

## Advanced technology for accuracy and fine surface finish

(All the following application examples are achieved with dry cutting.)

### Slot Milling



Only the FULLCUT MILL was capable of achieving this data with a No.40 spindle taper machine.

Fullcut Mill	<b>BBT40-FCM32113-85</b>
Insert	ARG321104(ACZ350)
Work Material	1055 Carbon steel
Cutting Speed V (SFM)	500
Feed Rate f (IPT)	.005
Axial DOC Ad (in)	.35



### Material of Low Machineability



High efficiency and stable milling (F=45IPM) is achieved.

Fullcut Mill	<b>ST25-FCM25093-120</b>
Holder	BBT50-MEGA25D-105
Insert	ARG250904(ACZ350S)
Work Material	304 Stainless steel
Cutting Speed V (SFM)	500
Feed Rate f (IPT)	.008
Axial DOC Ad (in)	.35
Radial DOC Rd (in)	.12



### High Speed Milling of Aluminum



Efficient chip evacuation and excellent surface finish.

Fullcut Mill	<b>BBT40-FCM16092-85</b>
Insert	ARG16094(DC20)
Work Material	Aluminum
Cutting Speed V (SFM)	1970
Feed Rate f (IPT)	.006
Axial DOC Ad (in)	.35



**BIG KAISER**<sup>®</sup>  
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CATALOG No.EXi134-0604-1

**BIG**  
BIG DAISHOWA

Indexable Insert Endmill

PAT.

**FULLCUT**  
**MILL** FCM Type

**BIG DAISHOWA SEIKI CO LTD**

CATALOG No. **EXi134**

World's first  
indexable insert endmill  
with eccentric relief

**NEW**

Indexable insert endmills  
with both excellent  
sharpness and toughness,  
achieving the performance of  
solid endmills



ø 1/2" - ø 2"



Patented; Japan, USA, Canada, Germany,  
UK, France, Italy, Taiwan,  
and South Korea

**BIG-PLUS**  
SPINDLE SYSTEM PAT.  
DUAL CONTACT  
US Patent No.5,352,073

# "Smooth and Free Cutting"

Indexable Insert endmill offering both accuracy and toughness

**BIG**  
BIG DAISHOWA

**FULLCUT**  
**MILL** FCM Type  
PAT.

Low cutting resistance

## Sharp cutting edge with both high radial and axial rake angles

Positive high rake cutting edge for both radial and axial directions achieves smooth and quiet endmilling.

High radial rake angle

High stiffness spiral form chip pocket

**20°**  
High axial rake angle

Coolant through holes provide extended insert life and increased metal removal rate

Excellent surface finish by wide wiper action

Sharp cutting edge from ground finish

**Exclusive insert for each cutter dia.**

Ideal rake angle and clearance angle for each cutter size



**FULLCUT MILL is offered in a variety of types, including straight shanks, integral tapers with BIG-PLUS dual face and taper contact and HSK versions.**



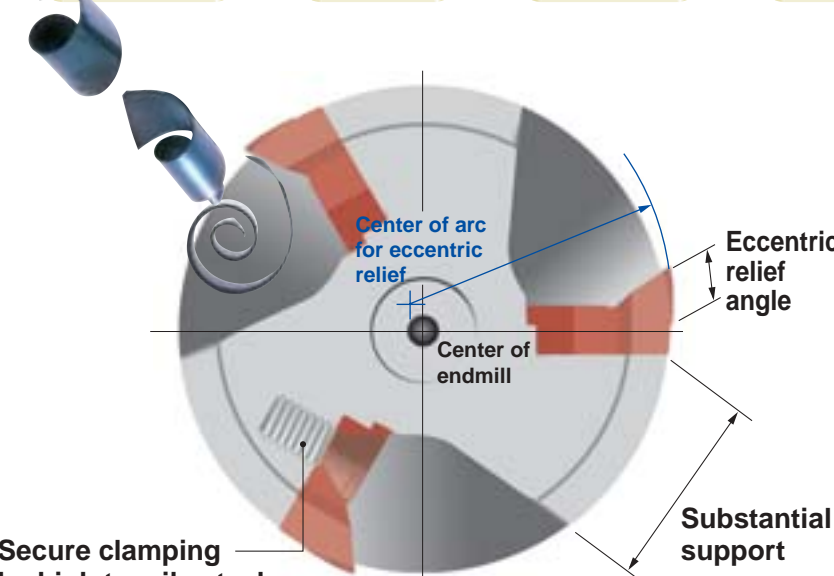
**Note**

To extend the machine spindle life, cutting loads during machining must be reduced. It is recommended to use an endmill offering both sharpness and low cutting resistance.

Toughness

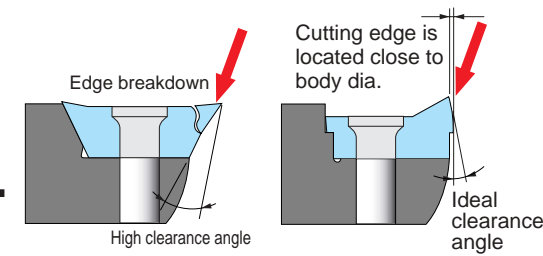
## Positive rake angle offering high toughness with a highly rigid integral body

Strong cutting edge + Secure clamping + Highly rigid body + Dual face and taper contact



Secure clamping by high tensile steel "Alpha Screw"

**Strong cutting edge reduces edge chipping.**



Other manufacturers FULLCUT MILL

**Eccentric relief angle**

Providing an eccentric to the cutting edge has been standard for solid endmills since the 1970's and has become the traditional technique in solid endmills. The relief angle is kept small to provide increased strength to the cutting edge without reducing the top rake and sharpness.

**Extreme rigidity by integral body with dual taper and face contact interface**



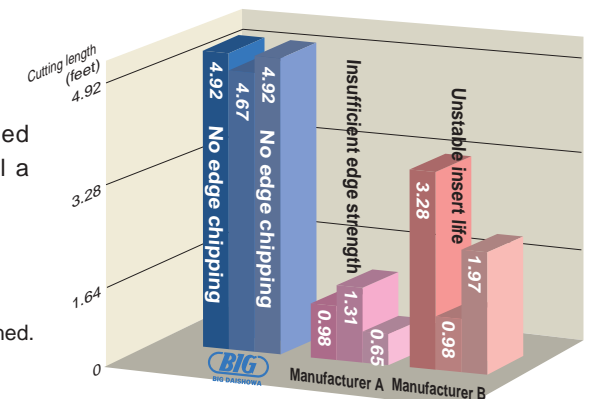
Evaluation of resistance to breakdown of cutting edge

**Tough cutting edge of FULLCUT MILL is proven.**



A workpiece with countless holes is used to evaluate the total cutting length until a cutting edge is chipped.

Cutter Dia.: 1.250" Rd=1.000"  
Work Material:1055 Ad= .125"  
V=262SFM Only one insert is attached.  
f= .008IPT Dry cutting



**Note**

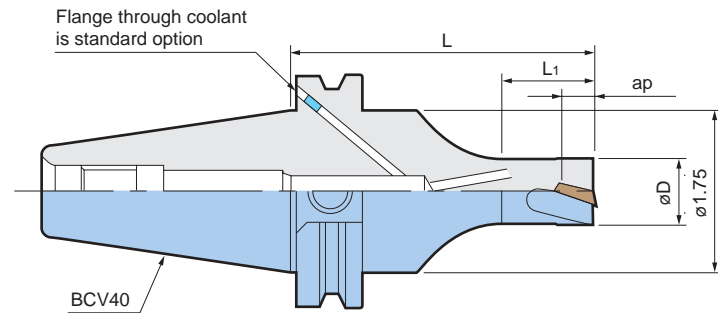
Inserts with a large clearance angle provide sharp cutting. However, in practice, the rake angle is the important requirement. Inserts with a large clearance angle have an increased likelihood to edge chipping.

# FULLCUT MILL is offered in various styles from integral to straight shank providing **Sharpness** **Rigidity** and **Accuracy**

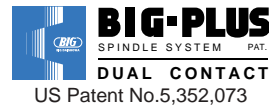
## BIG-PLUS CAT40

Dual taper and face contact

BIG-PLUS Spindle System is available as standard on all steep taper types to provide the highest rigidity and accuracy.



Coolant Bores in Accordance to DIN69871/Form B\*



## Inch style

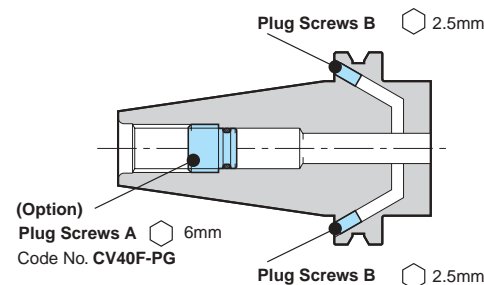
## ASME B5.50 - 1994

MODEL	øD	ap	L	L1	NO. OF INSERTS	INSERT MODEL
<b>BCV40-FCM .625-3</b>	.625	.354	3.00	1.00	2	ARG160904
<b>-4</b>			4.00	1.25		
<b>-5</b>			5.00	1.00		
<b>-FCM .750-3</b>	.750	.354	3.00	1.00	3	ARG200904
<b>-4</b>			4.00	1.25		
<b>-5</b>			5.00	1.00		
<b>-FCM1.000-3</b>	1.000	.354	3.00	1.00	3	ARG250904
<b>-5</b>			5.00	1.75		
<b>-6</b>			6.00	1.50		
<b>-FCM1.250-3</b>	1.250	.354	3.00	1.25	3	ARG321104
<b>-5</b>			5.00	2.25		
<b>-6</b>			6.00	1.75		
<b>-FCM1.500-3</b>	1.500	.433	3.00	1.50	4	ARG401104
<b>-5</b>			5.00	2.50		
<b>-6</b>			6.00	2.00		
<b>-FCM2.000-3</b>	2.000	.433	3.00	2.25	5	ARG401104
<b>-5</b>			5.00	4.25		
<b>-6</b>			6.00	5.25		

\*ap=The Length of Effective Cutting Edge  
\*Inserts are ordered separately.

\*BIG-PLUS tools can be used in machining centers with conventional spindles.  
\*Bores on Form B are sealed with set screws on delivery.

## Plug Screw for Flange through coolant



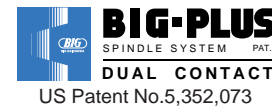
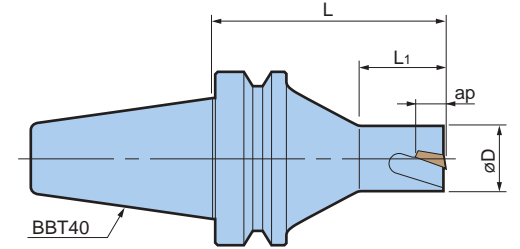
This Plug Screw A(option) prevents coolant leakage through retention knobs.

Bores on form B are sealed with Plug Screw B.

\*Remove 2 pcs Plug Screws B from end face of flange.  
\*Failure to use the Plug Screw "A" or other sealing method may result in coolant contamination of spindle and lead to it's premature failure or accidents.

## BIG-PLUS BT40

Dual taper and face contact



## Metric style

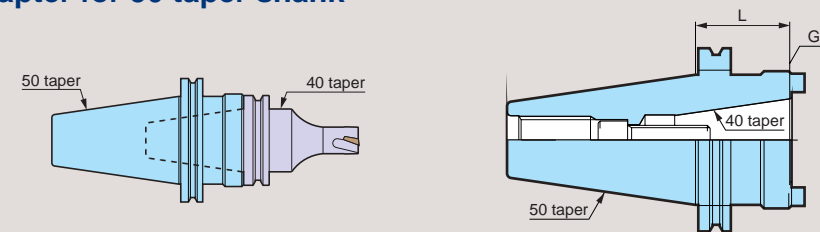
## MAS 403

MODEL	øD (inch)	ap	L	L1	NO. OF INSERTS	INSERT MODEL
<b>BBT40-FCM16092- 85</b>	16mm (.630)	.354	3.35	.91	2	ARG160904
<b>-105</b>			4.13	1.18		
<b>-120</b>			4.72	.98		
<b>-150</b>			5.91			
<b>-FCM20093- 85</b>	20mm (.787)	.354	3.35	1.10	3	ARG200904
<b>-105</b>			4.13	1.38		
<b>-120</b>			4.72	1.18		
<b>-FCM25093- 85</b>	25mm (.984)	.354	3.35	1.30	3	ARG250904
<b>-120</b>			4.72	1.77		
<b>-135</b>			5.32	1.58		
<b>-165</b>	6.50					
<b>-FCM32113- 85</b>	32mm (1.260)	.433	3.35	1.50	3	ARG321104
<b>-120</b>			4.72	2.36		
<b>-135</b>			5.32	1.97		
<b>-165</b>	6.50	1.58				
<b>-FCM40114- 85</b>	40mm (1.575)	.433	3.35	1.69	4	ARG401104
<b>-120</b>			4.72	2.56		
<b>-135</b>			5.32	2.36		
<b>-165</b>	6.50	1.97				
<b>-FCM50115- 70</b>	50mm (1.969)	.433	2.76	1.50	5	ARG401104
<b>-120</b>			4.72	2.56		
<b>-135</b>			5.32	2.36		
<b>-165</b>	6.50	1.97				

\*ap=The Length of Effective Cutting Edge  
\*Inserts are ordered separately.

\*BIG-PLUS tools can be used in machining centers with conventional spindles.

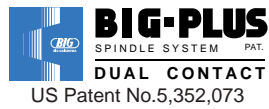
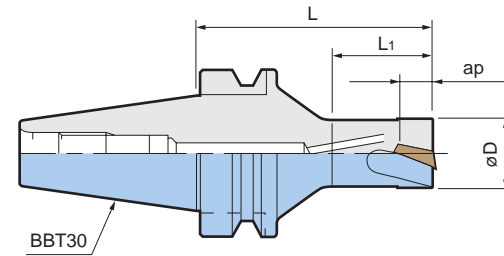
## Adapter for 50 taper shank



	MODEL	L
<b>CAT</b>	<b>BCV50-BCV40- 2</b>	2.000
	<b>- 4</b>	4.000
<b>MAS</b>	<b>BBT50-BBT40-50</b>	1.969
	<b>-90</b>	3.543

**BIG-PLUS BT30**

Dual taper and face contact

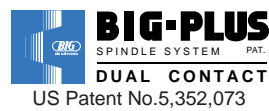


Inch style

MAS 403

MODEL	øD	ap	L	L1	NO. OF INSERTS	INSERT MODEL
<b>BBT30-FCM .625-2.5</b>	.625	.354	2.5	1.0	2	ARG160904
<b>-FCM .750-2.5</b>	.750		2.5	1.2	3	ARG200904
<b>-FCM 1.000-2.5</b>	1.000		2.5	1.4	3	ARG250904
<b>-FCM 1.250-2.5</b>	1.250	.433	2.5	1.6	3	ARG321104
<b>-FCM 1.500-2</b>	1.500		2.0	1.0	4	ARG401104
<b>-FCM 2.000-2</b>	2.000		2.0	1.1	5	

\*ap=The Length of Effective Cutting Edge    \*BIG-PLUS tools can be used in machining centers with conventional spindles.  
 \*Inserts are ordered separately.



Metric style

MAS 403

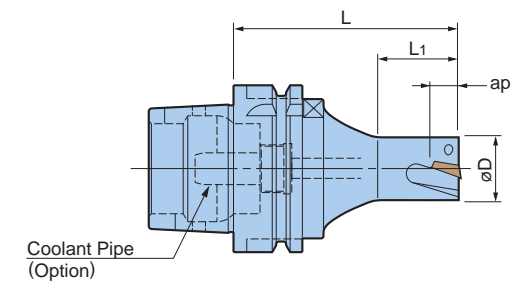
MODEL	øD (inch)	ap	L	L1	NO. OF INSERTS	INSERT MODEL
<b>BBT30-FCM16092- 65</b>	16mm (.630)	.354	2.56	.91	2	ARG160904
<b>-FCM20093- 65</b>	20mm (.787)			1.10	3	ARG200904
<b>-FCM25093- 65</b>	25mm (.984)			1.30		ARG250904
<b>-FCM32113- 65</b>	32mm (1.260)	.433	1.97	1.50	4	ARG321104
<b>-FCM40114- 50</b>	40mm (1.575)			.98		5
<b>-FCM50115- 50</b>	50mm (1.969)			1.10		

\*ap=The Length of Effective Cutting Edge    \*BIG-PLUS tools can be used in machining centers with conventional spindles.  
 \*Inserts are ordered separately.

**Note** The integral version of the FULLCUT MILL provides increased rigidity as a result of the reduced gage length. It is particularly recommended for use in machines having a small spindle taper. Additionally, there is a cost saving as no chuck is necessary.

**HSK for DIN 69893-1**

Dual taper and face contact

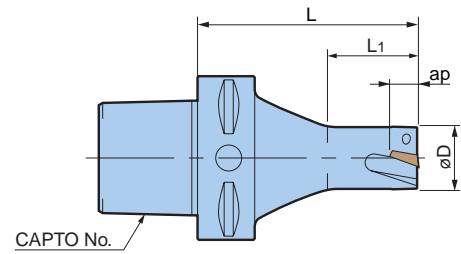


Metric style

MODEL	øD (inch)	ap	L	L1	NO. OF INSERTS	INSERT MODEL
<b>HSK-A40-FCM16092- 65</b>	16mm (.63)	.354	2.56	.93	2	ARG160904
<b>-FCM20093- 65</b>	20mm (.79)			1.10	3	ARG200904
<b>-FCM25093- 65</b>	25mm (.98)			1.38	3	ARG250904
<b>-FCM32113- 65</b>	32mm (1.26)	1.38		3	ARG321104	
<b>-FCM40114- 65</b>	40mm (1.58)	.433		1.77	4	ARG401104
<b>-FCM50115- 65</b>	50mm (1.97)			1.77	5	ARG401104
<b>HSK-A63-FCM16092- 85</b>	16mm (.63)		.354	3.35	.91	2
<b>-105</b>		4.13		1.18		
<b>-120</b>		4.72		.98		
<b>-150</b>	20mm (.79)	.354	5.91	.98	3	ARG200904
<b>-FCM20093- 85</b>			3.35	1.10		
<b>-105</b>			4.13	1.38		
<b>-120</b>	25mm (.98)	.354	4.72	1.18	3	ARG250904
<b>-150</b>			5.91	1.18		
<b>FCM25093- 85</b>			3.35	1.30		
<b>-120</b>	32mm (1.26)	.433	4.72	1.77	3	ARG250904
<b>-135</b>			5.32	1.58		
<b>-165</b>			6.50	1.58		
<b>-FCM32113- 85</b>	32mm (1.26)	.433	3.35	1.45	3	ARG321104
<b>-120</b>			4.72	2.36		
<b>-135</b>			5.32	1.97		
<b>-165</b>	40mm (1.58)	.433	6.50	1.58	4	ARG401104
<b>-FCM40114- 85</b>			3.35	1.69		
<b>-120</b>			4.72	2.56		
<b>-135</b>	50mm (1.97)	.433	5.32	2.36	4	ARG401104
<b>-165</b>			6.50	1.97		
<b>-FCM50115- 70</b>			2.75	1.58		
<b>-120</b>	50mm (1.97)	.433	4.72	3.54	5	ARG401104
<b>-135</b>			5.32	4.13		
<b>-165</b>			6.50	5.32		

\*ap=The Length of Effective Cutting Edge  
 \*Inserts are ordered separately.

## BIG Coromant Capto C6



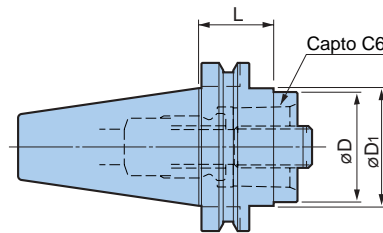
### Inch style

MODEL	øD	ap	L	L1	NO. OF INSERTS	INSERT MODEL
<b>C6 -FCM .625-3</b>	.625	.354	3.00	1.00	2	ARG160904
-4			4.00	1.20		
-5			5.00	1.00		
<b>-FCM .750-3</b>	.750	.354	3.00	1.10	3	ARG200904
-4			4.00	1.40		
-5			5.00	1.20		
<b>-FCM1.000-3</b>	1.000	.354	3.00	1.30	3	ARG250904
-4			4.00	1.80		
-5			5.00	1.60		
<b>-FCM1.250-3</b>	1.250	.354	3.00	1.50	3	ARG321104
-4			4.00	2.40		
-5			5.00	2.00		
<b>-FCM1.500-3</b>	1.500	.433	3.00	1.80	4	ARG401104
-4			4.00	2.50		
-5			5.00	2.50		
<b>-FCM2.000-2.5</b>	2.000	.433	2.50	1.40	5	ARG401104
-4			4.00	2.50		
-5			5.00	2.50		

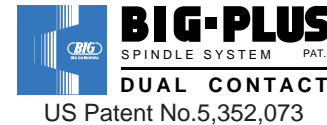
\*ap=The Length of Effective Cutting Edge \*Inserts are ordered separately.

Metric sizes are available upon request.  
C5 is also available upon request (metric only).

## BIG PLUS Basic Holder for Capto

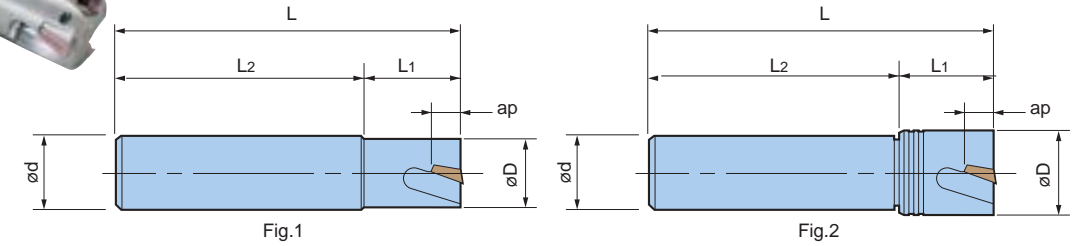


Patented:  
Japan, USA, Canada, Germany, UK, France,  
Italy, Taiwan, and South Korea



	Model	øD	øD1	L
CAT	BCV40-C6-3.5	2.48	1.75	3.50
	BCV50-C6-2		2.75	2.00
MAS	BBT40-C6-75	2.48	—	2.95
	BBT50-C6-50		—	1.97

## Straight Shank



### Inch style

MODEL	Fig.	ød	øD	ap	L	L1	L2	NO. OF INSERTS	INSERT MODEL
<b>ST .625-FCM .500-3</b>	1	.625	.500	.354	3	.65	2.40	1	ARG160904
-FCM .563-3			2.35						
-FCM .625-3			2.00						
<b>ST .750-FCM .750-4</b>	1	.750	.750	.354	4	1.25	2.75	3	ARG200904
<b>ST1.000-FCM 1.000-5</b>	1	1.000	1.000	.354	5	1.50	3.50	3	ARG250904
<b>ST1.250-FCM 1.250-5</b>	2	1.250	1.250	.433	5	1.50	3.50	3	ARG321104
-FCM 1.500-5			1.500						
-FCM 2.000-5			2.000						

\*ap=The Length of Effective Cutting Edge  
\*Inserts are ordered separately.

### Metric style

MODEL	Fig.	ød (Inch)	øD (Inch)	ap	L	L1	L2	NO. OF INSERTS	INSERT MODEL		
<b>ST16-FCM12091- 90</b>	1	16mm (.630)	12mm (.472)	.354	3.54	.59	2.76	1	ARG160904		
-FCM14091- 90			14mm (.551)								
-FCM16092- 90			16mm (.630)								
<b>ST20-FCM20093-110</b>	1	20mm (.787)	20mm (.787)	.354	4.33	1.18	3.15	3	ARG200904		
<b>ST25-FCM25093-120</b>	1	25mm (.984)	25mm (.984)						1.38	3.35	ARG250904
<b>ST32-FCM32113-130</b>	1	32mm (1.260)	32mm (1.260)						1.38	3.74	3
<b>-FCM40114-130</b>	2	32mm (1.260)	40mm (1.575)	.433	5.12	1.58	3.54	4	ARG401104		
<b>-FCM50115-130</b>			50mm (1.969)								
			5								

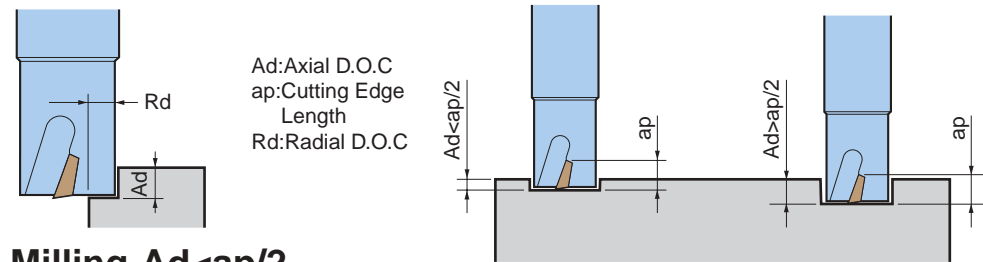
\*ap=The Length of Effective Cutting Edge  
\*Inserts are ordered separately.



These tools are recommended to be held with MEGA DOUBLE POWER CHUCK for optimum performance.

## Cutting Data Recommendations

Dual taper and face contact



### Finish or Light Milling- $Ad < ap/2$

Material	Diameter D	Insert Grade	Speed SFM	Feed, IPT	
				Full Slot	Rd < 1/2D
Low or Medium Carbon Steel, Unalloyed or Low Alloy Steel 1020,A36,8620,4140	.500- .625	ACZ350	300-620	.002- .004	.003- .005
	.750-1.000		300-690	.002- .005	.003- .006
	1.250-1.500		330-820	.003- .007	.004- .008
	2.000			.003- .008	.004- .010
High Carbon Steel, High Alloy Tool Steel 01,H13,D2,A2,M2,P20	.500- .625	ACZ350	300-620	.002- .004	.003- .005
	.750-1.000		300-650	.002- .005	.003- .006
	1.250-1.500		330-760	.002- .007	.003- .008
	2.000			.002- .008	.003- .009
Stainless Steel 303,304,316,420	.500- .625	ACZ350S	230-580	.003- .006	.003- .007
	.750-1.000		230-650	.004- .007	.004- .008
	1.250-1.500		330-650	.004- .008	.004- .009
	2.000			.004- .008	.004- .010
Cast Iron	.500- .625	ACZ310	300-580	.002- .005	.003- .006
	.750-1.000		300-620	.002- .006	.003- .007
	1.250-1.500		330-700	.003- .007	.003- .008
	2.000		330-720	.003- .008	.003- .010
Aluminum	.500- .625	DC20	660-5000	.003- .008	.004- .010
	.750-1.000			.004- .010	.004- .012
	1.250-1.500			.004- .012	.004- .014
	2.000			.004- .014	.004- .016

### Medium to Heavy milling- $Ad > ap/2$

Material	Diameter D	Insert Grade	Speed SFM	Feed, IPT	
				Full Slot	Rd < 1/2D
Low or Medium Carbon Steel, Unalloyed or Low Alloy Steel 1020,A36,8620,4140	.500- .625	ACZ350	260-590	.002- .003	.002- .004
	.750-1.000		300-620	.002- .004	.002- .005
	1.250-1.500		330-660	.003- .006	.004- .007
	2.000		330-760	.003- .008	.004- .010
High Carbon Steel, High Alloy Tool Steel 01,H13,D2,A2,M2,P20	.500- .625	ACZ350	260-580	.002- .004	.002- .005
	.750-1.000		260-620	.002- .005	.003- .006
	1.250-1.500		330-740	.002- .006	.003- .007
	2.000		330-760		.003- .008
Stainless Steel 303,304,316,420	.500- .625	ACZ350S	230-580	.003- .006	.003- .006
	.750-1.000		230-600	.004- .008	.004- .007
	1.250-1.500		330-600		.004- .008
	2.000				.004- .008
Cast Iron	.500- .625	ACZ310	300-580	.002- .004	.002- .005
	.750-1.000		300-620	.002- .005	.003- .006
	1.250-1.500		330-700	.003- .007	.003- .008
	2.000		330-720	.003- .008	.003- .010
Aluminum	.500- .625	DC20	660-5000	.003- .006	.004- .008
	.750-1.000			.004- .008	.004- .010
	1.250-1.500			.004- .010	.004- .012
	2.000			.004- .012	.004- .014

\*Formulas: RPM=SFMx3.82/D  
IPM=IPTxRPMxNo. of teeth

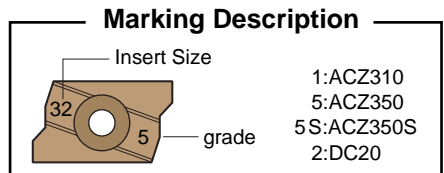


## Inserts

Cutter Dia.		Insert Model	ap	Insert Grade			
				ACZ350	ACZ350S	ACZ310	DC20
inch	metric			General steel	Stainless steel	Cast iron	Aluminum
.500	12	ARG160904	.354	○	○	○	○
.563	14			○	○	○	○
.625	16			○	○	○	○
.750	20	ARG200904		○	○	○	○
1.000	25	ARG250904		○	○	○	○
1.250	32	ARG321104		○	○	○	○
1.500	40	ARG401104	.433	○	○	○	○
2.000	50			○	○	○	○

\*Inserts are available in packets of 10 pcs.  
Ordering example : 10 pieces ARG160904 ACZ350

**Caution**  
FULLCUT MILL uses a different insert for each cutter diameter (except for dia. 1.50" and 2").  
If an incorrect insert is used, a problem will result.



### Insert Classifications

ACZ350	ACZ350S	ACZ310	DC20
For general steel and stainless steel. Ultra PVD multi-layer coating on extremely tough base prevents edge chipping and heat cracking, and provides excellent edge sharpness.	PVD multi-layer coating is given to the tough substrate and suitable for stainless steel. Excellent performance against heat combined strong cutting edge and long life.	For cast iron and ductile cast iron. Ultra PVD multi-layer coating on super fine grain carbide base for superior anti-abrasive properties and high resistance to mechanical shock.	For non-ferrous materials. Special diamond coating (diamond-like carbon) on K20 class carbide base achieves a high resistance to adherence and low friction.

### Spare Parts

Cutter Dia.		INSERT	MODEL	MODEL	MODEL
inch	metric				
.500	12	ARG160904	S2505DS	DA-T8	BN-5
.563	14		S2506DS		
.625	16				
.750	20		ARG200904	DA-T15	
1.000	25		ARG250904		
1.250	32		ARG321104		
1.500	40	ARG401104	S3508DS		
2.000	50				

**Note** It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.