

# Single-Sided APET/XPET 90° Milling Series

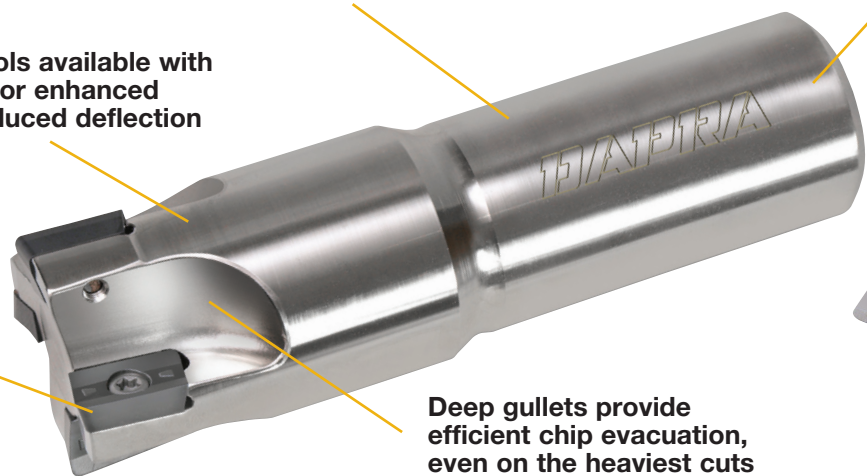
## DAPRA® Square Shoulder EXTREME Metal Removal

Cutter bodies machined from hardened steel to minimize runout and create excellent surface finishes at high feed rates

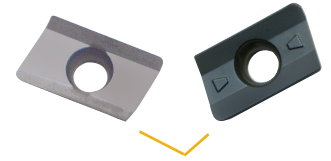
Nickel plating provides a harder casing for improved pocket durability and resistance to chip galling

Long-reach tools available with Carbide Core for enhanced rigidity and reduced deflection

Precision cutter and insert combination provides longer tool life



Deep gullets provide efficient chip evacuation, even on the heaviest cuts



Inserts offered in both pressed and lapped versions for a combination of economy and performance

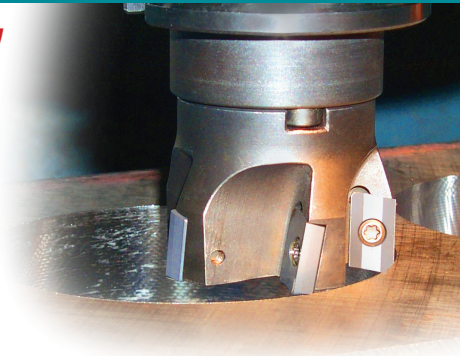
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# APET & XPET CNC Pressed Inserts

**The most economical, high-performance inserts available!**

- **APET and XPET** inserts are manufactured using CNC press technology, providing reliable accuracy and repeatability.
- Feature a high positive pressed cutting geometry for aggressive material removal rates and low horsepower consumption.
- Have a strong edge preparation for heavy chiploads.
- Are available in a large variety of corner radii with a true tangential blend.
- Wiper geometry provides excellent surface finishes.



## Insert Geometry Selection

APET Geometry	Traits	XPET Geometry
Positive/negative cutting edge with T-land	<b>Cutting Edge</b>	Positive cutting edge with a light hone and no T-land
Somewhat free-cutting; meant for higher chiploads (>.005" IPT); creates medium burr	<b>Cutting Action</b>	Free-cutting, small burr; can run at lighter chiploads (>.002" IPT)
Higher force due to negative edge; will deflect more than XPET	<b>Force</b>	Lower force due to sharper edge; less deflection
Higher heat generation than XPET; creates more heat at higher speeds	<b>Heat</b>	Less heat generated due to positive edge
Very strong cutting edge; able to withstand more shock and interruptions	<b>Strength</b>	Weaker, due to edge sharpness; not able to withstand significant interruptions
Longer edge life due to strong cutting edge; will roll more burr and wear out rather than chip out	<b>Edge Life</b>	Shorter, due to edge sharpness; may chip out if run too long



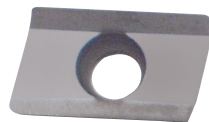
**APET** inserts feature a high-strength cutting edge and are ideal for high-performance milling of most harder steels and cast irons.



**XPET** inserts are ideal for high-performance milling of stainless steels, high-temperature alloys and nonferrous materials. Also good for gummy, softer, free-machining steels.

## XPET Lapped, Aluminum Cutting Inserts

- Ground and lapped rake face is ideally suited for machining aluminum and copper alloys, bronze, brass, etc. Built-up edge is virtually eliminated.
- Positive rake angle is higher than standard inserts, providing highest shear possible.
- Sharp cutting edge is configured specifically for cutting nonferrous materials, yielding the ultimate in low-torque material removal.
- Variety of corner radii available with a true tangential blend.



**XPET Lapped** inserts feature a ground and lapped rake face for machining aluminum and copper alloys.



**PCD-Tipped** inserts provide the ultimate in wear resistance for high-volume aluminum or graphite milling. Available in 1/32" corner radius only.

**See pages 24-25 for grade selection information.**

# Cutter Bodies for 10mm APET/XPET Inserts

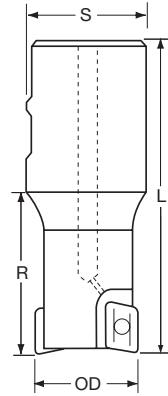
Dapra is in the process of transitioning to all thru-coolant tooling for SSEM, SSER, and CC-SSER cutter bodies. Solid bodies are available while stock lasts, after which only thru-coolant versions will be available. "C" denotes coolant thru tool.

## 10mm End Mills

### 10MM END MILLS

EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length
20000C	.500"	SSEM0500-0625-R35-1C	.350"	1	.625"	2.75"	.97"
20020C	.625"	SSEM0625-0625-R35-2C	.350"	2	.625"	3.00"	1.09"
20070	.750"	SSEM0750-0750-R35-2C	.350"	2	.750"	3.50"	1.47"
20100C	.750"	SSEM0750-0750-R35-3C	.350"	3	.750"	3.50"	1.47"
20150C	1.000"	SSEM1000-0750-R35-4C	.350"	4	.750"	3.50"	1.47"
20130	1.000"	SSEM1000-1000-R35-3C	.350"	3	1.000"	4.00"	1.72"
20230	1.250"	SSEM1250-1250-R35-5C	.350"	5	1.250"	4.78"	2.50"

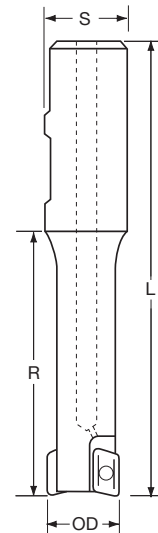
1.25" cutters and smaller are available without Weldon flats in limited supplies. Add WOF to end of part number when ordering.



### 10MM EXTENDED-REACH END MILLS

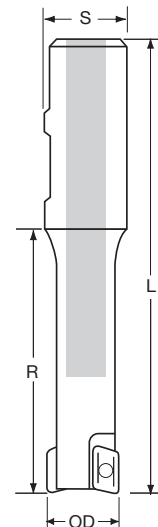
EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length
20500C	.500"	SSER0500-2000-R35-1C	.350"	1	.625"	3.91"	2.00"
20520	.625"	SSER0625-2500-R35-2C	.350"	2	.750"	4.41"	2.50"
20525	.625"	SSER0625-3300-R35-2C	.350"	2	.750"	5.21"	3.30"
20533C	.625"	SSER0625-7000-SS-R35-2C-WOF*	.350"	2	.625"	7.00"	1.25"
20540	.750"	SSER0750-2500-R35-2C	.350"	2	1.000"	4.78"	2.50"
20550	.750"	SSER0750-4000-R35-2C	.350"	2	1.000"	6.28"	4.00"
20565C	.750"	SSER0750-7000-SS-R35-2C-WOF*	.350"	2	.750"	7.00"	1.13"

\* Cylindrical shank – no Weldon flats.

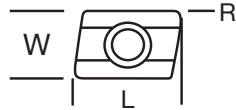


### 10MM EXTENDED-REACH END MILLS WITH CARBIDE CORE

EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length
20700	.750"	CC-SSER0750-2500-R35-2	.350"	2	1.000"	4.78"	2.50"
20700C	.750"	CC-SSER0750-2500-R35-2C	.350"	2	1.000"	4.78"	2.50"
20720	.750"	CC-SSER0750-4000-R35-2	.350"	2	1.000"	6.28"	4.00"



# 10mm APET/XPET Inserts and Grades



Insert Size	L	W	R	Uncoated (EDP)		Available Coated Grades (EDP)		
<b>APET</b> APET Inserts feature a high-strength cutting edge and are ideal for high-performance milling of most harder steels and cast irons.								
APET100308	.380"	.250"	.031"	DMP35 (25200)	DMP35-TCI (25290)	DMP35-GLH (25260)	DMP35-HM (25285)	
				DMP30 (25100)	DMP30-TCI (25190)	DMP30-GLH (25160)	DMP30-HM (25185)	
				DMK25 (25000)	DMK25-TCI (25090)	DMK25-GLH (25060)	DMK25-HM (25085)	
APET100316	.380"	.250"	.062"	DMP35 (25500)	DMP35-TCI (25590)	DMP35-GLH (25560)	DMP35-HM (25585)	
				DMP30 (25400)	DMP30-TCI (25490)	DMP30-GLH (25460)	DMP30-HM (25485)	
				DMK25 (25300)	DMK25-TCI (25390)	DMK25-GLH (25360)	DMK25-HM (25385)	
<b>XPET</b> XPET Inserts are ideal for high-performance milling of stainless steels and nonferrous materials such as copper alloys and aluminum. Also good for gummy, softer, free-machining steels.								
XPET100308	.380"	.250"	.031"	DMP35 (27300)	DMP35-TCI (27390)	DMP35-GLH (27360)	DMP35-HM (27385)	
				DMK30 (27100)	DMK30-TCI (27190)	DMK30-GLH (27160)	DMK30-HM (REQ)	
				DMP30 (27200)	DMP30-TCI (27290)	DMP30-GLH (27260)	DMP30-HM (REQ)	
				DMK25 (27000)	DMK25-TCI (27090)	DMK25-GLH (27060)	DMK25-HM (27085)	
XPET100316	.380"	.250"	.062"	DMP35 (27700)	DMP35-TCI (27790)	DMP35-GLH (27760)	DMP35-HM (REQ)	
				DMK30 (27500)	DMK30-TCI (27590)	DMK30-GLH (27560)	DMK30-HM (REQ)	
				DMP30 (27600)	DMP30-TCI (27690)	DMP30-GLH (27660)	DMP30-HM (REQ)	
				DMK25 (27400)	DMK25-TCI (27490)	DMK25-GLH (27460)	DMK25-HM (REQ)	
<b>XPET-ALU</b> XPET-ALU lapped inserts feature a ground and lapped rake face for machining aluminum and copper alloys, bronze, brass, etc. Built-up edge is virtually eliminated.								
XPET100308-ALU	.380"	.250"	.031"	DMK25 (29902)	DMK25-TCI (REQ)	DMK25-GLH (29908)	DMK25-HM (REQ)	
XPET100316-ALU	.380"	.250"	.062"	DMK25 (29910)	DMK25-TCI (REQ)	DMK25-GLH (REQ)	DMK25-HM (REQ)	

REQ = Available upon request.

Older coatings available upon request; may have up to a 2-week lead time.

Other grades available upon request.

SEE PG. 25 FOR INSERT GRADE DESCRIPTIONS



See chart on page 29 for technical help on optimizing cutting performance.

See page 31 for recommended speeds/feeds.





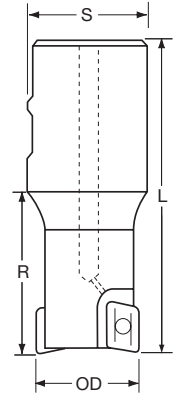
# Cutter Bodies for 12mm APET/XPET Inserts

Dapra is in the process of transitioning to all thru-coolant tooling for SSEM, SSER, and CC-SSER cutter bodies. Solid bodies are available while stock lasts, after which only thru-coolant versions will be available. "C" denotes coolant thru tool.

## 12mm End Mills

### 12MM END MILLS

EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length
20035	.625"	SSEM0625-0625-R45-1C	.430"	1	.625"	3.00"	1.09"
20105	.750"	SSEM0750-0750-R45-2C	.430"	2	.750"	3.50"	1.47"
20107	.750"	SSEM0750-0750-R45-2LC	.430"	2	.750"	4.28"	2.25"
20169	1.000"	SSEM1000-1000-R45-3SC	.430"	3	1.000"	3.28"	1.00"
20165	1.000"	SSEM1000-1000-R45-3C	.430"	3	1.000"	4.28"	2.00"
20167	1.000"	SSEM1000-1000-R45-3LC	.430"	3	1.000"	5.28"	3.00"
20245	1.250"	SSEM1250-1250-R45-4C	.430"	4	1.250"	4.78"	2.50"
20247	1.250"	SSEM1250-1250-R45-4LC	.430"	4	1.250"	6.03"	3.75"
20295	1.500"	SSEM1500-1250-R45-5C	.430"	5	1.250"	4.78"	2.50"



### 12MM EXTENDED-REACH END MILLS

EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length
20535	.625"	SSER0625-7000-SS-R45-1C-WOF*	.430"	1	.625"	7.00"	1.09"
20567	.750"	SSER0750-7000-SS-R45-2C-WOF*	.430"	2	.750"	7.00"	1.45"
20603	1.000"	SSER1000-9000-SS-R45-2C-WOF*	.430"	2	1.000"	9.00"	2.00"
20612	1.250"	SSER1250-10000-SS-R45-2C-WOF*	.430"	2	1.250"	10.00"	2.50"

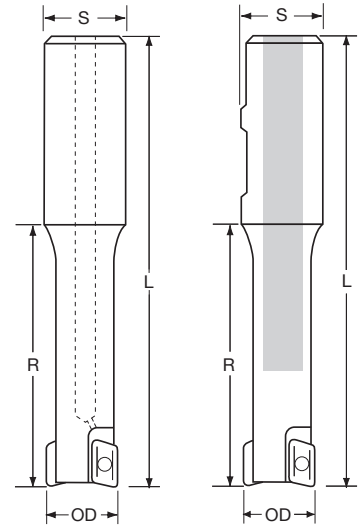
\* Cylindrical shank – no Weldon flats.

### 12MM EXTENDED-REACH END MILLS WITH CARBIDE CORE

EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length
20722	.750"	CC-SSER0750-4000-R45-2	.430"	2	1.000"	6.30"	4.00"
20724	1.000"	CC-SSER1000-4000-R45-3	.430"	3	1.250"	6.29"	4.00"
20726	1.000"	CC-SSER1000-6000-R45-3	.430"	3	1.250"	8.29"	6.00"

SSER -WOF\*

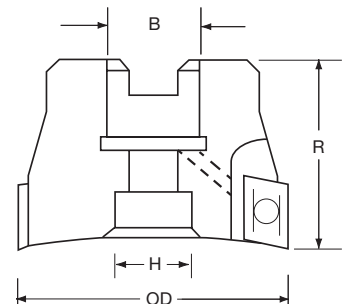
CC-SSER



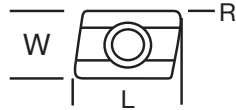
## 12mm Shell Mills

### 12MM STANDARD-PITCH SHELL MILLS

EDP	OD Diameter	Holder	Max. DOC	Flutes	B Arbor Dia.	R Overall Length	H Counter Bore Dia.	SHCS Socket Head Cap Screw
20890	1.500"	SSSM1500-0750-R45-5C	.430"	5	.750"	1.75"	.58"	TC-3/8
20913	2.000"	SSSM2000-0750-R45-5C	.430"	5	.750"	1.50"	.60"	TC-3/8
20915	2.000"	SSSM2000-0750-R45-7C	.430"	7	.750"	1.50"	.60"	TC-3/8
20945	2.500"	SSSM2500-1000-R45-8C	.430"	8	1.000"	1.75"	.80"	TC-1/2
20955	3.000"	SSSM3000-1000-R45-7C	.430"	7	1.000"	2.00"	.80"	TC-1/2
20957	3.000"	SSSM3000-1000-R45-10C	.430"	10	1.000"	2.00"	.80"	TC-1/2
20965	4.000"	SSSM4000-1500-R45-12	.430"	12	1.500"	2.00"	1.90"	N/A



# 12mm APET/XPET Inserts and Grades



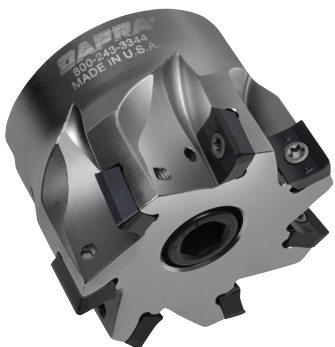
Insert Size	L	W	R	Uncoated (EDP)				Available Coated Grades (EDP)			
<b>APET</b> APET Inserts feature a high-strength cutting edge and are ideal for high-performance milling of most harder steels and cast irons.											
APET120408	.472"	.312"	.031"	DMP35 (30800)	DMP35-TCI (30890)	DMP35-GLH (30860)	DMP35-HM (REQ)				
				DMP30 (30700)	DMP30-TCI (30790)	DMP30-GLH (30760)	DMP30-HM (30785)				
				DMK25 (30500)	DMK25-TCI (30590)	DMK25-GLH (30560)	DMK25-HM (30585)				
APET120416	.472"	.312"	.062"	DMP35 (31200)	DMP35-TCI (31290)	DMP35-GLH (31260)	DMP35-HM (31285)				
				DMP30 (31100)	DMP30-TCI (31190)	DMP30-GLH (31160)	DMP30-HM (31185)				
				DMK25 (30900)	DMK25-TCI (30990)	DMK25-GLH (30960)	DMK25-HM (30985)				
APET120431	.472"	.312"	.120"	DMP35 (31600)	DMP35-TCI (31690)	DMP35-GLH (31660)	DMP35-HM (REQ)				
				DMP30 (31500)	DMP30-TCI (31590)	DMP30-GLH (31560)	DMP30-HM (REQ)				
				DMK25 (31300)	DMK25-TCI (31390)	DMK25-GLH (31360)	DMK25-HM (REQ)				
<b>XPET</b> XPET Inserts are ideal for high-performance milling of stainless steels and nonferrous materials such as copper alloys and aluminum. Also good for gummy, softer, free-machining steels.											
XPET120408	.472"	.312"	.031"	DMP35 (32400)	DMP35-TCI (32490)	DMP35-GLH (32460)	DMP35-HM (32485)				
				DMP30 (32300)	DMP30-TCI (32390)	DMP30-GLH (32360)	DMP30-HM (32385)				
				DMK25 (32100)	DMK25-TCI (32190)	DMK25-GLH (32160)	DMK25-HM (32185)				
				DMK35 (32200)			DMK35-HM (32201)	DMK35-IN (32202)			
XPET120416	.472"	.312"	.062"	DMP35 (32800)	DMP35-TCI (32890)	DMP35-GLH (32860)	DMP35-HM (REQ)				
				DMP30 (32700)	DMP30-TCI (32790)	DMP30-GLH (32760)	DMP30-HM (32785)				
				DMK25 (32500)	DMK25-TCI (32590)	DMK25-GLH (32560)					
				DMK35 (32640)			DMK35-HM (32641)	DMK35-IN (32642)			
XPET120431	.472"	.312"	.120"	DMP35 (33200)	DMP35-TCI (33290)	DMP35-GLH (33260)	DMP35-HM (REQ)				
				DMP30 (33100)	DMP30-TCI (33190)	DMP30-GLH (33160)	DMP30-HM (REQ)				
				DMK25 (32900)	DMK25-TCI (32990)	DMK25-GLH (32960)	DMK25-HM (REQ)				
<b>XPET-ALU</b> XPET-ALU lapped inserts feature a ground and lapped rake face for machining aluminum and copper alloys, bronze, brass, etc. Built-up edge is virtually eliminated.											
XPET120408-ALU	.472"	.312"	.031"	DMK25 (32010)	DMK25-TCI (REQ)	DMK25-GLH (32025)	DMK25-HM (REQ)				
XPET120416-ALU	.472"	.312"	.062"	DMK25 (32600)	DMK25-TCI (REQ)	DMK25-GLH (32615)	DMK25-HM (REQ)				
XPET120431-ALU	.472"	.312"	.120"	DMK25 (33000)	DMK25-TCI (REQ)	DMK25-GLH (33015)	DMK25-HM (REQ)				
<b>PCD-TIPPED</b> PCD-tipped inserts provide the ultimate in wear resistance for high-volume aluminum or graphite milling. Available in 1/32" corner radius only.											
XPET120408-PCD-150	.472"	.312"	.031"	DMK25 (29895)							

REQ = Available upon request.

Older coatings available upon request; may have up to a 2-week lead time.

Other grades available upon request.

SEE PG. 25 FOR INSERT GRADE DESCRIPTIONS



See chart on [page 29](#) for technical help on optimizing cutting performance.

See [page 31](#) for recommended speeds/feeds.

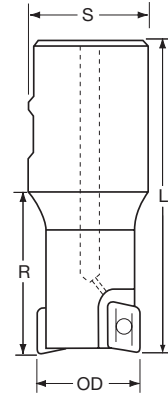
# Cutter Bodies for 16mm APET/XPET Inserts

Dapra is in the process of transitioning to all thru-coolant tooling for SSEM, SSER, and CC-SSER cutter bodies. Solid bodies are available while stock lasts, after which only thru-coolant versions will be available. "C" denotes coolant thru tool.

## 16mm End Mills

### 16MM END MILLS

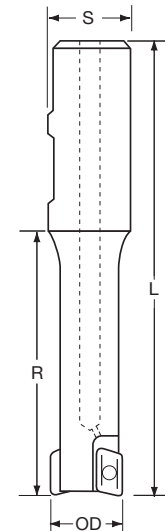
EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length
20040C	.625"	SSEM0625-0750-R55-1C	.600"	1	.750"	3.35"	1.15"
20110	.750"	SSEM0750-0750-R55-1	.600"	1	.750"	3.49"	1.40"
20170	1.000"	SSEM1000-1000-R55-2	.600"	2	1.000"	4.28"	2.00"
20190	1.000"	SSEM1000-1000-R55-2C	.600"	2	1.000"	4.28"	2.00"
20210	1.000"	SSEM1000-1000-R55-2LC	.600"	2	1.000"	5.28"	3.00"
20270	1.250"	SSEM1250-1250-R55-3C	.600"	3	1.250"	4.78"	2.50"
20300C	1.500"	SSEM1500-1250-R55-3C	.600"	3	1.250"	4.78"	2.50"
20310	1.500"	SSEM1500-1250-R55-4	.600"	4	1.250"	4.78"	2.50"
20320	1.500"	SSEM1500-1250-R55-4C	.600"	4	1.250"	4.78"	2.50"



### 16MM EXTENDED-REACH END MILLS

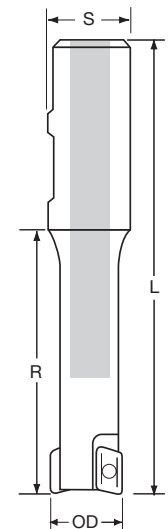
EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length
20570	1.000"	SSER1000-4000-R55-2C	.600"	2	1.250"	6.28"	4.00"
20590	1.000"	SSER1000-6000-R55-2C	.600"	2	1.250"	8.28"	6.00"
20605	1.000"	SSER1000-9000-SS-R55-2-WOF*	.600"	2	1.000"	9.00"	1.50"
20610	1.250"	SSER1250-4000-R55-3C	.600"	3	1.250"	6.28"	4.00"
20615	1.250"	SSER1250-10000-SS-R55-2-WOF*	.600"	2	1.250"	10.00"	1.88"
20620	1.500"	SSER1500-4000-R55-3C	.600"	3	1.500"	6.69"	4.00"

\* Cylindrical shank – no Weldon flats.



### 16MM EXTENDED-REACH END MILLS WITH CARBIDE CORE

EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length
20730C	1.000"	CC-SSER1000-4000-R55-2C	.600"	2	1.250"	6.28"	4.00"
20740C	1.000"	CC-SSER1000-6000-R55-2C	.600"	2	1.250"	8.28"	6.00"
20760C	1.000"	CC-SSER1000-8000-R55-2C	.600"	2	1.250"	10.28"	8.00"
20770	1.250"	CC-SSER1250-3200-R55-3	.600"	3	1.250"	5.50"	2.62"
20780	1.250"	CC-SSER1250-4000-R55-3	.600"	3	1.250"	6.28"	4.00"
20780C	1.250"	CC-SSER1250-4000-R55-3C	.600"	3	1.250"	6.28"	4.00"
20800C	1.250"	CC-SSER1250-6000-R55-2C	.600"	2	1.500"	8.70"	6.00"
20810C	1.250"	CC-SSER1250-8000-R55-2C	.600"	2	1.500"	10.70"	8.00"
20820C	1.500"	CC-SSER1500-6000-R55-2C	.600"	2	1.500"	8.69"	6.00"

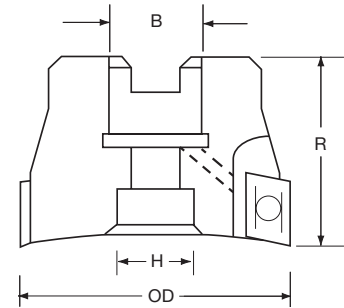


# Cutter Bodies for 16mm APET/XPET Inserts

## 16mm Shell Mills

### 16MM STANDARD-PITCH SHELL MILLS

EDP	OD Diameter	Holder	Max. DOC	Flutes	B Arbor Dia.	R Overall Length	H Counter Bore Dia.	SHCS Socket Head Cap Screw
20905	1.50"	SSSM1500-0750-R55-4C	.600"	4	.750"	1.75"	.58"	TC-3/8
20930	2.00"	SSSM2000-0750-R55-4C	.600"	4	.750"	1.50"	.60"	TC-3/8
20940	2.00"	SSSM2000-0750-R55-5C	.600"	5	.750"	1.50"	.60"	TC-3/8
20950	2.50"	SSSM2500-1000-R55-5C	.600"	5	1.000"	1.75"	.80"	TC-1/2
20960	3.00"	SSSM3000-1000-R55-6C	.600"	6	1.000"	2.00"	.80"	TC-1/2
20970	4.00"	SSSM4000-1500-R55-8	.600"	8	1.500"	2.00"	1.90"	N/A
20980	5.00"	SSSM5000-1500-R55-8	.600"	8	1.500"	2.00"	2.10"	N/A
20990	6.00"	SSSM6000-2000-R55-7	.600"	7	2.000"	2.00"	2.75"	N/A
21000	8.00"	SSSM8000-FM-R55-9	.600"	9	2.500"	2.50"	4.00" BC	N/A

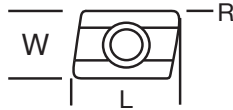


### 16MM COARSE-PITCH SHELL MILLS

EDP	OD Diameter	Holder	Max. DOC	Flutes	B Arbor Dia.	R Overall Length	H Counter Bore Dia.	SHCS Socket Head Cap Screw
21020	2.00"	SSSM2000-0750-R55-3C	.600"	3	.750"	1.50"	.60"	TC-3/8
21040	3.00"	SSSM3000-1000-R55-3C	.600"	3	1.000"	2.00"	.80"	TC-1/2

SEE PGS. 18-19 FOR 16MM INSERTS

# 16mm APET/XPET Inserts and Grades



Insert Size	L	W	R	Uncoated (EDP)				With Coating (EDP)	
<b>APET</b> APET Inserts feature a high-strength cutting edge and are ideal for high-performance milling of most harder steels and cast irons.									
APET160408	.625"	.375"	.031"	DMP35 (25800)	DMP35-TCI (25890)	DMP35-GLH (25860)	DMP35-HM (25885)		
				DMP30 (25700)	DMP30-TCI (25790)	DMP30-GLH (25760)	DMP30-HM (25785)		
				DMK25 (25600)	DMK25-TCI (25690)	DMK25-GLH (25660)	DMK25-HM (25685)		
APET160412	.625"	.375"	.047"	DMP35 (26100)	DMP35-TCI (26190)	DMP35-GLH (26160)	DMP35-HM (REQ)		
				DMP30 (26000)	DMP30-TCI (26090)	DMP30-GLH (26060)	DMP30-HM (REQ)		
				DMK25 (25900)	DMK25-TCI (25990)	DMK25-GLH (25960)	DMK25-HM (REQ)		
APET160416	.625"	.375"	.062"	DMP35 (26400)	DMP35-TCI (26490)	DMP35-GLH (26460)	DMP35-HM (26485)		
				DMP30 (26300)	DMP30-TCI (26390)	DMP30-GLH (26360)	DMP30-HM (26385)		
				DMK25 (26200)	DMK25-TCI (26290)	DMK25-GLH (26260)	DMK25-HM (26285)		
APET160431*	.625"	.375"	.120"	DMP35 (26700)	DMP35-TCI (26790)	DMP35-GLH (26760)	DMP35-HM (26785)		
				DMP30 (26600)	DMP30-TCI (26690)	DMP30-GLH (26660)	DMP30-HM (REQ)		
				DMK25 (26500)	DMK25-TCI (26590)	DMK25-GLH (26560)	DMK25-HM (26585)		
<b>XPET</b> XPET Inserts are ideal for high-performance milling of stainless steels and nonferrous materials such as copper alloys and aluminum. Also good for gummy, softer, free-machining steels.									
XPET160404	.625"	.375"	.015"	DMP35 (28000)	DMP35-TCI (28090)	DMP35-GLH (28060)	DMP35-HM (28085)		
				DMP30 (27900)	DMP30-TCI (27990)	DMP30-GLH (27960)	DMP30-HM (REQ)		
				DMK25 (27800)	DMK25-TCI (REQ)	DMK25-GLH (27860)	DMK25-HM (REQ)		
XPET160408	.625"	.375"	.031"	DMP35 (28400)	DMP35-TCI (28490)	DMP35-GLH (28460)	DMP35-HM (28485)		
				DMK30 (28200)	DMK30-TCI (28290)	DMK30-GLH (28260)	DMK30-HM (REQ)		
				DMP30 (28300)	DMP30-TCI (28390)	DMP30-GLH (28360)	DMP30-HM (28385)		
				DMK25 (28100)	DMK25-TCI (28181)	DMK25-GLH (28160)	DMK25-HM (REQ)		
				DMK35 (28183)			DMK35-HM (28184)	DMK35-IN (28185)	
XPET160412	.625"	.375"	.047"	DMP35 (28800)	DMP35-TCI (28890)	DMP35-GLH (28860)	DMP35-HM (REQ)		
				DMK30 (28600)	DMK30-TCI (28690)	DMK30-GLH (28660)	DMK30-HM (REQ)		
				DMP30 (28700)	DMP30-TCI (REQ)	DMP30-GLH (28760)	DMP30-HM (REQ)		
				DMK25 (28500)	DMK25-TCI (28590)	DMK25-GLH (28560)	DMK25-HM (REQ)		
XPET160416	.625"	.375"	.062"	DMP35 (29200)	DMP35-TCI (29290)	DMP35-GLH (29260)	DMP35-HM (29285)		
				DMK30 (29000)	DMK30-TCI (REQ)	DMK30-GLH (29060)	DMK30-HM (REQ)		
				DMP30 (29100)	DMP30-TCI (29190)	DMP30-GLH (29160)	DMP30-HM (REQ)		
				DMK25 (28900)	DMK25-TCI (28990)	DMK25-GLH (28960)	DMK25-HM (28985)		
			DMK35 (29083)			DMK35-HM (29084)	DMK35-IN (29085)		
XPET160424	.625"	.375"	.094"	DMP35 (29400)	DMP35-TCI (29490)**	DMP35-GLH (29460)	DMP35-HM (29485)		
XPET160431*	.625"	.375"	.120"	DMP35 (29800)	DMP35-TCI (29890)	DMP35-GLH (29860)	DMP35-HM (29885)		
				DMK30 (29600)	DMK30-TCI (REQ)	DMK30-GLH (29660)	DMK30-HM (REQ)		
				DMP30 (29700)	DMP30-TCI (REQ)	DMP30-GLH (29760)	DMP30-HM (REQ)		
				DMK25 (29500)	DMK25-TCI (29590)	DMK25-GLH (29560)	DMK25-HM (REQ)		

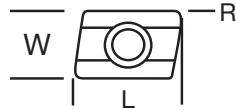
REQ = Available upon request.

\*\* Not stocked standard; available by request.

Older coatings available upon request; may have up to a 2-week lead time.



# 16mm APET/XPET Inserts and Grades



**XPET**  
Cutting Edge  
(Honed Edge)  
High Shear

Insert Size	L	W	R	Uncoated (EDP)	Available Coated Grades (EDP)			
<b>XPET-ALU</b> <i>XPET-ALU lapped inserts feature a ground and lapped rake face for machining aluminum and copper alloys, bronze, brass, etc. Built-up edge is virtually eliminated.</i>								
XPET160404-ALU	.625"	.375"	.015"	DMK25 (29912)	DMK25-TCI (REQ)	DMK25-GLH (29914)	DMK25-HM (REQ)	
XPET160408-ALU	.625"	.375"	.031"	DMK25 (29916)	DMK25-TCI (29923)	DMK25-GLH (29921)	DMK25-HM (REQ)	
XPET160412-ALU	.625"	.375"	.047"	DMK25 (29924)	DMK25-TCI (REQ)	DMK25-GLH (29928)	DMK25-HM (REQ)	
XPET160416-ALU	.625"	.375"	.062"	DMK25 (29932)	DMK25-TCI (REQ)	DMK25-GLH (29936)	DMK25-HM (29939)	
XPET160431-ALU*	.625"	.375"	.120"	DMK25 (29940)	DMK25-TCI (REQ)	DMK25-GLH (29948)	DMK25-HM (REQ)	
<b>PCD-TIPPED</b> <i>PCD-tipped inserts provide the ultimate in wear resistance for high-volume aluminum or graphite milling. Available in 1/32" corner radius only. .225" leg length for the PCD tip.</i>								
XPET160408-PCD-225	.625"	.375"	.031"	DMK25 (29900)				

REQ = Available upon request.

Older coatings available upon request; may have up to a 2-week lead time.

\* This insert is designed for heavy roughing and has a corner radius that actually measures closer to .115" than .125" (.010" difference) due to distortion by the positive radial insert angle.

Other grades available upon request.

**SEE PG. 25 FOR INSERT GRADE DESCRIPTIONS**



See chart on [page 29](#) for technical help on optimizing cutting performance.

See [page 31](#) for recommended speeds/feeds.

# Utility Cutters

Make the most of your APET and XPET Inserts!

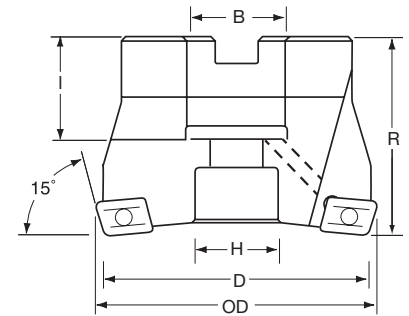
## BCSM 15° Back-Corner Shell Mills

**BCSM** shell mills allow the unused corner of the APET/XPET inserts to be used for general face milling – this means you get 4 usable edges per insert instead of 2!

### BCSM 15° BACK-CORNER SHELL MILLS

EDP	D Cutting Diameter	Holder	Max. DOC	Flutes	OD	B Arbor Dia.	R Overall Length	H Counter Bore Dia.	Inserts
22210	2.000"	BCSM2000-0750-R35-4C	.250"	4	2.11"	.750"	1.50"	.60"	10mm (pg. 13)
22215	2.000"	BCSM2000-0750-R45-4C	.312"	4	2.13"	.750"	1.50"	.60"	12mm (pg. 15)
22235	3.000"	BCSM3000-1000-R45-6C	.312"	6	3.13"	1.00"	2.00"	.80"	12mm (pg. 15)
22230	2.000"	BCSM2000-0750-R55-4C	.375"	4	2.16"	.750"	1.50"	.60"	16mm (pg. 18)
22240	3.000"	BCSM3000-1000-R55-5C	.375"	5	3.16"	1.00"	2.00"	.80"	16mm (pg. 18)
22245	4.000"	BCSM4000-1500-R55-6C	.378"	6	4.16"	1.50"	2.25"	.77"	16mm (pg. 18)

"C" denotes coolant thru tool.



**BCSM**  
Back Corner Shell Mill

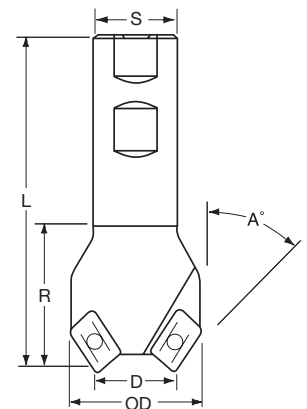
## CMEM Chamfering End Mills

**CMEM** end mills are perfect for chamfer milling, providing a free-cutting positive geometry for both 30° and 45° chamfering.

### CMEM CHAMFERING END MILLS

EDP	D Cutting Diameter	Holder	Max. DOC	Flutes	OD	S Shank Dia.	L Overall Length	R Effective Length	A	Inserts
22248	.500"	CMEM0500-30-R35-2	.300"	2	.80"	.750"	3.50"	1.45"	30°	10mm (pg. 13)
22255	.500"	CMEM0500-45-R35-2C	.245"	2	.94"	.750"	3.50"	1.45"	45°	10mm (pg. 13)
22265	.750"	CMEM0750-30-R45-3C	.355"	3	1.14"	.750"	3.50"	1.45"	30°	12mm (pg. 15)
22305	.750"	CMEM0750-45-R45-3C	.290"	3	1.31"	.750"	3.50"	1.45"	45°	12mm (pg. 15)
22310	.625"	CMEM0625-45-R55-2C	.245"	2	1.40"	.750"	3.50"	1.45"	45°	16mm (pg. 18)
22259	.700"	CMEM0700-30-R55-2C	.475"	2	1.25"	.750"	3.50"	1.45"	30°	16mm (pg. 18)
22300	.750"	CMEM0750-45-R35-3C	.245"	3	1.18"	.750"	3.50"	1.45"	45°	10mm (pg. 13)
22280	1.000"	CMEM1000-30-R55-3C	.475"	3	1.53"	1.000"	4.00"	1.72"	30°	16mm (pg. 18)
22320	1.000"	CMEM1000-45-R55-3C	.390"	3	1.76"	1.000"	4.00"	1.72"	45°	16mm (pg. 18)

Dapra is transitioning to thru-coolant on CMEM cutters. To specify the thru-coolant option, add a "C" to the end of the part number. Stock not guaranteed. Once the non-coolant cutter supply is exhausted, the thru-coolant option will be the only one available.



**CMEM**  
Chamfering End Mill

# Helical (Stacked) Utility Cutters

Make the most of your APET and XPET Inserts!

## HREM/HRSM Helical Roughing End Mills & Shell Mills

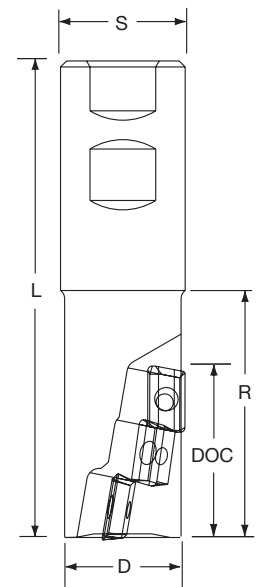
**Helical Roughing** end mills and shell mills are designed for high performance in long-edge profiling and step milling applications.

*Helical ("stacked") cutters create much more tool pressure than standard end mills, due to the increased number of engaged inserts. We recommend not exceeding 10% of the tool diameter in width of cut (WOC) with these HREM tools; irreversible cutter damage may occur.*

*To reduce tool pressure, it is recommended that the more positive XPET insert geometry be used with Helical Roughing Mills.*

### HREM HELICAL ROUGHING END MILLS

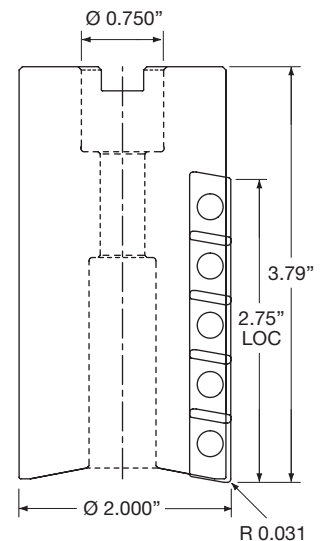
EDP	D Cutting Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length	# of Inserts	Inserts
21042	.750"	HREM0750-0750-R35-2-090	1.020"	2	.750"	3.50"	1.45"	6	10mm (pg. 13)
21060	1.000"	HREM1000-1000-R35-2-120	1.200"	2	1.000"	4.50"	2.04"	8	10mm (pg. 13)
21045	1.000"	HREM1000-1000-R45-2-110	1.100"	2	1.000"	4.50"	2.00"	6	12mm (pg. 15)
21075	1.250"	HREM1250-1250-R45-3-150	1.480"	3	1.250"	4.83"	2.50"	12	12mm (pg. 15)
21070	1.250"	HREM1250-1250-R55-2-165	1.650"	2	1.250"	4.88"	2.44"	6	16mm (pg. 18)
21080	1.500"	HREM1500-1250-R55-3-215	2.150"	3	1.250"	5.65"	3.15"	12	16mm (pg. 18)
21050	40mm	HREM40mm-1250-R55-2-165	1.650"	2	1.250"	4.80"	2.44"	6	16mm (pg. 18)



**HREM**  
Helical Roughing End Mill

### HRSM HELICAL ROUGHING SHELL MILLS

EDP	Cutting Diameter	Holder	Arbor Hole	Flutes	LOC	Overall Length	# of Inserts	Inserts
21085	2.000"	HRSM2000-0750-R55-4-265	.750"	4	2.75"	3.79"	20	16mm (pg. 18)



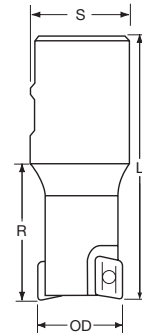
**HRSM**  
Helical Roughing Shell Mill

# Metric Cutter Bodies

Dapra is eliminating metric end mills and shell mills. Items shown are available while supplies last. "C" denotes coolant thru tool.

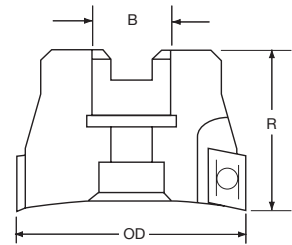
## APET/XPET METRIC END MILLS

EDP	OD Diameter	Holder	Max. DOC	Flutes	S Shank Dia.	L Overall Length	R Effective Length	Inserts
22005	16mm	SSEM16-16-R35-2C	10mm	2	16mm	80mm	31mm	10mm (pg. 13)
22015	20mm	SSEM20-20-R35-2C	10mm	2	20mm	90mm	39mm	10mm (pg. 13)
22040	32mm	SSEM32-32-R35-5	10mm	5	32mm	100mm	44mm	10mm (pg. 13)
22050	32mm	SSEM32-32-R55-3	16mm	3	32mm	100mm	44mm	16mm (pg. 18)
22060	40mm	SSEM40-32-R55-4	16mm	4	32mm	115mm	55mm	16mm (pg. 18)



## APET/XPET STANDARD-PITCH METRIC SHELL MILLS

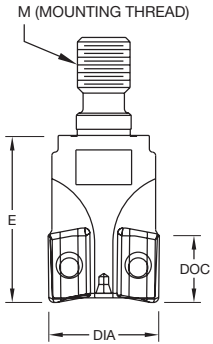
EDP	OD Diameter	Holder	Max. DOC	Flutes	B Arbor Dia.	R Overall Length	Mounting Screw	Inserts
22105	50mm	SSSM50-22-R55-4C	16mm	4	22mm	38mm	M10	16mm (pg. 18)
22130	80mm	SSSM80-27-R55-6	16mm	6	27mm	50mm	M12	16mm (pg. 18)



# Screw-On Modular Heads



- Screw-on heads are compatible with ISO standard modular cutting systems
- Close-tolerance mounting of heads minimizes runout and maximizes rigidity
- Provide significantly more effective reach than solid end mills
- Use standard inch wrench flats – no special metric wrenches needed
- All feature thru-coolant tooling
- See page 116 for modular extensions



## APET/XPET SCREW-ON MODULAR HEADS

EDP	DIA.	Holder	M	Max. DOC	E	Flutes	Inserts	Open-End Wrench
22400	.750"	SSEM0750-MOD-R35-2C	M10	.350"	1.50"	2	10mm (pg. 13)	9/16"
22405	.750"	SSEM0750-MOD-R45-2C	M10	.430"	1.50"	2	12mm (pg. 15)	9/16"
22407	1.000"	SSEM1000-MOD-R45-3C	M12	.430"	1.50"	3	12mm (pg. 15)	11/16"
22415	1.250"	SSEM1250-MOD-R45-4C	M16	.430"	1.75"	4	12mm (pg. 15)	15/16"
22410	1.000"	SSEM1000-MOD-R55-2C	M12	.600"	1.50"	2	16mm (pg. 18)	11/16"
22420	1.250"	SSEM1250-MOD-R55-2C	M16	.600"	1.75"	2	16mm (pg. 18)	15/16"
22430	1.500"	SSEM1500-MOD-R55-2C	M16	.600"	1.75"	2	16mm (pg. 18)	15/16"

**SEE PAGE 116 FOR CARBIDE CORE, SOLID CARBIDE AND HEAVY METAL MODULAR EXTENSIONS.**





# APET/XPET Insert Selection

## Carbide (Uncoated) Grade Selection

Traits	DMP35	DMK35	DMK30	DMP30	DMK25
<b>Toughness (Fracture)</b>	Very tough, able to withstand shock and interruptions	Somewhat tough – able to handle exotics and high-temp. alloys at normal parameters; not as fracture resistant as DMP35	Tough and hard; not as tough as DMP35, but tougher than DMK25	Tough and hard; not as tough as DMP35, but tougher than DMK25	Not as tough; may fracture in abusive applications
<b>Wear Resistance (Edge Life)</b>	Softer carbide, will not last as long as DMK25	Outstanding edge life in inconel and exotic materials where temperature control is primary and coolant is used	Good – harder than DMP35 but not as hard as DMK25	Longer life than DMP35, but shorter than DMK25	Longer edge life due to higher carbide hardness
<b>Heat Resistance</b>	Lower heat resistance due to lower hardness of carbide	Good heat resistance due to the fine grain structure of the carbide	Good heat resistance – more than DMP35, but less than DMK25	Higher heat resistance than DMP35, less than DMK25	Highest heat resistance
<b>Resistance to Built-Up Edge (BUE)</b>	Fair resistance to BUE; some buildup may occur – use coolant as a preventative	Excellent resistance to BUE; designed for the most challenging materials where coolant will be used, so BUE will be less problematic	Good resistance	Poorer resistance to BUE; not typically a stainless steel grade	Good resistance
<b>Feed Capability</b>	High, due to toughness	Feed at general parameters only; not intended for heavy feed rates	Average – less feed than DMP35 but more than DMK25	Strong feed capabilities, approx. 20% lower than DMP35	Lower, due to brittleness; run at higher speeds and lower feeds
<b>Coolant Capability</b>	Good; toughness gives it more resistance to thermal shock	Good; intended for use with coolant	Good on high-temp. alloys and some tough stainless steels	Fairly tough; will allow machining with good coolant flow	Not as high; may experience thermal shock unless coolant flow is very good

## Choose the Best Grade for Your Application

Material	Operating Speed	Geometry	1st Choice Grade*	Coolant
Free machining, low-carbon steels	Low to Medium	XPET	DMP30-TCI	Air/Flood
	Higher	XPET	DMP30-GLH	Air
Medium-carbon steels, tool steels	Low to Medium	APET / XPET**	DMP30-TCI / DMK30-TCI	Air
	Higher	APET / XPET**	DMP30-GLH / DMK30-GLH	Air
All steels – interrupted cuts and heavy roughing cuts	All	APET	DMP35-TCI / DMP35-GLH	Air
Heat-treated steels (48-62 Rc)	Low to Medium	APET	DMK25-HM	Air
Soft stainless steels (303, 304)	Low to Medium	XPET	DMP35-TCI / DMK30-TCI	Air/Flood
	Higher	XPET	DMP35-HM / DMP35-GLH	Air/Flood
Tough stainless steels (304L, 316, 400 series and PH series)	Low to Medium	XPET	DMP35-GLH / DMK30-GLH	Air/Flood
	Higher	XPET	DMP35-HM / DMK35-IN	Air/Flood
Cast iron	All	APET / XPET**	DMK30-HM / DMK25-HM	Air
Aluminum alloys, copper alloys	All	XPET-ALU XPET-PCD	DMK25 / DMK25-GLH	Flood
High-temperature alloys, titanium	All	XPET	DMP35-HM	Flood

\* Contact Applications Specialist if first choice doesn't work.

\*\* Customer preference. Both are acceptable – see cutting edge differences on page 11.

# APET/XPET Insert Grade Descriptions

Shock & Wear Resistance	Uncoated (Base Grade)	with Coating	Description	Specifications
TOUGHEST Shock Resistance	DMP35		Moderate wear resistance/high shock resistance. Recommended for interrupted or unstable steel applications, most stainless steel, and high-temperature alloy applications.	ANSI C1-C2 ISO K25-K40, M25-M35
		DMP35-TCI	Modified AlTiN – premium medium- to high-temperature coating.	
		DMP35-GLH	Premium AlTiN – higher-temperature coating, very low friction characteristics.	
	<b>NEW</b>	DMP35-HM	Use HM for a higher-temperature coating in tough stainless steels, high-temperature alloys, and titanium.	
TOUGH Shock and Wear	<b>DMK35</b> <i>XPET ONLY</i> <b>NEW</b>		Specifically developed for inconel and other high-temperature alloys, as well as demanding stainless steel applications.	ANSI C5-C6 ISO M30-M40, P30-P40, K30-K40
	<b>NEW</b>	DMK35-HM	Use HM for a higher-temperature coating in tough stainless steels.	
	<b>NEW</b>	DMK35-IN	IN provides the best performance for high-temperature alloys and tough stainless steels. First choice for inconel.	
MEDIUM Shock and Wear	<b>DMK30</b> <i>XPET ONLY</i>		Micro-grain carbide providing higher wear resistance and moderate shock resistance for applications in tough stainless steels, high-temperature alloys, irons, and many tool steels.	ANSI C2-C3 ISO K15-K30, M15-M30
		DMK30-TCI	Modified AlTiN – premium medium- to high-temperature coating.	
		DMK30-GLH	Premium AlTiN – higher-temperature coating, very low friction characteristics.	
	<b>NEW</b>	DMK30-HM	Use HM for a higher-temperature coating in tough stainless steels.	
MEDIUM Shock and Wear	DMP30		High wear resistance/moderate shock resistance, recommended for most steel and some ductile iron applications.	ANSI C5-C6 ISO P25-P40
		DMP30-TCI	Modified AlTiN – premium medium- to high-temperature coating.	
		DMP30-GLH	Premium AlTiN – higher-temperature coating, very low friction characteristics.	
	<b>NEW</b>	DMP30-HM	Use HM for high-performance milling of tougher steels and tool steels.	
HARDEST Wear Resistance	DMK25		Highest wear resistance with reduced shock-absorption capabilities. Suitable for all materials where cutting conditions are very stable. First choice for hardened steel (> 52 Rc).	ANSI C2-C3 ISO K15-K25, M15-M25
		DMK25-TCI	Modified AlTiN – premium medium- to high-temperature coating.	
		DMK25-GLH	Premium AlTiN – higher-temperature coating, very low friction characteristics.	
	<b>NEW</b>	DMK25-HM	Use HM for the highest hardness in gray and ductile irons, as well as heat-treated steels.	

*Older coatings available upon request; may have up to a 2-week lead time.*

# Spare Parts & Tools

Part Description	Order Number (EDP)		
	For all ..1003.. Inserts	For all ..1204.. Inserts	For all ..1604.. Inserts
Clamping Screw	SSTX-08-S (22600)	SSTX-10-S (22605)	SSTX-15-S (22610)
Wrench	T8-F (83000)	T10-T (83005)	T15-T (83010)
Tightening Torque for Clamping Screw	12 in-lbs (1.0 Nm)	20 in-lbs (2.25 Nm)	30 in-lbs (3.5 Nm)

*New cutter bodies may require additional torque to fully seat the inserts. Once the new cutter's pockets are "broken in," the recommended torque specs in the chart can be followed regularly.*



**OUR TORQUE WRENCH SYSTEMS MAKE REPEATABLE, ACCURATE INSERT LOADING EASIER THAN EVER BEFORE! SEE PAGE 118 FOR DETAILS.**

# Application Information

## Technical Considerations

- Always use anti-seize compound on screws.
- Thoroughly clean pocket at each insert change.
- Change insert screw every 10 inserts.
- Use the shortest-length tool holder (end mill holder) for maximum rigidity. The shank of the cutting tool should be up inside the machine spindle taper whenever possible.
- Use tool holders appropriate for roughing operations: end mill holders and power chucks **are** recommended; collets **are not** recommended.

## Recommendations

- Square Shoulder milling allows heavier Depths of Cut (DOC), but Dapra recommends that no more than 2/3 of the insert length should be engaged to reduce the chance for screw breakage.
- Although the cutter is capable of the heavier cut, take care to allow for the machine tool's capabilities in horsepower and rigidity.
- Utilize as much of the cutting edge per pass (DOC) as possible, to get the most metal removal within the insert's tool life.



- Feed rates should not go significantly below or above the recommended ranges (see page 31), or premature failure can occur.
- Square Shoulder tools can not plunge; instead, use up to a 2° ramp angle for full diameter cut. Greater ramp angles are possible with partial width cut.
  - **Climb milling** is recommended whenever possible.
  - Use the larger corner radii for the strongest cutting edge during roughing applications.
  - Compensate for radial chip thinning (see chart on page 29) when Width of Cut (WOC) is less than 50% of the cutter diameter.
  - Because our Square Shoulder tools cut a true 90°, they are a good choice for a wide range of finishing applications.
- Use Coarse Pitch cutters for slotting cuts or when cutting pressure needs to be reduced. Use Fine Pitch cutters for lighter profiling cuts or when feed rates can be maximized.

- Most of Dapra's high-performance grades run best without coolant. Coolant in most milling applications creates a high potential for thermal shock, which can produce premature, and sometimes catastrophic, failure. *Use air pressure to provide adequate cooling and chip evacuation.*
- For long-reach applications, utilize the Carbide Core cutting tools for increased rigidity and reduced chatter.

# Troubleshooting

## Concern

Insert wear appears high (flank wear)

Insert chipping

Built-up edge on insert

Poor finish/chatter

Tool shank breaks

## Possible Cause

- Not enough chip load
- Surface footage is high
- Incorrect grade or coating

- Surface footage is low
- Incorrect grade or coating
- Using sharp edge insert incorrectly
- Feed too high

- Low surface footage
- Light chip load (feed per tooth)
- Incorrect coating

- Cutter hung out too far
- Excessive runout
- Inadequate tool holding

- Tool pressure too great
- Fatigued cutter body

## Solutions

- Verify correct speed and feed
- Increase feed rate
- Decrease RPM
- Consider different insert

- Verify correct speed and feed
- Increase spindle speed
- Decrease feed rate
- Change insert selection
- Decrease DOC

- Verify correct speed and feed
- Increase cutting speed
- Increase feed rate
- Select different coating

- Use Carbide Core cutter body
- Reduce tool gage length
- Check tool holder wear
- Use high-rigidity tool holder

- Decrease DOC
- Reduce tool gage length
- Decrease feed rate



# Optimizing Cutting Performance

Dapra's high-performance cutters work best when allowed to perform within their designed operating parameters. Adhering to the following steps will ensure that you are getting the most from your investment.

1. Refer to the Feed and Speed Chart (see page 31) to find the recommended Surface Feet per Minute (**SFM**) and Feed per Tooth (**FPT**) at which to run your cutter, based on the material to be machined.
2. Use the following formula to determine the Revolutions per Minute (**RPM**) for your cutting tool:  

$$(\text{SFM} \times 3.82) / \text{Tool Dia.} = \text{RPM}$$
 Example: A 2" diameter tool operating at 900 **SFM**  $(900 \times 3.82) / 2 = 1720 \text{ RPM}$
3. Use the following formula to determine the feed in Inches per Minute (**IPM**) to be programmed into the machine tool:  

$$\text{FPT} \times \text{RPM} \times \text{N (number of teeth in cutter)} = \text{Feed}$$
 Example: A 5-flute cutter at .008" **FPT**  $(.008 \times 1720) \times 5 = 69 \text{ IPM}$
4. If the Width of Cut (**WOC**) is < 1/2 the cutter diameter, use the feed rate compensation chart (below) to compensate for chip thinning.



90° SQUARE SHOULDER

APET/APET | SINGLE-SIDED



Width of Cut (WOC) (% of tool Ø)	50% or >	40%	30%	20%	10%
Feed Rate Multiplier	1	1.02	1.1	1.25	1.7

After determining the percentage of **WOC** for the tool diameter, multiply the desired feed rate by the corresponding factor shown in the chart. This will be the Adjusted Feed per Tooth (**AFPT**) resulting in a true chip thickness of the desired amount.

**EXAMPLE:** If using a 1" dia. end mill @ .100" **WOC**, the **WOC** = 10% of the cutter diameter. Using the chart above, the factor for the chip thickness = 1.7. If a chip thickness of .005" is desired, a feed rate of .0085" (.005 x 1.7) should be programmed into the machine tool.

or

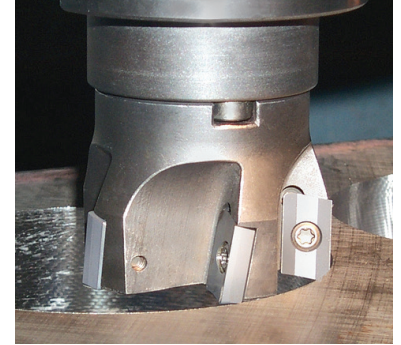
Adjusted Feed per Tooth (**AFPT**) = desired chip thickness x chip thinning factor (from chart).

# Hole Diameter Calculation

## Helical Interpolation for Larger-Diameter Hole Making

Larger-diameter hole making can be quick and easy when a Square Shoulder Cutter is used in combination with Helical Interpolation. This technique resembles thread milling in that all three axes (X, Y and Z) are in motion simultaneously. It differs from thread milling in that the tool is introduced into the material without a start hole of any kind.

The tool simply is positioned at the inside diameter of the hole to begin its helix from there, achieving complete material removal from the hole by ramping down to the final depth. This smooth operation tends to avoid the high horsepower consumption characteristic of large diameter hole making. The quick and easy process offers the added advantage of allowing many different hole sizes to be generated with the same diameter tool. Hole size variation is all in the programming.



**For more information on how Helical Interpolation can improve your manufacturing efficiency, contact your Dapra Applications Specialist.**

Part Number	Min. Hole Dia.*	Max. Hole Dia.
SSEM0500-R35-1	0.63"	1.00"
SSEM0625-R35-2	0.78"	1.25"
SSEM0750-R35-2	1.03"	1.50"
SSEM0625-R45-1	0.75"	1.25"
SSEM0750-R45-2	0.88"	1.50"
SSEM1000-R45-3	1.38"	2.00"
SSEM1250-R45-4	1.88"	2.50"
SSEM1500-R45-5	2.38"	3.00"
SSEM1000-R55-2	1.28"	2.00"
SSEM1250-R55-3	1.78"	2.50"
SSEM1500-R55-3	2.28"	3.00"
SSSM2000-R55-5	3.28"	4.00"
SSSM2500-R55-5	4.28"	5.00"
SSSM3000-R55-6	5.28"	6.00"
SSSM4000-R55-8	7.28"	8.00"
SSSM5000-R55-8	9.28"	10.00"
SSSM6000-R55-7	11.28"	12.00"

\* Smaller holes may be interpolated by pre-drilling.

Typical recommended ramp angle = 1 degree or less.

# Recommended Cutting Speeds/Feeds

**Recommended Cutting Speeds for Dapra Square Shoulder Cutters**

		1018, 12L14, 1041, 1045	4140, 4150, 4340, H13, P20, A2, D2	4140, 4150, 4340, H13, P20, A2, D2 (40s RC)	4140, 4150, 4340, H13, P20, A2, D2	303, 304 LOW 400 SERIES	316, 347, PH STAINLESS	GRAY, MALLEABLE, DUCTILE	6061, 7075	AMPCO, WEARITE	INCONEL, WASPALOY, MONEL			
		LOW-TO-MEDIUM CARBON STEELS	TOOL STEELS, HIGH-ALLOY STEELS (SOFT)	TOOL STEELS, HIGH-ALLOY STEELS (MID-HARDNESS)	TOOL STEELS, HIGH-ALLOY STEELS (HARDENED)	FREE MACHINING STAINLESS	TOUGHER STAINLESS	CAST IRONS	ALUMINUM ALLOYS	COPPER ALLOYS	HIGH-TEMP. ALLOYS	TITANIUM	PLASTICS, NON-FERROUS	
LOWER TEMPS »	TOUGHEST Shock Resistance	DMP35	300-450	250-400		150-300	125-250	300-450		200-600	50-150 ROUGHING	100-150		
		DMP35-TCI	500-800	400-700	250-450		400-640	250-500	500-800		400-1200			
		DMP35-GLH	700-1000	500-900	250-450		480-880	300-800	600-1200			55-90 ROUGHING	120-180	
		DMP35-HM	770-1100	550-990	250-450		530-970	330-880	660-1320			55-120 ROUGHING	140-200	
	TOUGH Shock & Wear	DMK35					200-320	140-275				50-80	100-150	
		DMK35-HM					250-500 (wet) 600-750 (dry)	300-600		300-600	50-110	140-200		
		DMK35-IN					300-550 (wet) 600-750 (dry)	350-650			50-110	140-200		
	MEDIUM Shock Resistance	DMK30	400-700	300-600			200-320	140-275	350-550			50-75	100-150	
		DMK30-TCI	500-900	500-800			400-720	275-550	500-900					
		DMK30-GLH	700-1400	500-1000		200-600	480-960	330-880	500-1300			75-120	120-180	
		DMK30-HM	770-1540	550-1100		220-660	528-1056	363-968	550-1430			75-120	140-200	
	MEDIUM Shock & Wear	DMP30	400-700	300-600					350-550 DUCTILE					
DMP30-TCI		500-900	400-800	350-550				500-900 DUCTILE	200-500					
DMP30-GLH		700-1400	500-1000	350-550	200-600			500-1300 DUCTILE	200-500					
DMP30-HM			500-850	350-550	250-550			600-1000 DUCTILE						
HIGHER TEMPS «	HARDEST Wear Resistance	DMK25				250-400	125-250 FINISHING	350-600 GRAY	1500+	200-600	50-75 FINISHING	100-150	1000+	
		DMK25-TCI	500-900	400-800			500-900	250-500 FINISHING	600-900 GRAY		400-900		1000+	
		DMK25-GLH	700-1400	500-1000	350-550	250-600	600-1200	300-800 FINISHING	800-1300 GRAY		400-1200	50-100 FINISHING	120-180	1000+
		DMK25-HM		550-850	350-550	250-700	250-500 (wet) 600-750 (dry)	350-650 FINISHING	800-1200 GRAY		300-600	50-100 FINISHING	140-200	
		PCD								2000+				
1ST CHOICE GEOMETRY		XPET/APET	APET	APET	APET	XPET	XPET	APET	XPET-ALU	XPET	XPET	XPET	XPET-ALU	
REC'D FPT – 10MM		.003-.008	.003-.008	.003-.005	.003-.005	.003-.008	.003-.007	.003-.010	.003-.020	.003-.010	.003-.006	.002-.005	.003-.025	
REC'D FPT – 12MM		.004-.012	.004-.010	.004-.006	.003-.006	.003-.010	.003-.010	.004-.012	.003-.020	.003-.015	.003-.007	.002-.006	.003-.025	
REC'D FPT – 16MM		.006-.015	.006-.012	.004-.008	.003-.008	.005-.012	.004-.010	.006-.015	.003-.025	.003-.020	.003-.008	.003-.007	.003-.025	

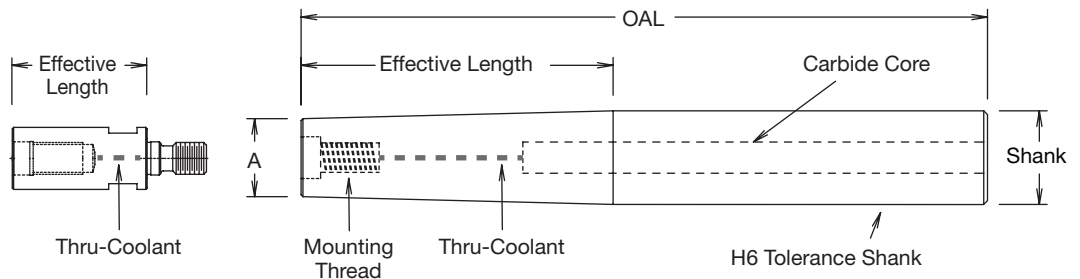
- First choice grade shown in **bold text**.
- For heavy WOC and/or DOC, use the lower end of the FPT range.
- For light WOC and DOC, the higher end of the FPT range may be possible.

The parameters provided are suggested operating parameters. Actual speeds and feeds will depend on many variables, such as rigidity, workpiece hardness, tool extension, machine accuracy, Depth of Cut, etc. Start at the middle of the SFM range and the low end of the IPT range. Next, increase IPT to optimize productivity and tool life. Higher SFM will provide higher output but will reduce tool life. Try different combinations to find the parameters that best suit your needs.

# Carbide Core Modular Extensions

## Ideal for Standard Inch End Mill Holders

- All styles of modular extensions are **UNIVERSAL** – use them with any of our screw-on modular heads, as well as many competitors' modular heads
- Cylindrical inch shanks, providing adaptation for end mill holders (add your own flat), milling chucks and heat-shrink holders
- 3 sizes to accommodate modular head sizes from 3/4" to 1-1/2"
- Carbide core for enhanced vibration dampening capability; reduced deflection and improved rigidity
- Optional add-on extensions for additional 2" reach – screw on to base extensions (for 3/4" to 1-1/2" modular heads)
- Thru-coolant for delivery of air or coolant right at the cutting edge



### CARBIDE CORE MODULAR EXTENSIONS

EDP	For Head Dia.	Extension Part No.	Shank Dia.	Effective Length	OAL	Thread	CC	A
22475	.750" / 20mm	CC-ME-0750-2500-5500-C	.750"	2.5"	5.5"	M10	3/8" x 4.0"	.660"
22485	.750" / 20mm	CC-ME-0750-3500-C-SS	.750"	3.7"	5.8"	M10	3/8" x 4.0"	.660"
22480	.750" / 20mm	CC-ME-0750-3500-C	1.000"	3.7"	6.0"	M10	7/16" x 4.0"	.660"
22495	1.000" / 25mm	CC-ME-1000-2500-5500-C	1.000"	2.5"	5.5"	M12	7/16" x 4.0"	.935"
22500	1.000" / 25mm	CC-ME-1000-4500-C	1.000"	4.7"	7.0"	M12	7/16" x 5.0"	.935"
22510	1.250" / 1.500"	CC-ME-1250-5500-C	1.250"	5.7"	8.0"	M16	1/2" x 6.0"	1.175"

Extensions feature a cylindrical shank, with no Weldon flats. Hold with high-performance milling chucks or heat/mechanical shrink holders, or mill Weldon flats and use a short-length solid end mill holder.

### 2" ADD-ON EXTENSIONS

EDP	For Head Dia.	Extension Part No.	Effective Length	Thread
22520	.750" / 20mm	ME-0750-2C Extension Adapter	2.0"	M10
22530	1.000" / 25mm	ME-1000-2C Extension Adapter	2.0"	M12
22540	1.250" / 1.500"	ME-1250-2C Extension Adapter	2.0"	M16

# Solid Carbide Modular Extensions

- Optimum rigidity reduces deflection and chatter
- No braze joints
- Best option for finishing with modular heads
- Thru-coolant for delivery of air or coolant right at the cutting edge

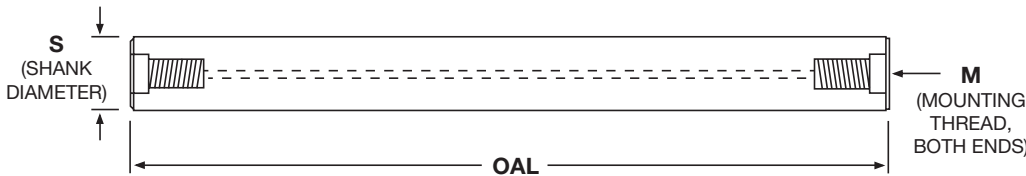


## SOLID CARBIDE MODULAR EXTENSIONS

EDP	For Head Dia.	Extension Part No.	Shank Dia.	Effective Length	OAL	Thread	A
22550-6	.500"	SC-ME-0500-6500-C-M6	.500"	1.500"	6.5"	M6	.460"
22560	.750"	SC-ME-0750-7700-C	.750"	2.250"	7.7"	M10	.709"
22570	1.000"	SC-ME-1000-8300-C	1.000"	5.000"	8.3"	M12	.890"/.950"

# Heavy-Metal Modular Extensions

- Made of high-density tungsten, providing extra resistance to vibration and deflection
- Machined on both ends; can be cut in half and used with two different modular heads
- Metric shank diameter provides clearance for each inch size modular head
- Thru-coolant equipped



## HEAVY-METAL MODULAR EXTENSIONS

EDP	For Head Dia.	Extension Part No.	OAL	M	Shank Dia.
22440	.750" / 20mm	ME-0750-18MM-900-C	9"	M10	18mm
22460	1.000" / 25mm	ME-1000-25MM-1100-C	11"	M12	25mm
22470	1.250" / 1.500"	ME-125/150-25MM-1200-C	12"	M16	25mm



# Torque Wrench Systems

## Precise Tightening without Binding and Stripping

Accurate torque application for insert screws is just a **CLICK** away with Dapra's line of torque wrenches. With two handle styles and three bit set sizes, repeatable and accurate insert loading and clamping is easier than ever!

**NO MORE GUESSING!** Dapra's torque wrench system features color-coded adapters and bits for quick identification of the correct size for your application. Each adapter size has a preset torque value. When the correct torque is achieved – **CLICK** – and the screw is tight.



T10 Torque Adapter  
TW-AD-10



T15 Torque Adapter  
TW-AD-15



T20 Torque Adapter  
TW-AD-20



T-Handle  
Torque Driver  
TW-TH with  
TW-AD-20 and  
TW-BT-20



Straight-Handle  
Torque Driver  
TW-SH-L



T-Handle  
Torque Driver  
TW-TH

### Dapra's new torque system offers users the following benefits:

- Accurate application of torque to insert screws
- No over-tightening, stripping or binding of screws
- Accurate, repeatable insert loading and clamping
- More secure grip and leverage when compared to typical flag-style wrenches
- Two handle styles for user preference

### COMPLETE SET PART NUMBERS

T10	T15	T20
Straight Handle: TW-SS-10 T-Handle: TW-TS-10	Straight Handle: TW-SS-15 T-Handle: TW-TS-15	Straight Handle: TW-SS-20 T-Handle: TW-TS-20
INDIVIDUAL PIECES		
Torque Driver Handle: Straight Handle – TW-SH-L T-Handle – TW-TH Adapter: TW-AD-10 TORX® Bits: TW-BT-10	Torque Driver Handle: Straight Handle – TW-SH-L T-Handle – TW-TH Adapter: TW-AD-15 TORX® Bits: TW-BT-15	Torque Driver Handle: Straight Handle – TW-SH-L T-Handle – TW-TH Adapter: TW-AD-20 TORX® Bits: TW-BT-20



T10  
TORX® Bits  
(set of 6)  
TW-BT-10



T15  
TORX® Bits  
(set of 6)  
TW-BT-15



T20  
TORX® Bits  
(set of 6)  
TW-BT-20



Straight-Handle  
Torque Driver  
TW-SH-L with  
TW-AD-10 and  
TW-BT-10

Other sizes available upon request.

TORX® is a registered trademark of Camcar/Textron.