

# HARDINGE WORKHOLDING

SPINDLE TOOLING FOR  
MANUAL & CNC LATHES





### VALUE IN WORKHOLDING

Team up with Hardinge to add value to your material-cutting processes and assembly operations. Work with dedicated sales, design and application engineers to solve difficult process problems, or choose your standard collet or step chuck knowing that quality and reliability comes with the Hardinge name. Experience value in longer lasting products, value in machine uptime, value in work-piece accuracy and value in your customer's satisfaction.

### FROM BAR STOCK TO FINISHED PRODUCT — 100% MADE IN USA

Individual care goes into every collet, feed finger and pad, at each manufacturing process, from handling the initial bar stock to polishing and laser etching. Generations of skilled-machine operators have taken part in the many critical processes of producing a hardened, precision-machined collet. Hardinge has been manufacturing workholding and industrial products for all brands of lathes, mills and grinding machines for over a century. Their process expertise, precision and accuracy provides a workholding product that is world-renowned.

### HARDNESS, SPRING AND SPREAD

A very important factor in manufacturing collets, feed fingers and pads that are long lasting and provide the performance you expect is the raw material used and the heat treat process control system to guarantee proper hardness and tempering. Collets and feed fingers are prone to breakage where the hardened area meets the tempered area. Hardinge heat treat processes are planned to eliminate breakage on critical design areas to provide a product that is not subject to breakage and wear. Hardinge collets are 5 to 7 points of Rockwell "C" harder than competitor's products to provide a longer lasting product. The harder the collet, the longer the life, reducing collet changeover and downtime associated with collet changing. However, if a collet is too hard, it could be brittle and break. It is the combination of hardness, spring and spread that Hardinge has perfected over the years at their Elmira, New York facility.

### COLLET CONCENTRICITY INSPECTION

Concentricity is measured in terms of Total Indicator Runout (TIR) using a Hardinge Super-Precision® spindle. A gage pin is inserted in the collet and the TIR is measured at a set distance from the spindle face, depending on the order hole size, using a .00005" dial indicator. You can be assured of a qualified inspection – standard 5C collets will run .001" or better, while special accuracy collets will run .0002" or better. This assures that the collet will hold your part consistently during your specified machining operations.

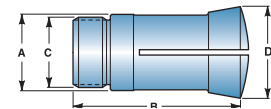


Hardened, Precision-Machined Collets .....	4, 5, 7
5C, 16C, 20C, 25C & 3J Collets and Collet Sets	
Collet Sets	
Step Collets	
Extended-Nose Collets	
Headstock Centers (Male Center)	
Lensmaker Collets	
Long Bearing Drill Collets	
Emergency Collets .....	6
5C, 16C, 20C, 25C & 3J	
Extended-Nose	
Kellenberger 5C Collet Adaptation Chuck .....	7
Step Chucks & Closers .....	8-12
5C, 16C, 20C, 25C & 3J – Hardened, Precision-Machined and Emergency	
3C & 4C – Hardened, Precision-Machined	
Collet Stops .....	13-14
Threaded Positive Solid Stops, Long Stops, Ejector Stops	
5C Universal Collet Stop	
16C Universal Draw Tube Stop	
Dead-Length® Collets – 5C & 16C .....	15
Dead-Length Emergency Step Chucks – 5C, 16C & 20C .....	16
Dead-Length Thru-Hole Collets - 5C, 16C .....	17
Dead-Length Collet Ejector Stops – 5C & 16C .....	18
Dead-Length Spider-Stop Step Chuck – 16C .....	19
Master Collets & Pads – Style "S" Draw-In .....	20
S10, S12, S16, S20, S22 & S26	
Expanding Collets	
5C & 16C Master Expanding Collets .....	21
Model-S Precision Expanding Collets – 5C & 16C .....	22
Model-S Emergency Expanding Collets .....	23
Sure-Grip® Expanding Collet Systems .....	23
Spindle Collet & Step Chuck Adapters .....	24
Collet Face Spanner Wrenches .....	24
5C & 16C Fixture & Backing Plates .....	25
5C Face Plates, Angle Plates, Stub/Mill Arbors & Driver .....	26
5C Collet Racks .....	27
Custom Application Manufacturing of Special Collets & Step Chucks.....	27-30
Stationary Collet Systems	
B65 .....	31-33
B42 .....	34-35
#11 & #22 B&S .....	36-39
2-, 3- & 4-Jaw Manual Chucks .....	40
Safety Information for 5C Spindle Tooling.....	40
Collet Directory - by machine manufacturer .....	41
Collet Directory - by Style (Dimensions and Capacities) .....	42-45
Frequently Asked Questions .....	46-47

# Hardened, Precision-Machined Collets



The Hardinge Collet is manufactured to exacting standards from special alloy steel. Threads are heat treated and the body is spring tempered to assure accuracy and durability at low cost. A wide range of standard sizes and shapes (and some not so standard) are available for off-the-shelf delivery. 5C decimal collets are available in .001" increments from .015" up to and including 1.0625". All collets are available in fractional sizes of round, hexagon and square to capacity. In addition, many round collets are stocked in metric, decimal, letter and number sizes. Most of the popular sizes of round serrated, taper hole and rectangular collets are available from stock. Many collets include precision internal threads for the Hardinge threaded positive stops.

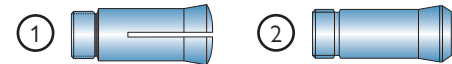


## Dimensions and Capacities

Type	A – Back Bearing Diameter	B – Overall Length	C – Thread	D – Head Diameter	Round Capacity	Hex Capacity	Square Capacity
5C	1.250" (31.75)	3.281" (83.34)	1.238" x 20 RH <sup>1</sup>	1.468"	1 1/16" (26.99)	2 9/32" (23.02)	3/4" (19.05)
16C	1.889" (47.98)	4.312" (109.52)	1.870" x 1.75mm RH <sup>1</sup>	2.265"	1 5/8" (41.28)	1 13/32" (35.72)	1 1/4" (28.97)
20C	2.378" (60.40)	6.250" (158.75)	2.359" (M60x1.5mm RH) <sup>1</sup>	2.880" (73.15)	2" (50.80)	1 3/4" (44.45)	1 7/8" (36.11)
25C	2.930" (74.42)	6.480" (161.59)	2.871" (M73x1.5mm RH) <sup>1</sup>	3.470" (88.14)	2.559" (65.00)	2.216" (56.29)	1.808" (45.92)
3J	2.000" (50.80)	3.750" (95.25)	1.988" x 20 RH	2.205"	1 3/4" (44.45)	1 7/32" (38.89)	1 1/4" (31.75)

1 - Internal Stop Thread: (5C: 1.041" x 24 RH), (16C: 1.687" x 20 TPI RH), (20C: M53 x 1mm RH), (25C: 2 5/8" x 24 TPI RH), (3J: 1.79" x 24 TPI RH).

## 5C Hardened, Precision-Machined Collets



Description	Part Number	Figure	Size Range
Special Accuracy	10030000000000	1	1/64" to 1 1/16", Decimal, Metric & Fractional Sizes
Round Fractional	10010019000000	1	1/64" to 1 1/16" inclusive by 1/64" increments
Hexagon Fractional	10010029000000	1	1/16" to 7/8" inclusive by 1/64" increments
Square Fractional	10010039000000	1	3/64" to 3/4" inclusive by 1/64" increments
Round Metric	10010017000000	1	.5mm to 27mm inclusive by .5mm increments <sup>1</sup>
Round Decimal	10010018000000	1	.016" to 1.030" inclusive by .001" increments <sup>1</sup>
Round Serrated Fractional	10010059000000	1	1/4" to 1 1/4" inclusive by 1/64" increments <sup>1</sup>
Morse Taper Hole	10050880000000	2	#1, #2, #3, #4
B & S Taper Hole	10050980000000	2	#4, #5, #6, #7, #9
Rectangular	10010049000000	1	1/8" x 5/32" to 5/8" x 3/4" inclusive

NOTE: Round 5C collets above 43/64", hex collets 55/64" and above, square 5C collets 23/32" and over, 5C number collets and letter collets do not have internal threads. For internal threads, see 5C-5C step collets.

Special-Accuracy 5C Collets are available. When held in a Hardinge Super-Precision® spindle, they are guaranteed to have a maximum TIR of .0002" for 5C round collets, and .0005" for 16C, 20C and 25C round collets over 3/16" (4.76mm) to the collet's capacity measured 1" from the face of the collet.



## 16C, 20C, 25C, 3J Hardened, Precision-Machined Collets

Type	16C Part No. / Size Range	20C Part No. / Size Range	25C Part No. / Size Range	3J Part No. / Size Range
Round Fractional	17170019 1/16" – 1 3/8" [1/64"]	17010019 1/16" – 2" [1/32"]	18010019 1/4" – 2 3/4" [1/64"]	15930019 1/4" – 1 3/4" [1/64"]
Hexagon Fractional	17170029 1/8" – 1 3/8" [1/16"]	17010029 1/4" – 1 3/4" [1/16"]	18010029 1/2" – 2 3/4" [1/16"]	15930029 3/8" – 1 1/2" [1/16"]
Square Fractional	17170039 1/8" – 1 3/8" [1/16"]	17010039 1/4" – 1 3/8" [1/16"]	18010039 1" – 1 3/4" [1/16"]	15930039 1/4" – 1 1/4" [1/16"]
Round Metric	17170017 1–42mm [1mm]	17010017 7–51mm [1mm]	18010017 15–65mm [1mm]	15930017 5–40mm [1mm]
Hex Metric	17170027 3–36mm [1mm]	17010027 6–40mm [1mm]	—	—
Square Metric	17170037 3–29mm [1mm]	—	—	—
Rd. Serrated Fractional	17170059 3/16" – 1 3/8" [1/32"]	17010059 1/2" – 2" [1/16"]	18010059 1/2" – 2 1/2" [1/16"]	15930059 3/8" – 1 3/8" [1/32"]
Round Serrated Metric	17170057 12–42mm [5mm]	17010057 10–50mm [1mm]	18010057 15–65mm [1mm]	—

NOTE: Increments in brackets. 3J Collets 1/64" and under are 3 split. 3J Collets over 1 3/32" do not have internal stop threads. 16C Collets 1.615" and over do not have internal stop threads. 16C Collets are four split.



# Hardened, Precision-Machined Collets



## 5C, 16C, 20C and 25C Collet Sets

Hardinge Special-Accuracy 5C Collet Sets are enclosed in a handsome walnut case with a certificate of accuracy signed by the President of Hardinge. Each collet in the set is tested in a Hardinge spindle and guarantees a maximum TIR of .0002" (.005mm). Sets are available in 1/64", 1/32" and .5mm increments.

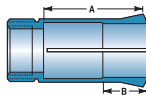
Standard-Accuracy Sets are available for 5C, 16C, 20C and 25C collets. These sets include our standard collets attractively priced and packaged in quantities that will outfit your machine nicely. Walnut box not included with Standard Accuracy Sets - see collet racks on page 27.

## Collet Sets

Type	Part Number: All Sizes With Internal Stop Threads	Part Number: Above 5/16" Have No Internal Threads	Increment	Quantity	Size & Range Stocked	Accuracy
5C - Round Fractional	09010700000000	09010000000000	1/64"	65 collets	1/16" to 1 1/16"	Standard Accuracy
5C - Round Fractional	09030700000000	09030000000000	1/64"	65 collets	1/16" to 1 1/16"	Special Accuracy (.0002" TIR)
5C - Round Fractional	09020700000000	09020000000000	1/32"	33 collets	1/16" to 1 1/16"	Standard Accuracy
5C - Round Fractional	09040700000000	09040000000000	1/32"	33 collets	1/16" to 1 1/16"	Special Accuracy (.0002" TIR)
5C - Round Metric	09080700000000	09080000000000	.5mm	51 collets	2mm to 27mm	Standard Accuracy
5C - Round Metric	09090700000000	09090000000000	.5mm	51 collets	2mm to 27mm	Special Accuracy (.005mm TIR)
16C - Round Fractional	09130000000000	—	1/8"	8 collets	1/8" - 1 1/2"	Standard Accuracy
16C - Round Fractional	09150019000000	—	1/8"	12 collets	1/4" - 1 5/8"	Standard Accuracy
16C - Round Fractional	09170019000000	—	1/16"	23 collets	1/4" - 1 5/8"	Standard Accuracy
20C - Round Fractional	09190019000000	—	1/8"	16 Collets	1/8" - 2"	Standard Accuracy
20C - Round Fractional	09210019000000	—	1/16"	31 collets	1/8" - 2"	Standard Accuracy
25C - Round Fractional	09250019000000	—	1/16"	33 collets	1/2" - 2 1/2"	Standard Accuracy
25C - Round Fractional	09230019000000	—	1/8"	17 collets	1/2" - 2 1/2"	Standard Accuracy



The SC Step Collet permits the use of the Hardinge threaded positive stops. The step depth varies depending on the collet capacity.



## Step Collets – 5C-SC and 16C-SC

Type	Part Number	Size Range	A – Max Depth	B – Length
5C Round	10010719	1" to 1 1/16"	2 3/8" (60.33)	3/4" (19.05)
5C Round	10010719	1 3/64" to 1 1/8"	1 1/2" (38.10)	1" (25.40)
5C Hexagon	10010729	55/64" to 29/32"	2 3/8" (60.33)	3/4" (19.05)
5C Hexagon	10010729	15/16" to 31/32"	1 1/2" (38.10)	1" (25.40)
5C Hexagon	10010729	1"	1 1/2" (12.70)	1 1/2" (12.70)
5C Square	10010739	23/32" to 3/4"	2 3/8" (60.33)	3/4" (19.05)
16C Round	917170719	Over 1 5/8" to 1 11/16" inclusive	2 7/8" (73.03)	1 3/8" (34.93)
16C Round	917170719	Over 1 11/16" to 1 3/4" inclusive	1 3/4" (44.45)	1 3/4" (44.45)
16C Hexagon	917170729	Over 1 13/32" to 1 25/64" inclusive	2 7/8" (73.03)	1 3/8" (34.93)
16C Hexagon	917170729	Over 1 25/64" to 1 33/64" inclusive	1 3/4" (44.45)	1 3/4" (44.45)
16C Square	917170739	Over 1 1/4" to 1 1/2" inclusive	2 7/8" (73.03)	1 3/8" (34.93)
16C Square	917170739	Over 1 1/2" to 1 5/8" inclusive	1 3/4" (44.45)	1 3/4" (44.45)

NOTE: Millimeters in parentheses. 5CSC step collets have internal stop threads. Part numbers preceded by 9 are special order.

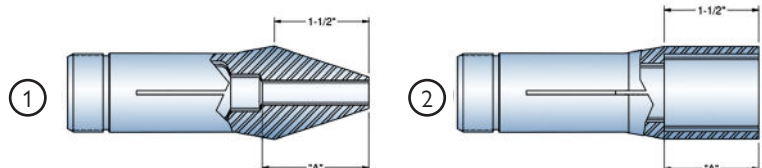
## 5C Extended-Nose Collets (Standard TIR: .001", 1/2" from Face)



5C Hardened, Precision-Machined Extended-Nose Collets are for the same applications as regular collets. The extended-nose permits deeper counter-bores and tool clearance for extended work. Extended-nose collets have internal threads for Hardinge positive stops.

Type	Part Number	Figure	Size Range	A – Maximum Depth
Round Fractional	80150019	1	1/16" to 1 1/4" [1/64"]	Thru Hole; No Step
		1	1/16" to 23/32" 1	2" (50.80)
		2	3/4" to 1 1/16" 1	1 1/2" (38.10)
Round Metric	80150017		2mm to 32mm [5mm]	
		1	3mm to 18mm 1	Thru Hole; No Step
		1	20mm to 28mm 1	2" (50.80)
		2	28mm to 32mm	1 1/2" (38.10)

NOTE: Increments in brackets. Special Accuracy Collet now available in 8015 style, .0005" TIR at 1/2" from Face. 1 - Diameter of face is order hole plus 1/4" (6.35mm)



# Emergency Collets



Even with the best of planning, emergencies arise when your tool room and production departments require a stepped, odd size or special-shape collet. On such occasions, use the Hardinge® Emergency Collet. The soft face and pilot hole permit rapid drilling, boring or stepping out to the exact size required. Pins are supplied for precision machining. Emergency collets have internal threads for positive stops.

Extended-Nose Emergency Collets permit deeper counter bores when required, and tool clearance for extended work. Extended-nose emergency collets also have internal threads for positive stops. The collet shank section of a 5C Emergency Plug Chuck is finished for direct application to your machine spindle. The nose section can be machined in place for the greatest degree of accuracy to suit your particular requirements for special arbors.

## Emergency Collets – 3C & 5C

3C Model	Part Number	5C Model	Part Number	Material	Pilot Hole	Slots
3C Blank	15831000	5C Blank	10011000000000	Steel	—	—
3C-E1	15851210	5C-E1	10071210000000	Steel	1/16" (1.59)	Specify 3 or 5C only
—	—	5C-E1	10131210000000	Brass	1/16" (1.59)	3
3CE	15851410	—	—	Steel	1/4" (6.35)	3
3C-E2	15851300	5C-E2	10071310000000	Steel	1/8" (3.18)	3
—	—	5C-E2	10071310000004	Steel	1/8" (3.18)	4
—	—	5C-E2	10131310000000	Brass	1/8" (3.18)	3
3C-E0	15851100	5C-E0	10071100000000	Steel	—	3

## Emergency Collets – 16C, 20C, 25C & 3J

Model	Part Number	Pilot Hole
16C Emergency Collets - 3 Slots		
16C-E	17171400000000	1/4" (6.35)
16C-E1	17171200000000	1/16" (1.59)*
16C-E2	17171300000000	1/8" (3.18)
16C-E0	17171100000000	—
20C Emergency Collets - 4 Slots		
20C-E	17011410000000	1/4" (6.35)
20C-E0	17011100000000	—
25C Emergency Collets - 4 Slots		
25C-E	18011410000000	1/2" (12.70)
25C-E0	18011100000000	—
3J Emergency Collets - 4 Slots		
3J-E	15951410000000	1/4" (6.35)
3J-E1	15951210000000	1/16" (1.59)
Replacement Pins		
3C	77210000	—
5C, 16C, 20C & 3J	77230000	—
25C	77250000	—

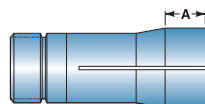
\* Specify 3 or 4 slots

NOTE: Millimeters in parentheses.

3J Collets 1/16" and under are 3 split.

3J Collets over 133/32" have no internal thread.

Emergency collets not intended to be heat treated.



## Extended-Nose Emergency Collets

Model	Part Number	Pilot Hole	A – Length
3C Emergency Collets - 3 Slots			
3C-EN1	17951410	1/4" (6.35)	1" (25.40)
3C-EN1-2	17951310	1/8" (3.18)	1" (25.40)
3C-EN2	17971410	1/4" (6.35)	1/2" (12.70)
5C Emergency Collets - 3 Slots			
5C-EN1	10091410000000	1/4" (6.35)	1" (25.40)
5C-EN1-1	10091210000000	1/16" (1.59)	1" (25.40)
5C-EN1-2	10091310000000	1/8" (3.18)	1" (25.40)
5C-EN2	10111410000000	1/4" (6.35)	1/2" (12.70)
5C-EN2-1	10111210000000	1/16" (1.59)	1/2" (12.70)
5C-EN2-2	10111310000000	1/8" (3.18)	1/2" (12.70)
3C & 5C Emergency Plug Chuck - Solid			
3C Plug	15870000	—	1" (25.40)
5C Plug	10150000000000	—	1 3/4" (44.45)
16C Emergency Collets - 3 Slots			
16C-EN1	17171213000000	1/4" (6.35)	1" (25.40)
16C-EN1-1	17171313000000	1/16" (1.59)	1" (25.40)*
16C-EN1-2	17171413	1/8" (3.18)	1" (25.40)
16C-EN2	17171214	1/4" (6.35)	1/2" (12.70)
16C-EN2-1	17171314	1/16" (1.59)	1/2" (12.70)*
16C-EN2-2	17171414	1/8" (3.18)	1/2" (12.70)
20C Emergency Collets - 4 Slots			
20C-EN .75	18091410	1/4" (6.35)	3/4" (19.05)
20C-EN 1.5	18111410	1/4" (6.35)	1 1/2" (38.10)
3J Emergency Collets - 4 Slots			
3J-EN1	15931213	1/4" (6.35)	1" (25.40)
3J-EN2	15931214	1/4" (6.35)	1/2" (12.70)
Replacement Pins			
All Sizes	77310000	—	—

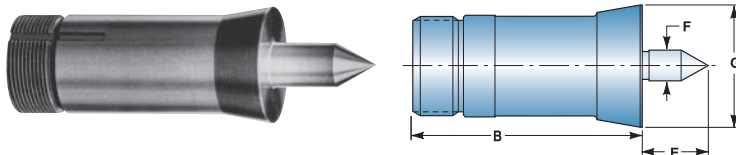
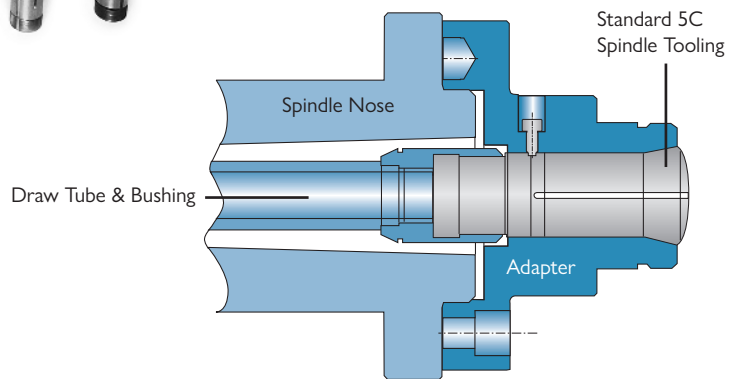
\* Specify 3 or 4 slots



## Kellenberger 5C Collet Adaptation Chuck

An adapter with draw tube permits the use of 5C spindle tooling on Kellenberger grinding machines. Use with collets, step chucks and Sure-Grip expanding collet systems. This system features the standard Hardinge threaded-nose design.

Part Number 0957-00-00-000000



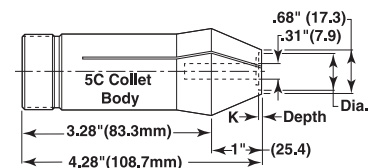
## Headstock Centers – Male Center

Style	Model	Part Number	B	E	F	G
5C	G9-5C	570000296	3 7/8" (81.35)	1 1/2" (30.93)	.570" (14.47)	1.470" (37.33)
16C	AK-7	AK000029616C	4.344" (110.33)	1.250" (31.75)	.570" (14.47)	2.250" (57.15)
20C	AK-13	AK000029620C	4.940" (125.47)	1.250" (31.75)	.570" (14.47)	2.880" (73.15)
25C	AK-19	AK000029625C	5.000" (127.00)	1.250" (31.75)	.570" (14.47)	3.464" (87.98)

NOTE: Millimeters in parentheses.

## 5C LensMaker Collets

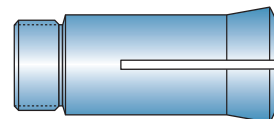
Collet	Part Number	Diameter	Depth
5C LM (3 Split)	82770118005010	.501"	1/16"
5C LM (3 Split)	82770218005010	.501"	1/8"
5C LM (6 Split)	82790118005010	.501"	1/16"
5C LM (6 Split)	82790218005010	.501"	1/8"



## 5C-ST Long Bearing Drill Collets – Hardened, Precision-Machined

Type	Part Number	Size Range
Letter	10170016	A to Z inclusive
Number	10170015	1 to 78 inclusive
Fractional	10170019	1/64" to 1 1/8" inclusive by 1/64" increments
Metric	10170017	3mm to 25mm by .5mm increments

NOTE: 5C-ST collets have longer bearing surface than standard 5C collets and do not have internal stop threads.



## 5C Step Chucks & Closers



Step Chucks are used for accurately holding work up to 6" in diameter. Castings, moldings, stampings and machined parts are held rigidly and accurately. Tubing can be held without crushing or distorting. Accurate gripping, the same as with collets, is yours when you use regular- and extra-depth capacity step chucks for holding larger diameters.

Regular-Depth Step Chucks are  $\frac{3}{8}$ " larger in diameter than the rated size so the full capacity may be readily applied to a depth of  $\frac{1}{2}$ ". A regular-depth step chuck closer is required for each rated size.

Extra-Depth Step Chucks are made so the full rated capacity may be applied to a depth of  $1\frac{1}{4}$ ". An extra-depth step chuck closer is required for each rated size. Small closing angles are available on step chucks for non-rotating use.

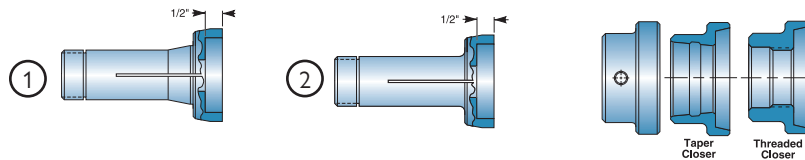
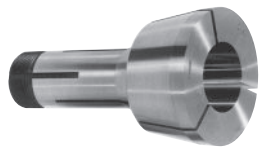
Step Chuck Closers are required when using step chucks on rotating spindles. Step chuck closers fit directly to the machine spindle. An inside taper corresponding to that on the step chuck places the closing pressure over the stepped area of the chuck, resulting in greater gripping power and accuracy. When ordering step chuck closers, specify for taper or threaded nose for 5C models or A2-4, A2-5, A2-6, A2-8 spindle noses. A step chuck closer is required for each rated size step chuck. The closer mounts directly on the spindle nose.

### 5C Regular-Depth Step Chucks and Closers – $\frac{1}{2}$ " / 12.70mm Max. Depth of Stop

Step Chuck Rated Size Dia. x Depth	Part Number	Figure	Material	Slots	Small Closing Angle	Taper Closer <sup>2</sup>	Threaded Closer <sup>2</sup>
2" x $\frac{1}{2}$ "	13890019000000 <sup>1</sup>	1	Steel	3	Yes	14212600000000	14210000000000
3" x $\frac{1}{2}$ "	91483000000000	2	Steel	3	No	14232600000000	14230000000000
4" x $\frac{1}{2}$ "	91485000000000	2	Steel	3	No	14252600000000	14250000000000
5" x $\frac{1}{2}$ "	91487000000000	2	Steel	3	No	14272600000000	14270000000000
6" x $\frac{1}{2}$ "	91489000000000	2	Steel	3	No	14292600000000	14290000000000

1 - Available in round sizes  $1\frac{1}{8}$ " to 2" inclusive by  $\frac{1}{16}$ " increments.  
 2 - For Emergency and Hardened, Precision-Machined Step Chucks.  
 NOTE: Part numbers preceded by a 9 are special order.

Spanner Wrench for Step Chuck Closers Part #460-0009189



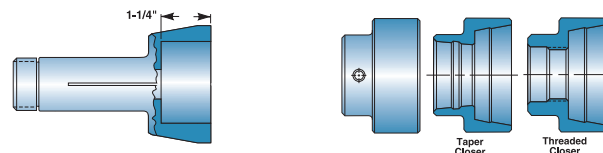
### 5C Extra-Depth Step Chucks and Closers – $1\frac{1}{4}$ " / 31.75mm Max. Depth of Stop

Step Chuck Rated Size Dia. x Depth	Part Number	Material	Slots	Small Closing Angle	Taper Closer <sup>2</sup>	Threaded Closer <sup>2</sup>
2" x $1\frac{1}{4}$ "	13910019000000 <sup>1</sup>	Steel	3	No	14332600000000	14330000000000
3" x $1\frac{1}{4}$ "	91491000000000	Steel	3	No	14352600000000	14350000000000
4" x $1\frac{1}{4}$ "	91493000000000	Steel	3	No	14372600000000	14370000000000
5" x $1\frac{1}{4}$ "	91495000000000	Steel	3	No	14392600000000	14390000000000
6" x $1\frac{1}{4}$ "	91497000000000	Steel	3	No	14412600000000	14410000000000

1 - Available in round sizes  $1\frac{1}{8}$ " to 2" inclusive by  $\frac{1}{16}$ " increments.  
 2 - For Emergency and Hardened, Precision-Machined Step Chucks.  
 NOTE: Part numbers preceded by a 9 are special order.

Spanner Wrench for Step Chuck Closers Part #460-0009189

**CAUTION:** Closers are required for all rotating step chuck applications. See page 40 for spindle rpm safety information.





Emergency Step Chucks are made for those situations where time does not allow for the ordering of a hardened step chuck. Emergency step chucks are supplied with pin holes and pins in place for precision machining. Pins are located beyond the maximum rated capacity of the step chuck—this permits stepping the chuck to its full capacity without cutting into the pins. Pins can be used, removed and saved for additional stepping operations.

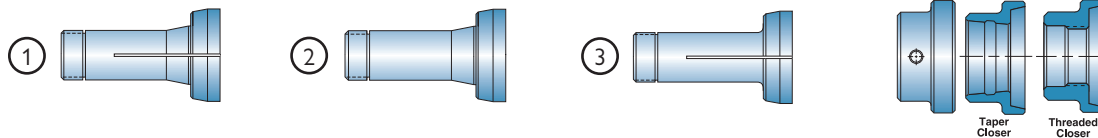
Regular-Depth Step Chucks are  $\frac{3}{8}$ " larger, while Extra-Depth Step Chucks are  $\frac{3}{4}$ " larger in diameter than the rated size so the full capacity bore may be easily machined. A regular-depth step chuck can be bored to a maximum depth of  $\frac{1}{2}$ ", the extra-depth step chuck to a maximum depth of  $1\frac{1}{4}$ " with  $1\frac{3}{4}$ " step for the 25C step chuck. A regular- or extra-depth step chuck closer is required for each rated size.

Hardinge Emergency Step Chucks are not designed to be heat treated by the customer. Step chucks with small closing angles are available for use with stationary (non-rotating) workholding devices only. All 5C taper and threaded-nose closers are made from cast iron. All other closers are made of steel.

## 5C Emergency Regular-Depth Step Chucks and Closers – $\frac{1}{2}$ " / 12.70mm Maximum Depth

Step Chuck Rated Size Dia. x Depth	Part Number	Figure	Material	Slots	Small Closing Angle	Taper Closer	Threaded Closer
2" x $\frac{1}{2}$ "	13510010000000	1	Steel	3	Yes	14212600000000	14210000000000
2" x $\frac{1}{2}$ "	13512500000000	2	Steel	—	Yes	14212600000000	14210000000000
2" x $\frac{1}{2}$ "	13770010000000	1	Steel	4	Yes	14212600000000	14210000000000
3" x $\frac{1}{2}$ "	13530010000000	1	Steel	3	Yes	14232600000000	14230000000000
4" x $\frac{1}{2}$ "	13550010000000	1	Steel	3	Yes	14252600000000	14250000000000
4" x $\frac{1}{2}$ "	13690010000000	3	Steel	3	No	14252600000000	14250000000000
5" x $\frac{1}{2}$ "	13570010000000	1	Steel	3	Yes	14272600000000	14270000000000
5" x $\frac{1}{2}$ "	13710010000000	3	Steel	3	No	14272600000000	14270000000000
6" x $\frac{1}{2}$ "	13590010000000	1	Steel	3	Yes	14292600000000	14290000000000
6" x $\frac{1}{2}$ "	13730010000000	3	Steel	3	No	14292600000000	14290000000000
7" x $\frac{1}{2}$ "	13750010000000	3	Steel	3	No	14312600000000	14310000000000

Replacement Pins Part #7723-00-00-000000. Spanner Wrench for Step Chuck Closers Part #460-0009189.

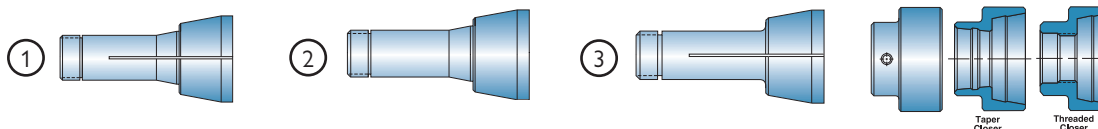


## 5C Emergency Extra-Depth Step Chucks and Closers – $1\frac{1}{4}$ " / 31.75mm Maximum Depth

Step Chuck Rated Size Dia. x Depth	Part Number	Figure	Material	Slots	Small Closing Angle	Taper Closer	Threaded Closer
2" x $1\frac{1}{4}$ "	13790010000000	1	Steel	3	Yes	14332600000000	14330000000000
2" x $1\frac{1}{4}$ "	13792500000000	2	Steel	—	Yes	14332600000000	14330000000000
3" x $1\frac{1}{4}$ "	13810010000000	3	Steel	3	No	14352600000000	14350000000000
4" x $1\frac{1}{4}$ "	13830010000000	3	Steel	3	No	14372600000000	14370000000000
5" x $1\frac{1}{4}$ "	13850010000000	3	Steel	3	No	14392600000000	14390000000000
6" x $1\frac{1}{4}$ "	13870010000000	3	Steel	3	No	14412600000000	14410000000000

Replacement Pins Part #7723-00-00-000000. Spanner Wrench for Step Chuck Closers Part #460-0009189.

CAUTION: Closers are required for all rotating step chuck applications. See page 40 for spindle rpm safety information.



# A2, 5C Emergency Step Chucks

Hardinge® Emergency Step Chucks used on A2-5 and A2-4 5C spindles have the same criteria as regular step chucks except the shank is longer. The closers are made of steel.

- The A2-4 Closer is used on the Hardinge QUEST® GT and CHNC 27 Lathe
- The A2-5 Closer is used on the older Hardinge CHNC®-5C and HXL  
(A2-5 5C spindle – the same closer used on all A2-5, 16C Spindles)

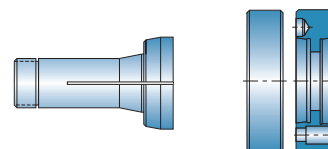
Because these 5C Step Chucks have a longer shank than standard 5C Step Chucks, they can only be used on Hardinge CONQUEST GT, QUEST GT, CHNC 27, CHNC-5C and HXL A2-5 5C lathes. A2-4 and A2-5 hardened, precision-machined step chucks are available as special orders.



## A2-5 and A2-4 — 5C Emergency Regular-Depth Step Chucks & Closers — 1/2" / 12.70mm Maximum Depth

Step Chuck Rated Size Dia. x Depth	Part Number	Material	Slots	Small Closing Angle	Closer for A2-5 CHNC-5C and HXL-5C	Closer for A2-4 QUEST GT
2" x 1/2"	12630000000000	Steel	3	No	160002682	50002682
3" x 1/2"	12510000000000	Steel	3	No	160002683	50002683
4" x 1/2"	12650000000000	Steel	3	No	160002684	50002684
5" x 1/2"	12530000000000	Steel	3	No	160002685	—
6" x 1/2"	12550000000000	Steel	3	No	160002686	—

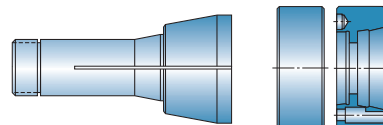
NOTE: The shank of these step chucks are longer than standard 5C step chucks. Replacement Pins Part #7723-00-00-000000.  
Bolts for Closers: A2-4 & A2-5 Part # – MS-0104019 (M10 x 1.5 x 25)



## A2-5 and A2-4 – 5C Emergency Extra-Depth Step Chucks & Closers — 1 1/4" / 31.75mm Maximum Depth

Step Chuck Rated Size Dia. x Depth	Part Number	Material	Slots	Small Closing Angle	Closer for A2-5	Closer for A2-4 QUEST GT
2" x 1 1/4"	12670000000000	Steel	3	No	160002682OC	50002682OC
3" x 1 1/4"	12570000000000	Steel	3	No	160002683OC	50002683OC
4" x 1 1/4"	12690000000000	Steel	3	No	160002684OC	50002684OC
5" x 1 1/4"	12590000000000	Steel	3	No	160002685OC	—
6" x 1 1/4"	12610000000000	Steel	3	No	160002686OC	—

NOTE: The shank of these step chucks are longer than standard 5C step chucks. Replacement Pins Part #7723-00-00-000000.  
Bolts for Closers: A2-4 & A2-5 Part # – MS-0104019 (M10 x 1.5 x 25)  
CAUTION: Closer required for all rotating step chuck applications.

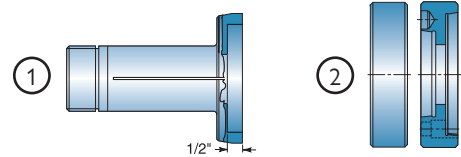


## 16C Hardened, Precision-Machined Regular-Depth Step Chucks & A2-5 Closers – 1/2" / 12.70mm Max. Depth

Rated Size Dia. x Depth	Step Chuck Part Number	Figure	Closer Part Number	Figure
2" x 1/2"	91273000000000	1	160002682	2
3" x 1/2"	12150019000000 <sup>1</sup>	1	160002683	2
4" x 1/2"	91217000000000	1	160002684	2
5" x 1/2"	91219000000000	1	160002685	2
6" x 1/2"	91221000000000	1	160002686	2

1 - Available from stock in round sizes 1 1/16" to 3" inclusive by 1/16" increments.

NOTE: All closers made of steel. Part numbers preceded by a 9 are special order.

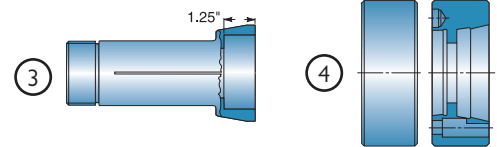


## 16C Hardened, Precision-Machined Extra-Depth Step Chucks & A2-5 Closers – 1 1/4" / 31.75mm Max. Depth

Rated Size Dia. x Depth	Step Chuck Part Number	Figure	Closer Part Number	Figure
2" x 1 1/4"	91277000000000	3	160002682OC	4
3" x 1 1/4"	91223000000000	3	160002683OC	4
4" x 1 1/4"	91225000000000	3	160002684OC	4
5" x 1 1/4"	91227000000000	3	160002685OC	4
6" x 1 1/4"	91229000000000	3	160002686OC	4

NOTE: All closers made of steel. Part numbers preceded by a 9 are special order.

CAUTION: Closer required for all rotating step chuck applications.

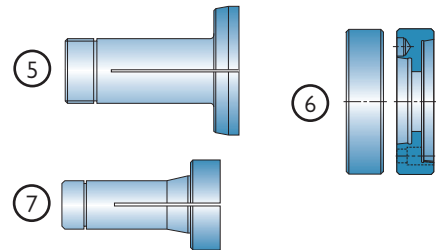


## 16C & 3J Emergency Regular-Depth Step Chucks & 16C A2-5 Closers – 1/2" / 12.70mm Maximum Depth

Rated Size Dia. x Depth	16C Step Chuck Part Number	Figure	A2-5 Closer Part Number	Figure	3J Step Chuck Part Number	Figure
2" x 1/2"	12753900000000	5	160002682	6	15970010000000	7
3" x 1/2"	12313900000000	5	160002683	6	15990010000000	7
4" x 1/2"	12333900000000	5	160002684	6	16490000000000	7
5" x 1/2"	12353900000000	5	160002685	6	17250000000000	7
6" x 1/2"	12373900000000	5	160002686	6	16590000000000	7

NOTE: All closers made of steel. 3J Step Chucks do not require a closer; Replacement Pins Part #7723-00-00-000000.

WARNING: 3J step chucks have no large closing angle, therefore, centrifugal force will severely reduce gripping force as the rpm increases.



## 16C, 20C and 25C Emergency Extra-Depth Step Chucks & Closers (A2-5, A2-6, A2-8)

Rated Size Dia. x Depth	16C 1-1/4" Step Chuck Part Number	20C 1-1/4" Step Chuck Part Number	25C 1-3/4" Step Chuck Part Number	Figure	16C A2-5 Closer Part Number	20C A2-6 Closer Part Number	25C A2-6 / A2-8 Closer Part Number		Figure
							QUEST® A2-6	Others A2-8	
2" x 1 1/4"	12813900	—	—	3	160002682OC	—	—	—	4
3" x 1 1/4"	12413900	12830000	—	3	160002683OC	200002683OC	—	—	4
4" x 1 1/4"	12433900	12850000	12870000	3	160002684OC	200002684OC	299500	144300	4
5" x 1 1/4"	12453900	—	—	3	160002685OC	—	—	—	4
6" x 1 1/4"	12473900	12890000	12930000	3	160002686OC	200002686OC	299700	144500	4
8" x 1 1/4"	OA	OA	14470010	3	OA	OA	299900	144900	4

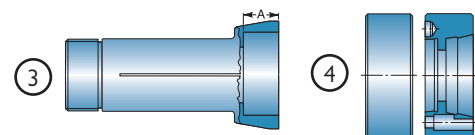
NOTE: Millimeters in parentheses. OA = On Application. Replacement Pins Part #7723-00-00-000000.

Emergency step chucks not intended to be heat treated.

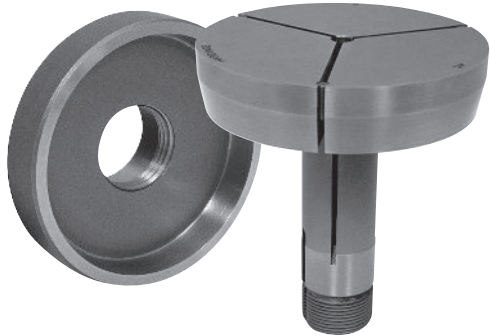
CAUTION: Closer required for all rotating step chuck applications.

Closer Mounting Bolt Part Numbers:

16C	0101216
20C	MS-0104219
25C	MS-0104620



## 3C/4C Emergency Step Chucks



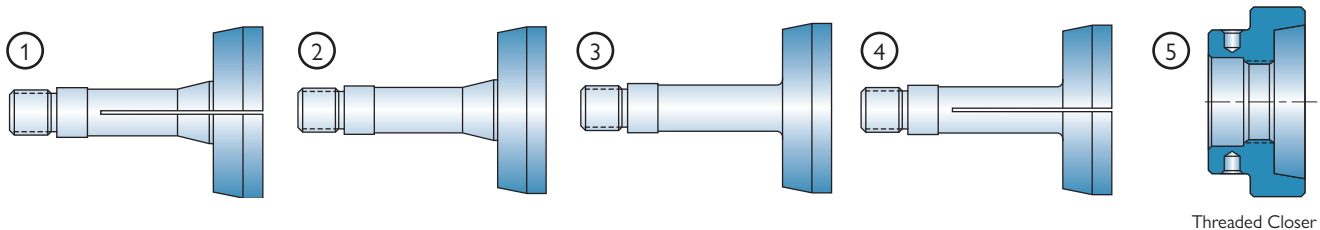
Emergency step chucks are made of soft, machineable steel, while closers are made of cast iron. Step chucks with small closing angles are available for use in stationary (non-rotating) workholding devices. Contact us for more information.

1300-series part numbers listed below are Hardinge® standard 3C and 4C Step Chucks made to order – other models will be quoted upon application.

### 3C & 4C Regular-Depth Step Chucks & Closers

Rated Size & Type	Standard Item	Step Chuck Part Number	Figure	Slots	Small Closing Angle	Closer – Tapered	Closer – Threaded Fig 5
2" 3C	x	13010010000000	1	3	Yes	14012600000000	14010000000000
2" 3C		HS4300	2	—	Yes	14012600000000	14010000000000
3" 3C		HS4301	3	—	No	14032600000000	14030000000000
3" 3C	x	13070010000000	4	3	No	14032600000000	14030000000000
4" 3C		HS4302	3	—	No	14052600000000	14050000000000
4" 3C	x	13090010000000	4	3	No	14052600000000	14050000000000
5" 3C		HS4303	3	—	No	14072600000000	14070000000000
5" 3C		37 2625A	4	3	No	14072600000000	14070000000000
6" 3C		HS4304	3	—	No		
6" 3C		370002626A	4	3	No		
2" 4C	x	13200000000000	2	—	Yes	14112600000000	14110000000000
2" 4C	x	13210010000000	1	3	Yes	14112600000000	14110000000000
3" 4C		HS4306	3	—	No	14132600000000	14130000000000
3" 4C	x	13230010000000	2	3	No	14132600000000	14130000000000
4" 4C		8946D	3	—	No	14152600000000	14150000000000
4" 4C		472624A	4	3	No	14152600000000	14150000000000
5" 4C		HS4308	3	—	No	14172600000000	14170000000000
5" 4C		472625A	4	3	No	14172600000000	14170000000000
6" 4C		HS4309	3	—	No		

CAUTION: Closers are required for all rotating step chuck applications. See page 40 for spindle rpm safety information.



Threaded Closer

## Threaded Positive Solid Stops

Style	Description	Part Number	Model	A – Depth
5C	Solid Stop Assembly	10490000000000	SS-5C	3 1/8" (73.38)
	Body	10510000000000		
	Nut	5A0001466C		
	Threaded Stop <sup>1</sup>	10530000000000		
16C	Solid Stop Assembly	18050000000000	SS-16C	3 3/4" (95.25)
	Body	18070000000000		
	Nut	11850000000000		
	Threaded Stop <sup>1</sup>	11830200000000		
16C	Adapter-Style Assembly	11990000000000	—	3 3/4" (95.25)
	Body	10510000000000		
	Adapter Bushing	11550100000000		
	Nut	5A0001466C		
16C	Threaded Stop (1/2" diameter) <sup>1</sup>	10710000000000	—	
	Adapter Bushing	11550100000000		
20C	Solid Stop Assembly	12790000000000	20C-SS	5 7/8" (149.23)
	Body	12780000000000		
	Nut	11850000000000		
	Threaded Stop <sup>1</sup>	12710000000000		
25C	Solid Stop Assembly	10730000000000	25C-SS	6 1/8" (155.58)
	Body	10750000000000		
	Nut	11850000000000		
	Threaded Stop <sup>1</sup>	12710000000000		
3J	Solid Stop Assembly	19990000000000	—	3" (76.2)
	Body	10510000000000		
	Adapter Bushing	19950000000000		
	Threaded Stop <sup>1</sup> (1/2" Dia.)	10710000000000		
22J	Solid Stop Assembly	17190000000001	22J-SS	3 5/8" (92.07)
	Body	17190000000002		
	Nut	11850000000000		
	Threaded Stop <sup>1</sup>	12710000000000		

## Long Stops

Long Stop	5C	16C	20C / 25C	3J
Assembly Part Number	10670000000000	12130000000000	N/A	20030000000000
Model	LS-5C	LS-16C	—	—
A – Depth	7 1/2" (190.50)	7 1/4" (184.15)	—	7 7/8" (200)
Body	10690000000000	11810200000000	—	19970000000000
Threaded Stop <sup>1</sup>	10710000000000	11830200000000	—	11830200000000
Nut	5A0001466C	11850000000000	—	11850000000000

1- Threaded stops can be altered to different lengths.

NOTE: Millimeters in parentheses.

## Ejector Stops

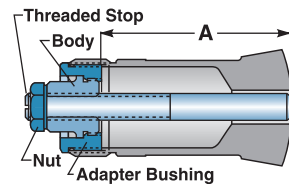
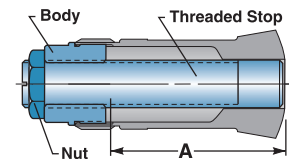
Ejector Stop	5C	16C	20C / 25C	3J
Assembly Part Number	10570000000000	11550000000000	N/A	20010000000000
Model	ES-5C	ES-16C	—	ES-3J
A – Dimension	2 3/4" (69.85)	3 3/8" (85.73)	—	3 3/8" (85.73)
Body	10590000	10590000	—	10590000
Plunger	10610000	10610000	—	10610000
Insert	10630000	10630000	—	10630000
Spring	10650000	10650000	—	10650000
Adpt bushing	—	11550100 <sup>1</sup>	—	19950000 <sup>1</sup>
Nuts [2]	U0004141C	U0004141C	—	U0004141C

1- Use AF7 wrench (7559)

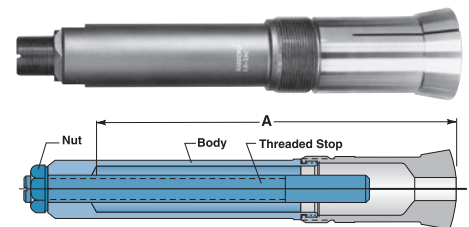
NOTE: Millimeters in parentheses.



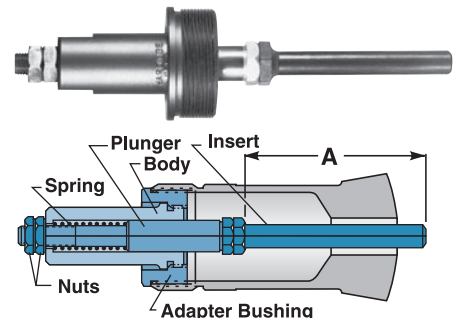
The standard Hardinge® collet comes with a deep, precision-threaded section at the rear of the capacity bore to permit the use of Hardinge positive solid and ejector stops. Purchase a standard collet and it is always ready for stop work since the threaded capacity bore is found in all fractional, decimal, hexagon, square, rectangular and emergency Hardinge collets within the ranges listed. The Hardinge solid, ejector and long threaded stops are threaded into and positively locked against the end of the collet. Once locked in place, the stop cannot move even under heavy drilling or other end-working pressures. The three types of stops permit a wide variety of chucking work since all are adjustable and machinable for the desired part length to the maximum workpiece depths indicated.



16C Adapter-style Solid Stop Assembly



Long Stop Assembly



Collets are not included in assemblies.



# 5C/16C Universal Collet Stops

## 5C Universal Collet Stop Set

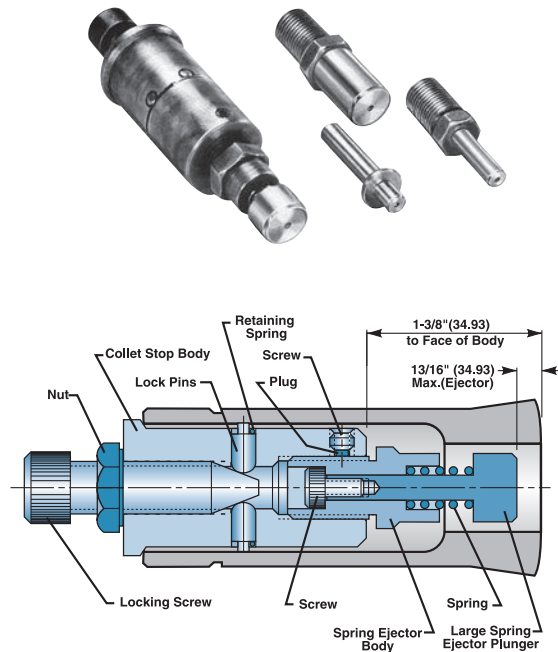
The Hardinge® Universal Collet Stop Set will convert Hardinge 5C collets without internal threads into Solid Stop or Spring Ejector Stop Collets. The two solid inserts and the two inserts for the spring ejector housing can be machined to suit varying requirements. The front end of the collet stop body has a standard 1/2-20 thread for convenient application of other sizes and special-shaped stops. The solid inserts of the spring ejector are adjustable in or out in the stop body to arrive at the desired chucking depth. The locking screw and brass plug hold the insert or spring ejector in the predetermined position. Once that is done, merely place the collet stop in the back of the collet and tighten the lock screw—see illustration. This causes the locking plugs to securely anchor the collet stop inside the collet. Application does not require machining of the collet—the stop is merely placed in the collet.

## 5C Universal Collet Stop Set

Description	Part Number	Figure	Model
Universal Stop Set - Includes:	10190000000000	G10	
Collet Stop Body	10290000000000		RX-107-F
Locking Screw	10310000000000		RX-107-G
Nut	U0004141C		
Lock Pins [6]	10210000000000		RX-107-A
Retaining Spring	10250000000000		RX-107-C
Plug	N370000483		
Screw	0550303		
Solid Insert, 3/16" Dia. <sup>1</sup>	10230000000000	A	RX-107-B
Solid Insert, 1/4" Dia. <sup>1</sup>	10270000000000	B	RX-107-E
Plunger, 3/16" Dia. <sup>1</sup>	10350000000000	C	RX-107-L
Plunger, 1/4" Dia. <sup>1</sup>	10370000000000	D	RX-107-N
Spring for Plunger	10390000000000		RX-107-R
Spring Ejector Body	10330000000000		RX-107-H
Screw	0100306		

1 - Can be altered to different lengths.

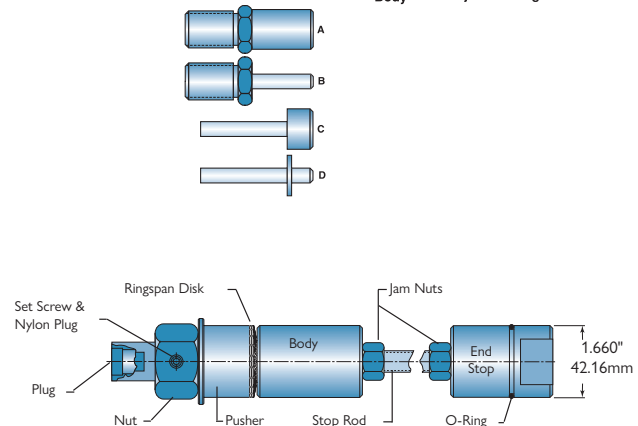
NOTE: Millimeters in parentheses.



## 16C Universal Stop – Draw-Tube Style

Description	Part Number
Universal Stop Assembly - includes:	17176600000000
Plug	17176601000000
Body	17176602000000
Nut	17176603000000
10 - 32" x 3/16" Set Screws [3]	0570303
5/32" x 1/16" Nylon Plugs [3]	N370000483
Pusher	17176604000000
Ringspan Disks	17176608000000
1/2" - 13 Jam Nut	MD 0003182
Short Stop Rod	17176605000000
Long Stop Rod	17176606000000
End Stop	17176607000000
O-Ring	OR 0002427

NOTE: Unit is mounted in the draw tube of the collet closer.



## Stop Wrench for Collet Body



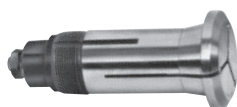
Description	5C Part Number	16C Part Number	20C Part Number	25C Part Number	3J Part Number
Collet Stop Wrench	ST0011759	CC0011759	CL0011759A	76050000	ST001175901
Model Number	G-15	16C-15	20C-15	25C-15	3J-15
Body	ST000402502	CC0004025	CL000402501	76090000	ST0004025
Handle	ST0006239	CC0006239	CC0006239	CC0006239	CC0006239
Key	ST0011006	ST0011006	CL0011006	CL0011006	ST001100601

## Hardinge® Dead-Length Collet Assembly

Shoulders and faces can be machined to exact length, regardless of OD variations with the Hardinge Dead-Length Collet Assembly. Parts are loaded against an adjustable solid stop which is threaded into the inner collet. The inner collet, in turn, is spring-loaded against the spindle face. There is no end movement.

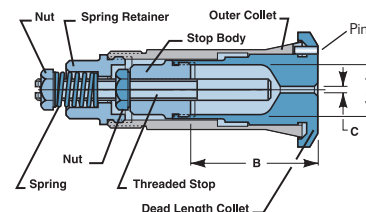
The low-cost inner collet has a soft face and pilot hole to permit boring to size in the machine spindle for exacting concentricity. The inner collet is pinned to the outer collet to maintain location and original bored accuracy.

Dead-Length Collets can be used on all machines and attachments with a 5C/16C spindle and draw bar. The outer collet, solid stop, spring and nut are interchangeable between the Dead-Length Collet and the Dead-Length 2" Step Chuck on the following page. The complete assembly is a one time purchase; after that, buy the inner collet only.



## 5C Dead-Length Collet Assembly

Description	Part Number	Model	A – Chucking Diameter	B – Maximum Depth of Stop	C – Pilot Hole or Bore Size
Emergency Collet Assembly:	11570000000000	5DS-71			
Outer Collet Assembly excludes the Dead-Length Inner Collet – Includes parts listed below:	11570200000000	5DS-71			
Spring	11650000000000	5DS-71-3			
Spring Retainer	11630000000000				
Nuts [2]	U0004141C				
Outer Collet	11610010000000				
Threaded Stop	32630000000000				
Stop Body	32610000000000				
Emergency Dead-Length Inner <sup>1</sup> Collet, 1/8"	11590010000000	5DS-71-1	Under 7/8" (22.23)	2 1/8" (53.98)	1/8" (3.18)
Other Available Collets					
Emergency Dead-Length Collet, 1/32"	11591100000000		Under 7/8" (22.23)	2 1/8" (53.98)	1/32" (.79)
Hardened Collet	11590019000000	5DS-71-1HG	Under 7/8" (22.23)	2 1/8" (53.98)	Order Size
Solid Stop Assembly	32590000000000	11-9150			

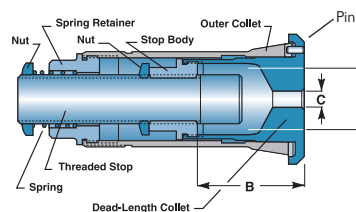


1 - Dead-Length Inner Collet sold separately.

NOTE: Millimeters in parentheses. Replacement Pins Part #7721.

## 16C Dead-Length Collet Assembly

Description	Part Number	Model	A – Chucking Diameter	B – Maximum Depth of Stop	C – Pilot Hole or Bore Size
16C Emergency Collet Assembly:	11710000000000	16DS-80	1 13/32" (35.72) and under	2" (50.80)	1/8" (3.18)
Outer Collet Assembly excludes the Dead-Length Inner Collet – Includes parts listed below:	11710200000000				
Spring	11870000000000	16DS-80-03			
Spring Retainer	11890000000000				
Nuts [2]	11850000000000				
Outer Collet	11770000000000				
Threaded Stop	11830200000000				
Stop Body	11810100000000				
Emergency Dead-Length Inner Collet	11731300000000	16DS-80-01			



1 - Dead-Length collet sold separately.

NOTE: Millimeters in parentheses. Replacement Pins Part Number: 7721.

# Dead-Length® Step Chucks

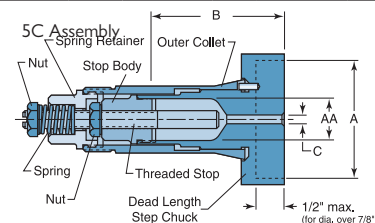
Hardinge® Dead-Length Step Chucks will accommodate larger chucking diameters. Shoulders and faces can be machined to exact length, regardless of OD variations with the Hardinge Dead-Length Step Chucks. The low-cost step chuck has a soft face and pilot hole to permit boring to size in the machine spindle for exacting concentricity. The step chuck is pinned to the outer collet to maintain location and original bored accuracy.

Dead-Length Step Chucks can be used on all machines and attachments with a 5C/16C spindle and draw bar. The outer collet, solid stop, spring and nut are inter-changeable between the Dead-Length Collet and the Dead-Length 2" Step Chuck. The complete assembly is a one time purchase; after that, buy the step chuck only.

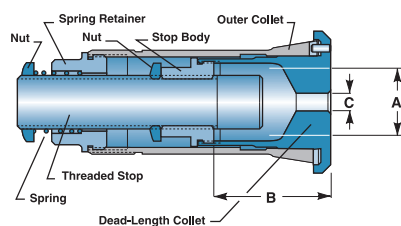


## Dead-Length Emergency Step Chucks

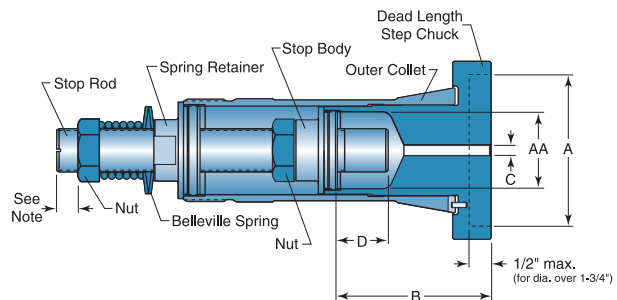
Description	5C Part Number	16C Part Number	20C Part Number	A – Chucking Diameter	AA – Chucking Diameter	B – Maximum Depth of Stop	C – Maximum Pilot Hole
Emergency Step Chuck Assembly:	11670000000000	11790000000000	20410000000000				
Model	5DS71SC	16DS80SC	20DS				
Outer Collet Assembly excludes the Dead-Length Inner Step Chuck – Includes parts listed below:	11570200000000	11710200000000	20410200000000				
Spring	11650000000000	11870000000000	11870000000000				
Spring (Belleville) [2] 20C Only			AM901170				
Spring Retainer	11630000000000	11890000000000	18150000000000				
Nuts [2]	U0004141C	11850000000000	11850000000000				
Outer Collet	11610010000000	11770000000000	20390000000000				
Threaded Stop (Stop Rod)	32630000000000	11830200000000	12710000000000				
Stop Body	32610000000000	11810100000000	18130000000000				
Dead-Length Inner Step Chuck							
5C	11690010000000			2" (50.80)	7/8" (22.23)	2 5/8" (66.67)	1/4" (6.35)
16C		11750000000000		2 3/4" (69.85)	1 13/32" (35.72)	2 5/8" (66.67)	1/4" (6.35)
20C			20370000000000	3 1/2" (88.90)	1 3/4" (44.45)	3 1/2" (88.9)	1/4" (6.35)



NOTE: Millimeters in parentheses. Emergency Collets not intended to be heat treated. Hardened, precision-machined collets are available upon application. To set spring tension, compress coil spring completely by hand, then back off nut one turn.



16C Assembly



20C Assembly



Collet Stop Wrench for Outer Collet

Inner Collet Spanner

Adjustable Face Spanner for Spring Retainer

## Wrenches, Spanners & Pins for Dead-Length Collet Assemblies

Part Name	5C Part Number	16C Part Number	20C Part Number
Collet Stop Wrench	ST0011759	CC0011759	CL0011759A
Inner Collet Spanner Wrench	78930000000000 <sup>1</sup>	78950000000000 <sup>2</sup>	78970000000000 <sup>3</sup>
Adjustable Face Spanner	—	78910000000000 <sup>1</sup>	—
Pins (3) for DL Collet – 5C, 16C	77210000000000	77210000000000	77210000000000
Pins (3) for Step Chuck – 5C, 16C, 20C	77230000000000	77230000000000	77230000000000

1 – 3/16" pin, 2 – 7/32" pin, 3 – 1/4" pin



## Dead-Length Thru-Hole Collets

Thru-hole collets are ideal for bar work and long workpieces. Bar stock up to  $\frac{3}{4}$ " in diameter can pass "through" the 5C collet, while maintaining part length control. The 16C Collet allows for bar stock up to  $1\frac{3}{16}$ ". With the Dead-Length Collet feature, the bar stock will not draw back from the stock stop.

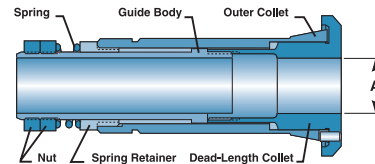
In use, the outer collet threads directly into the collet closer draw bar. The bar stock is then fed through the collet and located against the turret-mounted stock stop. As the closer is actuated, the draw bar pulls the outer collet into the machine spindle, allowing the inner collet to contract and accurately grip the stock. Because the inner collet is spring-loaded against the spindle face, no end movement is possible.

Hardened, precision-machined or emergency collets can be used as the inner collet. The 5C hardened, precision-machined collets are available in sizes  $\frac{1}{32}$ " to  $\frac{3}{4}$ ", inclusive by  $\frac{1}{32}$ " increments. Over-capacity sizes, available for chucking work are:  $\frac{25}{32}$ ",  $\frac{13}{16}$ ",  $\frac{27}{32}$ ", and  $\frac{7}{8}$ " (cannot be used for bar work). The low-cost emergency inner collet has a soft face with pins for machining and a  $\frac{1}{8}$ " pilot hole to permit boring to size in the machine spindle for exacting concentricity. The inner collet is keyed to the outer collet to maintain location and original bored accuracy. The pins used for machining can be saved for stepping out the collet on future jobs.

Buy the complete assembly one time, and then just buy the inner collets when needed. Use in any machine or fixture with a 5C/16C spindle and collet draw bar.

## Dead-Length Thru-Hole Collet (Not Available for 20C or 25C)

Description	5C Part Number	16C Part Number	A – Pilot Hole	Round	Hexagon	Square
Emergency Collet Assembly:	11570100000000	11710100000000				
Model Number	5DS-71-TR	16C-80-DTCL				
Outer Collet Assembly excludes	11570101000000	—				
Inner Dead-Length Collet –						
Includes parts listed below:						
Spring	11330000000000	16A00081015C				
Spring Retainer	11310000000000	11710102000000				
Nuts [2]	11570600000000	11710103000000				
Outer Collet	11610000000000	11770000000000				
Guide Body	11290000000000	11710101000000				
Inner Dead-Length Collets						
5C Emergency Dead-Length Collet	11590010000000		$\frac{1}{8}$ " (3.18)	$\frac{3}{4}$ " (19.05)	$\frac{41}{64}$ " (16.27)	$\frac{17}{32}$ " (13.50)
5C Hardened Precision DL Collet <sup>2</sup>	11590019000000			$\frac{3}{4}$ " (19.05)	$\frac{41}{64}$ " (16.27)	$\frac{17}{32}$ " (13.50)
16C Emergency Dead-Length Collet		11731300000000	$\frac{1}{8}$ " (3.18)	$\frac{13}{16}$ " (30.16)	$\frac{11}{16}$ " (25.80)	$\frac{53}{64}$ " (21.03)
16C Hardened Precision DL Collet		11730019000000		$\frac{13}{16}$ " (30.16)	$\frac{11}{16}$ " (25.80)	$\frac{53}{64}$ " (21.03)



1 – Dead-Length collet sold separately. 2 – Available in  $\frac{1}{32}$ " increments.

NOTE: Millimeters in parentheses. Part numbers preceded by 9 are special order.

# Dead-Length® Collet Ejector Stops



5C Ejector



16C Ejector

- Ideal for second operation work
- Kicks part out into part chute when collet is opened
- Ejects part into step collet and holds it against shoulder while collet is closing
- Ejects part into a feed finger style parts transfer device
- One time purchase of complete assembly; after that, buy only the "Stop for Plunger"

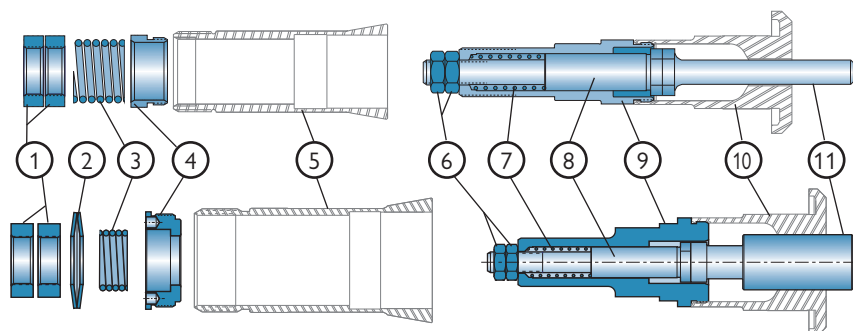
## 5C and 16C Dead-Length Collet Ejector Stop Assembly

Description	Key	5C D.L. Ejector Stop Part Number	16C D.L. Ejector Stop Part Number
Ejector Assembly Only - No Collets **		21650000000000	21750000000000
Ejector Stop Assembly - Complete		21610000000000	21710000000000
Ejector Assembly & Outer Collet *		21630000000000	21730000000000
Ejector Assembly Step Chuck - Complete		21570000000000	21590000000000
Parts List - Components			
Nut/nuts1	1	21690000000000	21790000000000
Belville Springs [2]	2	N/A	CE1750057
Large Spring	3	CE09751051250	CE11001050875
Spring Retainer	4	11310000000000	21810000000000
Outer Collet	5	11610010000000	11770000000000
Small Nut	6	U0004141C	U0004141C
Small Spring	7	10650000000000	10650000000000
Heavy Small Spring	7	—	CE0000054
Plunger	8	10610000000000	10610000000000
Ejector Body	9	21670000000000	21770000000000
Emergency Dead-Length Collet	10	11590010000000	11730000000000
Hardened, Precision Dead-Length Collet	10	1159001900Size	On Application
Dead-Length Step Chuck	10	11690010000000	11750000000000
Stop for Plunger	11	10630000000000	21830000000000

\*\* Includes Parts: 1, 2, 3, 4, 6, 7, 8, 9 and 11; \* Includes Parts: 1, 2, 3, 4, 5, 6, 7, 8, 9 and 11

5C Assembly

16C Assembly





# Dead-Length® Spider-Stop Step Chuck

The Dead-Length Spider-Stop Step Chuck is designed to handle workpieces larger than the capacity of the Dead-Length 16C Collet or Step Chuck. The spider stop slides through oversize slots in the step chuck and locates against the collet seat in the machine's 16C spindle. A stop button screws into the spider stop and can be machined to locate against the reference location on the workpiece. This system requires a standard extra-depth step chuck closer.



The Spider-Stop Step Chuck has only one moving part — the step chuck. This allows for much better concentricity than the standard Dead-Length Collet System, even for smaller diameter workpieces. The Step Chuck is first machined to the chucking diameter of the workpiece and to a depth to accommodate the stop button. The stop button is machined to the locating surface of the workpiece. The stop button is assembled. The unit is mounted into the spindle of the machine that already has the appropriate step chuck closer mounted. With the collet closer in the open position and the workpiece held against the stop button, the draw tube is turned until the step chuck just grips the workpiece and then backed off ½ a turn. The part should easily load into the step chuck. The collet closer is locked in this position. With the part firmly located against the stop button, the step chuck is closed. It is important that the stop button be lightly faced after the unit is mounted in the spindle to ensure extremely precise perpendicularity with the locating surface.

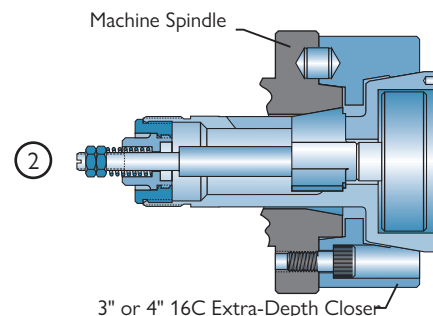
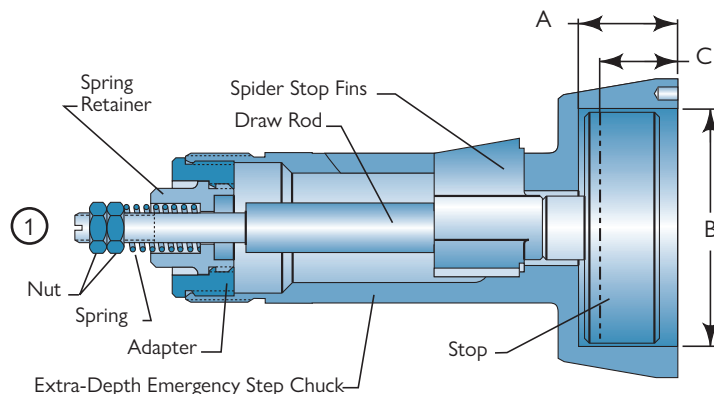
## 16C Dead-Length Spider-Stop Step Chuck

Description	Part Number	Figure	A – Maximum Bore Depth	B – Maximum Chucking Dia.	C – Maximum Chucking Depth
3" ED Emergency Dead-Length Step Chuck Assembly	13310000000000	1	1.250" (31.75)	3.00" (76.20)	1.000" (25.40)
3" ED Emergency Dead-Length Step Chuck	13270000000000	1			
3" Stop Button	11370000000000	1			
Spider-Stop Assembly, Includes:	12390000000000	1			
Spider Stop Fins*	13250000000000	1			
Draw Rod	13490000000000	1			
Adapter Bushing	11550100000000	1			
Spring Retainer	11630000000000	1			
Spring	11650000000000	1			
Nut [2]	U 0004141	1			
3" 16C ED Hardened Step Chuck Closer (sold separately)	160002683OC	2			
4" ED Emergency Dead-Length Step Chuck Assembly	13670000000000	1	1.250" (31.75)	4.00" (101.60)	1.000" (25.40)
4" ED Emergency D.L. Step Chuck	13290000000000	1			
4" Stop Button	13190000000000	1			
Spider-Stop Assembly (Parts Shown Above)	12390000000000	1			
4" 16C ED Hardened Step Chuck Closer (sold separately)	160002684OC	2			

\* ½"-20 TPI (Internal Thread) x ⅜" (15.9mm) deep can be used for customer made extensions.

NOTE: Millimeters in parentheses.

Initial Order Requires: One 3" or 4" Emergency Dead-Length Step Chuck Assembly and one 3" or 4" Extra-Depth Hardened Step Chuck Closer.



CROSS SECTION OF ITEMS MOUNTED

# Style "S" Master Collets & Pads



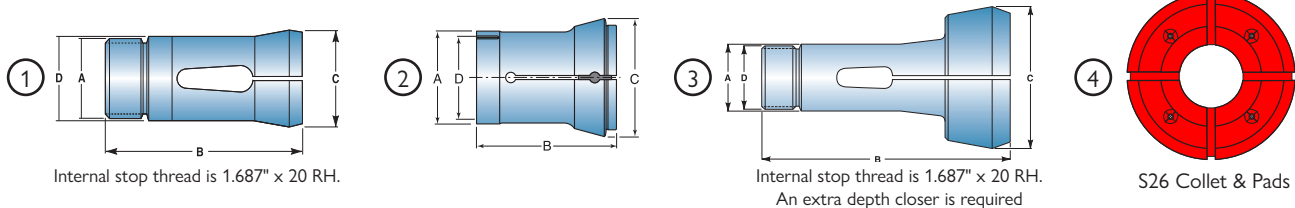
The Style "S" Master Collet, although originally designed for first operation machining on multi-spindle automatic screw machines, has many benefits to the CNC lathe operator. The collet pads can be changed much quicker than a standard solid collet, the cost is less and it requires much less storage space. Depending on size, the TIR for the master collet and pads is .004" to .008".

The Style "S" Master Collet System with Hardened, Precision collet pads should not be used for secondary work because of the system's large TIR. Some customers are successful using emergency pads which they bore to size on the machine tool. Choose from soft emergency or semi-hard emergency pads for longer wear. When the pads are removed from the master collet and then replaced, they may again runout excessively. Emergency collets are used again when re-bored to sizes larger than the original bore.

## Style "S" Master Collets and Pads

Style	Master Part Number	Fig	Extra-Depth Closer Part Number	Pad Part Number	A – Back Bearing Diameter	B – Overall Length	C – Collet Face Diameter	D – Thread	Round	Hexagon	Square
S10 (B42)	520500	2	—	5601	1.887" (47.93)	3.688" (93.68)	2.355" (59.82)	M43 x 1	1" (25.40)	<sup>55</sup> / <sub>64</sub> " (21.83)	<sup>45</sup> / <sub>64</sub> " (17.86)
S12 (16C)	171701	1	—	5603	1.889" (47.98)	4.625" (117.48)	2.265" (57.53)	1.870" x 1.75 mm RH	<sup>1</sup> / <sub>4</sub> " (31.75)	<sup>1</sup> / <sub>16</sub> " (26.99)	<sup>7</sup> / <sub>8</sub> " (22.23)
S16 (16C)	171702	3	160002683OC	5607	1.889" (47.98)	6.453" (163.91)	3.875" (98.43)	1.870" x 1.75 mm RH	<sup>1</sup> / <sub>8</sub> " (41.28)	<sup>13</sup> / <sub>32</sub> " (35.72)	<sup>1</sup> / <sub>4</sub> " (28.97)
S20 (20C)	124900	3	200002683OC	5609	2.378" (60.33)	8.388" (213.06)	3.750" (95.25)	2.359" / M60 x 1.5mm RH	2" (50.80)	<sup>123</sup> / <sub>32</sub> " (43.66)	<sup>113</sup> / <sub>32</sub> " (35.72)
S26 (20C)	3605N as a special			5613	2.378" (60.33)	8.813" (223.85)	4.750" (120.65)	2.359" / M60 x 1.5mm RH	<sup>2</sup> / <sub>8</sub> " (66.68)	<sup>217</sup> / <sub>64</sub> " (57.55)	<sup>127</sup> / <sub>32</sub> " (46.83)
S22 (B65) <sup>1</sup>	531100	2	—	5611	2.832" (71.93)	4.328" (109.93)	3.603" (91.51)	M66 x 1	<sup>2</sup> / <sub>4</sub> " (57.15)	<sup>115</sup> / <sub>16</sub> " (49.21)	<sup>137</sup> / <sub>64</sub> " (40.08)
S26 (25C)	129100	4	14430000000000	5613	2.930" (74.42)	9.020" (229.11)	4.926" (125.38)	2.871" / M73 x 1.5mm RH	<sup>2</sup> / <sub>8</sub> " (66.68)	<sup>217</sup> / <sub>64</sub> " (57.55)	<sup>127</sup> / <sub>32</sub> " (46.83)

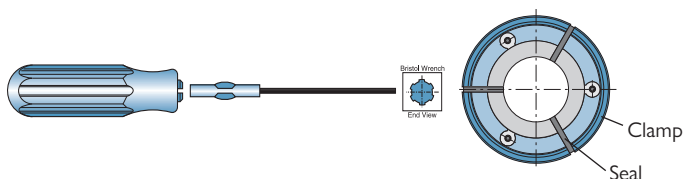
1- Uses Clamp Assembly 7627 (3 ea). NOTE: Millimeters in parentheses.



## Style "S" Pads – Standard, Soft Emergency, Semi-hard Emergency

Description	Round Smooth Part Number	Round Serrated Part Number	Round Metric Part Number	Hexagon Part Number	Square Part Number	Emergency Part Number	Semi-Hard Emerg. Part Number
S10 Pads	56010019	56010059	56010057	56010029	56010039	56011410	—
S12 Pads	56030019	56030059	56030057	56030029	56030039	56031410	56031310
S16 Pads	56070019	56070059	56070057	56070029	56070039	56071410	56071310
S20 Pads	56090019	56090059	56090057	56090029	56090039	56091410	56091310
S22 Pads	56110019	56110059	56110057	56110029	56110039	56111410	56111310
S26 Pads	56130019	56130059	56130057	56130029	56130039	56131410	56131310

NOTE: Other pad configurations available.



S10, S12, S16, S20 & S26 Collet & Pads

Description	Part Number
Bristol Wrench Handle	79090000000010
Wrench .111"	79090000000001
Wrench .145"	79090000000002
Bristol "L" Wrench	76370000000000
Bristol Wrench Handle	79090000000013
Seal (Sold by the dozen)	76430000010000
Clamp Assembly 3 ea. (S26 4 ea.)	76190000000000
Clamp Assembly for S22 (3 ea.)	76270000000000



The Hardinge® Super-Precision® Master Expanding Collet is a valuable aid for close tolerance machining. There is no end movement of the master expanding collet or pads. The collet threads are separate from the collet body and pull back to operate the expander. The shoulder on the machineable pads locates the work for Dead-Length® control for facing repetitive parts to the same length. No spindle nose cap is required.

## Master Expanding Collet Assembly – 5C and 16C

Description	5C Part Number	16C Part Number
Master Expanding Collet Assembly <sup>1</sup> – includes parts listed below:	11390000000000	11910000000000
Expanding Collet Body	11410000000000	11930000000000
Draw Thread	11430000000000	11950000000000
Draw Plug	11450000000000	11970000000000
Spring	11510000000000	11510000000000
Screw	0100306	0100306
Nut	U0004141C	U0004141C
Model Number	5EC-70	16EC-80

1 - Requires master pad set and appropriate limit ring; each sold separately.

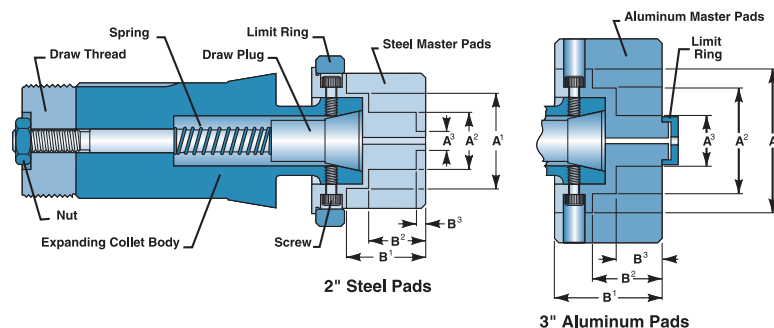
The master collet is hardened and precision-machined. The pads are soft for turning in the machine spindle for exacting concentricity. Depending on job application, pads may be machined for internal gripping from 1/4" to 3" ID. The limit ring is used to stabilize the pads while turning to the desired diameter. Pad segments and master collet are stamped "A", "B" and "C" for replacement positioning. The pads may be re-machined for smaller diameters. Can be used on all machines or attachments with a 5C or 16C spindle and operates with the standard draw spindle (bar). The collet body assembly and the limit rings are a one-time purchase. After that, you only have to order the low-cost pads.

## Master Expanding Collet Pad Sets – 1/4" to 3" (6.35 to 76.20mm) Capacity

Description	Part Number	Model	Pad Capacity	A – Gripping Diameter	B – Maximum Turned Length
2" Steel Master Pad Set <sup>2</sup>	11470000000000	5EC-70-4	2" (50.80)	Over 1 1/2" to 2" (38.10 to 50.80) [A1]	1 1/16" (26.99) [B1]
			2" (50.80)	Over 3/8" to 1 1/2" (9.53 to 38.10) [A2]	3/4" (19.05) [B2]
			2" (50.80)	1/4" to 3/8" (6.35 to 9.53) [A3]	Equal to Diameter Turned [B3]
Limit Ring for 2" Pads	11490000000000				
3" Aluminum Master Pad Set <sup>2</sup>	11530000000000	5EC-70-7	3" (76.20)	Over 2" to 3" (50.80 to 76.20) [A1]	1 5/8" (41.27) [B1]
			3" (76.20)	Over 1 1/2" to 2" (38.10 to 50.80) [A2]	1 1/16" (26.99) [B2]
			3" (76.20)	3/4" to 1 1/2" (19.05 to 38.10) [A3]	3/4" (19.05) [B3]
Limit Ring for 3" Pads	11112200000000				

2 - Requires limit ring.

NOTE: Millimeters in parentheses.



# Precision Expanding Collets



The Model-S Expanding collet draw plug expands at the front of the collet, resulting in maximum gripping force in the bore of a small diameter work-piece. For larger diameter workpieces, Hardinge recommends the Sure-Grip® Expanding Collet System.

## Model-S Precision Expanding Collets

Precision internal chucking simplifies your tooling and machining operations. Precision results are assured when many operations are done in one chucking. The Model-S expanding collet assembly is precision engineered for small inside diameter chucking.

Concentricity requirements, like all machining specifications, are very rigid. With the Hardinge expanding collet unit, it is easy to obtain concentric and square shoulders, faces and diameters with a previously machined bore. The Hardinge expanding collet adjusts to meet your most exacting requirements by means of four concentricity adjusting screws. Exact lengths are easily obtained since both the stationary expanding collet and work locating stop have no end movement. The work locating stop is machined in place during machine set up, assuring an absolutely square locating surface. When the collet is in the released position, it is smaller in diameter than the bore of the part. The result is fast and easy loading and unloading.

## 5C and 16C Model-S Expanding Collet Assembly – 3/8" to 3/4" (9.52 to 19.05mm) by 1/64" Increments

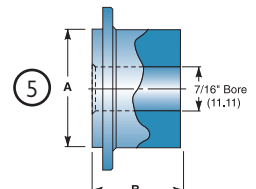
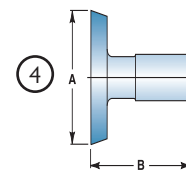
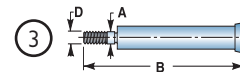
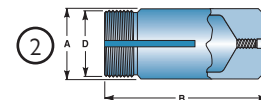
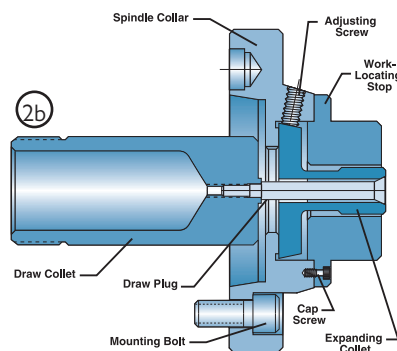
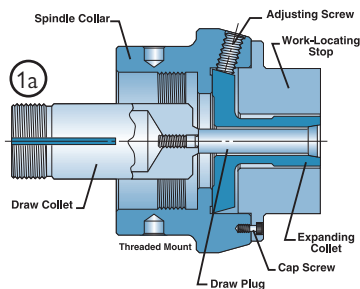
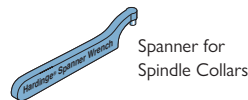
Description	Part Number	Fig.	Model	A – Back Bearing Outside Diameter	B – Overall Length	D – Thread
5C Model-S Assembly <sup>1</sup>						
- Taper	10772600000000	1a				
- Threaded	10770000000000	1a				
includes parts below:						
Draw Collet	10790000000000	2	E-206	1.249" (31.72)	3.250" (82.55)	1.238" x 20 RH
Draw Plug	10810000000000	3	ES-207	.254" (6.45)	2.750" (69.85)	.245" x 28 RH
Spindle Collar:		1a				
- Taper-Nose	10830000000000		E-211			
- Threaded-Nose	10850000000000		E-211-D			
- A2-4 and A2-5	Special Order					
Adjusting Screw	0570510					
Cap Screw	0100308					
16C Model-S Assembly <sup>1</sup>	12050200000000	1b				
includes parts below:						
Draw Collet	12090200000000	2		1.889" (47.98)	4.312" (109.53)	1.870" x 1.75 mm RH
Draw Plug	10811600000000	3		.220" (5.59)	2.969" (75.41)	7 mm x .75 RH
Spindle Collar	160000211A201	1b				
Adjusting Screws [4]	0550710	1b				
Cap Screws [3]	0100308	1b				
Mounting Bolts [4]	0101216	1b				
Model-S Expanding Collet <sup>2</sup>	1089 (fractional/decimal)	4	MP3461	2.255" (57.28)	1.750" (44.45)	
Work-Locating Stop <sup>3</sup>	10870000000000	5	ES-209	2.312" (58.72)	1.218" (30.94)	
Spanner for Spindle Collars, 5/16" Pin	4600009189					

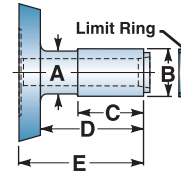
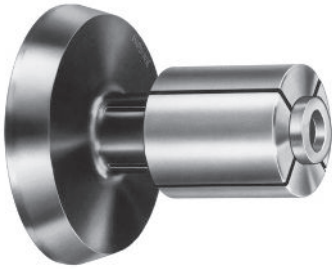
1 - Requires Model-S Expanding collet sold separately.

2 - Required with assembly. Available in Round sizes 3/8" to 3/4" by 1/64" increments.

3 - Optional. Recommended for positive part location.

NOTE: Millimeters in parentheses.





## Model-S Emergency Expanding Collets

Part Description	Number	Model	A – Neck Turned Range	B – Gripping Diameter	C – Gripping Length	D – Face to Length	E – Shoulder Depth	Length
Model-S Emergency Expanding Collet <sup>1</sup>	10930000	S-E	.562" to .750" (14.27 to 19.05)	.547" (13.89)	.766" (19.46)	.906" (23.01)	1.281" (32.54)	1.656" (42.06)
Limit Ring	10932200	MP3461C						

1 - Limit Ring required

Note: Millimeters in parentheses.



## Sure-Grip® Expanding Collet Systems

The Hardinge Sure-Grip® Expanding Collet System is ideal for internal gripping of larger diameter bores. The Sure-Grip system has a larger gripping range and considerably more gripping force due to its true parallel closing. Refer to models 200, 250, 300, 400, 500 and 600 in brochure #2270.

## ADVANTAGES OF THE SURE-GRIP EXPANDING COLLET SYSTEM

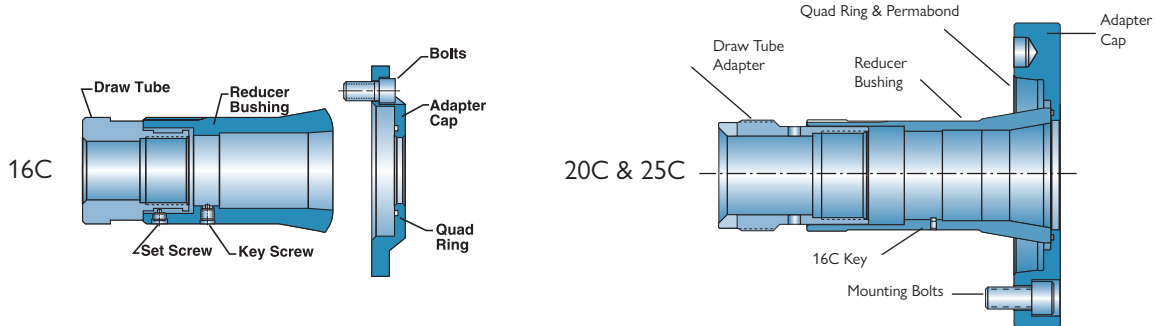
- Instant centering of the arbor—no adjustment needed after mounting
- Quick changeover
- Wide gripping range for each collet
- True parallel gripping even when gripping on half the collet body
- High gripping force
- Light gripping on small parts with bores down to 1/8" (3.175mm)
- Built-in safety stop to prevent the collet from over expanding
- Exact part length control
- Consistency in collet capacity for different spindle styles (interchangeable collets)
- Delivery in 3 to 5 days



# Collet & Step Chuck Adapters



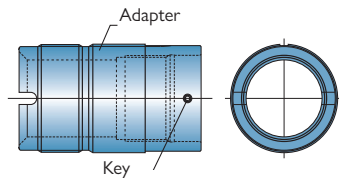
Collet adapters let you use smaller collets in machines with larger collet seats. Units are available to adapt 5C collets to 16C spindles, 16C collets to 20C and 25C spindles and 16C step chucks to 20C spindles. These units are valuable when you do not have the proper size standard collet for the machine but do have the proper size in a smaller style collet. Do not consider this unit when doing precision work. Because of the number of parts in the assembly, the TIR of the machined diameters to the chucked diameters may be unacceptable. This system should not be considered when doing many collet changes a day. It may take from 15 to 30 minutes to change a collet. It is more cost effective to purchase the proper style collet for the machine tool.



## Spindle Collet Adapters

Description	A2-5 Spindle 16C to 5C Part Number	A2-6 Spindle 20C to 16C Part Number	A2-6 QUEST® 25C to 16C Part Number	A2-8 Spindle 25C to 16C Part Number
Adapter Assembly - includes:	16B00001855C	75350000	29930000	74570000
Draw Tube Adapter	16A00003015C	75410000	74630000	74630000
Reducer Bushing	16A00001865C	75370000	74610000	74610000
Bolts [3] (20C & 25C 4ea.)	CC0007373	MS0104219	MS0104219	MS0104620
Adapter Cap	16B0010768	75430000	75430000	74590000
Quad Ring	40001115132	41001115145	41001115145	41001115145
Key	—	75390000	74650000	74650000
Key Screw	1600003385C	—	—	—
Set Screw	N0590304L	—	—	—
PermaBond 910	QC0010884	QC0010884	QC0010884	QC0010884

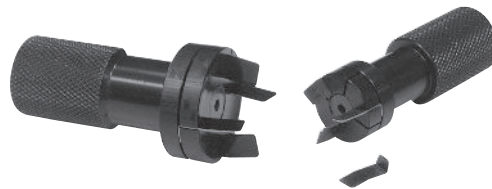
NOTE: For use with collets, positive stops, master expanding collet and pads, collet fixture plates, stub/mill arbors, and spindle centers and drivers.



## Spindle Step Chuck Adapters

Style	Description	Part Number
16C	N/A	
20C	20C to 16C Step Chuck Adapter - includes:	79110000000000
	Draw Tube Adapter	79130000000000
	Key	79150000000000
25C	N/A	

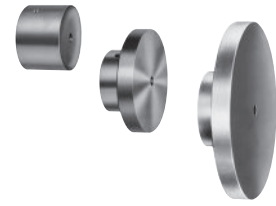
NOTE: Uses the lathe's standard closer with the adapted step chuck.



## Collet Face Spanner Wrenches

Collet	Wrench Part Number	Replacement Finger Set Part Number
3J, 16C	7901000000003J	7901000000FNGR
5C	78990000000000	7899000000FNGR
20C	79010000000020C	7901000000FNGR
25C	79010000000025C	7901000000FNGR
S15	790100000000S15	790100000015FN
S20	790100000000S20	7901000000SFNG
S26	790100000000S26	7901000000SFNG
S30	790100000000S30	7901000000SFNG

Fixture plates are used to mount parts which cannot be held in a collet, step chuck, expanding collet or jaw chuck. The clamping method is custom designed and manufactured by the customer to meet the machining requirements. Fixture plates normally have to be balanced to be safely run because the parts are not uniform or clamped in an off-center position. Collet and spindle-mount styles are available for both 5C and 16C spindles.

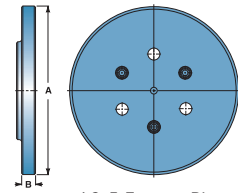


3 Sizes of  
5C Fixture Plates

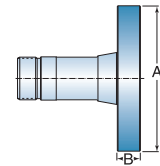
## Spindle-Mounted and Collet-Style Fixture Plates

Description	Taper Part No.	Threaded Part No.	Taper Model	Threaded Model	A – Diameter		B – Flange	
5C Fixture Plate	53A0008750	53A0008750D	C-23	C-23D	3"	(76.20)	—	
5C Fixture Plate	55A0008750	55A0008750D	C-24	C-24D	5"	(127.00)	3/4"	(19.05)
5C Fixture Plate	59A0008750	59A0008750D	C-25	C-25D	8 7/8"	(225.43)	3/4"	(19.05)
16C Fixture Plate	A2000875005			C-24A	5 1/2"	(139.70)	—	
A2-5 Fixture Plate	A2000875008			C-25A	8 7/8"	(225.43)	.750"	(19.05)
5C Collet-Style	13970000000000			5C-3F	3 3/8"	(85.73)	1"	(25.40)
5C Collet-Style	13990000000000			5C-4F	4 3/8"	(111.13)	1"	(25.40)
16C Collet-Style	17850000000000			—	6.370"	(161.79)	1"	(25.40)

NOTE: Millimeters in parentheses.



A2-5 Fixture Plate

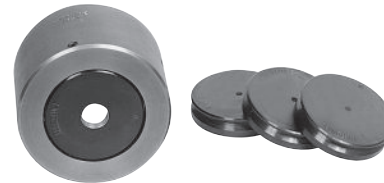


Collet Style  
Fixture Plates

Dead-Length Work Stops (Backing Plates) are used to hold extremely close lengths on parts that have a stem and a locating shoulder. The stem is gripped by the collet and the shoulder located against the stop plate. As the collet closes, it pulls the workpiece back against the backing plate. The workpiece length can be accurately controlled even when the gripping diameter of the part varies. The part is much more stable than one held in a collet against its face or a counterbore. This allows longer parts to be machined with better tool life. When running small quantities, the spindle mount systems do not have to be used. This system is the least costly of all precision length control systems.

## 5C Dead-Length Work Stops

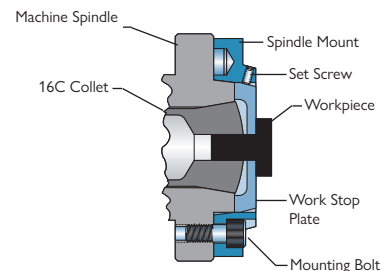
Description	Taper Part Number	Threaded Part Number	Taper Model	Threaded Model
Spindle Mount	ST0011203	ST0011203D	WS	WSD
Stop Plates [Set of 3]		ST0011223		WSS



5C Spindle Mount & Stop Plates

## 16C Dead-Length Work Stop Assembly

Description	Part Number
Spindle Mount Assembly	13110000000000
Includes:	
Work Stop Spindle Mount	13130000000000
Flat Face Set Screw [4]	0570306
Mounting Bolt [4]	0101216
Work Stop Plates (Set of 3)	13150000000000

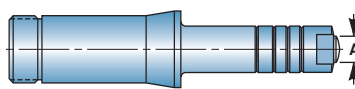
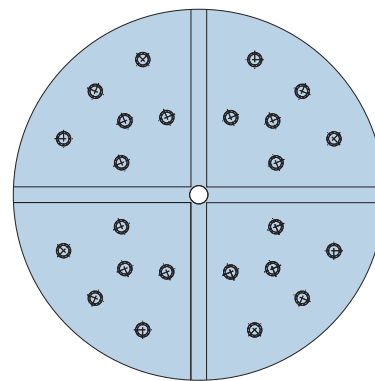
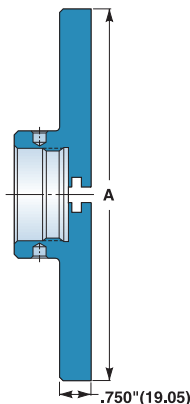


# 5C Face & Angle Plates



5C Face Plates	Taper Part Number	Threaded Part Number	Taper Model	Threaded Model	A – Diameter
Face Plate <sup>1</sup> -5C	57A0000692	57A0000692D	C-26	C-26D	7.000" (177.80)
Face Plate <sup>1</sup> -5C	59A0000692	59A0000692D	C-27	C-27D	8.875" (225.42)

1 – Drilled and tapped for 5/16" x 18 TPI bolts. NOTE: Millimeters in parentheses.



## 5C Stub/Mill Arbors

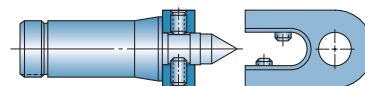
5C Stub Arbors are available in 5/8" and 1/2" shaft diameter. The stub arbors can be used on any mill with a 5C spindle. They are made for simple milling operations on Hardinge-style mills.

Description	Part Number	Model	A – Shaft Dia.
Stub/Mill Arbor	540002602	M-4	5/8" (15.88)
Stub/Mill Arbor	530002602	M-5	1/2" (12.70)
Center With Driver	U0009186	M-1	
Drive Plate:			
Taper	570000298	G-12	N/A
Threaded	570000298D	G-12D	N/A
Driving Dog	370002617	G-1	N/A

NOTE: Millimeters in parentheses.

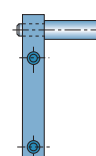
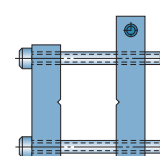
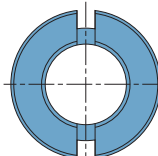
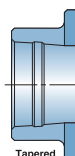
## 5C Center with Driver

The Hardened, Precision-Machined center with the driver is required for between-center work on any machine or attachment with a 5C Spindle.



## 5C Driving Dog and Driver

The drive plate mounts on the Hardinge 5C spindle nose and is used in conjunction with the driving dog to drive work between centers. When ordering, specify for taper- or threaded-nose spindle.



# CUSTOM MANUFACTURING OF SPECIAL COLLETS AND STEP CHUCKS

Hardinge will manufacture special 5C, 16C, 20C and 25C collets and step chucks to hold your extruded stock, non-round parts, eccentric, off-center and stepped parts. Special accuracy collets and step chucks, extremely deep and/or large diameter step chucks and closers are some of the frequently made items in our special collet department. If you have a special workholding application, Hardinge can manufacture a workholding device to accurately grip it.

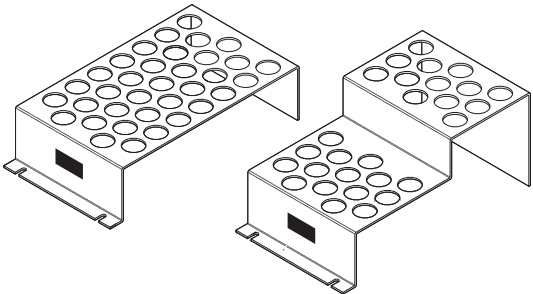
Specials are manufactured to rigid specifications, including material, proper heat treat and machined accuracy. The experts in our engineering department can offer you technical assistance in designing your collet, step chuck or related workholding device for your special machining needs. Hardinge can manufacture many of your unusual or unique workholding items to your specifications. For generations, Hardinge specials have been the choice of experienced machinists, manufacturing engineers and productivity-oriented manufacturers.

To request a quote or to order a special workholding device, please call 800-843-8801, or fax your drawing to 607-737-0090. Specifications for the most common special collets are shown on the following two pages. These pages can be photocopied, filled out and faxed or mailed to the Hardinge Sales Department. When sample parts are being sent to Hardinge, please call for a Returned Material Authorization number to help speed up the process. The drawings and sample parts should be addressed to: Hardinge Inc., Collet Sales Department, One Hardinge Drive, Elmira, NY, 14902-1507.



Protect your 5C collet investment with Hardinge® Collet Racks. Store your collets in a manner that will protect the head angle, threads and keyway. The collet racks give quick access and easy collet selection and are designed to bolt to your work table for maximum stability. Available in a 35 capacity rack and a stepped 28 capacity rack. The stepped model holds fully assembled Dead-Length® collets, collets with stops, master expansion collets, standard and extra-depth step chucks.

5C Collet Racks	Capacity	Part Number
5C Collet Rack	35	09440000000032
5C Collet Rack - Stepped	28	09440000000028



## Custom Quote Request I of 3

To place your order or request a quote, simply fill out this form and send the requested information below. We want to make it easy as possible for you to get your quotation back, so checking the box in front of each item will help to ensure everything is complete before sending the information to us. The following two pages will assist you in choosing your collet configuration.

- ☒ Your Name \_\_\_\_\_
- ☒ Company \_\_\_\_\_
- ☒ Address \_\_\_\_\_
- ☒ City, State & Zip \_\_\_\_\_
- ☒ Phone \_\_\_\_\_
- ☒ Fax \_\_\_\_\_
- ☒ Machine Make and Model Number on which workholding will be used:  
(Example: Hardinge Quest 8/51)
- ☒ Collet Required:  
(Example: 20C)
- ☒ Spindle Nose:  
(Example: A2-6)
- ☒ Sample Stock (6" long - extruded stock), casting, first operation part, finished part
- ☒ Legible Prints of the stock, finished part. These must be marked to show the diameters or surfaces to be gripped. Mark the locating surface used for length control. Please mark the surfaces to be machined.
- ☒ AutoCad Files or dxf files of the above, if available.
- ☒ Written Explanation of any special requirements:  
For example special concentricity or perpendicularity requirements, concerns with chip flushing, requirements for thru-spindle coolant, customer concerns with part being deformed by gripping, large variation of gripping surface or locating dimensions, etc.

Explanation:

---

---

---

---

---

---

— This page may be duplicated —



- Fill in the Type of Collet or Special (example 5C, 20C, 3J)
  - Find the illustration of the feature needed in one of the boxes
  - Put a Bold "X" in the box to indicate that feature
  - Write the required dimensions next to their numbers in the chart to the right
- Note: Only fill in the dimensions for the numbers on one illustration

Type of Collet or Special:  
(example: 5C, 16C, #3J, etc.)

Numbers below correspond to dimensions in boxes

Today's Date \_\_\_\_\_

Date Order Required \_\_\_\_\_

Customer Number \_\_\_\_\_

Purchase Order Number \_\_\_\_\_

Method of Shipping \_\_\_\_\_

---

Bill To:

Name \_\_\_\_\_

Title/Dept. \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

Ship To: (If different from Bill To)

Name \_\_\_\_\_

Title/Dept. \_\_\_\_\_

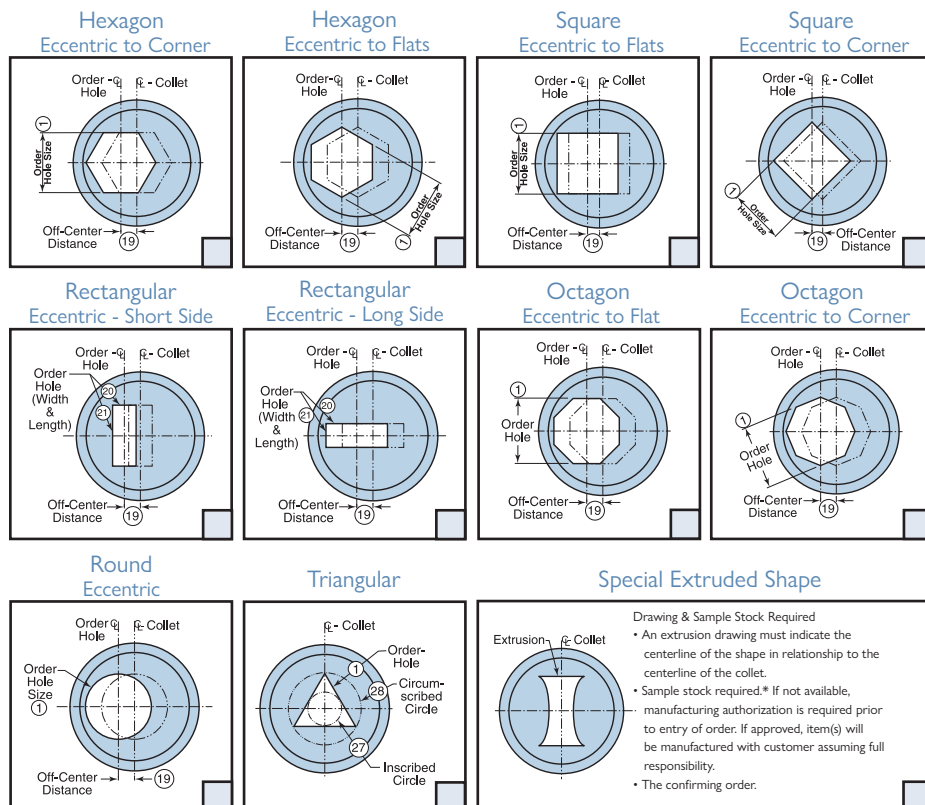
Company \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_

- ① Order Hole Size: \_\_\_\_\_
- ② Order Hole, 2nd: \_\_\_\_\_
- ③ Number of Slots: \_\_\_\_\_
- ④ Radius: \_\_\_\_\_
- ⑤ Bearing Length: \_\_\_\_\_
- ⑥ Bearing Length Front: \_\_\_\_\_
- ⑦ Back Drill Dia.: \_\_\_\_\_
- ⑧ Relief Dia.: \_\_\_\_\_
- ⑨ Relief Length: \_\_\_\_\_
- ⑩ Depth of Step, 1st: \_\_\_\_\_
- ⑪ Depth of Step, 2nd: \_\_\_\_\_
- ⑫ Auxiliary Hole Size: \_\_\_\_\_
- ⑬ Length of Extension: \_\_\_\_\_
- ⑭ Dia. at Face: \_\_\_\_\_
- ⑮ Degrees Taper/Chamfer: \_\_\_\_\_
- ⑯ Front Dimension of Taper: \_\_\_\_\_
- ⑰ Rear Dimension of Taper: \_\_\_\_\_
- ⑱ Taper-Industrial Std: \_\_\_\_\_
- ⑲ Off Center Distance: \_\_\_\_\_
- ⑳ Order Hole - Width: \_\_\_\_\_
- ㉑ Order Hole - Length: \_\_\_\_\_
- ㉒ Thread Length: \_\_\_\_\_
- ㉓ Threads Per Inch: \_\_\_\_\_
- ㉔ Right/Left Hand Thrd.: \_\_\_\_\_
- ㉕ Class Thread (1), (2), (3): \_\_\_\_\_
- ㉖ Chamfer Depth: \_\_\_\_\_
- ㉗ Inscribed Circle: \_\_\_\_\_
- ㉘ Circumscribed Circle: \_\_\_\_\_
- ㉙ Clearance Bore: \_\_\_\_\_
- ㉚ Actuator Stroke: \_\_\_\_\_



Send Drawings, Sample Parts  
and this form to:

**Hardinge Inc.**

Collet Sales Dept.

One Hardinge Drive

Elmira, New York 14902-1507

Phone: 800-843-8801

Fax: 607-737-0090

Email: [info@shophardinge.com](mailto:info@shophardinge.com)

Canada: 800-468-5946

Return Material Authorization (RMA#) required  
for Hardinge to receive your Sample Part

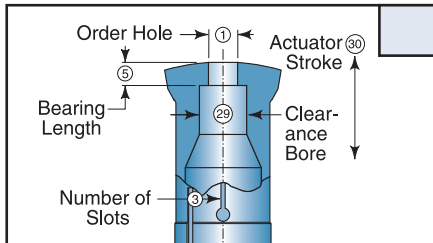
— This page may be duplicated —

\*One 6" length of stock required when ordering 1 to 3 collets; two 6" lengths for 4 to 7 collets; three 6" lengths for 8 to 11 collets; four 6" lengths for 12 to 15 collets ordered.

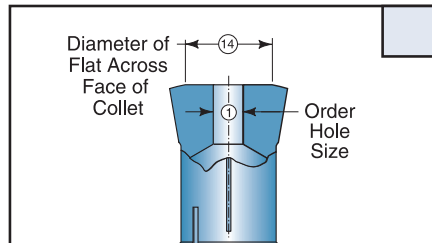
# Custom Quote Request 3 of 3

Checkmark the box with the feature you require and record the dimensions on the corresponding lines 1-30 on the previous page.

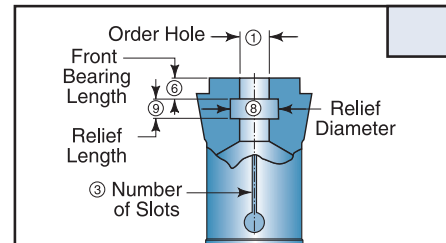
### Over-the Shoulder



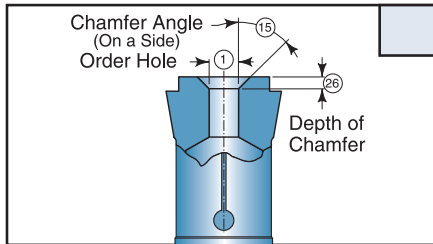
### Flat Face



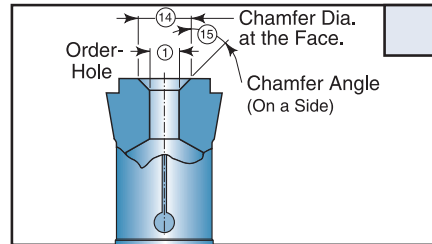
### Bearing Relief



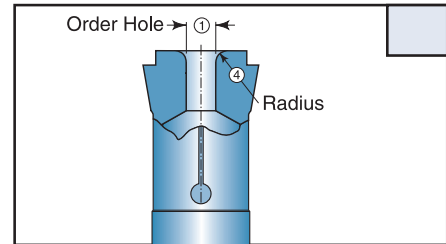
### Chamfer - Depth



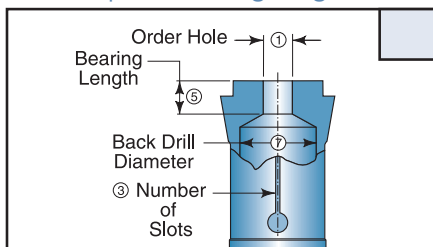
### Chamfer - Diameter



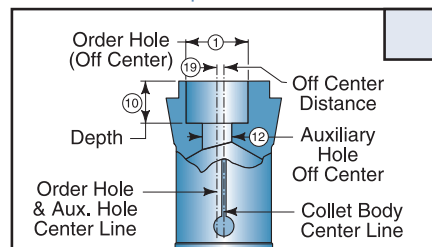
### Radius



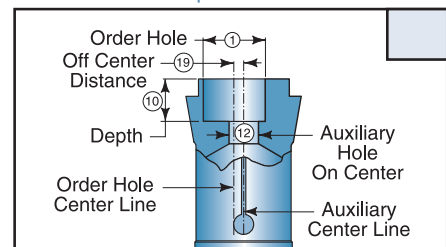
### Special Bearing Length



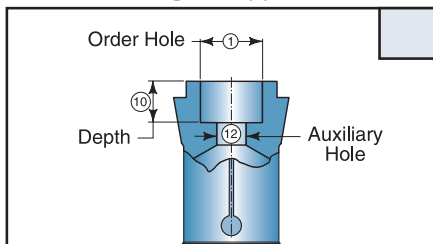
### Eccentric Step - Aux. Off Center



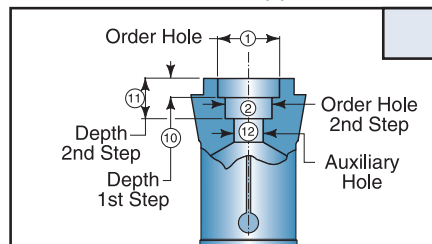
### Eccentric Step - Aux. On Center



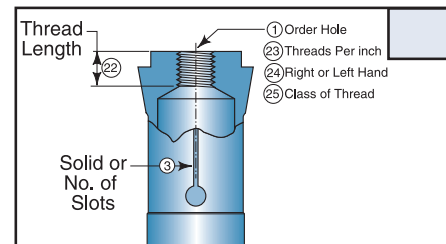
### Single-Stepped



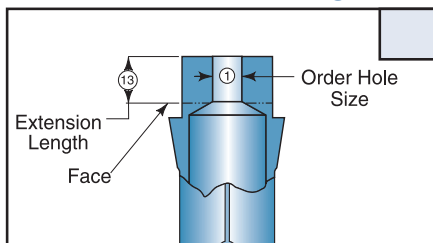
### Double-Stepped



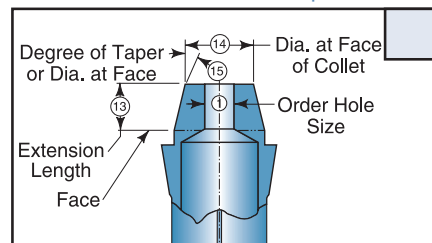
### Threaded Order Hole



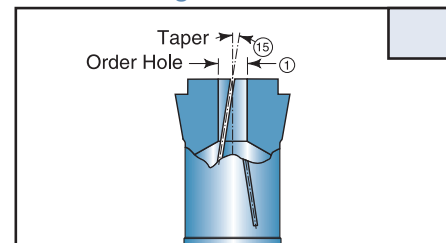
### Extended Nose - Straight



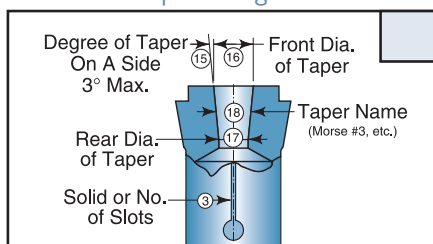
### Extended Nose - Tapered



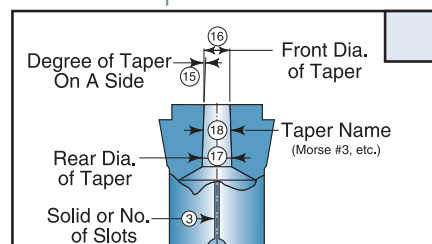
### Angular Slotted



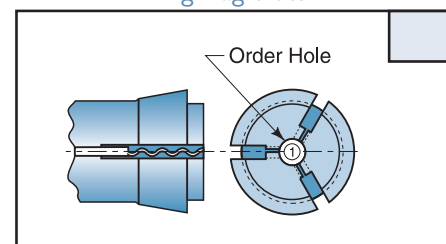
### Taper - Regular



### Taper - Reverse



### Zig-Zag Slots



— This page may be duplicated —

## B65 Collet Chuck

The B65 collet chuck is a Dead-Length® system designed to provide very precise length control of the workpiece. This exact part-length feature makes it possible to accurately transfer parts from one spindle to the other within .0005" (.0127 mm). The system uses either B65 Solid or B65 Style S22 Master Collets and pads.

The B65 Stationary Collet is used on the Hardinge QUEST® TwinTurn® 65 CNC Turning Center and other machines that use B65 Stationary Collet Systems.

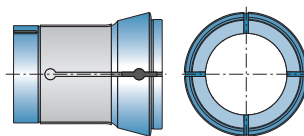
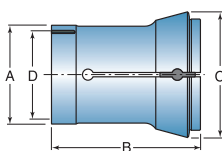
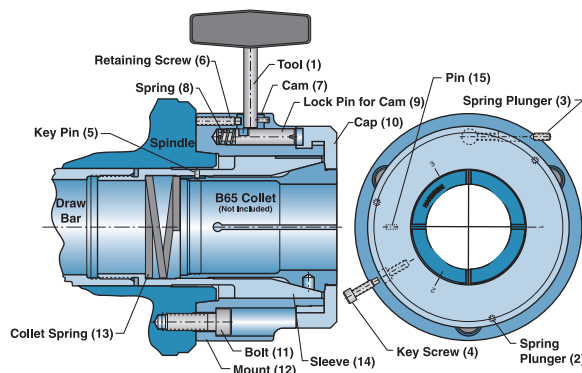
Stationary collet systems are noted for their length control feature. The collet does not move when it is closed. It is inserted into the collet chuck or spindle adapter and held in place with a cap. The collet is closed by a sleeve which moves forward on the collet closing angle. The B65 standard collet has RTV sealant in slots up to the Teflon chip sleeve and seal.



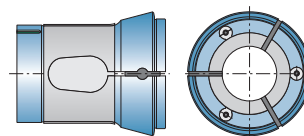
These units can be used for Dead-Length applications on lathes with A2-6 spindle noses. Separate link-ups will be needed for other lathes. Collet sold separately.

## B65 Collet Chuck Assembly and Parts List

Item	Description	Qty	Part Number
	B65 Collet Chuck Assembly	1	3757000000000
1	Tool	1	3757000000009
2	Spring Plunger Reid # ST-4N	3	CE 0375711
3	Spring Plunger Reid # K2-N	1	CE 0375712
4	Key Screw	1	3757000000008
5	Key Pin	1	3757000000007
6	Retaining Screw	1	3757000000006
7	Cam	1	3757000000005
8	Spring-Spec. # C-0360-047-1000-M	1	CE 0360047100M
9	Lock Pin for Cam	1	3757000000004
10	Cap	1	3757000000002
11	M12 x 30 Socket Head Cap Screw	3	MS 0104220
12	B65 Mount	1	3757000000001
13	Collet Spring	1	CE 0375710
14	Collet Sleeve	1	3757000000003
15	1/8" Dia. x 5/16" Dowel Pin	1	0004628



B65 Standard Collet



B65 Style-S Collet

## Collet Dimensions

Collet Style	A – Back Bearing Dia.	B – Overall Length	Head Diameter	D – ID Stop Thread	Round Capacity	Hex Capacity	Square Capacity
Std.	2.832" (71.93)	4.328" (109.93)	3.603" (91.51)	M66 x 1	1/16" – 2.559" (1.58 - 65.00)	1/16" – 2.216" (1.58 - 56.20)	1/16" – 1.809" (1.58 - 45.90)
S22	2.832" (71.93)	4.328" (109.93)	3.603" (91.51)	M66 x 1	1/8" – 2 1/4" (3.17 - 57.15)	1/4" – 1 15/16" (6.35 - 49.21)	1/4" – 1 37/64" (6.35 - 40.08)

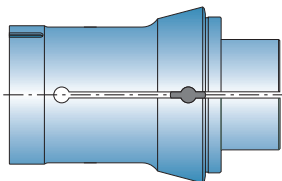
\* No internal threads over 2.530" Round, 2.191" Hex, 1.789" Square

NOTE: Millimeters in parentheses.

## B65 Collets – Standard and Style-S

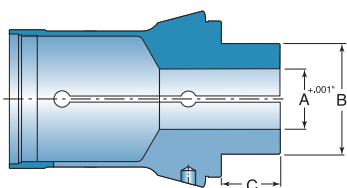
Description	Round Smooth Part Number	Round Serrated Part Number	Hexagon Part Number	Square Part Number	Emergency Part Number
B65 Solid Collet	37430019	37430059	37430029	37430039	37431410
B65 S22 Master Collet	53110000	—	—	—	—
S22 Pads	56110019	56110059	56110029	56110039	56111410

NOTE: Other collet & pad configurations available.



## B65 Collets – Emergency Extended-Nose

Description	Part Number	Nose Length	Pin Part No. ( $\frac{3}{16}$ " x 1")
B65 Ext. Nose Emergency Collet	37431413001875	1.5" from face	TL0006648

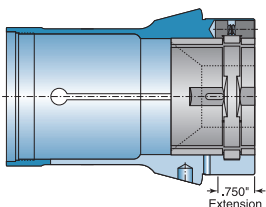


## B65 Special Extended-Nose Hardened Precision Collets

Hardened, precision collets were designed for the times you require extended-nose collets due to tooling interference. The hardened precision collets are most economical for long run jobs.

Description	Part Number	A – Smooth or Serrated Bore	B – Nose Diameter C – Extension
B65 Ext. Nose Hardened Collet	937436718	$\frac{1}{8}$ " to $2\frac{3}{4}$ " (3.17 to 63.89)	determined by the customer, or Hardinge, to meet the specific workpiece requirements.

NOTE: Millimeters in parentheses.

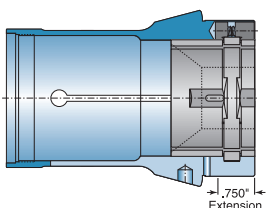


## B65 Style S22 Extended-Nose Master Collet

The Style "S" Extended-Nose Master Collets are ideal when frequently changing bar stock diameters. Only the pads need to be changed from one bar size to another, much quicker than changing standard collets. The pads take up less storage space and are less expensive than standard collets.

Description	Part Number	Nose Diameter
B65 S22 Ext. Nose Master Collet	53115400000000	3.188" (80.97)

NOTE: Millimeters in parentheses.



## B65 Style S22 Extended-Nose Emergency Pads

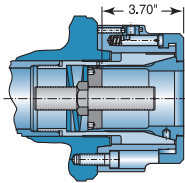
The Special Style-S Extended-Nose Emergency Pads are specifically designed for the Extended-Nose S22 Master Collet. The back of the pad extends the full length of the master collet bore. This design ensures that the closing forces are directly over the collet pads. This is a special order product.

Description	Part Number	Nose Diameter
B65 S22 Ext. Nose Pads	9561167000769Q	$\frac{1}{8}$ " to $2\frac{1}{4}$ " (3.1 to 57.15)

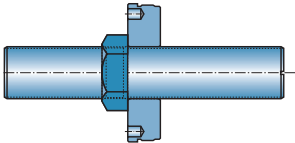
NOTE: Millimeters in parentheses.

B65 Threaded Positive Solid Stops

The stop assembly is threaded into the back of the collet and can be machined to locate the part for accurate length control.



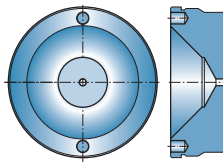
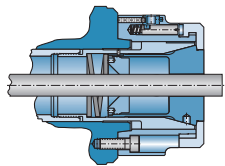
Description	Part Number
B65 Solid Stop Assembly - includes:	37590000000000
Body	37590000000001
Nut	11850000000000
Threaded Stop (1" diameter screw)	13630000000000



NOTE: The stop can be installed in all solid and master collets internally threaded with bores up to: 2.530" (64.2mm) Round; 2.191" (55.6mm) Hex; 1.789" (45.4mm) Square.

B65 Guide Bushing

The Guide Bushing is used to guide and support the bar stock into the bore of the collet when changing bars. The hole in the bushing should be 1/32" (.79mm) larger than the bar stock. The hole is bored to size by the customer. (Part Number 3761-00-00-000000)

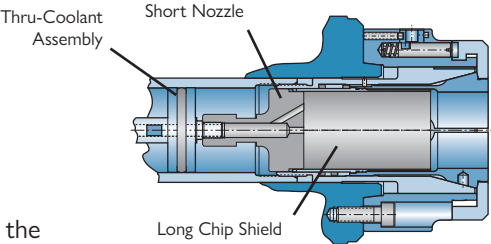
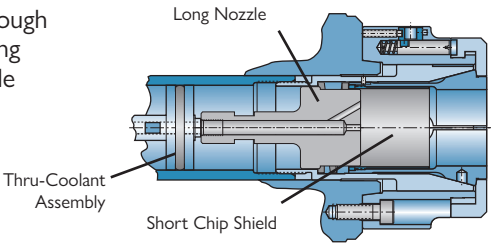
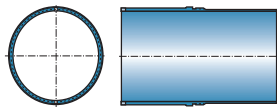
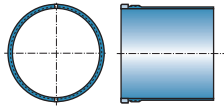


B65 (Internal) Chip Shield Kits

The shield reduces the possibility of chips going through the slots of the collet when through drilling or boring second operation work. The threaded stop or guide bushing cannot be used with the shield.

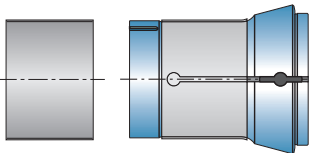
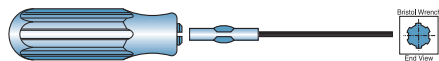
Description	Part Number
Short Sleeve Kit - includes:	37570000000010
Shield	37570000000011
Wrench	37570000000012
Long Coolant Nozzle	37570000000015
Long Sleeve Kit - includes:	37570000000013
Shield	37570000000014
Wrench	37570000000012
Short Coolant Nozzle	37570000000016

NOTE: The chip shield can be installed in all solid and master collets below 2.43" (61.7mm) round.



B65 Coolant Nozzles

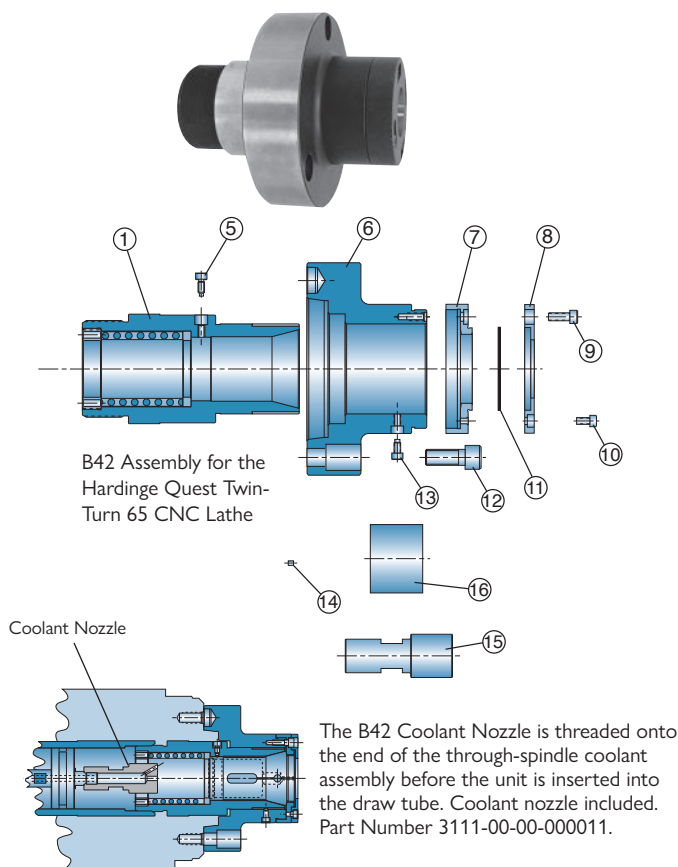
The Coolant Nozzles are threaded onto the end of the thru-spindle coolant assembly before the unit is inserted into the draw tube. The short nozzle is for the long chip shield and the long nozzle is for the short chip shield.



B65 Accessories

Description	Part Number
Bristol Wrench Handle	79090000000013
Wrench .145"	79090000000002
Seal - Standard Collet (12)	76490000010000
Seal - Style "S" (by dozen)	76430000010000
Clamp Asm. 1 ea. (3 Req.)	76270000000000
Bristol "L" Wrench	76390000000000
RTV Sealant (for slots)	CE00108840832
Teflon Sleeve	375700000000A19

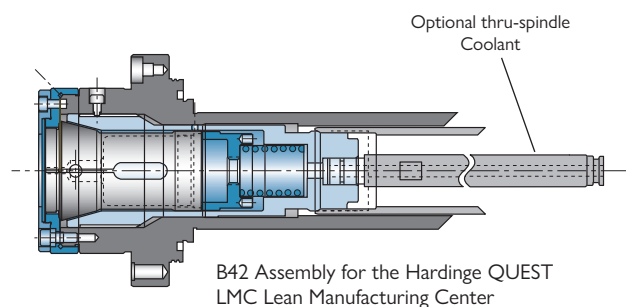
An external Heat-Shrinkable Teflon Sleeve is standard on all B65 collets with the straight slots which have a relief hole at the end. Older collets with the tear-drop slot may not have the sleeve. Its purpose is to help keep chips from getting into the collet chuck assembly. The Teflon sleeve can easily be replaced if it becomes damaged. It can also be added to older B65 collets. The slots are sealed up to the sleeve with RTV Sealant (Dow Corning #832).



The B42 Stationary Collet Adapter Assembly is a Dead-Length® system designed to provide precise length control of the workpiece. This feature makes it possible to accurately transfer parts from one spindle to the other within .0005" (.0127 mm). The system uses either B42 Solid or B42 Style S10 Master Collets and pads. The B42 Stationary Collet can be used on the Hardinge machines indicated below as well as other machines with an A2-6 spindle nose. Separate linkups will be required.

## Adapter Assembly and Parts List for the Hardinge® Quest® TwinTurn® 65

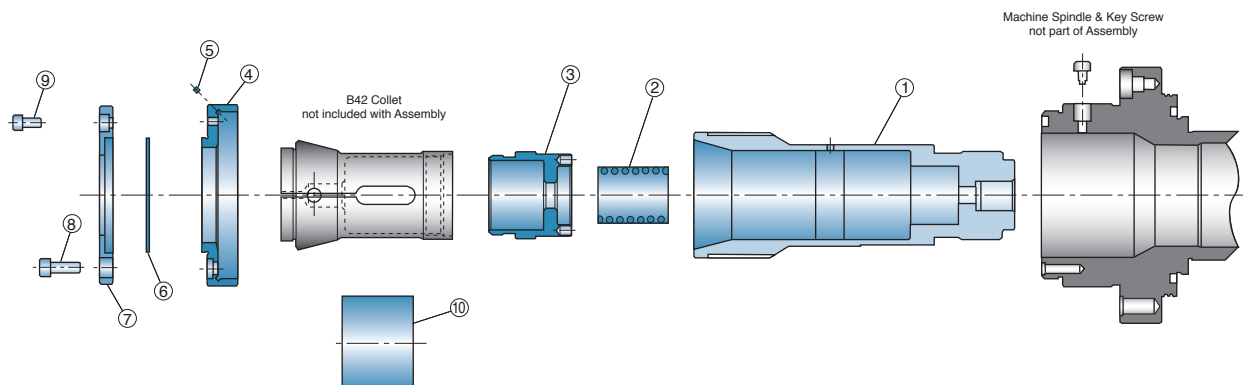
Item	Description	Qty	Part Number
—	B42 Collet Adapter Assembly	1	37190000000001
1	Spring Assembly	1	371900000000015
	(Items 1-4 in previous catalog—do not disassemble)		
5	— Removable Keyscrew	1	311100000000007
6	— Mount	1	371900000000002
7	— Cap	1	371900000000003
8	— Cover	1	371900000000005
9	— M6 x 16 SHCS	4	MS 0103617
10	— M5 x 10 SHCS	4	MS 0103515
11	— Seal	6	371900000000006
12	— M12 x 30 SHCS	4	MS 0104019
13	— Keyscrew	1	311100000000008
14	— Plug	6	307500000000004
15	— Coolant Nozzle	1	311100000000011
16	— Teflon Sleeve	3	371900000000012



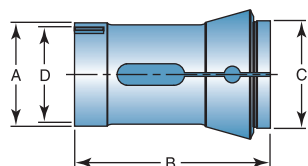
B42 extended-nose collets, expanding collets, ejector stops, chip control and thru-spindle coolant are available per application.

## B42 Adapter Assembly and Parts List for the QUEST® LMC42 Lean Manufacturing Cell

Item	Description	Qty	Part Number
—	B42 Collet Adapter Assembly	1	371900000000024
1	— Collet Sleeve	1	371900000000025
2	— Collet Sleeve Spring	1	CE12501561750
3	— Spring Retainer	1	371900000000026
4	— Cap	1	371900000000003
5	— Plug	6	307500000000004
6	— Seal	1	371900000000006
7	— Cover	1	371900000000005
8	— M6 x 16 SHCS	4	MS 0103617
9	— M5 x 10 SHCS	4	MS 0103515
10	— Teflon Sleeve	3	371900000000012
11	— Instructions	1	B 00095000121







## Dimensions

Collet Style	A – Back Bearing Diameter	B – Overall Length	C – Head Diameter	D – ID Stop Thread	Round Capacity	Hex Capacity	Square Capacity
Std.	1.887" (47.93)	3.688" (93.68)	2.355" (59.82)	M43 x 1	$\frac{1}{16}"(1.58) - 1\frac{5}{8}"(41.28)$	$\frac{1}{16}"(1.58) - 1\frac{13}{32}"(35.72)$	$\frac{1}{16}"(1.58) - 1\frac{9}{64}"(28.97)$
S10	1.887" (47.93)	3.688" (93.68)	2.355" (59.82)	M43 x 1	$\frac{1}{8}"(3.17) - 1" (25.40)$	$\frac{1}{4}"(6.35) - \frac{55}{64}"(21.83)$	$\frac{1}{4}"(6.35) - \frac{45}{64}"(17.86)$

NOTE: Millimeters in parentheses.

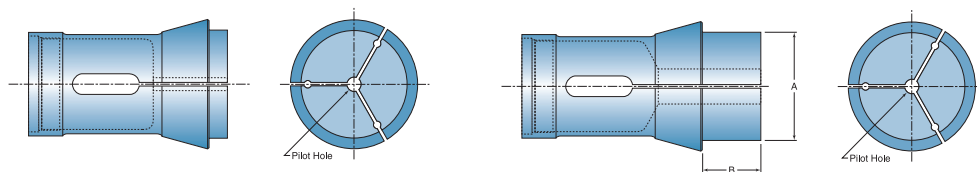
## B42 Collets – Standard and S10 Master Collets and Pads

Description	Round Smooth Part Number	Round Serrated Part Number	Hexagon Part Number	Square Part Number	Emergency Part Number
B42 Solid Collet	37190019	37190059	37190029	37190039	37191410
B42 S10 Master Collet	52050000	—	—	—	—
S10 Pads	56010019	56010059	56010029	56010039	56011410

NOTE: Other configuration collets & pads available.

## B42 Emergency Collets—Standard and Extended-Nose

Even with the best planning, emergencies arise when your tool room and production departments require a stepped, odd size or special-shaped collet. On such occasions, use the Hardinge emergency collet. The soft face and pilot hole allow rapid drilling, boring or stepping out to the exact required size. The extended-nose allows deeper counter bores, when required, and tool clearance for extended work. Emergency collets have internal threads for positive stops.



Description	Part Number	Pilot Hole	A – Nose Diameter	B – Nose Length
B42 Emergency Collet	37191411000000	.250" (6.35)	1.970" (50.00)	.375" (9.53)
B42 Extended-Nose Emergency Collet	37191411000007	.250" (6.35)	1.970" (50.00) (Standard)	1.250" (31.75) (.875" over standard)

NOTE: Millimeters in parentheses.

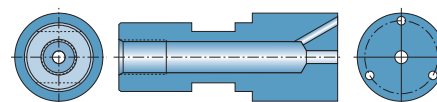
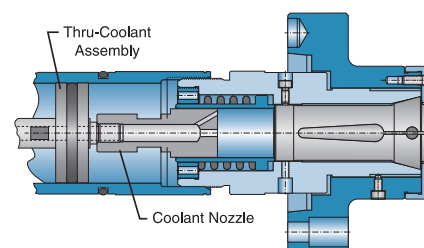
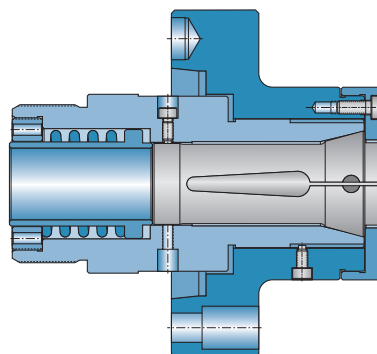
# TT65 to #22 B&S Collet System



The #22 B&S Dead-Length Collet Chuck System will provide minimal tool interference while achieving shorter cycle times when your work is under 1 1/4" diameter.

The nose diameter is just 3.5" by 2.3" (88.9 x 58.4mm) long with an overall chuck length of 3.783" (96mm) from the spindle locating surface. This stationary collet design provides precise length control of the workpiece. The Dead-Length feature makes it possible to accurately transfer parts from one spindle to the other within .0005" (.0127mm). The system uses either #22, #22Y or #22SC B&S collets.

The #22 B&S Stationary Collet is used on the Hardinge QUEST® TwinTurn® 65 CNC Turning Center and other machines that use #22 B&S Stationary Collet Systems.

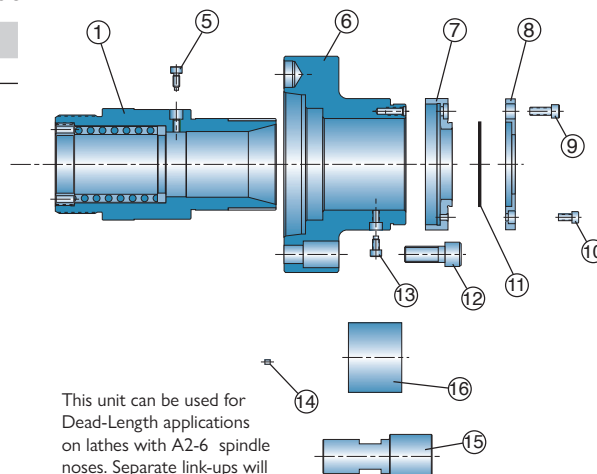


The #22 B&S Coolant Nozzle is threaded onto the end of the through-spindle coolant assembly before the unit is inserted into the draw tube. A coolant nozzle is included with each assembly. Part Number 3111-00-00-000011.

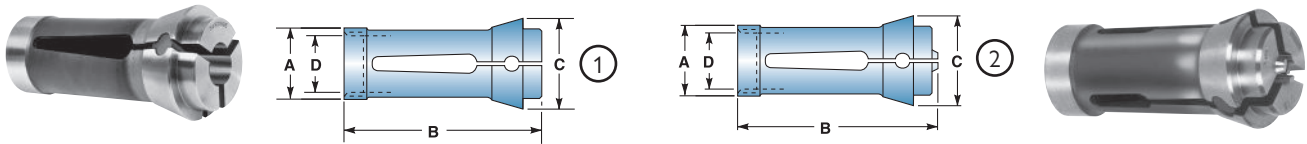
## TT65 to #22 B&S Collet Assembly and Parts List

Item	Part Number	Qty	Description
—	31110000000001	1	TT65 to #22 B&S Collet Assembly
1	31110000000015	1	— Spring and Sleeve Assembly (Items 1-4 in previous catalog—do not disassemble)
5	31110000000007	1	— Removable Keyscrew
6	31110000000002	1	— Mount
7	31110000000003	1	— Cap
8	31110000000005	1	— Cover
9	MS 0103617	4	— M6 x 16 SHCS
10	MS 0103515	4	— M5 x 10 SHCS
11	31110000000006	6	— Seal
12	MS 0104019	4	— M12 x 30 SHCS
13	31110000000008	1	— Keyscrew
14	30750000000004	6	— Plug
15	31110000000011	1	— Coolant Nozzle
16	31110000000012	3	— Teflon Sleeve

NOTE: Keyed collets are not standard.



This unit can be used for Dead-Length applications on lathes with A2-6 spindle noses. Separate link-ups will be needed for other lathes. Collet not included.



The #22 B&S Stationary Collet is used on the Hardinge QUEST® TwinTurn® 65 CNC Turning Center and other machines that use #22 B&S Stationary Collet Systems.

## Dimensions

Description	Part Number	Figure	Style	A – Back Bearing Diameter	B – Overall Length	C – Collet Head Diameter	D - Thread	Round Capacity	Hexagon Capacity	Square Capacity
Collet, Solid	3111	1	22	1.498" (38.05)	4.250" (107.95)	1.925" (48.90)	—	1¼" (31.75)	1⅝" (27.38)	⅞" (22.22)
Collet, Solid	3109	2	22Y	1.498" (38.05)	4.312" (109.53)	1.925" (48.90)	—	.092" (2.33)	⅝" (1.98)	⅛" (1.58)
Collet, Solid Stop Collet	3227	1	22SC	1.498" (38.05)	4.250" (107.95)	1.925" (48.90)	1.291" x 24 RH	1¼" (31.75)	1⅝" (27.38)	⅞" (22.22)

NOTE: Millimeters in parentheses.

## #22 B&S Collets – Standard and Stop Collets

Description	Round Smooth Part Number	Round Serrated Part Number	Hexagon Part Number	Square Part Number
#22 B&S Standard	31110019	31110059	31110029	31110039
#22Y B&S Standard	31090019	31090059	31090029	31090039
#22SC B&S Stop	32270019	32270059	32270029	32270039

NOTE: Other configuration collets also available.

## #22 B&S Emergency Collets

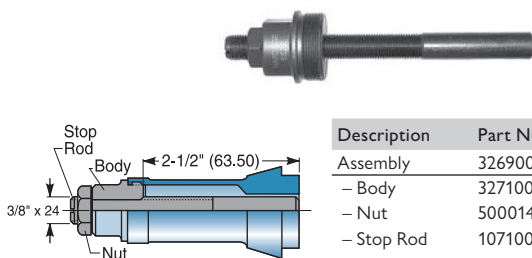
Emergency	Part Number	Pilot Hole
#22 Collet Blank	31110000	—
#22SC-E	32331410	¼"
#22SC-E1	32331210	⅛"
#22SC-E2	32331310	⅛"

## SS22 Solid Collet Stop for #22SC B&S Collet

The solid stop assembly is threaded into the back of the #22 B&S collet and the stop rod can be machined to length to locate the part. Collet sold separately.

## SE Ejector Stop for #22SC B&S Collets

The threaded ejector stop assembly is threaded into the back of the collet. The insert can be machined to locate the part. Collet sold separately.

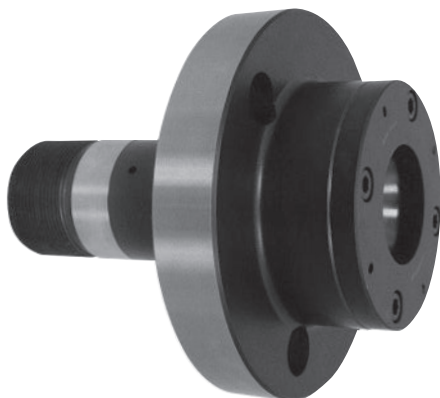


Description	Part Number
Assembly	32690000000000
– Body	32710000000000
– Nut	50001466B
– Stop Rod	10710000000000



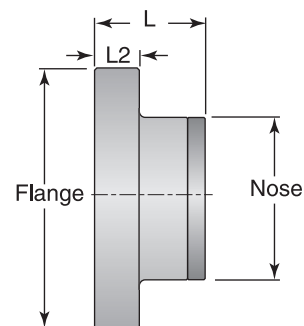
Description	Part Number
Assembly	32730000000000
– Body	32750000000000
– Plunger	32770000000000
– Insert	32790000000000
– Nut (2)	50001466B
– Spring	32810000000000

# 16C to #22 B&S Collet System



These units can be used for Dead-Length applications on lathes with A2-5 spindle noses. Separate link-ups will be needed for other lathes.

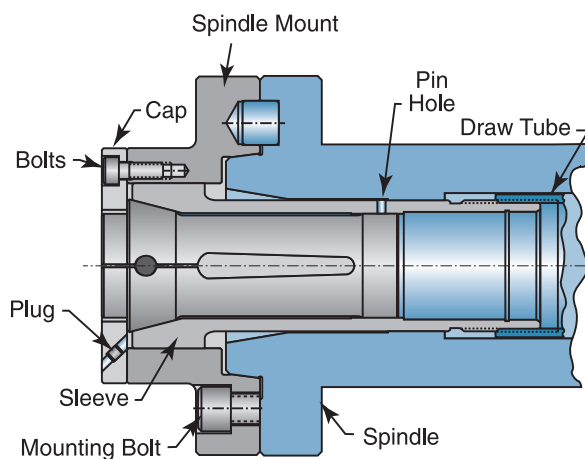
#22 B&S Collets sold separately on previous page.



## A2-5 16C Spindle to #22 B&S Collet Adaptation Chuck

Description	Assembly Part Number	Spindle	L – Length	L2 – Length	Flange OD	Nose OD	Thru Capacity
A2-5 16C to #22 B&S	17170900000000	A2-5	2.285" (58.04)	.915" (23.24)	5.500" (139.7)	3.400" (86.36)	1.25" (31.75)

NOTE: Millimeters in parentheses.

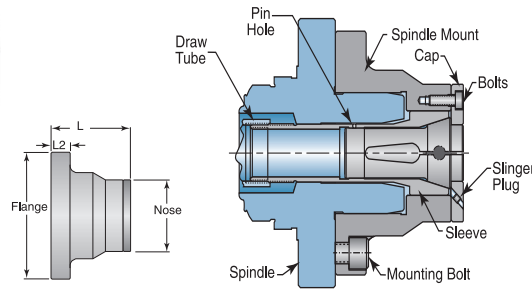


## Parts List

Description	Qty	Part Number
Sleeve	1	17170900000003
Mount	1	17170900000001
Cap	1	17170900000002
Bolts for Cap – M6 x 16	4	MS 0103617
Mounting Bolts – M10 x 25	3	MS 0104019
Slinger Hole Plug	6	17170900000004
Orientation Pin 1/8" Dia. (Option)	1	37570000000007



Not exactly as shown. See drawing for stepped nose design.



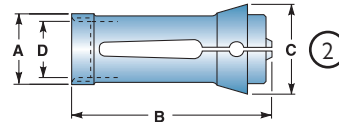
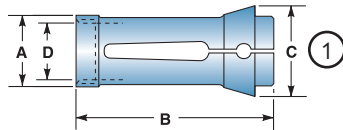
## Assembly Parts List

Description	Qty	Part Number
– Sleeve	1	30750000000003
– Mount	1	307500000000001
– Cap	1	307500000000002
– Bolts for Cap, M5 x 16	4	MS 0103517
– Mounting Bolts, M10 x 25	3	MS 0104019
– Slinger Hole Plug	6	307500000000004
– Orientation Pin (Option)	1	– 3/32" Diameter Pin

## GT 5C to #11 B&S Collet Adaptation Chuck

Description	Assembly Part Number	Spindle	L – Length	L2 – Length	Flange OD	Step OD	Nose OD	Thru Capacity
GT 5C	307500000000000	GT	2.820" (71.62)	.76" (19.30)	5.000" (127.00)	3.400" (86.36)	2.830" (71.88)	55/64" (21.82)

NOTE: Millimeters in parentheses.



## #11 B&S Collet Dimensions

Description	Part Number	Figure	Style	A – Back Bearing Diameter	B – Overall Length	C – Collet Head Diameter	D – Thread	Round Capacity	Hexagon Capacity	Square Capacity
Collet, Solid	3057	1	11	1.061" (26.95)	2.875" (73.03)	1.490" (37.85)	—	7/8" (22.22)	3/4" (19.05)	5/8" (15.87)
Collet, Solid	3055	2	11Y	1.061" (26.95)	2.937" (74.60)	1.490" (37.85)	—	55/64" (21.83)	3/4" (19.05)	39/64" (11.11)
Collet, Solid	3217	1	11SC	1.061" (26.95)	2.875" (73.03)	1.490" (37.85)	.916" x 24 RH	55/64" (21.83)	47/64" (18.65)	19/32" (15.08)
Stop Collet										
Collet, Solid	MP3591	2	11SCY	1.061" (26.95)	2.937" (74.60)	1.490" (37.85)	.916" x 24 RH	55/64" (21.83)	47/64" (18.65)	19/32" (15.08)
Stop Collet	(Special Collet)									

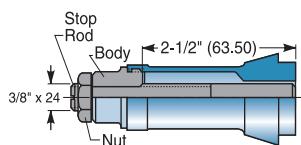
NOTE: Millimeters in parentheses.. Special Collets are not stock items.

## #11 B&S Collets – Standard and Stop Collets

Description	Round Smooth Part Number	Round Serrated Part Number	Hexagon Part Number	Square Part Number
#11 Solid Collet	30570019	30570059	30570029	30570039
#11Y Solid Collet	30550019	30550059	30550029	30550039
#11SC Stop Collet	32170019	32170059	32170029	32170039

## SS11 Solid Collet Stop for #11SC B&S Collets

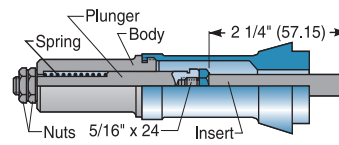
The solid stop assembly is threaded into the back of the #11 B&S collet and the stop rod can be machined to length to locate the part. Collets sold separately.



Description	Part Number
Assembly	325900000000000
– Body	326100000000000
– Nut	U0004141C
– Stop Rod	326300000000000

## SE11 Ejector Stop for #11SC B&S Collets

The threaded ejector stop assembly is threaded into the back of the collet. The insert can be machined to locate the part. Collets sold separately.

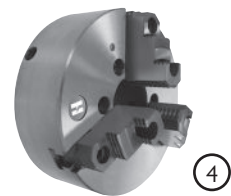
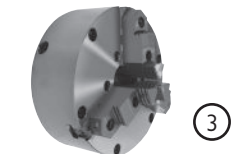
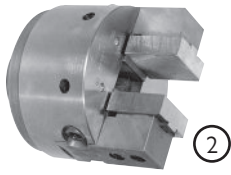
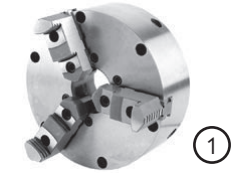


Description	Part Number
Assembly	326500000000000
– Body	326700000000000
– Plunger	106100000000000
– Insert	106300000000000
– Spring	106500000000000
– Nuts {2}	U0004141C

# Manual Jaw Chucks

2, 3, and 4-jaw Chucks are available for manual machines with Hardinge® 5C Spindles. Products shown with bold part numbers are included with the chuck. Manual Chucks are also available with A2-4 and A2-5 mounting plates where indicated below.

Hardinge and other CNC lathes use Sure-Grip® 3-Jaw Power Chucks. Information for Sure-Grip chucks, along with full line of jaws for all chucks, can be found in Hardinge brochure number 2357 (chucks) and 2358 (jaws).



Description	Figure	Chuck	Soft Jaw	OD Jaw	ID Jaw	Reversible Hard Jaw	Wrench
<b>5" 3-Jaw Universal</b>							
Taper-Nose Spindle	2	53B5405HB	53B5405SJ	—	—	53B5405HJ	53B5405CK
Threaded-Nose Spindle	2	53B5405HB D	53B5405SJ	—	—	53B5405HJ	53B5405CK
with A2-4 Mounting Plate	4	53B5405BCA4	53B5405SJ	—	—	53B5405HJ	53B5405CK
with A2-5 Mounting Plate	4	53B5405BCA5	53B5405SJ	—	—	53B5405HJ	53B5405CK
<b>5" 4-Jaw Independent</b>							
Taper-Nose Spindle	2	54B5405HB	—	—	—	54B5405SJR	54B5405CK
Threaded-Nose Spindle	2	54B5405HB D	—	—	—	54B5405SJR	54B5405CK
<b>6" 2-Jaw Universal (Jaws not included)</b>							
Taper-Nose Spindle	3	625405HB	625405SJ	—	—	—	625405CK
Threaded-Nose Spindle	3	625405HB D	625405SJ	—	—	—	625405CK
<b>6" 3-Jaw Universal</b>							
Taper-Nose Spindle	2	63B5405HB	63B5405SJ	—	—	63B5405HJ	63B5405CK
Threaded-Nose Spindle	2	63B5405HB D	63B5405SJ	—	—	63B5405HJ	63B5405CK
with A2-4 Mounting Plate	4	63B5405BCA4	63B5405SJ	—	—	63B5405HJ	63B5405CK
with A2-5 Mounting Plate	4	63B5405BCA5	63B5405SJ	—	—	63B5405HJ	63B5405CK
<b>6" 4-Jaw Independent</b>							
Taper-Nose Spindle	2	64B5405HB	64B5405STJ	—	—	64B5405HTJ	64B5405CK
Threaded-Nose Spindle	2	64B5405HB D	64B5405STJ	—	—	64B5405HTJ	64B5405CK
with A2-4 Mounting Plate	4	64B5405BCA4	64B5405STJ	—	—	64B5405HTJ	64B5405CK
with A2-5 Mounting Plate	4	64B5405BCA5	64B5405STJ	—	—	64B5405HTJ	64B5405CK
<b>8" 3-Jaw Independent</b>							
with A2-5 Spindle Mount	4	835405A25	—	—	—	835405HRJ	835405KEY
<b>10" 3-Jaw Independent</b>							
with A2-5 Spindle Mount	4	135405A25	—	—	—	135405HRJ	135405KEY

## Safety Information for 5C Spindle Tooling - Read Carefully

### RECOMMENDATIONS FOR SAFE OPERATING CONDITIONS FOR HARDINGE 5C CAST IRON SPINDLE TOOLING

NOTE: All tooling is assumed NOT to be weakened by usage and to be free of defects.

SPINDLE TOOLING	SPEED	DRAWBAR FORCE
2", 3" & 4" Step Chuck Closers	Less than 5000 rpm	Less than 5000 lb force
5" and 6" Step Chuck Closers	Less than 4000 rpm	Less than 5000 lb force

#### FACE PLATES AND FIXTURE PLATES

The maximum surface speed of 6000 fpm includes allowances made for load eccentricities, clamping forces and stress concentrations. Operator discretion is needed because precise guidelines cannot be established due to the uncertainties in operating conditions. Following is a rough guideline. All rpm recommendations listed below result in surface speeds of less than 6000 fpm.




SPINDLE TOOLING	SPEED
3" Fixture Plates	Less than 3500 rpm
5" Fixture Plates	Less than 3000 rpm
8.875" Fixture Plates	Less than 2000 rpm
5" Jaw Chuck	Less than 3000 rpm
6" Jaw Chuck	Less than 2500 rpm
7" Face Plate with angle plate	Less than 2500 rpm
9" Face Plate with angle plate	Less than 2000 rpm



Manufacturer of Machine or Fixture	Collet	Page
All Tool	4C, 5C	43
American	3H, 6H	42, 43
Ames	1AM, 3AM	42
Armor	2M	42
Arrow	1A, 3AT, 3C, 5C	42, 43
Arter	5C	43
Atlas	3AT	42
Axelson	Requires Sjogren Chuck	—
B&S Holders 156, 158, 160	1K	42
B&S Holders 246, 256	1K	42
Barker	1A, 3C	42
Barrett	Requires Sjogren Chuck	—
Becker	2AB, 2B, 3B	42
Benchmark	2M	42
Boye & Emmes	6H, 8H	43, 44
Bradford	5NS	43
Bridgeport	2M, 7 B & S, B3, R8	42, 44, 45
Brown & Sharpe	7B, 9B	44
Burke	3C, 9B	42, 44
Carroll	4NS, 4C, 5C, 115	43, 45
Carroll & Jamieson	3H, 5C	42, 43
Carter & Hakes	4OS	43
Cataract	See Hardinge.	42, 43, 44
Chard	Requires Sjogren Chuck	—
Cincinnati	1AM, 3H, 6H, 8H	42, 43, 44
Clausing	3C, 5C	42, 43
Colborne	5C	43
Crownshield-Harris	2AB	42
Crystal Lake	3C, 4C, 5C	42, 43
Cushman, 1 1/8" capacity	115	45
Cushman, 1 1/4" capacity	215	45
Cushman, 3 1/4" capacity	315	45
Dalton	3C, 4C	42, 43
Dandy	5C	43
Davis	2H, 3H, 6H	42, 43
Delta	5C, R8	43, 45
Diamond	7B, 9B	44
Dykrex	3C, 5C	42, 43
Elgin	2AB, 3C, 4C, 5C	42, 43
Ellis	3C	42
Fay & Scott	5NS	43
Flather	3C, 4NS, 4OS, 5NS	42, 43
Fray	2M, 7B	42, 43
Glenbard	5C	43
Gorton	4NS, 9B, GTM, R8	43, 44, 45
Graham	Requires Sjogren Chuck	—
Greaves-Klusman	3H	42
Hamilton	2B, 4C, 5C	42, 43
Hancock	5C	43
Hardinge®	1C, 2VB, 3C, 4C,	42, 43
Hardinge®	5C, 16C, 20C, 25C	43, 44
Hartford	Requires Sjogren Chuck	—
Heald	9B	44
Hendey	2H, 3H, 6H, 8H	42, 43, 44
Holland	7B	44
Hydromat	25W, 25W OS & Step, B32 & Step	44, 45
Hydromat	B32/45 & Step, B45 & Step, Pro-20 & Step	45
Index	3C, 9B	42, 44
Jacobs	JC	45
Jefferson	7B	44
Johansson	2M, 7B	42, 44
Jones & Lamson	J & L Center Mill	45
Kearney & Trecker Hldr 9026	1K	42
Kearney & Trecker Hldr 9027	1K	42
Knight	1K	42
L-W	4C, 4NS	43
LeBlond	3C, 4C, 4NS, 6L, 10L	42, 43, 44
Lee	5C	43
Lehmann-Brandes	5NS, 8WN	43, 44
Linley	LB	45
Lodge & Shipley	3H	42
Logan	3AT, 3C, 5C	42, 43
Majestic	4NS	43
Master	5C	43
Mead	3C, 5C	42, 43
Millmaster	9B	44
Monarch	2H, 3H, 5C, 5M, 6H	42, 43
Mueller	6H	43
Nebel	6H, 8H	43, 44
Nichols	4NS	43
Oliver Ace	1AM, 5C, 8H	42, 43, 44
Pacific	R8	45

Manufacturer of Machine or Fixture	Collet	Page
Pearson	R8	45
Porter-Cable	2H, 5C	42, 43
Potter	4C	43
Pratt & Whitney	3PN, 4PN, 5PN, 5P, 7P, 10P	42, 43, 44
Rahn-Larmon	6H, 8H	43, 44
Reed-Prentice	2VB, 6L	42, 43
Rivett	2NS, 2OS, 3NS, 4NS, 4OS	42, 43
Rivett	4S, 5C, 5NS, 5OS, 6NS, 6R	43
Rocheleau	5C	43
Rockford	2H, 3H	42
Rotex	9B	44
Rouse	4C, 4PN	43
Royal Oak	RO	45
Rusnok	9B	44
Schaublin	20W, 25W, 25W Stepped	44
Schauer	3C, 5C	42, 43
Sebastian	2J, 2S, 3H, 5C, 6H	42, 43
Seneca	2S, 3S	42
Seneca Falls	RO, 5C	43, 45
Sheldon	4C, 5C	43
Sidney	6H, 8H	43, 44
Sjogren, 1 1/8" capacity	1J, 5C	42, 43
Sjogren, 1 1/4" capacity	2J	42
Sjogren, 1 1/2" capacity	3J	43
Sjogren, 2 1/4" capacity	22J	44
Sjogren, 3 1/2" capacity	35J	44
Sloan & Chace	5SC, 52SC	43, 45
South Bend	1A, 2A, 2S, 3C, 4C	42, 45
South Bend	4NS, 5C, 5NS, 6H, 6K	43
Springfield	3H, 6H, 8H	42, 43, 44
Stark	4S, 32S, 42S	43, 44
Taft-Pierce	2H	42
Unimatic	5C	43
Van Norman	5V, 50V	43, 45
Vernon	9B, LB	44, 45
Viking	9B	44
Wade	5C, 8WN	43, 44
Walcott	2H, 6H	42, 43
Western	Requires Sjogren Chuck	—
Whitcomb-Blaisdell	4C	43
Willard	3H	42
Worcester	2H, 3H	42

# Collets by Style

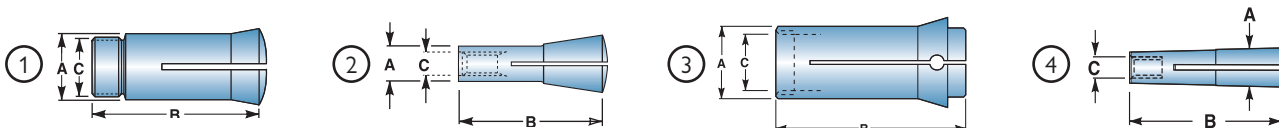
Collet	Part Number	Figure	Dimensions			Rated Capacity		
			A	B	C			
			Back Bearing	Overall Length	Thread	Round	Hexagon	Square
1A	9-1501	1	.650" (16.51)	2.563" (65.10)	.640" x 26 RH	1/2" (12.70)	7/16" (11.11)	11/32" (8.73)
1AM	1505	1	1.125" (28.58)	3.906" (99.21)	1.118" x 24 RH	1" (25.40)	7/8" (22.23)	23/32" (18.26)
1B	9-1509	2	.437" (11.10)	1.750" (44.45)	.312" x 30 RH	5/16" (7.94)	7/32" (5.56)	3/16" (4.76)
1C	1511	1	.335" (8.51)	1.438" (36.53)	.322" x 40 RH	1/4" (6.35)	7/32" (5.56)	11/64" (4.37)
1J	1513	1	1.250" (31.75)	3.000" (76.20)	1.238" x 20 RH	1 1/16" (26.99)	7/8" (22.23)	3/4" (19.05)
1K	1521	3	1.250" (31.75)	2.813" (71.45)	—	1" (25.40)	7/8" (22.23)	23/32" (18.26)
2A	9-1527	1	.860" (21.84)	3.313" (84.15)	.850" x 20 RH	1 1/16" (17.46)	19/32" (15.08)	15/32" (11.91)
2AB	9-1529	2	.750" (19.05)	2.563" (65.10)	.500" x 20 RH	5/8" (15.88)	31/64" (12.30)	25/64" (9.92)
2AM	9-1531	1	.629" (15.98)	3.188" (80.98)	.622" x 24 RH	1/2" (12.70)	7/16" (11.11)	11/32" (8.73)
2B*	9-1533	2	.590" (14.99)	2.031" (51.59)	.437" x 26 RH	1/2" (12.70)	7/16" (11.11)	11/32" (8.73)
2C	9-1535	1	.450" (11.43)	1.812" (46.02)	.442" x 30 RH	11/32" (8.73)	19/64" (7.54)	15/64" (5.95)
2H	1537	1	.826" (20.98)	4.250" (107.95)	.799" x 20 RH	5/8" (15.88)	17/32" (13.50)	7/16" (11.11)
2J	1539	1	1.625" (41.28)	3.250" (82.55)	1.611" x 18 RH	1 3/8" (34.93)	1 3/16" (30.16)	1" (25.40)
2L	9-1553	1	.950" (24.13)	3.000" (76.20)	.938" x 20 RH	3/4" (19.05)	21/32" (16.67)	17/32" (13.50)
2M	1555	4	2 Morse 2 Morse	2.875" (73.03)	.375" x 16 RH	1/2" (12.70)	13/32" (10.31)	11/32" (8.73)
2NS	1693	1	.324" (8.23)	1.562" (39.67)	.318" x 40 RH	1/4" (6.35)	13/64" (5.16)	11/64" (4.37)
2OS	1691	1	.299" (7.59)	1.250" (31.75)	.263" x 40 RH	3/16" (4.76)	5/32" (3.97)	1/8" (3.18)
2S	1557	1	.750" (19.05)	3.234" (82.14)	.745" x 18 RH	9/16" (14.29)	31/64" (12.30)	25/64" (9.92)
2VB	9-1561	2	.595" (15.11)	2.438" (61.93)	.437" x 26 RH	1/2" (12.70)	7/16" (11.11)	11/32" (8.73)
3AM	9-1569	1	.750" (19.05)	3.188" (80.98)	.742" x 24 RH	5/8" (15.88)	17/32" (13.50)	7/16" (11.11)
3AT	1573	1	.687" (17.45)	2.313" (58.75)	.637" x 26 RH	1/2" (12.70)	7/16" (11.11)	11/32" (8.73)
3B	1581	2	.875" (22.23)	3.438" (87.33)	.625" x 16 RH	3/4" (19.05)	41/64" (16.27)	17/32" (13.50)
3C	1583	1	.650" (16.51)	2.688" (68.28)	.640" x 26 RH	1/2" (12.70)	7/16" (11.11)	11/32" (8.73)
3H	1589	1	1.125" (28.58)	4.438" (112.73)	1.050" x 20 RH	7/8" (22.23)	3/4" (19.05)	5/8" (15.88)
3J <sup>A</sup>	1593	1	2.000" (50.80)	3.750" (95.25)	1.988" x 20 RH	1 3/4" (44.45)	1 1/2" (38.10)	1 1/4" (31.75)
3NS	1601	1	.687" (17.45)	2.875" (73.03)	.647" x 20 RH	1/2" (12.70)	7/16" (11.11)	11/32" (8.73)

\* Do not confuse with 2B Simmons - See Turret Lathe chapter in Automatics Catalog — #2287

<sup>A</sup> Internal Stop Thread is 1.790 x 24 RH

NOTE: Millimeters in parentheses.

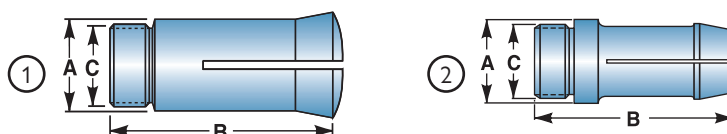
Part numbers preceded by 9 are special order.



Collet	Part Number	Figure	Dimensions			Rated Capacity		
			A	B	C	Round	Hexagon	Square
			Back Bearing	Overall Length	Thread			
3OS	9-1603	1	.589" (14.96)	2.094" (53.19)	.518" x 26 RH	3/8" (9.53)	5/16" (7.94)	17/64" (6.75)
3PN	9-1605	1	.650" (16.51)	2.063" (52.40)	.645" x 24 RH	1/2" (12.70)	7/16" (11.11)	11/32" (8.73)
3PO	9-1607	1	.599" (15.21)	2.063" (52.40)	.500" x 24 RH	3/8" (9.53)	5/16" (7.94)	17/64" (6.75)
3S	9-1609	1	1.000" (25.40)	4.594" (116.69)	.995" x 20 RH	3/4" (19.05)	21/32" (16.67)	17/32" (13.50)
3SC	9-1613	1	.350" (8.89)	1.587" (40.30)	.293" x 36 RH	3/16" (4.76)	5/32" (3.97)	1/8" (3.18)
3SS	9-1611	1	.589" (14.96)	2.125" (53.98)	.515" x 26 RH	3/8" (9.53)	5/16" (7.94)	17/64" (6.75)
4C	1621	1	.950" (24.13)	3.000" (76.20)	.938" x 20 RH	5/16" (20.3)	21/32" (16.67)	17/32" (13.50)
4NS	1625	1	.826" (20.98)	3.500" (88.90)	.800" x 20 RH	5/8" (15.88)	17/32" (13.50)	7/16" (11.11)
4OS	9-1629	1	.750" (19.05)	2.781" (70.64)	.660" x 20 RH	1/2" (12.70)	7/16" (11.11)	11/32" (8.73)
4PN	9-1631	1	1.000" (25.40)	2.906" (73.81)	.995" x 16 RH	3/4" (19.05)	21/32" (16.67)	17/32" (13.50)
4S	9-1635	1	.998" (25.35)	3.250" (82.55)	.982" x 20 RH	3/4" (19.05)	21/32" (16.67)	17/32" (13.50)
5C <sup>A</sup>	1001	1	1.250" (31.75)	3.281" (83.34)	1.238" x 20 RH <sup>1</sup>	1 1/16" (26.99)	29/32" (23.02)	3/4" (19.05)
5M	9-1643	2	1.438" (36.53)	3.438" (87.33)	1.238" x 20 RH	7/8" (22.23)	3/4" (19.05)	5/8" (15.88)
5NS	9-1647	1	1.062" (26.97)	4.219" (107.16)	1.050" x 20 RH	7/8" (22.23)	3/4" (19.05)	5/8" (15.88)
5OS	H5026	1	1.062" (26.97)	3.500" (88.90)	.937" x 18 RH	3/4" (19.05)	41/64" (16.27)	33/64" (13.10)
5P	9-1651	1	.812" (20.62)	3.687" (93.65)	.807" x 24 RH	5/8" (15.88)	17/32" (13.50)	7/16" (11.11)
5PN	9-1653	1	1.312" (33.32)	3.406" (86.51)	1.307" x 16 RH	1" (25.40)	7/8" (22.23)	23/32" (18.26)
5SC	9-1655	1	.600" (15.24)	2.438" (61.93)	.500" x 26 RH	3/8" (9.53)	21/64" (8.33)	17/64" (6.75)
5ST	1017	1	1.250" (31.75)	3.281" (83.34)	1.238" x 20 RH	1 1/16" (26.99)	29/32" (23.02)	3/4" (19.05)
5V	9-1657	1	.850" (21.59)	3.875" (98.43)	.775" x 18 RH	9/16" (14.29)	31/64" (12.30)	25/64" (9.92)
6H	1667	1	1.375" (34.93)	4.750" (120.65)	1.300" x 20 RH	1 1/8" (28.58)	31/32" (24.61)	51/64" (20.24)
6K	1671	1	.842" (21.39)	3.000" (76.20)	.762" x 26 RH	5/8" (15.88)	17/32" (13.50)	7/16" (11.11)
6L	1675	1	1.250" (31.75)	4.438" (112.73)	1.178" x 20 RH	1" (25.40)	7/8" (22.23)	23/32" (18.26)
6NS	1663	1	1.312" (33.32)	5.906" (150.01)	1.234" x 14 RH	1" (25.40)	55/64" (21.83)	45/64" (17.86)
6R	1679	1	1.375" (34.93)	4.938" (125.43)	1.300" x 20 RH	1 1/8" (28.58)	31/32" (24.61)	25/32" (19.85)

A – Internal stop thread is 1.041" x 24 RH.

NOTE: Millimeters in parentheses.  
Part numbers preceded by 9 or H are special order.

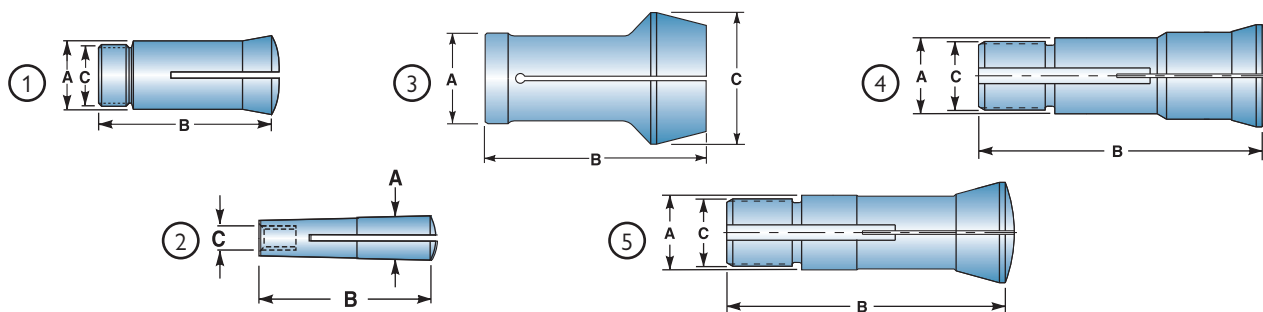


# Collets by Style

Collet	Part Number	Figure	Dimensions			Rated Capacity		
			A	B	C	Round	Hexagon	Square
			Back Bearing	Overall Length	Thread			
7B	9-1685	2	7 B & S	3.125"	.375" x 16 RH	1/2"	13/32"	11/32"
			7 B & S	(79.38)		(12.70)	(10.32)	(8.73)
7 B & S	9-1687	2	7 B & S	2.875"	.375" x 16 RH	1/2"	13/32"	11/32"
			7 B & S	(73.03)		(12.70)	(10.32)	(8.73)
7P	9-1689	1	1.125"	4.750"	1.120" x 20 RH	7/8"	3/4"	5/8"
			(28.58)	(120.65)		(22.23)	(19.05)	(15.88)
7R	2581	3	1.062"	3.500"	—	7/8"	3/4"	5/8"
			(26.97)	(88.90)		(22.22)	(19.05)	(15.88)
8H	9-1695	1	1.500"	4.750"	1.425" x 20 RH	1 1/4"	1 1/16"	7/8"
			(38.10)	(120.65)		(31.75)	(26.99)	(22.23)
8ST	9-1697	1	2.375"	5.906"	2.354" x 12 RH	2 1/8"	1 27/32"	1 1/2"
			(60.33)	(150.01)		(53.98)	(46.83)	(38.10)
8WN	1699	1	1.250"	3.875"	1.245" x 16 RH	1"	7/8"	23/32"
			(31.75)	(98.43)		(25.40)	(22.23)	(18.26)
9B	9-1707	2	9 B & S	4.125"	.500" x 13 RH	3/4"	41/64"	17/32"
			9 B & S	(104.78)		(19.05)	(16.27)	(13.50)
10L	9-1713	1	1.562"	5.500"	1.490" x 18 RH	1 1/4"	1 1/16"	7/8"
			(39.67)	(139.70)		(31.75)	(26.99)	(22.23)
10P	9-1715	1	1.500"	4.750"	1.495" x 20 RH	1 1/4"	1 1/16"	7/8"
			(38.10)	(120.65)		(31.75)	(26.99)	(22.23)
16C <sup>A</sup>	1717	1	1.889"	4.312"	1.870" x 1.75 mm RH <sup>1</sup>	1 5/8"	1 13/32"	1 9/64"
			(47.98)	(109.52)		(41.28)	(35.72)	(28.97)
20C <sup>B</sup>	1701		2.378"	6.250"	M60-1.5mm RH	2"	1 3/4"	1 27/64"
			(60.40)	(158.75)		(50.80)	(44.85)	(36.07)
20W	1777	1	.787"	2.719"	Buttress	9/16"	31/64"	25/64"
			(19.99)	(69.06)		(14.29)	(12.30)	(9.92)
22J	1719	1	2.562"	4.000"	2.550" x 18 RH	2 1/4"	1 15/16"	1 9/16"
			(65.07)	(101.60)		(57.15)	(49.21)	(39.69)
25C <sup>C</sup>	1801	1	2.930"	6.480"	M73 x 1.5mm RH	2.559"	2.216"	1.808"
			(74.42)	(161.49)		(65.00)	(56.29)	(45.92)
25W	1901	5	.984"	3.719"	.970" x 15 RH Buttress	3/4"	41/64"	17/32"
			(24.99)	(94.46)		(19.05)	(16.27)	(13.49)
25W OS Thru 1903 (Oversize)		4	.984"	3.719"	.970" x 15 RH Buttress	3/4"	41/64"	17/32"
			(24.99)	(94.46)		(19.05)	(16.27)	(13.49)
25W OS Stepped	1903	4	.984"	3.719"	.970" x 15 RH Buttress	.751" - 1"	.642" - 7/8"	.532" - 3/4"
			(24.99)	(94.46)		(19.07 - 25.40)	(16.30 - 22.22)	(13.51 - 19.05)
32S	1723	1	.703"	2.563"	.690" x 24 RH	1/2"	7/16"	11/32"
			(17.86)	(65.10)		(12.70)	(11.11)	(8.73)
35J	9-1727	1	3.875"	5.000"	3.861" x 18 RH	3 1/2"	3"	27/16"
			(98.43)	(127.00)		(88.90)	(76.20)	(61.91)
42S	9-1729	1	1.250"	3.688"	1.236" x 20 RH	1"	7/8"	23/32"
			(31.75)	(93.68)		(25.40)	(22.23)	(18.26)

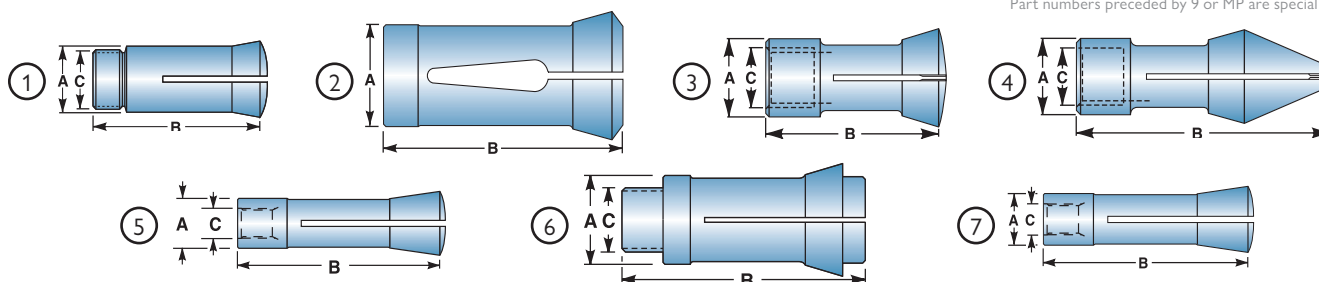
A - Internal stop thread is 1.687" x 20 RH.  
 B - Internal stop thread is M53 x 1mm RH.  
 C - Internal stop thread is 2 5/8" - 24 TPI RH.

NOTE: Millimeters in parentheses.  
 Part numbers preceded by 9 are special order.



Collet	Part Number	Figure	Dimensions			Rated Capacity		
			A	B	C			
			Back Bearing	Overall Length	Thread	Round	Hexagon	Square
50V	1731	6	1.250" (31.75)	4.000" (101.60)	1.125" x 24 RH	$1\frac{5}{16}"$ (23.81)	$1\frac{3}{16}"$ (20.64)	$2\frac{1}{32}"$ (16.67)
52SC	9-1733	1	.800" (20.32)	3.688" (93.68)	.795" x 20 RH	$\frac{5}{8}"$ (15.88)	$\frac{17}{32}"$ (13.50)	$\frac{7}{16}"$ (11.11)
115	1735	1	1.344" (34.14)	3.500" (88.90)	1.307" x 20 LH	$1\frac{1}{8}"$ (28.58)	$\frac{31}{32}"$ (24.61)	$\frac{51}{64}"$ (20.24)
215	9-1739	1	2.030" (51.56)	4.750" (120.65)	1.990" x 18 LH	$1\frac{3}{4}"$ (44.45)	$1\frac{1}{2}"$ (38.10)	$1\frac{1}{32}"$ (30.96)
315	1743	1	3.687" (93.65)	5.500" (139.70)	3.622" x 16 LH	$3\frac{1}{4}"$ (82.55)	$2\frac{13}{16}"$ (71.44)	$2\frac{1}{4}"$ (57.15)
B3	1745	5	.650" (16.51)	3.031" (76.99)	.437" x 20 RH	$\frac{1}{2}"$ (12.70)	$\frac{7}{16}"$ (11.11)	$1\frac{1}{32}"$ (8.73)
B32 Thru-Hole	2249	1	1.259" (31.97)	4.008" (101.80)	Buttress 1.169" x 15 RH	.943" (23.95)	.817" (20.75)	.667" (16.94)
B32 Stepped	2249	1	1.259" (31.97)	4.008" (101.80)	Buttress 1.169" x 15 RH	.943" to 1.25" (23.95 to 31.7)	.817" to 1.091" (20.75 to 17.71)	.667" to .89" (16.94 to 22.6)
B32/45 Thru-Hole	2239	4 (page 44)	1.259" (31.97)	4.623" (117.42)	Buttress 1.169" x 15 RH	$\frac{59}{64}"$ (23.41)	.817" (20.75)	.667" (16.94)
B32/45 Stepped	2241	4 (page 44)	1.259" (31.97)	4.623" (117.42)	Buttress 1.169" x 15 RH	.922" to $1\frac{3}{4}"$ (23.4 to 44.45)	.817" to $1\frac{1}{2}"$ (20.75 to 38.10)	.667" to $1\frac{1}{4}"$ (16.94 to 31.7)
B45 Thru-Hole	2243	1	1.771" (44.98)	4.290" (108.96)	M42 x 1.5 RH	$1\frac{13}{32}"$ (35.71)	1.240" (31.49)	1.013" (25.73)
B45 Stepped	2245	1	1.771" (44.98)	4.290" (108.96)	M42 x 1.5 RH	1.407" to $1\frac{3}{4}"$ (35.73 to 44.45)	1.240" to $1\frac{1}{2}"$ (31.49 to 38.10)	1.013" to 1.25" (25.73 to 31.7)
D5	9-1747	5	.780" (19.81)	3.031" (76.99)	.500" x 20 RH	$\frac{5}{8}"$ (15.88)	$\frac{17}{32}"$ (13.50)	$\frac{7}{16}"$ (11.11)
GTM	1789	5	.625" (15.88)	2.437" (61.90)	.437" x 20 RH	$\frac{1}{2}"$ (12.70)	$\frac{7}{16}"$ (11.11)	$1\frac{1}{32}"$ (8.73)
J & L Center Mill	MP2932	7	.999" (25.37)	4.375" (111.13)	.625" x 11 RH	$\frac{3}{4}"$ (19.05)	$\frac{41}{64}"$ (16.27)	$\frac{33}{64}"$ (13.10)
JC	1751	6	1.360" (34.54)	4.000" (101.60)	—	$1\frac{3}{16}"$ (30.16)	1" (25.40)	$1\frac{3}{16}"$ (20.64)
LB	1755	2	.687" (17.45)	2.000" (50.80)	—	$\frac{1}{2}"$ (12.70)	$\frac{7}{16}"$ (11.11)	$1\frac{1}{32}"$ (8.73)
Pro 20 Thru-Hole	2247	4 (page 44)	.7874" (20)	3.700" (93.98)	Buttress .775" x 6 Thrds/cm	.5708" (14.50)	.4921" (12.5)	.3937" (10.0)
Pro 20 Stepped	2247	4 (page 44)	.7874" (20)	3.700" (93.98)	Buttress .775" x 6 Thrds/cm	.5708" to .7874" (14.50 to 20.0)	.4921" to .6693" (12.5 to 17.0)	.3937" to .551" (10.0 to 14.0)
RO	9-1769	3	1.250" (31.75)	2.938" (74.63)	.875" x 16 RH	$1\frac{1}{8}"$ (28.58)	$\frac{31}{32}"$ (24.61)	$\frac{25}{32}"$ (19.85)
RO	9-1771	4	1.250" (31.75)	4.437" (112.70)	.875" x 16 RH	.800" (20.32)	$1\frac{1}{16}"$ (17.46)	$\frac{9}{16}"$ (14.29)
RO	9-1773	4	1.250" (31.75)	4.437" (112.70)	.875" x 16 RH	$1\frac{1}{8}"$ (28.58)	$\frac{31}{32}"$ (24.61)	$\frac{25}{32}"$ (19.85)
RO	9-1767	3	1.250" (31.75)	2.938" (74.63)	.875" x 16 RH	.800" (20.32)	$1\frac{1}{16}"$ (17.46)	$\frac{9}{16}"$ (14.29)
R8	1757	5	.950" (24.13)	4.000" (101.60)	.437" x 20 RH	$\frac{3}{4}"$ (19.05)	$\frac{41}{64}"$ (16.27)	$1\frac{1}{32}"$ (13.50)

NOTE: Millimeters in parentheses.  
Part numbers preceded by 9 or MP are special order.



# Frequently Asked Questions

## Why buy a Hardened, Precision-Machined Collet?

A hardened, precision-machined collet has a head angle and bore that are case hardened to 60 to 63 Rockwell. This will give you the maximum life possible. The bore is hardened, precision-machined and guaranteed to have a TIR of .001" or less. Special-accuracy collets are available that are guaranteed to have a TIR of .0002". Before investing in a special-accuracy collet, check your standard collet – they usually have a TIR of .0005" or better.

## Why not buy a bargain collet?

A bargain is possible because something has been compromised. The head angle and bore are not in the 60+ Rockwell range. The back bearing of the collet is not held to precision size and concentricity tolerances. The bore, head angle, back bearing and thread are not all concentric with each other. Because the collet is softer than a Hardinge collet, it will wear very quickly. A hardened, precision-machined collet can last for years.

## When should I use an emergency collet?

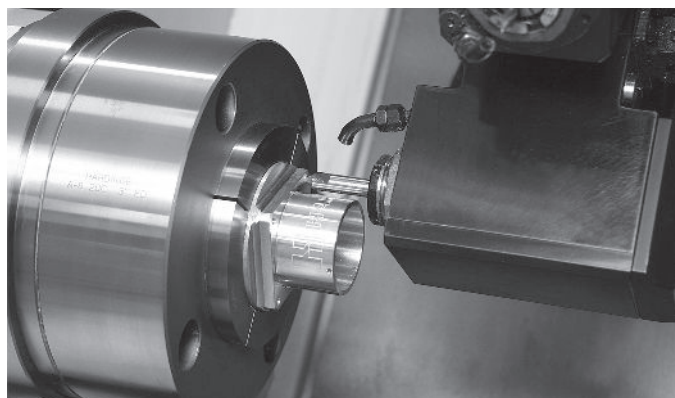
An emergency collet can be used when:

- You need a collet bore to run as close as the spindle's TIR; an emergency is bored in place in the machine's spindle.
- A hardened, precision-machined collet is necessary for any long run or high wear situation. But, if one doesn't exist in your inventory, an emergency collet can be quickly bored to size. It allows the job to get in the schedule while waiting for delivery of the hardened, precision-machined collet.
- A job consisting of a couple hundred parts and the proper size hardened, precision-machined collet is not available.

Points to consider: The head angle and the collet bore are not heat treated on emergency collets and will wear quickly under heavy or long use. The rule of thumb for the life of the bore and leaf tension of an emergency collet is 300 to 500 pieces. The threads are heat treated but the leaves of the collet are not spring tempered. This results in the collet leaves losing their elasticity. Eventually you will not be able to put the part in the collet because the leaves have lost their tension.

## Why do I have to use a stop plate with my Sure-Grip Expanding Collet?

The expanding collet is pulled back with a draw plug to open it. If the chucking ID of the parts vary, the collet will pull back or stick out farther than the previous piece. The Stop Plate eliminates the movement of the part and also stabilizes it for heavy stock removal.



## Is there an adapter that allows me to use my 5C collets in the 16C spindle?

Yes, there is a 16C-to-5C collet adapter which accepts 5C collets. There are many limitations, however. The major one is concentricity. Because of the number of parts in the assembly, the TIR will be .002" or more. If you are a production shop, you should not consider the adapter except for emergency situations. It takes about 15 minutes to change a collet. When doing secondary work, it will not be possible to hold concentricity of less than .002". Adapters are also available for 20C-to-16C and 25C-to-16C.

## Why do I need Dead-Length® Collets or Step Chucks?

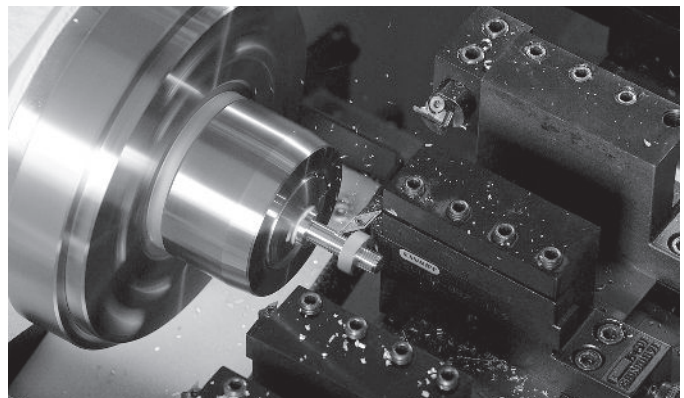
All draw-in collets have a diameter-to-length ratio when doing secondary operations. When using 5C, 16C, 20C, 25C collets or other collets with a 10° head angle, the ratio is 1:3. For every .001" change on the chucking diameter, the part will either pull back .003" or stick out .003" from the setup part. This can mean a total length variation of .009" when the chucking diameter varies .003". If the print calls for a length tolerance less than .002", a standard collet cannot be used. This is where the Dead-Length collet is ideal. If the stock diameter varies .003", the finished part lengths will not vary more than a few ten thousandths of an inch (.0002" to .0005").

## I have noticed that the threads and back bearing on our collets are being damaged and have to be replaced. How can I eliminate this expense?

Vises, vise-grips and pump pliers are probably the cause of your problem. Purchase several collet wrenches for each style (5C, 16C, 20C, 25C, etc.) collet in your shop. These wrenches are keyed and locate over the back bearing of the collet to hold it while the threaded stop, Dead-Length assembly, etc., are tightened into the collet.

## I have Style "S" Master Collets on my multi-spindle automatics. Can I use them on my CNC Lathe?

Possibly. If you're doing bar work, they work very well. The Style "S" Master Collet system was developed for use on multi-spindle automatic bar machines where collet runout is of very little concern. Secondary work on CNC machines requires very good collet concentricity, usually better than .001" TIR. Style "S" Master Collet system's TIR could be as high as .004" to .008", making them unacceptable for secondary work. Emergency pads will work in an emergency. Once you remove them, they cannot be used to run the same job again as their TIR will be unacceptable.





### What is the difference between the Dead-Length® Collet and the Dead-Length Spider-Stop Step Chucks?

The Dead-Length Collet uses the face of the spindle as its locating surface for the inner collet. Because the spindle doesn't move when the draw bar pulls the collet back, the inner collet also doesn't move, resulting in length control. The Dead-Length Spider-Stop Step Chuck uses a spider stop that fits inside the slots of the step chuck and locates against the collet seat (angle) of the spindle. Because the collet seat doesn't move when the draw bar pulls back the step chuck, neither does the spider stop or the workpiece. There is an internal thread in the face of the spider which accepts the male thread in the stop button. The customer has to bore out the step chuck to accommodate the stop button. The stop button is machined to conform to the location point of the workpiece.

### Is there ever a reason I would use a Dead-Length Spider-Stop Step Chuck for small diameter work?

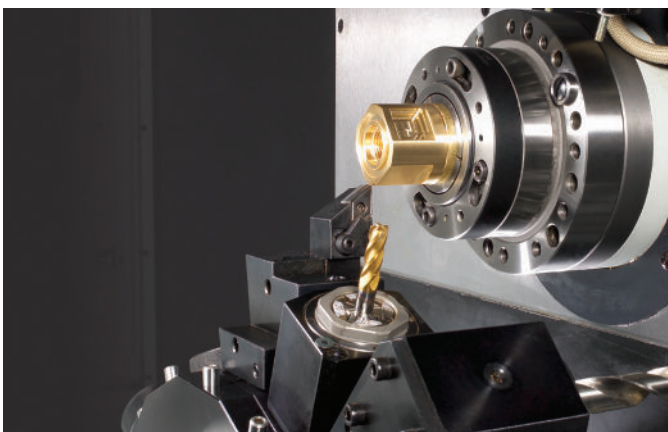
Yes. Occasionally a customer finds that the standard 5C Dead-Length Collet does not allow them to hold their parts to the print's concentricity requirements. A Dead-Length collet does not run as concentric as a Hardened, Precision-Machined collet even though it may be bored in place. This is because of the allowances between the moving parts. A Dead-Length Spider Step Chuck is identical to a standard collet; there is only one moving part — the step chuck. This attribute will allow closer concentricities between chucking and machined diameters than with a standard Dead-Length collet.

### I have a 6" diameter part which I want to hold in a Dead-Length Spider-Stop Step Chuck, but it has a maximum size of 4". What can I do?

Order a special Dead-Length step chuck. Request Hardinge Brochure #2285, "Precision Length Control", which describes many ways to control length and various ideas relating to step chucks.

### Will threaded collet stops help me hold lengths?

No, however if the diameter of the part being gripped is held to a very close tolerance, the answer could be yes. Unfortunately the stop is attached to the collet, which draws back with the draw bar. For every .001" variation in the chucking diameter, the collet will draw back or stick out .003". The main purpose of a collet stop is to eliminate the push-back of the part while it is being machined, or to automatically eject the part when the collet is opened.



### I have a part that requires internal gripping. After turning, I want to take it to a mill for additional work but still want to grip on the ID. What are my options?

There are two options — The "Master Expanding Collet" and the "Sure-Grip® Collet-Style Expanding Collet." Both of these can be taken to an index fixture or dividing head that has a 5C or 16C collet seat. The Master Expanding Collet uses interchangeable pads which can be removed and stored. This unit is opened with a draw plug that actuates the collet in the front. It is mainly for light-duty machining. The Sure-Grip Collet-Style Expanding Collet system will also work. The collets are parallel opening and have a range from .125" to 4". This system, in the larger sizes, can handle heavy-duty machining operations.

### What is the correct procedure for boring out an emergency collet or step chuck?

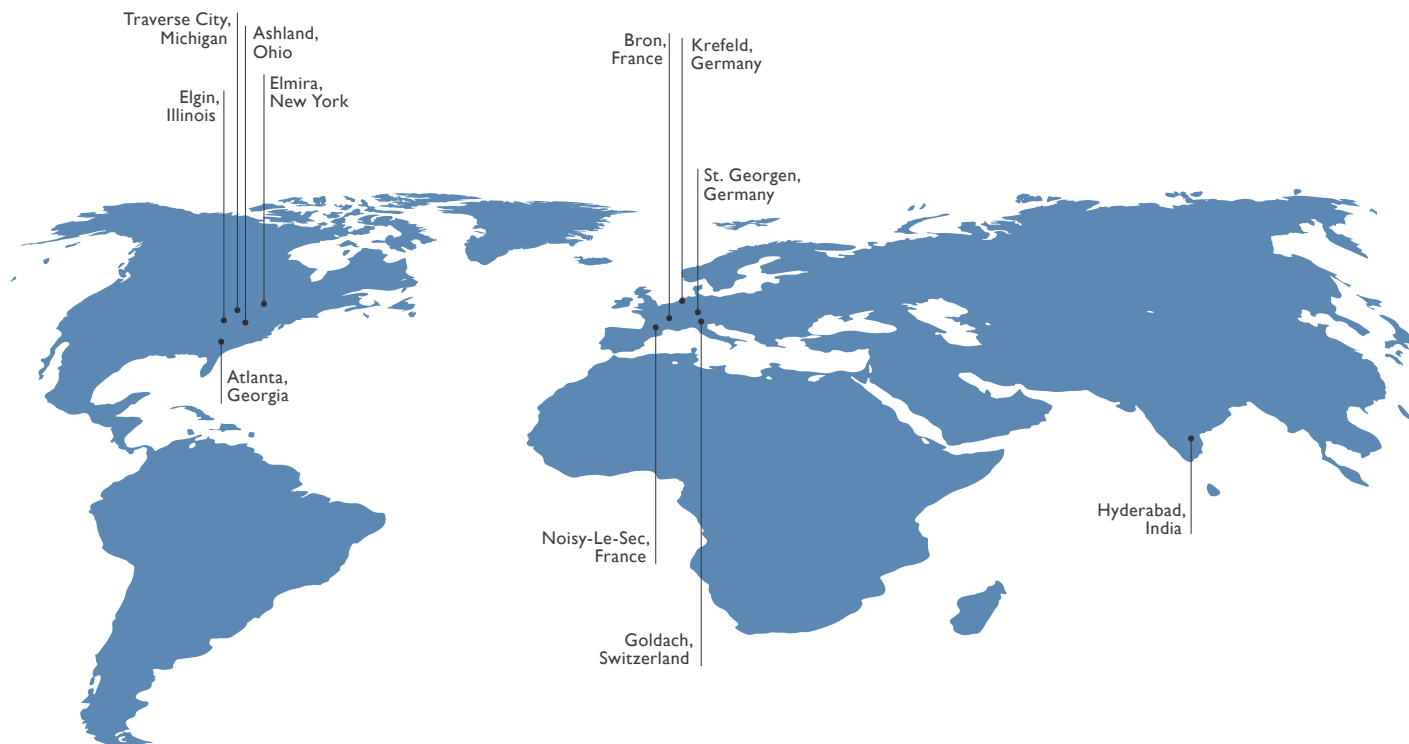
Insert the collet in the spindle with the draw bar in the full open position. Make certain that all the pins are in the face of the collet or step chuck. Adjust the collet closer until closed on the pins and then back off  $\frac{1}{8}$  to  $\frac{1}{4}$  of a turn. DO NOT back off enough to where the collet angle is not fully seated in the spindle. Lock the draw bar in this position. Decrease the chucking force as much as possible (do not use the same force you would to grip the part). Close the collet. If you can pull the pins out, you should increase the chucking pressure until the pins cannot be removed. Rough and finish the bore to the chucking diameter of the part. Remove the collet or step chuck and deburr it. Thoroughly clean the spindle, step chuck, closer and then remount them. Adjust the collet closer for proper gripping and the correct draw bar pressure to hold the workpiece.

### I have a part with a 9" chucking diameter to be run on my QUEST® T51 Lathe. I want to hold it in a step chuck which will allow me to run at my machine's maximum rpm. Your catalog lists the largest step chuck as 8". Can I get a larger step chuck and closer?

Yes. We have a full department set up to make special spindle tooling to help you with any situation you may encounter. You are right about using a step chuck and closer. If your part has a good chucking diameter (+.001", -.003"), you will be more productive than when holding the part in a 3-jaw power chuck. As with the jaw chuck, it is necessary to check for turret tooling interferences.



# HARDINGE WORLDWIDE



Hardinge is a leading international provider of advanced metal-cutting solutions. We provide a full spectrum of highly reliable CNC turning, grinding, and honing machines as well as technologically advanced workholding accessories.

The diverse products we offer enable us to support a variety of market applications in industries including aerospace, agricultural, automotive, construction, consumer products, defense, energy, medical, technology, transportation and more.

We've developed a strong global presence with manufacturing operations in North America and Europe. Hardinge applies its engineering and applications expertise to provide your company with the right machine tool solution and support every time.

## AMERICAS

**GEORGIA**  
Hardinge Corporate  
79 W Paces Ferry Rd, 2F  
Atlanta, GA 30305  
P. 800.843.8801

**ILLINOIS**  
USACH  
1755 Britannia Dr  
Unit A  
Elgin, IL 60124

**MICHIGAN**  
Forkardt Hardinge  
2155 Traversefield Dr  
Traverse City, MI 49686  
P. 800.544.3823  
E. [tcsales@forkardt.com](mailto:tcsales@forkardt.com)

**NEW YORK**  
Hardinge  
1 Hardinge Drive  
Elmira, NY 14903  
P. 800.843.8801  
E. [info@hardinge.com](mailto:info@hardinge.com)

**OHIO**  
Ohio Tool Works  
1374 Enterprise Parkway (TR 743)  
Ashland, OH 44805  
P. 419.281.3700  
E. [sales@ohiotoolworks.com](mailto:sales@ohiotoolworks.com)

## EUROPE

**SWITZERLAND**  
Hardinge Kellenberger AG  
Thannackerstrasse 22  
CH-9403 Goldach  
P. +41 71 2429111  
E. [info@kellenberger.net](mailto:info@kellenberger.net)

**GERMANY**  
Hardinge GmbH  
Fichtenhain A 13c  
47807 Krefeld  
P. 49 2151 49649 10  
E. [info@hardinge-gmbh.de](mailto:info@hardinge-gmbh.de)

J.G. Weisser Söhne GmbH  
Johann-Georg-Weisser-Straße 1  
78112 St. Georgen  
P. +49 7724 881-0  
E. [info@weisser-web.com](mailto:info@weisser-web.com)

**FRANCE**  
Jones & Shipman SARL  
8 Allee des Ginkgos  
BP 112-69672  
Bron Cedex, France

**HARDINGE.COM | SHOP.HARDINGE.COM**

800-843-8801 • [info@hardinge.com](mailto:info@hardinge.com) • [parts@hardinge.com](mailto:parts@hardinge.com) • [service@hardinge.com](mailto:service@hardinge.com)

All prices and specifications are subject to change without notice.  
All marks indicated by ® and ™ are trademarks of their respective owners.  
#2348J\_SpindleTooling © Hardinge Inc. 2023 • 04/2023