels remove stock at a faster rate, increasing production speeds and lowering cost per part honed.
- Units come with extended wear surfaces (shoes) standard, in either hard steel or plated diamond. This ensures longer service life and significantly reduces centerline changes from cycle to cycle. Also, downtime is lowered which increases productivity and reduces unit costs.
- Mandrel units have hardened wedges to prolong wedge life. This assures high performance honing from start to finish for better cost efficiency.
- The stone retraction feature is ideal for use in automated applications facilitating loading and unloading, reducing labor costs.
- Retraction marks and scratches that can occur when taking the part off the mandrel after honing are greatly minimized. This ensures a consistently higher-quality end product.



## Retractable Mandrel Options

### Diamond Plated Super Mandrels —

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond.

### Carbide Shoe Mandrels —

(Available on Special Order)

Two types of Carbide Shoe Mandrels are available for high-production applications. Available in either Round Carbide Rod Inserted and Full Carbide Shoe Mandrels. In the correct application they will last significantly longer than standard hardened mandrels and prevent galling in exotic materials such as 303 stainless steel. When ordering full-carbide type specify starting and finish diameter.

### Extended Shank Mandrels —

(Available on Special Order)

Extended Shank Mandrels are available for honing parts that are too long to be honed with a standard mandrel.

### Metal Bond Superabrasive Insert Mandrels —

(Available on Special Order)

For applications where a long lasting mandrel is needed and the materials being honed reacts negatively with either a hardened or carbide shoe mandrel. Single or double insert mandrels in either CBN or diamond are available.

Contact Customer Service for price and availability.

## How To Order

To order a retractable KR-16 or BLR-16 13,36 mm - 14,15 mm (.526"-.557") diameter mandrel, simply add "R" after the "K" or after the "BL" from the corresponding table on pages 20 - 42 in this catalog. SEE EXAMPLE BELOW (from page 36 of catalog):

## Order 1-5 For Complete K16 or J-K16 Honing Units

Diameter Range 12,57 mm - 15,72 mm .495" - .619"		1 K16 Mandrel Includes wedge Mandrel With Standard Shank Choose One Suffix			1 J-K16 Mandrel Includes wedge Steel Mandrel With Extra-Long Shank Choose One Suffix			2 Truing Sleeve	3 Adapter For J-K16 mandrels order J-K16-A adapter With stone retainer and wedge guide	4 Alignment Bushing For machines with fully adjustable spindle nose	5 Honing Stone
mm	inches		H	SD		H	SD				
12,57-13,36	.495-.526	K16-495A	H	SD	J-K16-495A	H	SD	S-495	K16-A	C-495	Contact Customer Service For Availability
13,36-14,15	.526-.557	K16-526A	H	SD	J-K16-526A	H	SD	S-526	K16-A	C-526	
14,15-14,94	.557-.588	K16-557A	H	SD	J-K16-557A	H	SD	S-557	K16-A	C-557	
14,94-15,72	.588-.619	K16-588A	H	SD	J-K16-588A	H	SD	S-588	K16-A	C-588	

H = hardened steel  
SD = diamond plated

Example: KR16-526AH

KR16-A

KR16-\_\_\_\_\_

# Metric Mandrels

## Order 1-4 For Most Metric Applications

Metric Range 7,90 mm - 25,72 mm		1 Metric Mandrel	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	Replacement Guide Shoes
		With Standard Shank				
mm	Inches					
7,90-8,11	.311" - .319"	K10-8MMAH	S-8MM	K10-A	C-8MM	
9,90-10,28	.389" - .405"	K12-10MMAH	S-10MM	K12-A	C-10MM	
11,90-12,31	.468" - .485"	K12-12MMAH	S-12MM	K12-A	C-12MM	
13,90-14,69	.547" - .578"	K16-14MMAH	S-14MM	K16-A	C-14MM	
15,90-16,69	.625" - .657"	K20-16MMAH	S-16MM	K20-A	C-16MM	
16,90-17,69	.665" - .697"	K20-17MMAH	S-17MM	K20-A	C-17MM	
17,90-18,71	.704" - .737"	K20-18MMAH	S-18MM	K20-A	C-18MM	
19,90-20,69	.783" - .815"	K20-20MMUA	S-20MM	AK20-A	C-20MM	UA-CH
21,90-22,69	.862" - .893"	K20-22MMUB	S-22MM	AK20-A	C-22MM	UB-CH
23,90-24,69	.940" - .972"	K20-24MMUC	S-24MM	AK20-A	C-24MM	UCCH-24MM
24,90-25,72	.980" - 1.012"	K20-25MMUC	S-25MM	AK20-A	C-25MM	UCCH-25MM

### Truing Sleeve

Select the truing sleeve whose bore diameter is just under finish size.  
Hone or bore this sleeve .127mm from finish size.

Superabrasive Stone Inserted Guide Shoes are available for situations where a longer life shoe is needed. Contact Customer Service for ordering information.

NOTE: Not available in KR Series

### Sunnen Metric Mandrels

Sunnen Metric Mandrels will save you time and money when it comes to bore sizing and finishing metric dimensions.

Sunnen, the worldwide leader in abrasive bore sizing and finishing systems, has engineered mandrels specifically for applications that require bore sizing and finishing to metric specifications.

### Sunnen Metric Mandrels Save Money

With Sunnen Metric Mandrels it is no longer necessary to excessively true mandrels built to standard English dimensions in order to hone to metric finished size. And it is no longer necessary to use two English mandrels to remove the necessary stock to finish at an exact metric dimension. For further convenience, Sunnen metric mandrels use standard honing abrasives.



# Notes

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**[www.sunnen.com](http://www.sunnen.com)**

## Approximate Surface Finish

Material	Grit Size											
	D1-70		D3-100		D5-220		D7-320		D8-400		D00-1200	
	µm	µin	µm	µin	µm	µin	µm	µin	µm	µin	µm	µin
Soft Steel	1,17-2,39	46-94	0,69-1,52	27-60	0,36-0,89	14-35	0,25-0,69	10-27	0,15-0,51	6-20	0,05-0,28	2.00-11
Hard Steel	0,51-1,52	20-60	0,30-0,97	12-38	0,18-0,53	7-21	0,13-0,41	5-16	0,08-0,21	3-11	0,02-0,10	.80-4
Aluminum	0,97-2,46	38-97	0,61-1,93	24-76	0,30-1,02	12-40	0,25-0,69	10-27	0,18-0,41	7-16	0,08-0,13	3.00-5
Cast Iron	0,61-2,39	24-94	0,38-1,52	15-60	0,23-0,89	9-35	0,15-0,71	6-28	0,10-0,56	4-22	0,03-0,33	1.30-13
Bronze	0,94-2,84	37-112	0,61-1,80	24-71	0,25-0,99	10-39	0,20-0,71	8-28	0,10-0,53	4-21	0,02-0,20	.80-8
Carbide	0,79-0,97	31-38	0,43-0,61	17-24	0,18-0,36	7-14	0,10-0,28	4-11	0,05-0,18	2-7	0,01-0,03	.25-7
Copper	0,94-2,84	37-112	0,61-1,80	24-71	0,25-0,99	10-39	0,20-0,71	8-28	0,10-0,53	4-21	0,02-0,20	.80-8
Brass	1,07-2,84	42-112	0,61-1,80	24-71	0,28-0,99	11-39	0,23-0,71	9-28	0,13-0,53	5-21	0,03-0,20	1.00-8

The surface finishes shown are approximate. Actual surface finish will vary depending on your particular operation, type, hardness of material being finished and tool condition.

Surface Finish in Micrometers - µm and Microinches - µ" Ra



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# KROSSGRINDING® Tooling and Alignment Bushing

## Superabrasive KROSSGRINDING® Tools Selection Guide

### How to Use Selection Guide

- Select Diameter Range
- Located Tool Part Number: **CGT 36.- 1125- D\***
  - KROSSGRINDING® Tool
  - Tool Family
  - Nominal Size
  - Grit Size (D - Diamond)
- Grit Sizes Available (See D\* in the following Selection Guide):
 

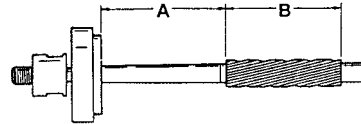
D1 - 70 Grit	D7 - 320 Grit
D3 - 100 Grit	D8 - 400 Grit
D5 - 220 Grit	D0 - 600 Grit

## Alignment Bushings

For aligning tool with adjustable spindle nose, use Sunnen Runout Indicator Assembly (CGM-4005).

Accurate centering of Sunnen KROSSGRINDING® Tools requires a concentric Alignment Bushing. The ID of the bushing should be the same as the starting diameter of the workpiece.

For workpieces whose starting diameters fall between the diameters listed, the bushing should be honed out to the workpiece starting diameter.



Allow two weeks delivery for CGT Tools

Standard CGT tools are designed to produce bores within 0,005 mm straight and round in uninterrupted bores of abrasive length after sizing a reasonable number of bores to find the optimum operating setup. CGT tools may produce bores within 0,001 mm straight and round with the limited use of a Diamond Conditioning sleeve (DCS). These conditioning sleeves only remove or flatten a fraction of the percentage of the available grits so no great loss of tool life is expected. Results will be dependent on applications. Sunnen will verify tools to produce required straight and round specification on a test bushing for an added charge. There may also be an added one-time charge for tooling if the projected sales of the specific tool is not large enough for Sunnen to absorb the added capital expense.

## KROSSGRINDING® Tool/Alignment Bushing Selection Guide

Nominal Size		Diameter Range of Tool		Tool (D*-See How to Use) Part No.	A Shank Length		B Abrasive Length		Alignment Bushing Part No.	Nominal Size		Diameter Range of Tool		Tool (D*-See How to Use) Part No.	A Shank Length		B Abrasive Length		Alignment Bushing Part No.
mm	in	mm	in		mm	in	mm	in		mm	in	mm	in		mm	in	mm	in	
5,54	.218	5,46-5,59	.215-.220	<b>CGT7-218-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-218</b>	8,08	.318	8,00-8,15	.315-.321	<b>CGT10-318-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-315</b>
5,61	.221	5,54-5,66	.218-.223	<b>CGT7-221-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-221</b>	8,15	.321	8,08-8,23	.318-.324	<b>CGT10-321-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-318</b>
5,69	.224	5,61-5,74	.221-.226	<b>CGT7-224-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-224</b>	8,23	.324	8,15-8,31	.321-.327	<b>CGT10-324-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-321</b>
5,77	.227	5,69-5,82	.224-.229	<b>CGT7-227-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-227</b>	8,31	.327	8,23-8,38	.324-.330	<b>CGT10-327-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-324</b>
5,84	.230	5,77-5,89	.227-.232	<b>CGT7-230-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-230</b>	8,38	.330	8,31-8,46	.327-.333	<b>CGT10-330-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-327</b>
5,92	.233	5,84-5,97	.230-.235	<b>CGT7-233-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-233</b>	8,46	.333	8,38-8,53	.330-.336	<b>CGT10-333-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-330</b>
5,99	.236	5,92-6,05	.233-.238	<b>CGT7-236-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-236</b>	8,53	.336	8,46-8,61	.333-.339	<b>CGT10-336-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-333</b>
6,07	.239	5,99-6,12	.236-.241	<b>CGT7-239-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-239</b>	8,61	.339	8,53-8,69	.336-.342	<b>CGT10-339-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-336</b>
6,15	.242	6,07-6,20	.239-.244	<b>CGT7-242-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-242</b>	8,69	.342	8,61-8,76	.339-.345	<b>CGT10-342-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-339</b>
6,22	.245	6,15-6,27	.242-.247	<b>CGT7-245-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-245</b>	8,76	.345	8,69-8,84	.342-.348	<b>CGT10-345-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-342</b>
6,30	.248	6,22-6,35	.245-.250	<b>CGT7-248-D**</b>	34,92	1.375	41,3	1.626	<b>CGC-247</b>	8,84	.348	8,76-8,92	.345-.351	<b>CGT10-348-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-345</b>
6,35	.250	6,27-6,40	.247-.252	<b>CGT8-250-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-247</b>	8,92	.351	8,84-8,99	.348-.354	<b>CGT10-351-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-348</b>
6,43	.253	6,35-6,48	.250-.255	<b>CGT8-253-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-250</b>	8,99	.354	8,92-9,07	.351-.357	<b>CGT10-354-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-351</b>
6,50	.256	6,43-6,55	.253-.258	<b>CGT8-256-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-253</b>	9,07	.357	8,99,9,14	.354-.360	<b>CGT10-357-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-354</b>
6,58	.259	6,50-6,63	.256-.261	<b>CGT8-259-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-256</b>	9,14	.360	9,07-9,22	.357-.363	<b>CGT10-360-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-357</b>
6,65	.262	6,58-6,71	.259-.264	<b>CGT8-262-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-259</b>	9,22	.363	9,14-9,30	.360-.366	<b>CGT10-363-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-360</b>
6,73	.265	6,66-6,78	.262-.267	<b>CGT8-265-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-262</b>	9,30	.366	9,22-9,37	.363-.369	<b>CGT10-366-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-363</b>
6,81	.268	6,73-6,86	.265-.270	<b>CGT8-268-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-265</b>	9,37	.369	9,30-9,45	.366-.372	<b>CGT10-369-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-366</b>
6,88	.271	6,81-6,93	.268-.273	<b>CGT8-271-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-268</b>	9,45	.372	9,37-9,53	.369-.375	<b>CGT10-372-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-369</b>
6,96	.274	6,88-7,01	.271-.276	<b>CGT8-274-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-271</b>	9,53	.375	9,42-9,63	.371-.379	<b>CGT12-375-D*†</b>	46,02	1.812	50,80	2.000	<b>CGC-371</b>
7,04	.277	6,96-7,09	.274-.279	<b>CGT8-277-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-274</b>	9,63	.379	9,53-9,73	.375-.383	<b>CGT12-379-D*†</b>	46,02	1.812	50,80	2.000	<b>CGC-375</b>
7,11	.280	7,04-7,16	.277-.282	<b>CGT8-280-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-277</b>	9,73	.383	9,63-9,83	.379-.387	<b>CGT12-383-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-379</b>
7,19	.283	7,11-7,24	.280-.285	<b>CGT8-283-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-280</b>	9,83	.387	9,73-9,93	.383-.391	<b>CGT12-387-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-383</b>
7,26	.286	7,19-7,32	.283-.288	<b>CGT8-286-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-283</b>	9,93	.391	9,83-10,03	.387-.395	<b>CGT12-391-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-387</b>
7,34	.289	7,26-7,39	.286-.291	<b>CGT8-289-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-286</b>	10,03	.395	9,93-10,13	.391-.399	<b>CGT12-395-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-391</b>
7,42	.292	7,34-7,47	.289-.294	<b>CGT8-292-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-289</b>	10,13	.399	10,03-10,24	.395-.403	<b>CGT12-399-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-395</b>
7,49	.295	7,42-7,54	.292-.297	<b>CGT8-295-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-292</b>	10,23	.403	10,13-10,34	.399-.407	<b>CGT12-403-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-399</b>
7,57	.298	7,49-7,62	.295-.300	<b>CGT8-298-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-295</b>	10,34	.407	10,24-10,44	.403-.411	<b>CGT12-407-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-403</b>
7,65	.301	7,57-7,70	.298-.303	<b>CGT8-301-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-298</b>	10,46	.412	10,36-10,57	.408-.416	<b>CGT12-412-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-408</b>
7,72	.304	7,65-7,77	.301-.306	<b>CGT8-304-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-301</b>	10,56	.416	10,46-10,67	.412-.420	<b>CGT12-416-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-412</b>
7,80	.307	7,72-7,85	.304-.309	<b>CGT8-307-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-304</b>	10,67	.420	10,57-10,77	.416-.424	<b>CGT12-420-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-416</b>
7,87	.310	7,80-7,93	.307-.312	<b>CGT8-310-D**</b>	44,45	1.750	44,45	1.750	<b>CGC-307</b>	10,77	.424	10,67-10,87	.420-.428	<b>CGT12-424-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-420</b>
7,92	.312	7,85-8,00	.309-.315	<b>CGT10-312-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-309</b>	10,87	.428	10,77-10,97	.424-.432	<b>CGT12-428-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-424</b>
8,00	.315	7,92-8,08	.312-.318	<b>CGT10-315-D*</b>	44,45	1.750	47,62	1.875	<b>CGC-312</b>	10,97	.432	10,87-11,07	.428-.436	<b>CGT12-432-D*</b>	46,02	1.812	50,80	2.000	<b>CGC-428</b>

**NOTE:** For bore diameter sizes below 5,46 mm (.215") and above 31,50 mm (1.260"), consult your Sunnen Field Engineer.

**†NOTE:** Not available in D1 (70 Grit).

**\*NOTE:** See How to Use Selection Guide



# HPH

## High-Precision Helix Single Stroke Honing® Tools

### INTRODUCTION

The Single Stroke Honing® process is a fast and accurate method of sizing certain bores to final size. With the high-precision helix tool, the efficient process is now available for high production applications. Sunnen's high-production helix tools incorporate an expandable, superabrasive sleeve mounted on a tapered mandrel for precision bore sizing and finishing.

The mandrels and pilots of Sunnen's high-precision helix, Single Stroke Honing® tools are designed for maximum accuracy and fast cycle times. Sunnen stocks a wide variety of high-precision helix tools, ready to ship, for most applications.

It should be pointed out that the Single Stroke Honing® process is limited with respect to the types and volumes of material that can be removed. The size and volume of chips removed must be no more than there is clearance for between the diamond grits on the sleeve. Therefore, the Single Stroke Honing® process is best suited for honing operations that produce a relatively low volume of chips, such as interrupted or short bores, and is most successful in honing cast iron and powdered metals.

### HONING HINTS – SELECTION HINTS

Although actual stock removal capability of the grit sizes offered will vary with your particular application, the following table is offered as a starting point. It lists the abrasive grits and the stock removal range found useful on various applications of the Sunnen Single Stroke Honing® Tools in the past.

GRIT SIZE	STOCK REMOVED (Cast Iron)	
D1	.001 - .003 in.	(0,03 - 0,13 mm)
D3	.0005 - .002 in.	(0,01 - 0,05 mm)
D5	.0001 - .001 in.	(0,003 - 0,03 mm)

### SURFACE FINISH

The surface finish produced by a particular grit is affected by many variables, such as type of material, material hardness, and tool sharpness. The following table is offered as a guide:

Grit Size	Honing Soft Material		Honing Hard Material	
	Micrometer R <sub>a</sub>	Microinch R <sub>a</sub>	Micrometer R <sub>a</sub>	Microinch R <sub>a</sub>
<b>D1</b>	2,29 - 3,56	90 - 140	0,51 - 1,52	20 - 60
<b>D3</b>	1,14 - 2,41	45 - 95	0,25 - 0,64	10 - 25
<b>D5</b>	0,71 - 1,07	28 - 42	0,20 - 0,41	8 - 16

1. Either the part to be honed or the tool itself must be allowed to float.
2. A continuous flow of Sunnen Industrial Honing Oil or Coolant must be provided during the honing operation to flush the chips out of the bore.
3. Honing Speed can vary from 50 to 300 surface feet per minute, based on your particular application and honing process.
4. Feed Rate can vary from 5 to 200 inches per minute, based on your particular application and honing process.
5. Stock Removal should be consistent with the grit size of the sleeve and the surface finish requirements of the bore, based on your particular application and honing process.

### TOOL DIMENSIONS

The Sunnen High-Precision Helix Single Stroke Honing® Tools are recommended for use in selected materials, where speed and accuracy are important.

To aid you in adapting your machine(s) for use of the Sunnen Single Stroke Honing® Tool, the following Tool Dimensions Table is provided. Mandrel dimensions may be altered using common metal cutting tools.

### HOW TO ORDER

To avoid errors use the Part Numbers and Descriptions given in the Selection Guide.

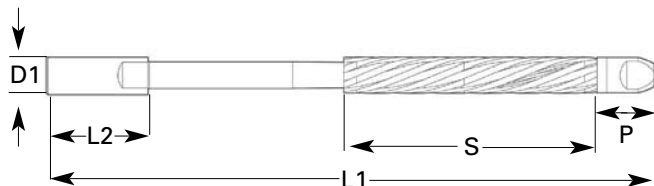
#### EXAMPLE

Starting Diameter: .501 in. (12,73 mm)  
 Finish Diameter: .502 in. (12,75 mm)  
 Material: Cast Iron  
 Surface Finish Req: 32 µin Ra (0,8 µm Ra)

- A. Using the tool dimension table, on the following pages to locate the diameter range under which the tool you need will fall.  
**NOTE:** In this example the tool falls into the .499 - .502 in (12,68 - 12,75 mm) diameter range.
- B. To purchase individual components, use the selection guide on the following pages depending on the style mandrel - flat or round - you need. Move horizontally across the table and select the proper Abrasive Sleeve, Pilot, Pilot Foot and Mandrel (items 1 -4).  
**NOTE:** In this example, we will order all components for a complete tool:  
 Item 1 - **Abrasive Sleeve** 6HPH500D5  
 (We chose D5 - 220 grit)  
 Item 2 - **Pilot** 6HPH500P  
 Item 3 - **Pilot Foot** 6HPH500F  
 Item 4 - **Mandrel** 6HPHD7MR (round chucking shank)  
**NOTE:** If a flat on the mandrel is required (item 4) you would order 6HPHD7MRRA9X as shown on page 108.
- C. When entering the order for parts:
  1. Use the Item Name used under the Number Columns Headings in the Selection Guide on the following pages. (Items 1-4 used in step B above).
  2. Use the Item Numbers listed under those Columns.



## High-Precision Helix Single Stroke Honing® Tools



STANDARD  
MANDRELS

STANDARD  
TOOLING

PORTABLE  
TOOLING

CUSTOM  
TOOLING

ABRASIVES

MACHINE  
ACCESSORIES

GAGING

FILTERS

HONING FLUIDS  
& COOLANTS

TECHNICAL  
DATA

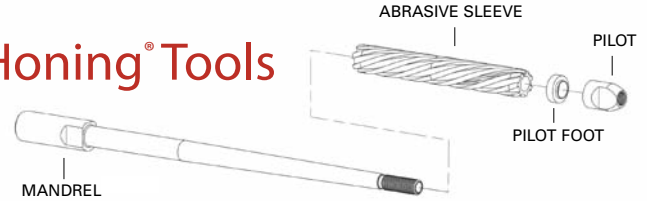
### FINISHED DIAMETER TOOL RANGE

FINISHED DIAMETER TOOL RANGE		L1		L2		D1		S		P	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
.249 - .252	6,325 - 6,401	10.63	269,9	2.625	66,68	0.375	9,525	3	76,2	1.375	34,925
.275 - .278	6,985 - 7,061	10.63	269,9	2.625	66,68	0.375	9,525	3	76,2	1.375	34,925
.3115 - .3145	7,912 - 7,988	10.63	269,9	2.625	66,68	0.375	9,525	3	76,2	1.375	34,925
.314 - .317	7,976 - 8,052	10.63	269,9	2.625	66,68	0.375	9,525	3	76,2	1.375	34,925
.374 - .377	9,500 - 9,576	10.63	269,9	2.625	66,68	0.5	12,7	3	76,2	1.375	34,925
.393 - .396	9,982 - 10,058	10.63	269,9	2.625	66,68	0.5	12,7	3	76,2	1.125	28,575
.437 - .440	11,100 - 11,176	10.63	295,3	2.625	66,68	0.5	12,7	3	76,2	1.125	28,575
.471 - .474	11,963 - 12,040	11.63	295,3	2.625	66,68	0.625	15,875	4	101,6	1.125	28,575
.499 - .502	12,675 - 12,751	11.63	295,3	2.625	66,68	0.625	15,875	4	101,6	1.125	28,575
.530 - .533	13,462 - 13,538	11.63	295,3	2.625	66,68	0.75	19,05	4	101,6	1.125	28,575
.550 - .553	13,970 - 14,046	11.63	295,3	2.625	66,68	0.75	19,05	4	101,6	1.125	28,575
.5615 - .5645	14,262 - 14,338	11.63	295,3	2.625	66,68	0.75	19,05	4	101,6	1.125	28,575
.5895 - .5925	14,973 - 15,050	11.63	295,3	2.625	66,68	0.75	19,05	4	101,6	1.125	28,575
.624 - .627	15,850 - 15,926	11.63	295,3	2.625	66,68	0.75	19,05	4	101,6	1.125	28,575
.629 - .632	15,977 - 16,053	11.63	295,3	2.625	66,68	0.75	19,05	4	101,6	1.125	28,575
.668 - .671	16,967 - 17,043	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.6865 - .6895	17,437 - 17,513	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.7075 - .7105	17,971 - 18,047	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.747 - .750	18,974 - 19,050	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.749 - .752	19,025 - 19,101	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.7865 - .7895	19,977 - 20,053	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.8115 - .8145	20,612 - 20,688	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.865 - .868	21,971 - 22,047	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.874 - .877	22,200 - 22,276	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.944 - .947	23,978 - 24,054	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575
.9835 - .9865	24,981 - 25,057	12.63	320,7	2.625	66,68	0.75	19,05	5	127	1.125	28,575

Additional Diameter and Grit Size Available - Contact Customer Service.

# HPH

## High-Precision Helix Single Stroke Honing® Tools

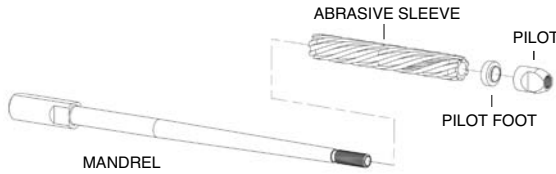


### Round Shank Tool Selection Guide

For sizes not listed, contact Sunnen Customer Service

STANDARD MANDRELS	Sunnen High-Precision Helix Single Stroke Honing® Tools Round Shank									
	Diameter Range 6,35 - 25,0 mm (0.250 - .984 in.)									
	Nominal Size		Finished Diameter Tool Range		1 Abrasive Sleeve	2 Pilot	3 Pilot Foot	4 Mandrel Round Shank	5 Sleeve Removal Tool	
	mm	in	mm	in						
STANDARD TOOLING	6,35	0.250	6,325 - 6,401	.249 - .252	2-HPH-250-D1-S 2-HPH-250-D3-S 2-HPH-250-D5-S	2HPH250P	2HPH250F	2HPHD7MR	2HPHRCX	
	7,0	0.276	6,985 - 7,061	.275 - .278	3-HPH-276-D1-S 3-HPH-276-D3-S 3-HPH-276-D5-S	3HPH276P	3HPH276F	3HPHD7MR	3HPHRCX	
	7,94	0.313	7,912 - 7,988	.3115 - .3145	3-HPH-313-D1-S 3-HPH-313-D3-S 3-HPH-313-D5-S	3HPH313P	3HPH313F			
PORTABLE TOOLING	8,0	0.315	7,976 - 8,052	.314 - .317	3-HPH-315-D1-S 3-HPH-315-D3-S 3-HPH-315-D5-S	3HPH315P	3HPH315F	4HPHD7MR	4HPHRCX	
	9,53	0.375	9,500 - 9,576	.374 - .377	4-HPH-375-D1-S 4-HPH-375-D3-S 4-HPH-375-D5-S	4HPH375P	4HPH375F			
	10,0	0.394	9,982 - 10,058	.393 - .396	5-HPH-394-D1-S 5-HPH-394-D3-S 5-HPH-394-D5-S	5HPH394P	5HPH394F	5HPHD7MR	5HPHRCX	
CUSTOM TOOLING	11,1	0.438	11,100 - 11,176	.437 - .440	5-HPH-438-D1-S 5-HPH-438-D3-S 5-HPH-438-D5-S	5HPH438P	5HPH438F	5HPHD7MR	5HPHRCX	
	12,0	0.472	11,963 - 12,040	.471 - .474	6-HPH-472-D1-S 6-HPH-472-D3-S 6-HPH-472-D5-S	6HPH472P	6HPH472F	6HPHD7MR	6HPHRCX	
	12,7	0.500	12,675 - 12,751	.499 - .502	6-HPH-500-D1-S 6-HPH-500-D3-S 6-HPH-500-D5-S	6HPH500P	6HPH500F			
ABRASIVES	13,49	0.531	13,462 - 13,538	.530 - .533	7-HPH-531-D1-S 7-HPH-531-D3-S 7-HPH-531-D5-S	7HPH531P	7HPH531F	7HPHD7MR	7HPHRCX	
	14,0	0.551	13,970 - 14,046	.550 - .553	7-HPH-551-D1-S 7-HPH-551-D3-S 7-HPH-551-D5-S	7HPH551P	7HPH551F			
	14,29	0.5625	14,262 - 14,338	.5615 - .5645	7-HPH-563-D1-S 7-HPH-563-D3-S 7-HPH-563-D5-S	7HPH563P	7HPH563F			
MACHINE ACCESSORIES	15,0	0.591	14,973 - 15,050	.5895 - .5925	7-HPH-591-D1-S 7-HPH-591-D3-S 7-HPH-591-D5-S	7HPH591P	7HPH591F	7HPHD7MR	7HPHRCX	
	15,88	0.625	15,850 - 15,926	.624 - .627	7-HPH-625-D1-S 7-HPH-625-D3-S 7-HPH-625-D5-S	7HPH625P	7HPH625F			
	16,0	0.630	15,977 - 16,053	.629 - .632	7-HPH-630-D1-S 7-HPH-630-D3-S 7-HPH-630-D5-S	7HPH630P	7HPH630F			
GAGING	17,0	0.669	16,967 - 17,043	.668 - .671	8-HPH-669-D1-S 8-HPH-669-D3-S 8-HPH-669-D5-S	8HPH669P	8HPH669F	8HPHD7MR	8HPHRCX	
	17,46	0.6875	17,437 - 17,513	.6865 - .6895	8-HPH-688-D1-S 8-HPH-688-D3-S 8-HPH-688-D5-S	8HPH688P	8HPH688F			
	18,0	0.709	17,971 - 18,047	.7075 - .7105	8-HPH-709-D1-S 8-HPH-709-D3-S 8-HPH-709-D5-S	8HPH709P	8HPH709F			
FILTERS	19,0	0.748	18,974 - 19,050	.747 - .750	8-HPH-748-D1-S 8-HPH-748-D3-S 8-HPH-748-D5-S	8HPH748P	8HPH748F	9HPHD7MR	9HPHRCX	
	19,05	0.750	19,025 - 19,101	.749 - .752	8-HPH-750-D1-S 8-HPH-750-D3-S 8-HPH-750-D5-S	8HPH750P	8HPH750F			
	20,0	0.787	19,977 - 20,053	.7865 - .7895	9-HPH-788-D1-S 9-HPH-788-D3-S 9-HPH-788-D5-S	9HPH788P	9HPH788F			
HONING FLUIDS & COOLANTS	20,64	0.8125	20,612 - 20,688	.8115 - .8145	9-HPH-813-D1-S 9-HPH-813-D3-S 9-HPH-813-D5-S	9HPH813P	9HPH813F	9HPHD7MR	9HPHRCX	
	22,0	0.866	21,971 - 22,047	.865 - .868	9-HPH-866-D1-S 9-HPH-866-D3-S 9-HPH-866-D5-S	9HPH866P	9HPH866F			
	22,23	0.875	22,200 - 22,276	.874 - .877	9-HPH-875-D1-S 9-HPH-875-D3-S 9-HPH-875-D5-S	9HPH875P	9HPH875F			
TECHNICAL DATA	24,0	0.945	23,978 - 24,054	.944 - .947	10-HPH-945-D1-S 10-HPH-945-D3-S 10-HPH-945-D5-S	10HPH945P	10HPH945F	10HPHD7MR	10HPHRCX	
	25,0	0.984	24,981 - 25,057	.9835 - .9865	10-HPH-985-D1-S 10-HPH-985-D3-S 10-HPH-985-D5-S	10HPH985P	10HPH985F			

\*Adapter Sleeve is necessary for use on Sunnen Multi-Spindle VSS™ systems. Additional Diameter and Grit Size Available - Contact Customer Service.



# Flat Shank Tool Selection Guide

For sizes not listed, contact Sunnen Customer Service

## Sunnen High-Precision Helix Single Stroke Honing® Tools Flat Shank

Diameter Range 6,35 - 25,0 mm (0.250 - .984 in.)

Nominal Size		Finished Diameter Tool Range		1 Abrasive Sleeve	2 Pilot	3 Pilot Foot	4 Mandrel Flat Shank	5 Adapter Sleeve*	6 Sleeve Removal Tool
mm	in	mm	in						
6,35	0.250	6,325 - 6,401	.249 - .252	2-HPH-250-D1-S 2-HPH-250-D3-S 2-HPH-250-D5-S	2HPH250P	2HPH250F	2HPHD7MRR9X		2HPHRCX
7,0	0.276	6,985 - 7,061	.275 - .278	3-HPH-276-D1-S 3-HPH-276-D3-S 3-HPH-276-D5-S	3HPH276P	3HPH276F	3HPHD7MRR9X	HPH23	3HPHRCX
7,94	0.313	7,912 - 7,988	.3115 - .3145	3-HPH-313-D1-S 3-HPH-313-D3-S 3-HPH-313-D5-S	3HPH313P	3HPH313F			
8,0	0.315	7,976 - 8,052	.314 - .317	3-HPH-315-D1-S 3-HPH-315-D3-S 3-HPH-315-D5-S	3HPH315P	3HPH315F			
9,53	0.375	9,500 - 9,576	.374 - .377	4-HPH-375-D1-S 4-HPH-375-D3-S 4-HPH-375-D5-S	4HPH375P	4HPH375F	4HPHD7MRR9X	HPH45	4HPHRCX
10,0	0.394	9,982 - 10,058	.393 - .396	5-HPH-394-D1-S 5-HPH-394-D3-S 5-HPH-394-D5-S	5HPH394P	5HPH394F	5HPHD7MRR9X		5HPHRCX
11,1	0.438	11,100 - 11,176	.437 - .440	5-HPH-438-D1-S 5-HPH-438-D3-S 5-HPH-438-D5-S	5HPH438P	5HPH438F	5HPHD7MR	HPH6	5HPHRCX
12,0	0.472	11,963 - 12,040	.471 - .474	6-HPH-472-D1-S 6-HPH-472-D3-S 6-HPH-472-D5-S	6HPH472P	6HPH472F	6HPHD7MRR9X		6HPHRCX
12,7	0.500	12,675 - 12,751	.499 - .502	6-HPH-500-D1-S 6-HPH-500-D3-S 6-HPH-500-D5-S	6HPH500P	6HPH500F			
13,49	0.531	13,462 - 13,538	.530 - .533	7-HPH-531-D1-S 7-HPH-531-D3-S 7-HPH-531-D5-S	7HPH531P	7HPH531F	7HPHD7MRR9X	7HPHRCX	
14,0	0.551	13,970 - 14,046	.550 - .553	7-HPH-551-D1-S 7-HPH-551-D3-S 7-HPH-551-D5-S	7HPH551P	7HPH551F			
14,29	0.5625	14,262 - 14,338	.5615 - .5645	7-HPH-563-D1-S 7-HPH-563-D3-S 7-HPH-563-D5-S	7HPH563P	7HPH563F			
15,0	0.591	14,973 - 15,050	.5895 - .5925	7-HPH-591-D1-S 7-HPH-591-D3-S 7-HPH-591-D5-S	7HPH591P	7HPH591F	7HPHD7MRR9X	7HPHRCX	
15,88	0.625	15,850 - 15,926	.624 - .627	7-HPH-625-D1-S 7-HPH-625-D3-S 7-HPH-625-D5-S	7HPH625P	7HPH625F			
16,0	0.630	15,977 - 16,053	.629 - .632	7-HPH-630-D1-S 7-HPH-630-D3-S 7-HPH-630-D5-S	7HPH630P	7HPH630F			
17,0	0.669	16,967 - 17,043	.668 - .671	8-HPH-669-D1-S 8-HPH-669-D3-S 8-HPH-669-D5-S	8HPH669P	8HPH669F	8HPHD7MRR9X	HPH710	8HPHRCX
17,46	0.6875	17,437 - 17,513	.6865 - .6895	8-HPH-688-D1-S 8-HPH-688-D3-S 8-HPH-688-D5-S	8HPH688P	8HPH688F			
18,0	0.709	17,971 - 18,047	.7075 - .7105	8-HPH-709-D1-S 8-HPH-709-D3-S 8-HPH-709-D5-S	8HPH709P	8HPH709F			
19,0	0.748	18,974 - 19,050	.747 - .750	8-HPH-748-D1-S 8-HPH-748-D3-S 8-HPH-748-D5-S	8HPH748P	8HPH748F	8HPHD7MRR9X	HPH710	8HPHRCX
19,05	0.750	19,025 - 19,101	.749 - .752	8-HPH-750-D1-S 8-HPH-750-D3-S 8-HPH-750-D5-S	8HPH750P	8HPH750F			
20,0	0.787	19,977 - 20,053	.7865 - .7895	9-HPH-788-D1-S 9-HPH-788-D3-S 9-HPH-788-D5-S	9HPH788P	9HPH788F			
20,64	0.8125	20,612 - 20,688	.8115 - .8145	9-HPH-813-D1-S 9-HPH-813-D3-S 9-HPH-813-D5-S	9HPH813P	9HPH813F	9HPHD7MRR9X	9HPHRCX	
22,0	0.866	21,971 - 22,047	.865 - .868	9-HPH-866-D1-S 9-HPH-866-D3-S 9-HPH-866-D5-S	9HPH866P	9HPH866F			
22,23	0.875	22,200 - 22,276	.874 - .877	9-HPH-875-D1-S 9-HPH-875-D3-S 9-HPH-875-D5-S	9HPH875P	9HPH875F			
24,0	0.945	23,978 - 24,054	.944 - .947	10-HPH-945-D1-S 10-HPH-945-D3-S 10-HPH-945-D5-S	10HPH945P	10HPH945F	10HPHD7MRR9X	10HPHRCX	
25,0	0.984	24,981 - 25,057	.9835 - .9865	10-HPH-985-D1-S 10-HPH-985-D3-S 10-HPH-985-D5-S	10HPH985P	10HPH985F			

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TECHNICAL DATA

\*Adapter Sleeve is necessary for use on Sunnen Multi-Spindle VSS™ systems. Additional Diameter and Grit Size Available - Contact Customer Service.

# Single Stroke Honing®

## A-Type Tooling and Accessories

### Introduction

Single Stroke Honing®. This process is a fast and accurate method of sizing certain bores to final size. The Sunnen Single Stroke Honing® Tool used is an expandable, superabrasive sleeve mounted on a tapered arbor. The sleeve is expanded to size during setup. The rotating Single Stroke Honing® Tool is pushed through the bore only once. Only periodic expansion adjustments are necessary to compensate for tool wear after initial setup.

It should be pointed out that the Single Stroke Honing® process is limited with respect to the types and volumes of material that can be removed. The size and volume of chips removed must be no more than there is clearance for between the diamond grits on the sleeve. Therefore, the Single Stroke Honing® process is best suited for honing operations that produce a relatively low volume of chips, such as interrupted or short bores, and is most successful in honing cast iron and powdered metals.

### Selection Hints

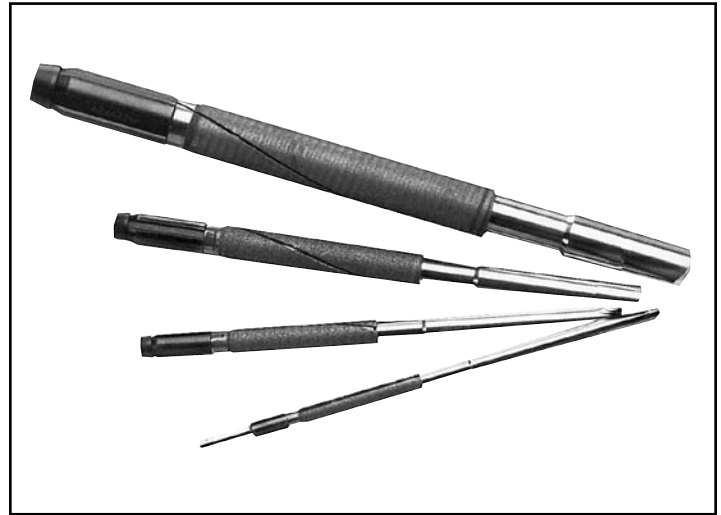
For most Single Stroke Honing® applications D5-220 grit diamond roughing sleeves, and D8-400 grit diamond finishing sleeves, are all that is required. Many of these sleeves are shipped from stock as noted by the (\*) asterisk next to the sleeve's part number in the Tables on pages 110 through 114. Other grits are available for applications where stock removal and/or surface finish requirements indicate their need.

Although actual stock removal capability of the grit sizes offered will vary with your particular application, the following table is offered as a starting point. It lists the abrasive sleeves and the stock removal range found useful on various applications of the Sunnen Single Stroke Honing® Tools in the past.

### Adapter Sleeves for AH, MHS, VSS Machines

Part Number	mm	in
A810S	5,92-9,35	.233-.368
A12S†	9,35-10,90	.368-.429
A14S†	10,90-12,47	.429-.491
A16S†	12,47-14,05	.491-.553
A18S†	14,05-15,57	.553-.613
A20S†	15,57-17,17	.613-.676
A22S†	17,17-18,31	.676-.721
A24S†	18,31-20,29	.721-.799
A26S†	20,29-21,79	.799-.858
A28S†	21,79-23,42	.858-.922
A30S†	23,42-24,92	.922-.981
A32S†	24,92-26,39	.981-1.039

†Special Order - Contact Customer Service.



### Surface Finish

The surface finish produced by a particular grit is affected by many variables, such as type of material, material hardness, and tool sharpness. The following Table is offered as a guide.

Grit Size	Honing Soft Material		Honing Hard Material	
	Micrometer R <sub>a</sub>	Microinch R <sub>a</sub>	Micrometer R <sub>a</sub>	Microinch R <sub>a</sub>
D1	2,29-3,56	90-140	,51-1,52	20-60
D3	1,14-2,41	45-95	,25-.64	10-25
D5	,71-1,07	28-42	,20-.41	8-16
D7	,51-.89	20-35	,13-.36	5-14
D8	,25-.58	10-23	,08-.25	3-10
D0	,20-.46	8-18	,05-.23	2-9
D00	,15-.33	6-13	,03-.18	1-7

Grit Size	Stock Removed	
	mm	in
D1 (70 Grit Diamond)	0,03-0,13	.001-.005
D3 (100 Grit Diamond)	0,03-0,10	.001-.004
D5 (220 Grit Diamond)	0,01-0,08	.0005-.003
D7 (320 Grit Diamond)	0,01-0,06	.0005-.0025
D8† (400 Grit Diamond)	0,001-0,013	.00005-.0005
D0† (600 Grit Diamond)	0,0006-0,005	.000025-.0002
D00† (1200 Grit Diamond)	0,0006-0,0013	.000025-.00005

†Use rougher grit sleeve or sleeves first to qualify bore.

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