

# SEC type



## “ Super End Chipper ”



## “ MEC Super End Chipper Heads ”



## “ Super End Chipper ”



### ■ SEC Type

## INDEXABLE END MILL

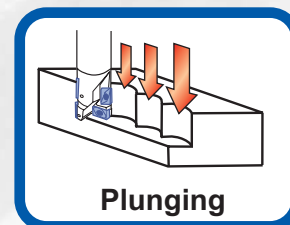
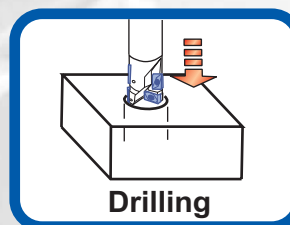
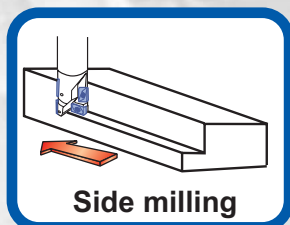
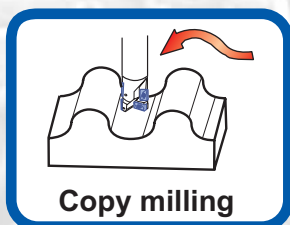
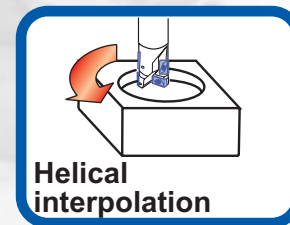
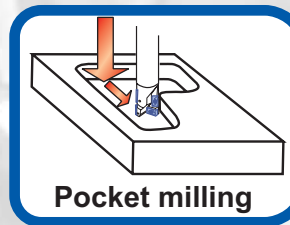
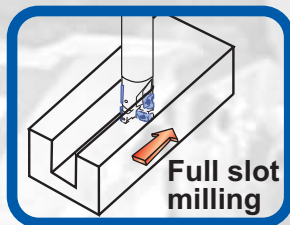
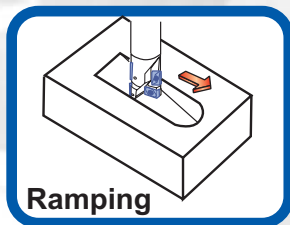


*The multi-purpose indexable end mill for effective milling in all directions.*

### ■ Features

1. Ramping, plunge milling, copy milling and also drilling capability.
2. Excellent performance in open and closed slotting, facing and cavity milling.
3. Large depth of cut and low cutting forces at higher feed rates for high productivity.
4. Secure cutter geometry, insert geometry and grades combined for optimum solutions in any operation.

### ■ Versatility of "SUPER END-CHIPPER"



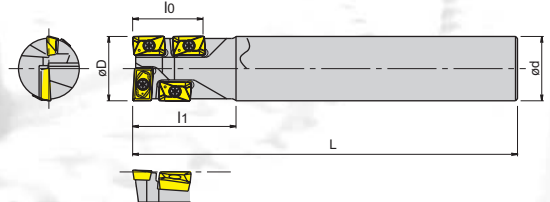
# “ Super End Chipper ”



## SEC End-mill Type



Fig.1 (Straight shank)



### Body

Cat. No.	Stock	No. of inserts		Dimensions (mm)						Inserts		Parts		Fig.	
		Central	Peripheral	øD	I0	I1	I2	L	ød	Central	Peripheral	Clamp Screw	Wrench		
M Type	SECM1616S16	●		16	16	50		130	16	ZDMT08T208L	ZPMT09T208R	TSW-2250 (0.6 N-m)	A-07SD	1	
	SECM2021S20	●		20	21	55		130	20	ZDMT100308L	ZCMT100308R	ESW-206 (0.9 N-m)	A-08SD	1	
	SECM2121S20	●		21	21	35		130	20	ZDMT100308L	ZCMT100308R	ESW-206 (0.9 N-m)	A-08SD	1	
	SECM2527S25	●	1	3	25	27	60		140	25	ZDMT13T3.. L	ZPMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	1
	SECM2627S25	●			26	27	40		140	25	ZDMT13T3.. L	ZPMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	1
	SECM3034S32	●			30	34.5	70		150	32	ZPMT1504.. L	ZPMT1604.. R	TSW-408 (3.1N-m)	A-15SD	1
	SECM3234S32	●			32	34.5	70		150	32	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1N-m)	A-15SD	1
	SECM3334S32	●			33	34.5	50		150	32	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1N-m)	A-15SD	1
ML Type	SECML1616S15	●		16	16	30		150	15	ZDMT08T208L	ZPMT09T208R	TSW-2250 (0.6 N-m)	A-07SD	1	
	SECML1616S16	●		16	16	65		150	16	ZDMT08T208L	ZPMT09T208R	TSW-2250 (0.6 N-m)	A-07SD	1	
	SECML2021S20	●		20	21	65		150	20	ZDMT100308L	ZCMT100308R	ESW-206 (0.9 N-m)	A-08SD	1	
	SECML2121S20	●	1	3	21	21	35		150	20	ZDMT100308L	ZCMT100308R	ESW-206 (0.9 N-m)	A-08SD	1
	SECML2527S25	●			25	27	70		180	25	ZDMT13T3.. L	ZPMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	1
	SECML2627S25	●			26	27	40		180	25	ZDMT13T3.. L	ZPMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	1
	SECML3234S32	●			32	34.5	80		190	32	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1N-m)	A-15SD	1
	SECML3334S32	●			33	34.5	50		190	32	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1N-m)	A-15SD	1
L Type	SECL1616S15	●		16	16	30		180	15	ZDMT08T208L	ZPMT09T208R	TSW-2250 (0.6 N-m)	A-07SD	1	
	SECL1616S16	●		16	16	75		180	16	ZDMT08T208L	ZPMT09T208R	TSW-2250 (0.6 N-m)	A-07SD	1	
	SECL2021S20	●		20	21	75		185	20	ZDMT100308L	ZCMT100308R	ESW-206 (0.9 N-m)	A-08SD	1	
	SECL2121S20	●		21	21	35		185	20	ZDMT100308L	ZCMT100308R	ESW-206 (0.9 N-m)	A-08SD	1	
	SECL2527S25	●	1	3	25	27	75		220	25	ZDMT13T3.. L	ZPMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	1
	SECL2627S25	●			26	27	40		220	25	ZDMT13T3.. L	ZPMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	1
	SECL3034S32	●			30	34.5	100		180	32	ZPMT1504.. L	ZPMT1604.. R	TSW-408 (3.1N-m)	A-15SD	1
	SECL3234S32	●			32	34.5	90		230	32	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1N-m)	A-15SD	1
EL Type	SECEL2627S25	●		26	27	40		250	25	ZDMT13T3.. L	ZDMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	1	
	SECXL2627S25	●	1	3	26	27	40		300	25	ZDMT13T3.. L	ZDMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	1
	SECEL3334S32	●			33	34.5	50		300	32	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1N-m)	A-15SD	1
	SECXL3334S32	●			33	34.5	50		350	32	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1N-m)	A-15SD	1

Attention to use 3.0 mm Corner Radius Inserts

Body must be modified to 1.5 mm. Radius or 1.2 mm Chamfer at corner.

Note : Please see page 104~110 for cutting conditions.

## “ Super End Chipper ”



### SEC End-mill Type



Fig.3 (Morse taper shank)

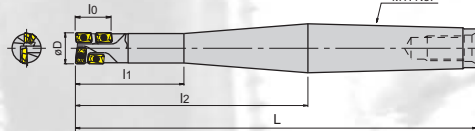


Fig.2 (Weldon shank)

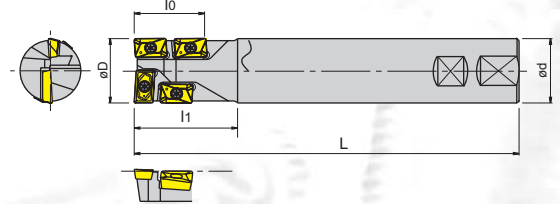
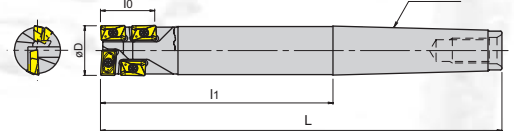


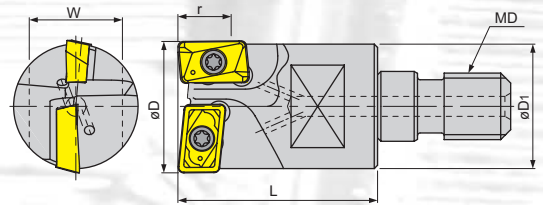
Fig.4 (Morse taper shank)



### Body

Cat. No.	Stock	No. of inserts		Dimensions (mm)						Inserts		Parts		Fig.	
		Central	Peripheral	øD	l0	l1	l2	L	ød	Central	Peripheral	Clamp Screw	Wrench		
MT shank type	SEC-20150-MT4	●		20	21	150	70	258	MT4	ZDMT100308L	ZCMT100308R	ESW-206 (0.9 N-m)	A-08SD	3	
	SEC-25120-MT4	●	1	3	25	27	120	—	228	MT4	ZDMT13T3.. L	ZPMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	4
	SEC-32150-MT4	●			32	34.5	150	—	259	MT4	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1 N-m)	A-15SD	4
Weldon shank type	SEC-25040-W25	●			25	27	40	—	140	25	ZDMT13T3.. L	ZPMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	2
	SEC-25075-W25	●	1	3	25	27	75	—	220	25	ZDMT13T3.. L	ZPMT13T3.. R	DSW-307 (1.4 N-m)	A-10SD	2
	SEC-32050-W32	●			32	34.5	50	—	150	32	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1 N-m)	A-15SD	2
	SEC-32090-W32	●			32	34.5	90	—	230	32	ZPMT1604.. L	ZPMT1604.. R	TSW-408 (3.1 N-m)	A-15SD	2

### MEC SEC Heads Type (with trough coolant hole)



### Body

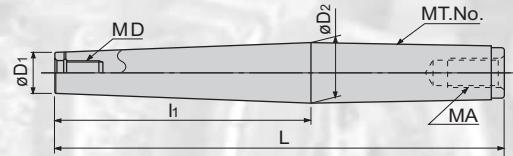
Cat. No.	Stock	No. of inserts	Dimensions (mm)						Passende WP		Parts	
			øD	r	L	øD1	MD	W	Central	Peripheral	Clamp screw	Wrench
MEC-2016-M8	●	2	16	8	23	14.8	M8	12	ZDMT08T208L ZPMT09T208R		TSW-2250	A-07SD
MEC-2020-M10	●	2	20	9	30	18.7	M10	14	ZDMT100308L ZCMT100308R		ESW-206 (0.9 N-m)	A-08SD
MEC-2021-M10	●	2	21	9	30	19.6	M10	14				ESW-206 (0.9 N-m)
MEC-2025-M12	●	2	25	12.5	35	23.2	M12	17	ZDMT13T3OOL ZPMT13T3OOR		DSW-307 (1.4 N-m)	A-10SD
MEC-2026-M12	●	2	26	12.5	35	24.1	M12	17				DSW-307 (1.4 N-m)
MEC-2030-M16	●	2	30	15	43	28.2	M16	22	ZPMT150408L ZPMT160408R		TSW-408 (3.1 N-m)	A-15SD
MEC-2032-M16	●	2	32	15	43	30.2	M16	22				TSW-408 (3.1 N-m)
MEC-2033-M16	●	2	33	15	43	31	M16	22	ZPMT1604OOL ZPMT1604OOR		TSW-408 (3.1 N-m)	A-15SD

Attention to use 3.0 or 3.2 mm Corner Radius  
Body must be modified to 1.5 mm. Radius or 1.2 mm Chamfer at corner.

Note : Please see page 104~110 for cutting conditions.

# “ Super End Chipper ”

## MMT Morse Taper type



### Body

Cat. No.	Stock	Dimensions (mm)							Applicable head
		øD1	øD2	l1	L	MD	MT. No.	MA	
MMT-M8-50-MT2	○		18.030	50	119		MT2	M10	MEC-2016-M8
MMT-M8-80-MT3	○	15	24.076	80	166	M8	MT3	M12	
MMT-M8-110-MT3	○		24.076	110	196		MT3	M12	
MMT-M10-60-MT3	○		24.076	60	146		MT3	M12	MEC-2020-M10, MEC-2021-M10
MMT-M10-80-MT3	○	19	24.076	80	166	M10	MT3	M12	
MMT-M10-110-MT4	○		31.605	110	219		MT4	M16	
MMT-M12-50-MT3	○		24.076	50	136		MT3	M12	MEC-2025-M12, MEC-2026-M12
MMT-M12-80-MT3	○	21	24.076	80	166	M12	MT3	M12	
MMT-M12-110-MT4	○		31.605	110	219		MT4	M16	
MMT-M12-140-MT4	○		31.605	140	249		MT4	M16	
MMT-M16-50-MT4	○		31.605	50	159		MT4	M16	MEC-2030-M16, MEC-2032-M16 MEC-2033-M16
MMT-M16-80-MT4	○		31.605	80	189		MT4	M16	
MMT-M16-110-MT5	○	29	44.741	110	246	M16	MT5	M20	
MMT-M16-140-MT5	○		44.741	140	276		MT5	M20	
MMT-M16-180-MT5	○		44.741	180	316		MT5	M20	

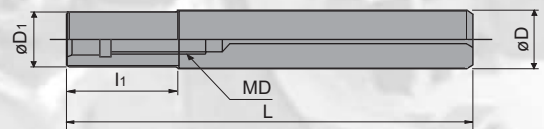
○ Will not be available after current stock exhausted.

## MSN Straight Neck type (Through Coolant Hole)

- For high productivity
- High rigidity



**NEW**



### Body

Cat. No.	Stock	Dimensions (mm)					Applicable head
		øD	l1	L	øD1	MD	
<b>NEW</b> MSN-M8-40-S16C	●		40	95			MEC-2016-M8
<b>NEW</b> MSN-M8-80-S16C	●	16	80	135	15.5	M8	
<b>NEW</b> MSN-M8-120-S16C	●		120	175			
MSN-M10-40-S20C	●		40	100			MEC-2020-M10, MEC-2021-M10
MSN-M10-90-S20C	●	20	90	150	19.5	M10	
MSN-M10-140-S20C	●		140	200			
MSN-M12-55-S25C	●		55	120			MEC-2025-M12, MEC-2026-M12
MSN-M12-105-S25C	●	25	105	170	24	M12	
MSN-M12-155-S25C	●		155	220			
MSN-M16-55-S32C	●		55	120			MEC-2030-M16, MEC-2032-M16 MEC-2033-M16
MSN-M16-105-S32C	●	32	105	170	29	M16	
MSN-M16-155-S32C	●		155	220			

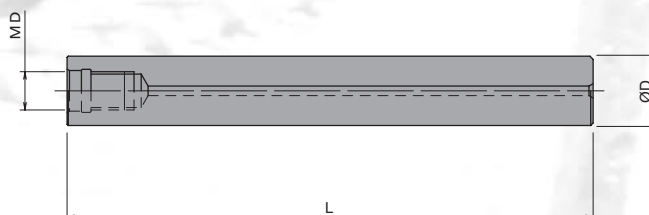
Note : Please see page 104~110 for cutting conditions.

## “ Super End Chipper ”



### ■ MSN Straight Arbor Type (Through Coolant Hole)

- For high productivity
- High rigidity



### ■ Body

Cat. No.	Stock	Dimensions (mm)			Applicable holders
		ØD	L	MD	
MSN-M10-130S-S18C	●	18	130	M10	MEC-2020-M10 MEC-2021-M10
MSN-M10-190S-S18C	●		190		
MSN-M10-130S-S20C	●	130			
MSN-M10-190S-S20C	●	190			
MSN-M10-250S-S20C	●	250			
MSN-M12-185S-S23C	●	23	185		
MSN-M12-265S-S23C	●		265		
MSN-M12-145S-S25C	●	145			
MSN-M12-215S-S25C	●	25	215		
MSN-M12-285S-S25C	●		285		
MSN-M16-160S-S28C	●	28	160	M16	MEC-2030-M16 MEC-2032-M16 MEC-2033-M16
MSN-M16-230S-S28C	●		230		
MSN-M16-310S-S28C	●	310			
MSN-M16-157S-S32C	●	32	157		
MSN-M16-217S-S32C	●		217		
MSN-M16-287S-S32C	●		287		
MSN-M16-357S-S32C	●		375		

Note : Please see page 104~110 for cutting conditions.

### ■ Recommended tightening torque for modular head

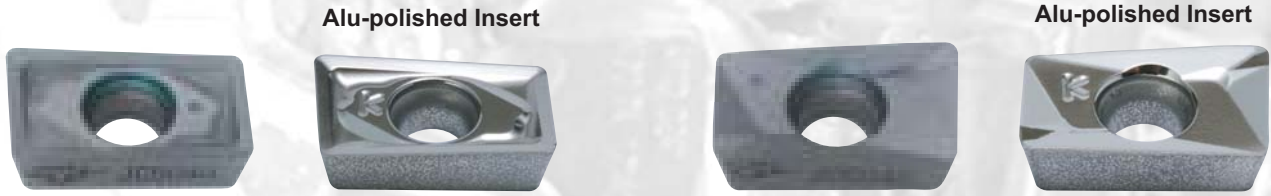
Tread Size	Tightening Torque	Wrench Size mm.
M8	23 Nm	10,12
M10	46 Nm	14,15
M12	80 Nm	17
M16	90 Nm	22,26

#### Attention to mounting head !

Clean the contact surface of head and carbide holder, and also confirm there is no gap between head and holder after tightening.  
Please check and try to obtain good run-out.

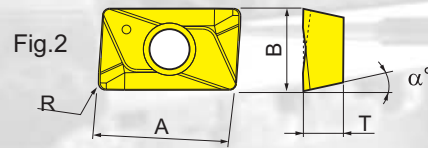
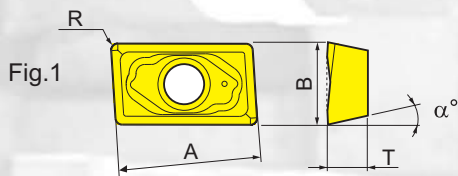
# “ Super End Chipper ”

## SEC Inserts



Central insert

Peripheral insert



## Inserts

Cat. No.	Coated		Uncoated		Dimensions (mm)					Fig.
	JC5015	JC5040	FZ15		A	B	T	$\alpha^\circ$	R	
ZDMT08T208L /P	●	●	□		7.9	6	2.78	15	0.8	1
ZPMT09T208R /P	●	●	□		9	5.4	2.78	11	0.8	2
ZDMT100308L /P	●	●	□		10.4	6.35	3.4	15	0.8	1
ZCMT100308R /P	●	●	□		10.4	6.35	3.4	7	0.8	2
ZDMT13T308L /P	●	●	□		12.9	7.938	3.97	15	0.8	1
ZPMT13T308R /P	●	●	□		13.3	7.938	3.97	11	0.8	2
ZDMT13T320L /P	●	●	□		12.9	7.938	3.97	15	2.0	1
ZPMT13T320R /P	●	●	□		13.3	7.938	3.97	11	2.0	2
ZPMT150408L /P	●	●	□		15.45	9.525	4.76	11	0.8	1
ZPMT160408L /P	●	●	□		16.45	9.525	4.76	11	0.8	1
ZPMT160408R /P	●	●	□		16	9.525	4.76	11	0.8	2
ZPMT160416L /P	●	●	□		16.45	9.525	4.76	11	1.6	1
ZPMT160416R /P	●	●	□		16	9.525	4.76	11	1.6	2
ZPMT160420L /P	●	●	□		16.45	9.525	4.76	11	2.0	1
ZPMT160420R /P	●	●	□		16	9.525	4.76	11	2.0	2
ZPMT160430L /P	●	●	□		16.45	9.525	4.76	11	3.0	1
ZPMT160430R /P	●	●	□		16	9.525	4.76	11	3.0	2
ZPMT160432L /P	●	●	□		16.45	9.525	4.76	11	3.2	1
ZPMT160432R /P	●	●	□		16	9.525	4.76	11	3.2	2

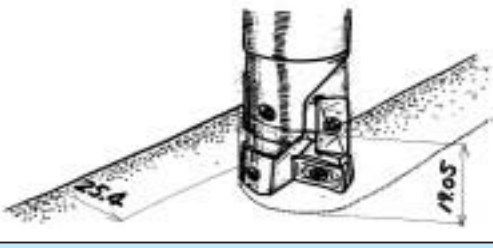
□ FZ15 Polished inserts for aluminium, please add **P** at the end of Cat. No.

□ Stock in Japan


## “ Super End Chipper ”

### Cutting data for SEC

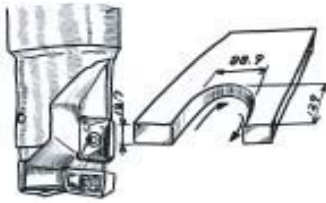
#### 1. Deep machining for injection mold

<b>Plunging and side milling</b> 	Work	Part name	Injection mold
		Material	P20
Hardness		30-34 HRC	
	Tool	Tool No.	SECL3234S32
		Insert No.	JC5040
<b>Result</b> SEC increased the productivity 5 times than 2" dia. Radius cutter with 5 inserts.	Cutting conditions	Cutting speed	140 m/min (1,400 min <sup>-1</sup> )
		Feed speed	508 mm/min
		Ap	19.05 mm
		Ae	25.4 mm
		Coolant	Air blow
	Machine	Vertical MC	

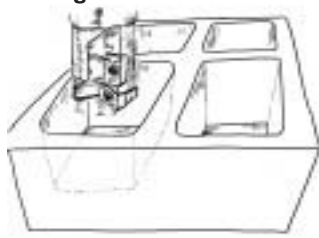
#### 2. High efficient machining for Aluminum.

<b>Side milling</b> 	Work	Part name	Aluminum plate
		Material	Aluminum alloy
Hardness		–	
	Tool	Tool No.	SECML3234S32
		Insert No.	JC5040
<b>Result</b> SEC increased the productivity 2.4 times than previous indexable end mill.	Cutting conditions	Cutting speed	249 m/min (2,500 min <sup>-1</sup> )
		Feed speed	762 mm/min
		Ap	38.1 mm
		Ae	12.7 mm
		Coolant	Wet cut
	Machine	Vertical MC	

#### 3. Slot milling. (Tool life x 2, Feed speed x 1.6)

<b>U groove machining</b> 	Work	Part name	Heat resistant plate
		Material	Heat resistant alloy
Hardness		–	
	Tool	Tool No.	SECML2527S25
		Insert No.	JC5040
<b>Result</b> Increased feed speed by 1.6 times and improved tool life by 2 times compare with competitor.	Cutting conditions	Cutting speed	110 m/min (1,400 min <sup>-1</sup> )
		Feed speed	635 mm/min
		Ap	12.7 mm
		Ae	25 mm
		Coolant	Water soluble
	Machine	Vertical MC	

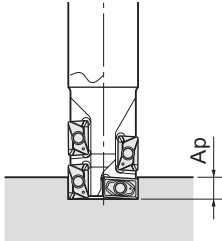
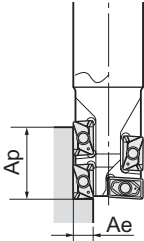
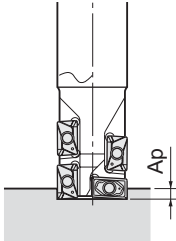
#### 4. High efficient machining (Q=8,000cm<sup>3</sup>/corner)

<b>Pocket milling</b> 	Work	Part name	Cavity mold
		Material	S53C
Hardness		–	
	Tool	Tool No.	SECM3334S32
		Insert No.	JC5040
<b>Result</b> Increased chip removal Rate and tool life by 3 times Q=8,000cm <sup>3</sup> /corner	Cutting conditions	Cutting speed	124 m/min (1,200 min <sup>-1</sup> )
		Feed speed	320 mm/min
		Ap	12 mm
		Ae	23-33 mm
		Coolant	Dry cut
	Machine	Vertical MC	



# “ Super End Chipper ”

■ Recommended cutting conditions for SEC 30, 32 and 33mm dia.

Type of machining							
Materials	Grade	Parameter	Slotting	Shoulder cutting	Drilling		
Carbon steel (C50, C55) 150-280HB	JC5040	N (min <sup>-1</sup> )	1,490	1,390	1,590	1,590	1,490
		Vf (mm/min)	450	310	550	400	370
		Ap (mm)	Up to 6	6 - 16	Up to 8	8 - 34	Up to 5
		Ae (mm)	–	–	Up to 16	Up to 6	–
Alloy steel (1.7225) 150-280HB	JC5040	N (min <sup>-1</sup> )	1,490	1390	1,590	1,590	1,490
		Vf (mm/min)	420	280	480	350	300
		Ap (mm)	Up to 6	6 - 16	Up to 8	8 - 34	Up to 5
		Ae (mm)	–	–	Up to 16	Up to 6	–
Mold steel (1.2311,P20) 280-400HB	JC5040	N (min <sup>-1</sup> )	1,290	1,190	1,290	1,290	1,290
		Vf (mm/min)	320	240	390	260	250
		Ap (mm)	Up to 5	5 - 16	Up to 8	8 - 34	Up to 5
		Ae (mm)	–	–	Up to 16	Up to 6	–
Tool & die steel (1.2344,1.2379) 150-255HB	JC5040	N (min <sup>-1</sup> )	1,190	1,100	1,290	1,290	1,190
		Vf (mm/min)	300	220	390	260	240
		Ap (mm)	Up to 5	5 - 16	Up to 8	8 - 34	Up to 5
		Ae (mm)	–	–	Up to 16	Up to 6	–
Stainless steel (1.4301,1.4401) 150-250HB	JC5015 JC5040	N (min <sup>-1</sup> )	1,100	1,000	1,190	1,190	1,100
		Vf (mm/min)	275	200	360	240	165
		Ap (mm)	Up to 5	5 - 16	Up to 8	8 - 34	Up to 5
		Ae (mm)	–	–	Up to 16	Up to 6	–
Cast iron (GG25,GG30) 160-260HB	JC5015 JC5040	N (min <sup>-1</sup> )	1,690	1,590	1,790	1,790	1,690
		Vf (mm/min)	680	480	700	540	500
		Ap (mm)	Up to 8	8 - 16	Up to 8	8 - 34	Up to 5
		Ae (mm)	–	–	Up to 16	Up to 6	–
Nodular cast iron (GGG60,GGG70) 170-300HB	JC5015 JC5040	N (min <sup>-1</sup> )	1,490	1,390	1,590	1,590	1,490
		Vf (mm/min)	520	350	560	400	370
		Ap (mm)	Up to 8	8 - 16	Up to 8	8 - 34	Up to 5
		Ae (mm)	–	–	Up to 16	Up to 6	–

Note: 1. The figures to be adjusted according to the machine rigidity or work rigidity.  
 2. Page 88 reduction above Ap, N and F to ML, L and EL type tools.  
 3. Please use JC 5015 grade for finishing operation or in case of JC 5040's wear.

# “ Super End Chipper ”

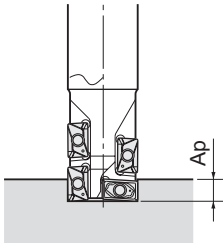
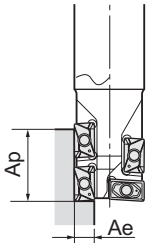
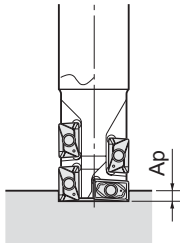
## ■ Recommended cutting conditions for SEC 25 and 26mm dia.

Type of machining								
Materials	Grade	Parameter	Slotting		Shoulder cutting		Drilling	
Carbon steel (C50, C55) 150-280HB	JC5040	N (min <sup>-1</sup> )	1,910	1,780	2,040	2,040	1,910	
		Vf (mm/min)	520	350	610	400	470	
		Ap (mm)	Up to 5	5 - 12	Up to 7	7 - 27	Up to 4	
		Ae (mm)	–	–	Up to 12	Up to 5	–	
Alloy steel (1.7225) 150-280HB	JC5040	N (min <sup>-1</sup> )	1,910	1,780	2,040	2,040	1,910	
		Vf (mm/min)	480	320	550	360	380	
		Ap (mm)	Up to 5	5 - 12	Up to 7	7 - 27	Up to 4	
		Ae (mm)	–	–	Up to 12	Up to 5	–	
Mold steel (1.2311,P20) 280-400HB	JC5040	N (min <sup>-1</sup> )	1,530	1,400	1,650	1,650	1,530	
		Vf (mm/min)	380	250	440	290	300	
		Ap (mm)	Up to 4	4 - 12	Up to 7	7 - 27	Up to 4	
		Ae (mm)	–	–	Up to 12	Up to 5	–	
Tool & die steel (1.2344,1.2379) 150-255HB	JC5040	N (min <sup>-1</sup> )	1,530	1,400	1,650	1,650	1,530	
		Vf (mm/min)	380	250	440	290	300	
		Ap (mm)	Up to 4	4 - 12	Up to 7	7 - 27	Up to 4	
		Ae (mm)	–	–	Up to 12	Up to 5	–	
Stainless steel (1.4301,1.4401) 150-250HB	JC5015 JC5040	N (min <sup>-1</sup> )	1,400	1,270	1,530	1,530	1,400	
		Vf (mm/min)	320	200	380	270	210	
		Ap (mm)	Up to 4	4 - 12	Up to 7	7 - 27	Up to 4	
		Ae (mm)	–	–	Up to 12	Up to 5	–	
Cast iron (GG25,GG30) 160-260HB	JC5015 JC5040	N (min <sup>-1</sup> )	2,040	1,910	2,160	2,160	2,040	
		Vf (mm/min)	700	470	750	540	600	
		Ap (mm)	Up to 5	5 - 12	Up to 7	7 - 27	Up to 4	
		Ae (mm)	–	–	Up to 12	Up to 5	–	
Nodular cast iron (GGG60,GGG70) 170-300HB	JC5015 JC5040	N (min <sup>-1</sup> )	1,910	1,780	2,040	2,040	1,910	
		Vf (mm/min)	570	390	650	460	480	
		Ap (mm)	Up to 5	5 - 12	Up to 7	7 - 27	Up to 4	
		Ae (mm)	–	–	Up to 12	Up to 5	–	

- Note: 1. The figures to be adjusted according to the machine rigidity or work rigidity.  
 2. Page 88 reduction above Ap, N and F to ML, L and EL type tools.  
 3. Use JC 5015 grade for finishing operation or in case of JC 5040's wear.

# “ Super End Chipper ”

■ Recommended cutting conditions for SEC 20 and 21mm dia.

Type of machining							
Materials	Grade	Parameter	Slotting	Shoulder cutting	Drilling		
Carbon steel (C50, C55) 150-280HB	JC5040	N (min <sup>-1</sup> )	2,390	2,230	2,550	2,550	2,390
		Vf (mm/min)	600	380	680	510	480
		Ap (mm)	Up to 4	4 - 10	Up to 5	5 - 21	Up to 3
		Ae (mm)	–	–	Up to 10	Up to 4	–
Alloy steel (1.7225) 150-280HB	JC5040	N (min <sup>-1</sup> )	2,390	2,230	2,550	2,550	2,390
		Vf (mm/min)	540	350	630	460	430
		Ap (mm)	Up to 4	4 - 10	Up to 5	5 - 21	Up to 3
		Ae (mm)	–	–	Up to 10	Up to 4	–
Mold steel (1.2311,P20) 280-400HB	JC5040	N (min <sup>-1</sup> )	1,910	1,750	2,070	2,070	1,910
		Vf (mm/min)	430	275	520	370	340
		Ap (mm)	Up to 3	3 - 10	Up to 5	5 - 21	Up to 3
		Ae (mm)	–	–	Up to 10	Up to 4	–
Tool & die steel (1.2344,1.2379) 150-255HB	JC5040	N (min <sup>-1</sup> )	1,910	1,750	2,070	2,070	1,910
		Vf (mm/min)	430	275	520	370	340
		Ap (mm)	Up to 3	3 - 10	Up to 5	5 - 21	Up to 3
		Ae (mm)	–	–	Up to 10	Up to 4	–
Stainless steel (1.4301,1.4401) 150-250HB	JC5015 JC5040	N (min <sup>-1</sup> )	1,750	1,590	1,910	1,910	1,750
		Vf (mm/min)	385	240	430	305	260
		Ap (mm)	Up to 3	3 - 10	Up to 5	5 - 21	Up to 3
		Ae (mm)	–	–	Up to 10	Up to 4	–
Cast iron (GG25,GG30) 160-260HB	JC5015 JC5040	N (min <sup>-1</sup> )	2,500	2,390	2,700	2,700	2,500
		Vf (mm/min)	750	530	810	610	630
		Ap (mm)	Up to 4	4 - 10	Up to 5	5 - 21	Up to 3
		Ae (mm)	–	–	Up to 10	Up to 4	–
Nodular cast iron (GGG60,GGG70) 170-300HB	JC5015 JC5040	N (min <sup>-1</sup> )	2,390	2,230	2,550	2,550	2,390
		Vf (mm/min)	600	400	700	500	480
		Ap (mm)	Up to 4	4 - 10	Up to 5	5 - 21	Up to 3
		Ae (mm)	–	–	Up to 10	Up to 4	–

Note: 1. The figures to be adjusted according to the machine rigidity or work rigidity.  
 2. Page 88 reduction above Ap, N and F to ML, L and EL type tools.  
 3. Use JC 5015 grade for finishing operation or in case of JC 5040's wear.

# “ Super End Chipper ”

## ■ Recommended cutting conditions for SEC 16mm dia.

Type of machining							
Materials	Grade	Parameter	Slotting		Shoulder cutting		Drilling
Carbon steel (C50, C55) 150-280HB	JC5040	N (min <sup>-1</sup> )	2,790	2,590	2,980	2,980	2,790
		Vf (mm/min)	560	310	630	450	420
		Ap (mm)	Up to 3	3 - 8	Up to 5	5 - 16	Up to 2
		Ae (mm)	–	–	Up to 8	Up to 3	–
Alloy steel (1.7225) 150-280HB	JC5040	N (min <sup>-1</sup> )	2,790	2,590	2,980	2,980	2,790
		Vf (mm/min)	500	280	570	410	380
		Ap (mm)	Up to 3	3 - 8	Up to 5	5 - 16	Up to 2
		Ae (mm)	–	–	Up to 8	Up to 3	–
Mold steel (1.2311,P20) 280-400HB	JC5040	N (min <sup>-1</sup> )	2,190	1,990	2,390	2,390	2,190
		Vf (mm/min)	390	250	480	330	260
		Ap (mm)	Up to 2.5	3 - 8	Up to 5	5 - 16	Up to 2
		Ae (mm)	–	–	Up to 8	Up to 3	–
Tool & die steel (1.2344,1.2379) 150-255HB	JC5040	N (min <sup>-1</sup> )	2,190	1,990	2,390	2,390	2,190
		Vf (mm/min)	390	250	480	330	260
		Ap (mm)	Up to 2.5	3 - 8	Up to 5	5 - 16	Up to 2
		Ae (mm)	–	–	Up to 8	Up to 3	–
Stainless steel (1.4301,1.4401) 150-250HB	JC5015 JC5040	N (min <sup>-1</sup> )	1,990	1,790	2,190	2,190	1,990
		Vf (mm/min)	350	220	430	280	240
		Ap (mm)	Up to 2.5	3 - 8	Up to 5	5 - 16	Up to 2
		Ae (mm)	–	–	Up to 8	Up to 3	–
Cast iron (GG25,GG30) 160-260HB	JC5015 JC5040	N (min <sup>-1</sup> )	2,980	2,790	3,180	3,180	2,980
		Vf (mm/min)	720	500	760	570	520
		Ap (mm)	Up to 3	3 - 8	Up to 5	5 - 16	Up to 2
		Ae (mm)	–	–	Up to 8	Up to 3	–
Nodular cast iron (GGG60,GGG70) 170-300HB	JC5015 JC5040	N (min <sup>-1</sup> )	2,790	2,590	2,980	2,980	2,790
		Vf (mm/min)	560	310	630	450	420
		Ap (mm)	Up to 3	3 - 8	Up to 5	5 - 16	Up to 2
		Ae (mm)	–	–	Up to 8	Up to 3	–

- Note: 1. The figures to be adjusted according to the machine rigidity or work rigidity.  
 2. Page 88 reduction above Ap, N and F to ML, L and EL type tools.  
 3. Use JC 5015 grade for finishing operation or in case of JC 5040's wear.

# “ Super End Chipper ”

## ■ Recommended cutting conditions for MEC and MSN.

Materials	Grades	Tool dia. (mm)															
		16				20 / 21				25 / 26				30 / 32 / 33			
		No. of teeth 2N				No. of teeth 2N				No. of teeth 2N				No. of teeth 2N			
		L (mm)	Ap (mm)	N (min <sup>-1</sup> )	F (mm/min)	L (mm)	Ap (mm)	N (min <sup>-1</sup> )	F (mm/min)	L (mm)	Ap (mm)	N (min <sup>-1</sup> )	F (mm/min)	L (mm)	Ap (mm)	N (min <sup>-1</sup> )	F (mm/min)
Carbon steel (C50, C55) Below 250HB	JC5040	70	0.6	3,580	2,140	70	0.7	2,860	1,430	90	1.0	2,290	1,150	100	1.5	1,790	900
		120	0.5	3,180	1,590	120	0.5	2,860	1,430	140	0.6	2,290	1,150	150	1.0	1,790	900
		160	0.3	2,980	1,490	190	0.3	2,400	1,200	210	0.3	1,900	950	210	0.6	1,490	745
Mold steel (1.2311, P20) 30-43HRC	JC5040	70	0.6	3,180	1,590	70	0.7	2,550	1,150	90	1.0	2,040	920	100	1.5	1,600	720
	JC5015	120	0.5	3,180	1,590	120	0.5	2,550	1,150	140	0.6	2,040	920	150	1.0	1,600	720
	JC5015 above 40HRC	160	0.3	2,980	1,490	190	0.3	2,400	1,200	210	0.3	1,900	860	210	0.6	1,490	670
Die steel (1.2344, 1.2379) Below 255HB	JC5040	70	0.6	3,180	1,590	70	0.7	2,550	1,150	90	1.0	2,040	920	100	1.5	1,600	720
		120	0.5	3,180	1,590	120	0.5	2,550	1,150	140	0.6	2,040	920	150	1.0	1,600	720
		160	0.3	2,980	1,490	190	0.3	2,400	1,200	210	0.3	1,900	860	210	0.6	1,490	670
Stainless steel Below 250HB	JC5015	70	0.6	3,180	1,590	90	0.7	2,550	1,150	90	1.0	2,040	920	100	1.5	1,600	720
		120	0.5	2,980	1,490	120	0.5	2,400	1,080	140	0.6	1,900	860	150	1.0	1,490	670
		160	0.3	2,980	1,490	190	0.3	2,400	1,080	210	0.3	1,900	860	210	0.6	1,490	670
Hardened die steel (1.2344, 1.2379) 40-50HRC	JC5015	70	0.4	1,400	350	70	0.5	1,110	280	90	0.7	890	270	100	0.8	700	210
		120	0.3	1,200	300	120	0.3	950	240	140	0.4	765	230	150	0.5	600	180
		160	-	-	-	190	-	-	-	210	-	-	-	210	0.3	600	180
Grey & Nodular cast iron (GG, GGG) Below 300HB	JC5015	70	0.6	2,980	1,800	70	0.7	2,400	1,440	90	1.0	1,900	1,140	100	1.5	1,500	900
		120	0.5	2,980	1,650	120	0.5	2,400	1,440	140	0.6	1,900	1,140	150	1.0	1,500	900
		160	0.3	2,500	1,380	190	0.3	2,070	1,240	210	0.3	1,600	960	210	0.6	1,250	750

L: Overhung length, Ap: Depth of cut, N: Spindle speed, F: Feed speed

**NOTE**

- 1) The figure to be adjusted according to the machine rigidity or work rigidity.
- 2) In case of chatter occurring, recommend to reduce the depth of cut Ap or Spindle speed and keep feed per tooth.
- 3) In case of full slotting recommend to reduce the spindle speed N and feed speed F to 70% of above figures.
- 4) In case of ramp cutting, up to 3 degrees is recommended.

# “ Super End Chipper ”

## ■ Attention for use

1. Speed and feed to be adjusted according the machine-rigidity or work rigidity.
2. Apply right table reduction above  $A_p$ ,  $N$  and  $F$  to ML, L and EL type tools.

Type	$A_p$	N	Vf
ML	80%	90%	80%
L	30%	70%	70%
EL	1mm	50%	60%

3. In case of ramp cutting, up to 3 degrees is recommended.

Dia. (mm)	$A_1$ mm	T (mm)
ø16	5.2	0 - 5.2 or 11.8 - 15.5
ø20- ø21	5.5	0 - 5.5 or 14.0 -17.5
ø25- ø26	7.0	0 - 7.0 or 16.8 - 23.2
ø30- ø32- ø33	8.6	0 . 8.6 or 20.3 - 28.1

Fig.1

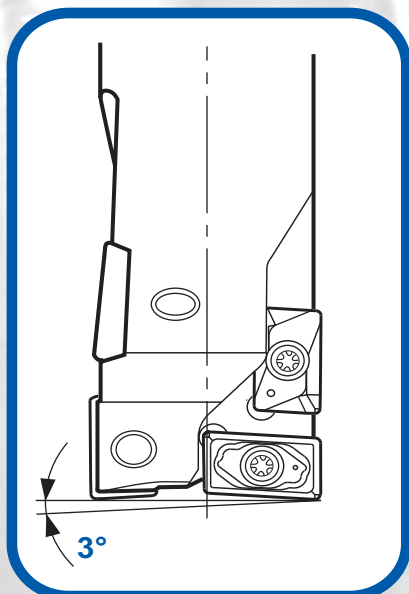


Fig.2

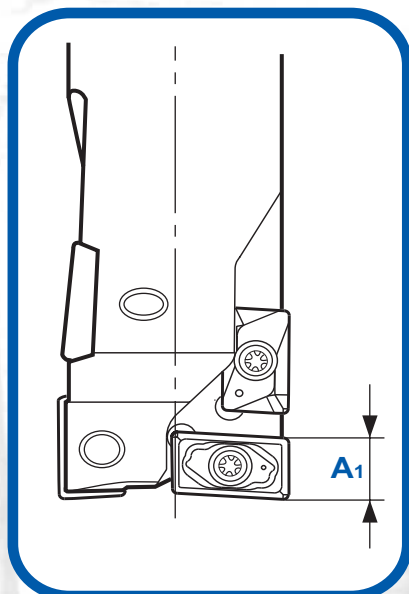


Fig.3

