

# Tapping for High Performance Machinery





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# Tapping Terminology

## **Axial Feed**

A thread is an inclined plane that is rolled into a cylinder. The distance between a point on the plane and the point directly above or below it is the pitch of the thread. To produce quality thread the tap must be fed into the work piece precisely on pitch. A tap is the only metalworking tool in which the feed rate and the spindle speed must be perfectly matched. For each revolution the tap makes it must advance the distance of the pitch. Retarding or accelerating the taps entrance and exit will cause the tap to be pushed or pulled, producing a defective thread.

## **Tension/Compression Stroke**

A tap is a precision ground cutting tool. Because not all machine tools can synchronize speed to feed, a tension and compression floating tapping head is utilized. This allows the tap to pull itself in to the workpiece on entrance, and follow the pitch exiting the workpiece allowing the tap to be pulled from the workpiece, thus producing a quality thread.

## **Torque Control**

Torque control is the ability to cause the tap to stop rotating when a predetermined force or pressure is reached. This often happens when tapping blind holes where chip build-up blocks the hole. Without torque control, the tap can break, resulting in excessive tooling cost, and a possible defective or an unusable workpiece. To prevent this problem when tapping blind holes, choose SCM's tap adapters with the torque control clutch feature.

## **Radial Float**

Radial float allows for misalignment between the tap and the hole to be tapped. This also allows the tap to follow a hole which has not been drilled straight.

## **Axial Compression**

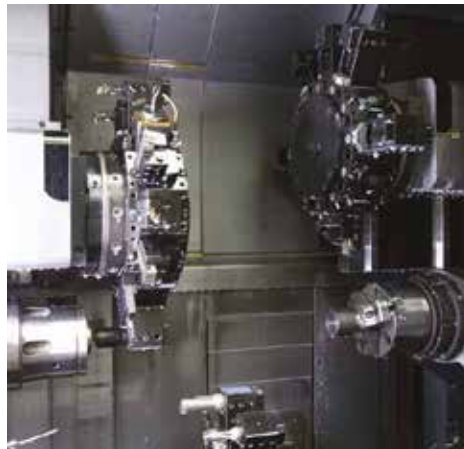
The compression stroke cushions the tap as it enters the workpiece. This feature also allows holes to be re-tapped. This is particularly helpful when setting up a job. The compression stroke to maximize depth control on Size #1 is adjustable from 45 ft/lbs. to 100 ft/lbs. Size #2 is adjustable from 95 ft/lbs. to 360 ft/lbs.

## **Syncrolize**

Modern machine tools offer the capability of synchronizing the spindle rotation and spindle feed. This means the compression and tension stroke found in traditional tapping heads is not needed. The newer processors allow for the use of a lower cost holder since the axial float mechanism is not needed. It also offers the advantage of tapping at higher cycle speeds. SCM recommends the Syncrolize tapping chuck for synchronized tapping. It offers 0.039" tension stroke, 0.008" compression stroke, & 0.0001" radial float. This combination results in perfect hole line-up, reduced cycle times, quality threads and longer tap life (up to 4 times) with a lower cost tapping head.



More than 40 years of  
Patents and Innovation.



# Tapping for High Performance Machinery



## MATERIAL

Tapping Toolholders, from SCM are manufactured from 18 NiCrMo5. This high quality Nickel - Chrome alloy steel is used to provide maximum performance and life of the toolholder.

## HEAT TREAT

All tapered shanks are case hardened to 58-60 Rockwell "C" and have a core hardness of 40-45 Rockwell "C". The case hardness is designed to provide the maximum toolholder life without damaging the machine spindle.

## TAPER END

All tapers manufactured by SCM are 100% controlled and manufactured in accordance to the AT3 tolerance specification or better. The taper roundness tolerance is held at .00008" or better. Every taper that SCM manufactures is inspected and evaluated with 3 point contact measurement which exceeds the 2 point contact as required by the AT3 specification.

## QUALITY CONTROL

SCM has a significant investment in inspection equipment and processes to ensure the quality of every tool that it manufactures. All high performance tools are 100% inspected and evaluated for T.I.R. and balance. A document of certification is provided that states the actual measurements. All products are manufactured on modern, well maintained machinery by trained and skilled operators.

**SAFETY WARNING** SCM-America products are engineered and manufactured with safety in mind. The heat treat specifications exceed or meet all standards. All of the products manufactured by SCM-America are designed to perform without any undue safety issues when caution, common sense and proper safety practices are followed. The use of cutting tools and toolholders is safe when proper application and protection guidelines are observed. Even when these proper precautions are taken, it is possible that fragments of a cutting tool, cutting material, or holding device may be thrown at a very high rate of speed and have potential to cause severe bodily harm. It is imperative that general safety precautions and safety glasses be used at all times.

# SYNCROLIZE SYSTEM

For machines capable of synchronous tapping

The CNC synchronizes tap rotation and machine feed according to the pitch of the tap.

Capable of higher speeds

Significantly increased tool life

Ideal for high performance and carbide taps.

## The SCM Syncrolize System

A new generation system, patented by SCM, using a quick change tapping chuck and tap adapter. The micro-compensation, rigidity and high precision alignment significantly increases tap-hole yields and tap life with improved thread quality.

## Much Higher Axial and Radial Force

The first threads of the tap have a high concentration of both axial and radial force at the moment of reversal.

## Increased Precision and Tool Life

SCM's micro-compensation technology minimizes tap damage which compromises precision and tool life.

## Differentiated Compensation to Reduce Axial and Radial Forces

The compensation in extension is higher than that in compression. In extension axial force is reduced during reversal; in compression the depth of the thread is guaranteed.

### Size 1

#0 to 1/2"  
M1.6 – M12  
ER 16

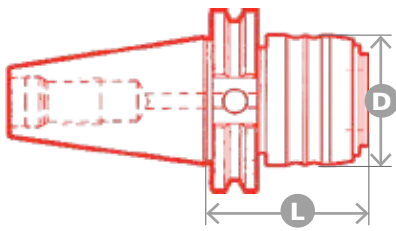
### Size 2

3/8" to 5/8"  
M10 – M16  
ER 25

### Size 3

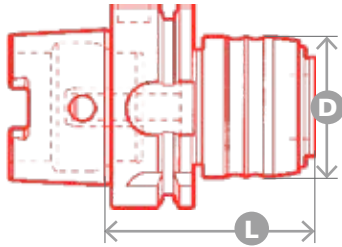
5/8" to 1"  
M16 – M25  
ER 40





## CAT

EDP	Part	Shank	(D)	(L)	Size	Collet Size	Quick Change Collet Chucks
<b>13004B</b>	23400-40CAT	CAT40	1.732"	2.756"	1	ER16	23410-ER16
<b>13005B</b>	23400-50CAT	CAT50	1.732"	2.756"	1	ER16	23410-ER16
<b>13013B</b>	23600-40CAT	CAT40	2.362"	3.543"	2	ER25	23610-ER25
<b>13014B</b>	23600-50CAT	CAT50	2.362"	3.543"	2	ER25	23610-ER25
<b>13320B</b>	23800-50CAT	CAT50	3.425"	4.528"	3	ER40	23810-ER40

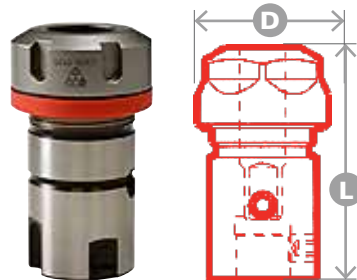


## HSK

EDP	Part	Shank	(D)	(L)	Size	Collet Size	Quick Change Collet Chucks
<b>13002B</b>	23400-H63A	HSK63	1.693"	2.520"	1	ER16	23410-ER16
<b>13003B</b>	23400-H100A	HSK100	1.693"	2.756"	1	ER16	23410-ER16
<b>13011B</b>	23600-H63A	HSK63	2.362"	3.819"	2	ER25	23610-ER25
<b>13012B</b>	23600-H100A	HSK100	2.362"	3.583"	2	ER25	23610-ER25
<b>13090B</b>	23800-H100A	HSK100A	3.425"	4.528"	3	ER40	23810-ER40

Stock standard chuck styles listed above. Many more sizes and shank styles are available by special order, including: **Straight Shank, BT, CAPTO™, HSK Form E, ISO 69871, MAS-BT, DIN, VDI, Kennametal™, Kennametal™-Mazak™.** Contact your Customer Service Representative today for more information.

QUICK  
CHANGE  
COLLETS



EDP	Part	Size	(D)	(L)
<b>13600A</b>	23410-ER16	ER16	1.102"	0.945"
<b>13602A</b>	23610-ER25	ER25	1.654"	1.102"
<b>14415A</b>	23810-ER40	ER40	2.480"	1.260"



REPLACEMENT  
NUTS

EDP	Size	Type
<b>60022A</b>	ER16	Hex
<b>14962A</b>	ER25	Standard
<b>14964A</b>	ER40	Standard

# SYNCROLIZE SYSTEM

## EXTENSION SYSTEM

### ER Terminal

EDP	Part	(L)	Size
13103B	42147/ER16	1.969"	1
13107B	42247/ER25	3.110"	2
13304B	42347/ER40	3.661"	3

### Extensions

EDP	Part	(L)	Size
13101B	42150/25	0.984"	1
13102B	42150/50	1.969"	1
13105B	42250/50	1.969"	2
13106B	42250/100	3.937"	2
13300B	42350/100	3.937"	3

### Extended Tap Adapter Body

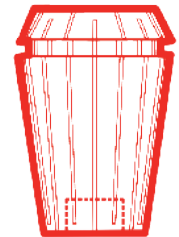
EDP	Part	(L)	Size
13100B	23411-MOD	0.197"	1
13104B	23611-MOD	0.276"	2
13303B	23811-MOD	0.078"	3



### Positive Drive

## ER COLLETS

Inch	Metric	Shank	Size 1 ER16 #0 to 1/2"	Size 2 ER25 3/8 to 5/8"	Size 3 ER40 5/8 to 1"
#0-6	M1.6-M3.5	0.141"	X13700A		
#8	M4	0.168"	X13701A		
#10	M5	0.194"	X13702A		
#12	---	0.220"	X13703A		
1/4"	M6	0.255"	X13704A		
5/16"	M7, M8	0.318"	X13705A		
3/8"	M10	0.381"	X13706A	X13723A	
7/16"	M10	0.323"	X13708A	X13726A	
1/2"	M12	0.367"	X13707A	X13724A	
9/16"	M14	0.429"		X13727A	
5/8"	M16	0.480"		X13725A	X13754A
11/16"	M18	0.542"			X13755A
3/4"	---	0.590"			X13757A
13/16"	M20	0.652"			X13758A
7/8"	M22	0.697"			X13760A
15/16"	M24	0.760"			X13762A
1"	M25	0.800"			X13763A
1/8" NPT	---	0.322"			X13753A
1/4" NPT	---	0.421"			X13756A
1/2" NPT	---	0.515"			X13759A
3/8" NPT	---	0.531"			X13761A





# MICRO-COMPENSATION SPRING

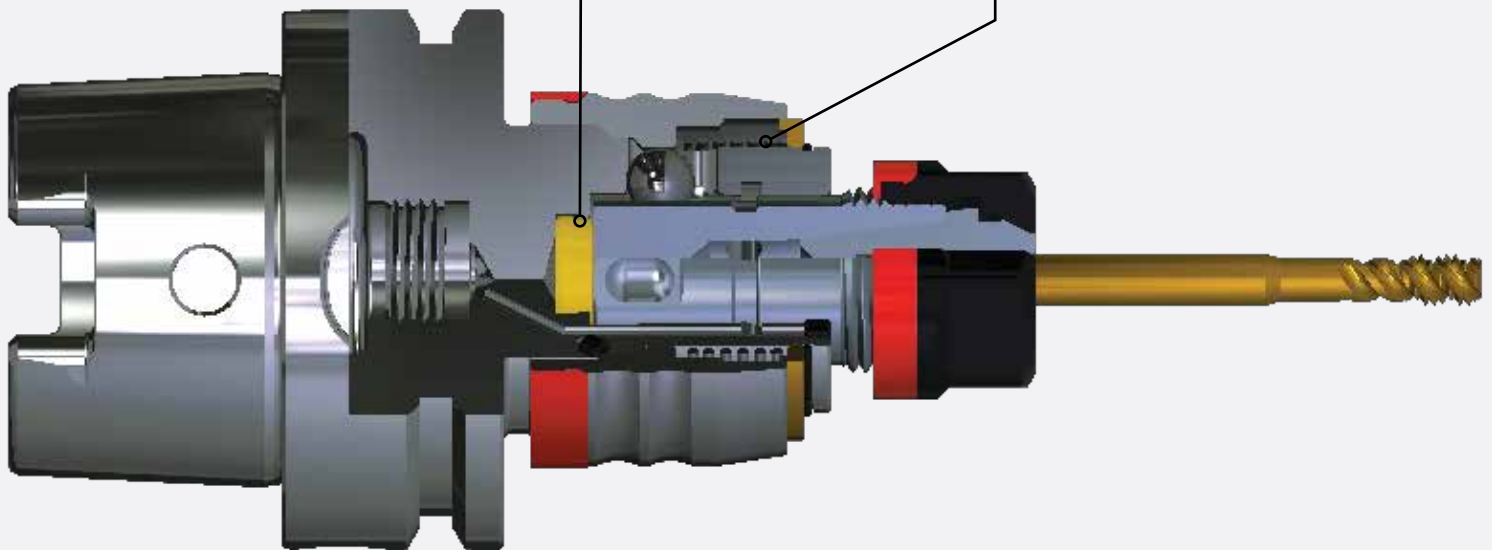
An exclusive Micro-Compensation Spring combined with a Rubber Disc which, when compressed, guarantees reliability and chuck life by absorbing the force of the tap in extension.



**Rubber Disc**  
For a guaranteed depth of thread.



**Micro-Compensation Spring**  
Spring Steel guaranteed for maximum spring life and function.

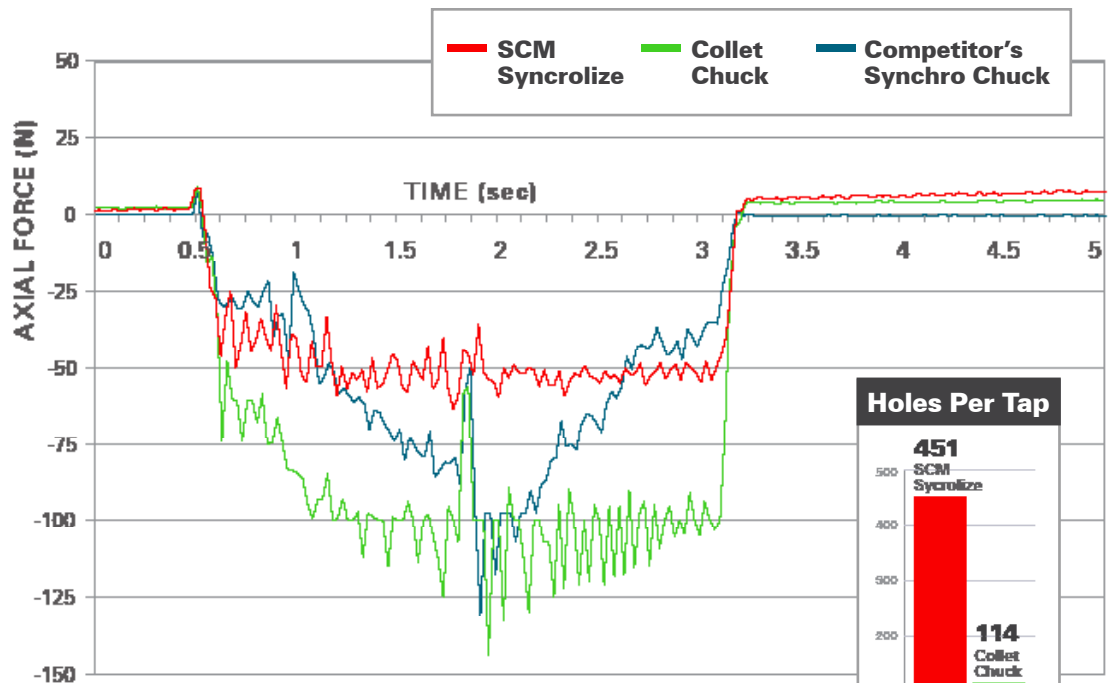


## THE LEAST AXIAL FORCE

### Comparison

During synchronized tapping operations, the SCM Syncrolize produces the least axial force, and the best tap life.

## SAVES TIME AND MONEY



Increased Tap Life more than **400%**

### Machine Used

Mori Seiki® SH40

### Tap Used

UFS K82M6X TXC LA030310F  
(Vt=12m/min Av=1mm/rev prof=12mm)

### Material

AISI 304 - 1,3401 Rolled steel  
(150 x 100 x 15 mm)

### Orientation

Horizontal



(220) 666-0911

QUALITY MADE IN ITALY

# TENSION & COMPRESSION SYSTEM

Compensates for spindle over-rotation and prevents cross-threading

Softer entry and exit of the hole produces a higher quality thread.

Significantly increased tool life

Uses quick change tap adapters

## Large Axial Stroke

Offsets difference between tap pitch and machine feed

## Ball Retainer

A smooth axial compensation for perfect tolerance on threads

## Controlled Tapping Depth

Increase entry pressure and obtain controlled tapping depth  $\pm 0.1$



### Size 1

#0 to 9/16"  
M1.6 - M14

### Size 2

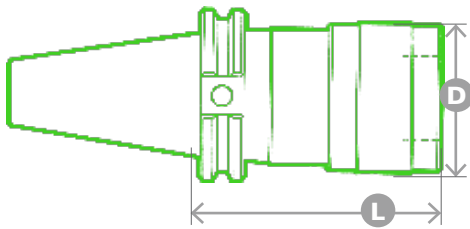
5/16" to 7/8"  
M8 - M22

### Size 3

1/2" to 1-3/8"  
M12 - M33

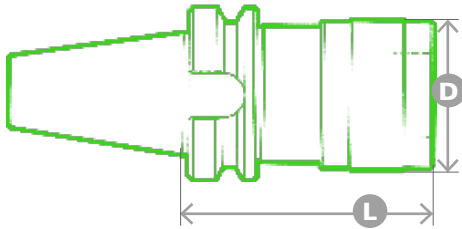
### Size 4

1-1/2" to 1-7/8"  
M36 - M42



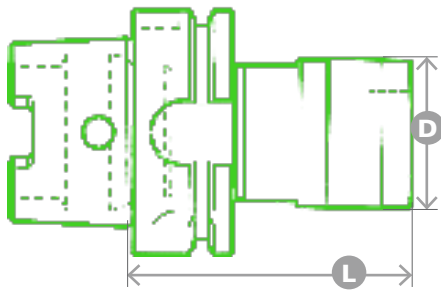
## CAT

EDP	Part	Shank	(D)	(L)			Size
					Tension	Compression	
<b>11050B</b>	32400/40CAT	CAT40	1.496"	3.012"	0.35"	0.35"	1
<b>11051B</b>	32400/50CAT	CAT50	1.496"	3.012"	0.35"	0.35"	1
<b>11052B</b>	32600/40CAT	CAT40	2.165"	3.940"	0.59"	0.59"	2
<b>11053B</b>	32600/50CAT	CAT50	2.165"	3.898"	0.59"	0.59"	2
<b>11054B</b>	32800/40CAT	CAT40	3.110"	5.472"	0.94"	0.94"	3
<b>11055B</b>	32800/50CAT	CAT50	3.110"	5.276"	0.94"	0.94"	3
<b>11056B</b>	32900/40CAT	CAT40	3.858"	6.063"	1.02"	1.02"	4
<b>11057B</b>	32900/50CAT	CAT50	3.858"	5.809"	1.02"	1.02"	4



## BT

EDP	Part	Shank	(D)	(L)			Size
					Tension	Compression	
<b>11200B</b>	32400/30BT	BT30	1.496"	2.480"	0.35"	0.35"	1
<b>11201B</b>	32400/40BT	BT40	1.496"	2.677"	0.35"	0.35"	1
<b>11203B</b>	32600/30BT	BT30	2.165"	3.780"	0.59"	0.59"	2
<b>11204B</b>	32600/40BT	BT40	2.165"	3.661"	0.59"	0.59"	2

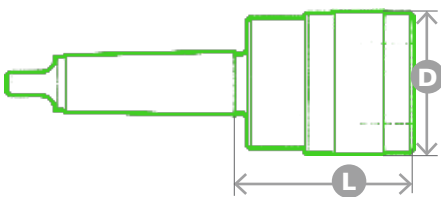


## HSK

EDP	Part	Shank	(D)	(L)			Size
					Tension	Compression	
<b>11401B</b>	34400/H63A	HSK63A	1.614"	2.835"	0.29"	0.29"	1
<b>11403B</b>	34400/H100A	HSK100A	1.614"	3.150"	0.29"	0.29"	1
<b>11405B</b>	34600/H63A	HSK63A	2.362"	4.331"	0.39"	0.39"	2
<b>11408B</b>	34800/H63A	HSK63A	3.386"	5.551"	0.69"	0.69"	3
<b>11410B</b>	34800/H100A	HSK100A	3.386"	5.669"	0.69"	0.69"	3

## HSK S SERIES: TENSION STROKE ONLY

EDP	Part	Shank	(D)	(L)			Size
					Tension	Compression	
<b>11364B</b>	34400/H63AS	HSK63A	1.614"	2.657"	0.47"	N/A	1
<b>11366B</b>	34400/H100AS	HSK100A	1.614"	2.972"	0.47"	N/A	1
<b>11370B</b>	34600/H63AS	HSK63A	2.362"	4.094"	0.63"	N/A	2
<b>11372B</b>	34600/H100AS	HSK100A	2.362"	3.701"	0.63"	N/A	2
<b>11373B</b>	34800/H63AS	HSK63A	3.386"	5.118"	1.18"	N/A	3
<b>11375B</b>	34800/H100AS	HSK100A	3.386"	5.217"	1.18"	N/A	3



## MORSE TAPER

EDP	Part	Shank	(D)	(L)			Size
					Tension	Compression	
<b>12025B</b>	32400/2	MT2	1.496"	1.811"	0.35"	0.35"	1
<b>12026B</b>	32400/3	MT3	1.496"	1.811"	0.35"	0.35"	1
<b>12023B</b>	32600/3	MT3	2.165"	2.717"	0.59"	0.59"	2
<b>12028B</b>	32600/4	MT4	2.165"	2.756"	0.59"	0.59"	2
<b>12024B</b>	32800/4	MT4	3.110"	4.252"	0.94"	0.94"	3
<b>12030B</b>	32800/5	MT5	3.110"	4.055"	0.94"	0.94"	3
<b>12031B</b>	32900/5	MT5	3.858"	4.567"	1.02"	1.02"	4

Stock standard chuck styles listed above. Many more sizes and shank styles are available by special order, including: **Straight Shank, Cylindrical Shank, Morse Cone, ISO DIN 2080, VDI, CAPTO™, DIN 1835 B+E.**

Contact your Customer Service Representative today for more information.

# RIGID SYSTEM

For fast, rigid tapping

No axial compensation

Uses quick change tap adapters

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## Faster and Easier

Than using a standard collet chuck

### Size 1

#0 to 9/16"  
M1.6 - M14

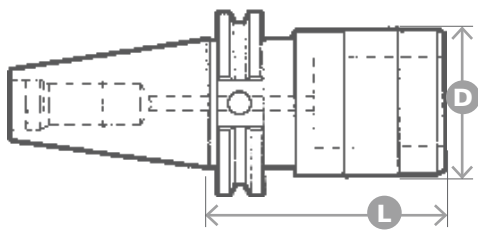
### Size 2

5/16" to 7/8"  
M8 - M22

### Size 3

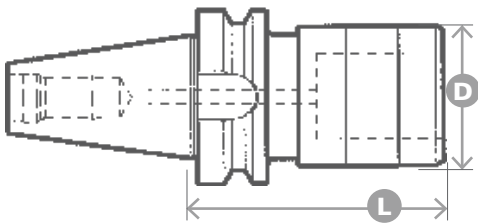
1/2" to 1-3/8"  
M12 - M33





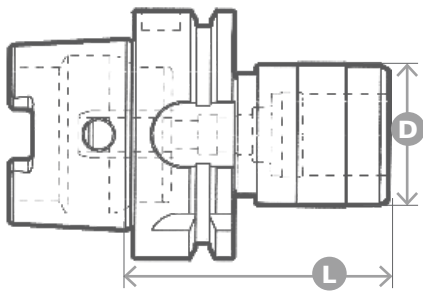
## CAT

EDP	Part	Shank	(D)	(L)	Size
<b>11100B</b>	21480/40CAT	CAT40	1.299"	2.953"	1
<b>11101B</b>	21480/50CAT	CAT50	1.299"	2.953"	1
<b>11102B</b>	21680/40CAT	CAT40	1.969"	3.386"	2
<b>11103B</b>	21680/50CAT	CAT50	1.969"	3.858"	2
<b>11104B</b>	21880/40CAT	CAT40	2.835"	4.803"	3
<b>11105B</b>	21880/50CAT	CAT50	2.835"	4.803"	3



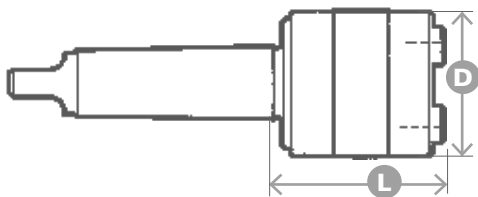
## BT

EDP	Part	Shank	(D)	(L)	Size
<b>12174B</b>	21480/30BT	BT30	1.299"	2.441"	1
<b>12128B</b>	21480/40BT	BT40	1.299"	2.638"	1
<b>12175B</b>	21680/30BT	BT30	1.969"	3.346"	2
<b>11181B</b>	21680/40BT	BT40	1.969"	3.543"	2
<b>11182B</b>	21880/40BT	BT40	2.835"	4.606"	3



## HSK

EDP	Part	Shank	(D)	(L)	Size
<b>12152B</b>	21480/H63A	HSK63A	1.299"	2.480"	1
<b>12154B</b>	21480/H100A	HSK100A	1.299"	2.717"	1
<b>12157B</b>	21680/H63A	HSK63A	1.969"	3.504"	2
<b>12159B</b>	21680/H100A	HSK100A	1.969"	3.622"	2
<b>12160B</b>	21880/H63A	HSK63A	2.835"	5.079"	3
<b>12162B</b>	21880/H100A	HSK100A	2.835"	4.567"	3



## MORSE TAPER

EDP	Part	Shank	(D)	(L)	Size
<b>12178B</b>	21480/2	MT2	1.299"	1.772"	1
<b>12179B</b>	21480/3	MT3	1.299"	1.772"	1
<b>12180B</b>	21680/2	MT2	1.969"	2.402"	2
<b>12181B</b>	21680/3	MT3	1.969"	2.402"	2
<b>12183B</b>	21880/4	MT4	2.835"	3.622"	3

Stock standard chuck styles listed above. Many more sizes and shank styles are available by special order, including: **Straight Shank, ISO 69871, MAS-BT, ISO DIN 2080, Morse Cone, Cylindrical Shank.**

Contact your Customer Service Representative today for more information.

## TAP ADAPTERS

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# Rigid

Rigid tap adapters are well suited for through holes and tapping in non-ferrous materials.



## TAP ADAPTERS

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# Torque Control

Protects your taps and workpieces from tap breakage. The best solution for blind hole tapping and where chip evacuation is a concern.



# TAP ADAPTERS

## Rigid Tap Sizes

## Torque Control Sizes

ANSI	ISO	STI	1	2	3	4	1	2	3
#0 - 6	M1.6-M3.5	#1- 4	<b>11600B</b>				<b>11800B</b>		
#8	M4	#5	<b>11602B</b>				<b>11801B</b>		
#10	M5	#6	<b>11604B</b>				<b>11802B</b>		
#12	---	#8	<b>11605B</b>				<b>11803B</b>		
1/4"	M6	#10	<b>11606B</b>				<b>11804B</b>		
5/16"	M8	1/4"	<b>11607B</b>	<b>11614B</b>			<b>11805B</b>	<b>11811B</b>	
3/8"	M10	5/16"	<b>11608B</b>	<b>11615B</b>			<b>11806B</b>	<b>11812B</b>	
7/16"	M11	---	<b>11611B</b>	<b>11616B</b>			<b>11807B</b>	<b>11813B</b>	
1/2"	M12	3/8"	<b>11612B</b>	<b>11617B</b>	<b>11627B</b>		<b>11808B</b>	<b>11814B</b>	<b>11825B</b>
9/16"	M14	7/16"	<b>11613B</b>	<b>11618B</b>	<b>11628B</b>		<b>11809B</b>	<b>11815B</b>	<b>11826B</b>
5/8"	M16	1/2"		<b>11619B</b>	<b>11629B</b>			<b>11816B</b>	<b>11827B</b>
11/16"	M18	9/16"		<b>11620B</b>	<b>11630B</b>			<b>11817B</b>	<b>11828B</b>
3/4"	---	5/8"		<b>11621B</b>	<b>11631B</b>			<b>11818B</b>	<b>11829B</b>
13/16"	M20	---		<b>11622B</b>	<b>11632B</b>			<b>11819B</b>	<b>11830B</b>
7/8"	M22	3/4"		<b>11623B</b>	<b>11633B</b>			<b>11820B</b>	<b>11831B</b>
15/16"	M24	M20			<b>11634B</b>				<b>11833B</b>
1"	M25	7/8"			<b>11635B</b>				<b>11834B</b>
1-1/16"	M27	M24			<b>11636B</b>				<b>11835B</b>
1-1/8"	M27	M24			<b>11636B</b>				<b>11835B</b>
1-3/16"	M30	1"			<b>11637B</b>				<b>11836B</b>
1-1/4"	M30	1"			<b>11637B</b>				<b>11836B</b>
1-5/16"	M33	1-1/8"			<b>11638B</b>				<b>11837B</b>
1-3/8"	M33	1-1/8"			<b>11638B</b>				<b>11837B</b>
1-1/2"	---	---				<b>11643B</b>			
1-7/16"	M36	1-1/4"				<b>11643B</b>			
1-5/8"	M39	1-3/8"				<b>11644B</b>			
1-3/4"	M42	1-1/2"				<b>11645B</b>			
1-7/8"	---	---				<b>11646B</b>			
1/8" NPT	---	---	<b>11609B</b>				<b>11810B</b>		
1/4" NPT	---	---		<b>11624B</b>				<b>11822B</b>	
3/8" NPT	---	---		<b>11625B</b>	<b>11639B</b>			<b>11823B</b>	<b>11838B</b>
1/2" NPT	---	---		<b>11626B</b>	<b>11640B</b>			<b>11824B</b>	<b>11839B</b>
3/4" NPT	---	---			<b>11641B</b>				<b>11840B</b>
1" NPT	---	---			<b>11642B</b>				<b>11841B</b>

# TAP ADAPTER ACCESSORIES



### Reduction Cups

EDP	Size
10071A	1 - 0
10072A	2 - 1
10073A	3 - 1
10074A	3 - 2



### ER Collet Chuck Adapters

EDP	Size
11750A	1 - ER16
11751A	2 - ER25



### Tap Adapter Extension

EDP	Size
10080A	Size 1 #10 - 9/16"



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QTI is committed to providing our supply channel partners and end user customers the best drilling and tapping products in the world. If you have any suggestions on how we can do better, please don't hesitate to contact me!

-Joshua Nourse, President

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