

High Precision Multi-purpose Shoulder Milling Cutter

SEC-WaveMill **WEZ** series

Rev. 9

Ultra-Refined "Universal" Cutter



New Coated Grades
XCU2500/XCK2000 Expanded



Features

● Supports A Variety of Machining Operations

A lineup of cutter sizes from $\varnothing 14$ to $\varnothing 160$ mm which enable large ramping angles. 28 repeater type items are now available in addition to the modular type and short shank type

● Excellent Machining Quality

With a combination of optimised cutting edge shape and high-precision molding technology, superb wall accuracy and surface finish quality are achieved.

● Excellent Sharpness with Low Cutting Force

Reducing machining noise and suppressing burrs, the lineup includes ground type inserts with a focus on sharpness.

● Applicable to Various Work Materials

In addition to the general-purpose grade ACU2500, the new-generation coated carbide grades XCU2500/XCK2000 are available. Applicable to various work materials such as steel, stainless steel,

Product Range (Standard)

Type	Cat. No.	Dia. (mm)																	
		ø14	ø16	ø18	ø20	ø22	ø25	ø26	ø28	ø30	ø32	ø35	ø40	ø50	ø63	ø80	ø100	ø125	ø160
Shell	WEZ 11000RS												4 6	5 7	6 8	7 10	9 12		
	WEZ 11000R Inch															7 10	9 12		
	WEZ 17000RS												3 4	3 5	4 6	4 7	5 8	6 9	8 10
	WEZ 17000R Inch															4 7	5 8	6 11	8 10
Shank	WEZ 11000E	1	2*	2	2 3*	3	2 4*	3*	4	4	2 3 4 5*	5	2 4 6	5 7	8	10			
	WEZ 11000ES For multi-tasking machines	1	2*		3*		4*												
	WEZ 11000EL	1	2*	2	2*	2	2 3		2	2	2 3	2 3	2	3					
	WEZ 17000E						2*		2	3	2 3*	3	3 4	3 5*	4 6*	7			
	WEZ 17000ES For multi-tasking machines						2				3								
	WEZ 17000EL						2		2	2	2 3	2	2 3 4	3 5*	4 6*				
Modular	WEZ 11000M		2	2	2 3	3	2 3 4	4 5	4 5	2 4 5	2 3 4 5	2 5	2 4 5 6						
	WEZ 17000M						2 3		2	2 3	2 3 4	2 3	2 3 4						

Number in ●●● shows the number of teeth Inch Inch Bore * mark: Different diameter shanks available

Modular type P36

Product Range (Repeater)

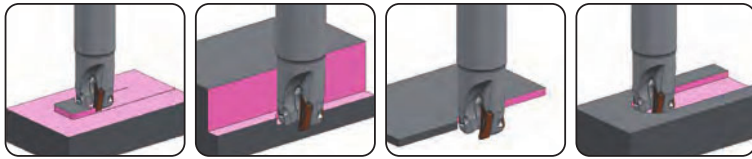
Type	Cat. No.	Dia. (mm)								
		ø20	ø25	ø30	ø32	ø35	ø40	ø50	ø63	ø80
Shell	WEZR 11000RS						4	4		
	WEZR 17000RS							2 3 4	3 4 5	5
Shank	WEZR 11000E	1 2	2	2	2 3	3	3 4			
	WEZR 17000E						2 3	2 3		
Modular	WEZR 11000M				3					
	WEZR 17000M						3			

Numbers in ●●● represent the effective number of teeth

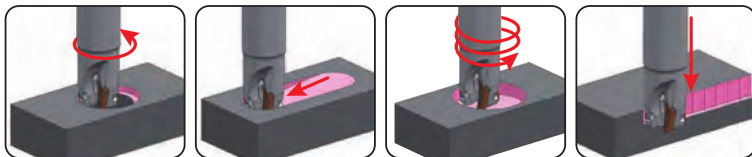
Modular type P36

- Supports Ramping/Helical Milling/Plunge Milling
Applicable to various applications!

Face Milling Shoulder Milling Side Milling Groove Milling

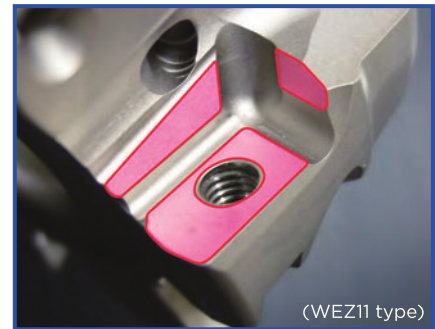


Hole Expansion Ramping Helical Milling* Plunge Milling



*Helical milling is not recommended for WEZR type products.

- Optimised Body Design
Wide Guide Face
for Stable Insert Clamping

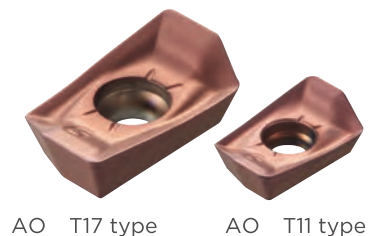


Chipbreaker Selection

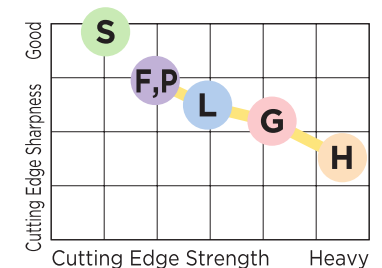
Work Material	P Steel, M Stainless Steel, K Cast Iron, S Heat-resistant Alloy, Titanium Alloy, H Hardened Steel N Non-Ferrous Metal
Applications	Light Cutting General-purpose to Interrupted Milling Heavy Cutting Light Cutting Light Cutting Non-Ferrous Metals
Features	Low-rigidity Machining Standard Heavy Interrupted Cutting Hardened Steel Medium Finishing Burr Prevention High-precision Machining High Wall Surface Squareness Low Cutting Force
	L type G type H type F type P type S type

Chipbreaker						
Cutting Edge Cross Section						
11 type	Not Available	0.05mm 28°	0.15mm 20°	28°	28°	28°
17 type	0.05mm 28°	0.15mm 20°	0.2mm 10°	28°	28°	28°

Insert Size Comparison



Chipbreaker Selection Guide



Product Range (Insert)

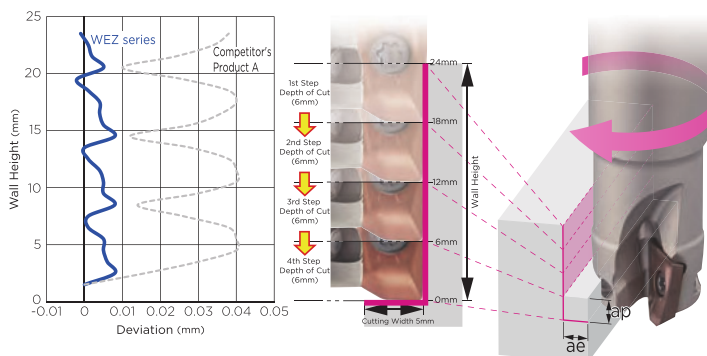
●: Standard stocked item

Size	Insert Class	Cat. No.	Corner Radius (mm)													
			R0.2	R0.4	R0.5	R0.8	R1.0	R1.2	R1.6	R2.0	R2.4	R3.0	R3.2	R4.0	R5.0	R6.4
11 type	M Class	AOMT11T300PEER-G	●	●	●	●	●	●	●	●	●	●	●			
		AOMT11T300PEER-H		●		●		●	●							
	E Class	AOET11T300PEER-F	●	●	●	●	●	●	●	●	●	●	●			
		AOET11T300PEER-P16	●	●	●	●	●	●								
		AOET11T300PEER-P20	●	●	●	●	●	●								
		AOET11T300PEER-P25	●	●	●	●	●	●								
		AOET11T300PEFR-S	●	●	●	●	●	●	●	●	●	●	●			

17 type	M Class	AOMT170500PEER-G	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		AOMT170500PEER-H		●		●		●	●							
	E Class	AOET170500PEER-F	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		AOET170500PEER-P25	●	●	●	●	●	●								
		AOET170500PEER-P32	●	●	●	●	●	●								
		AOET170500PEFR-S	●	●	●	●	●	●	●	●	●	●	●	●	●	●

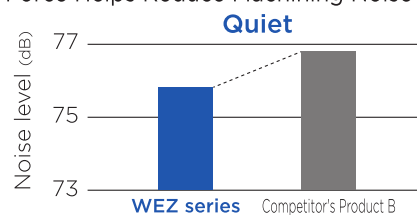
■ Cutting Performance

● Good Wall Accuracy



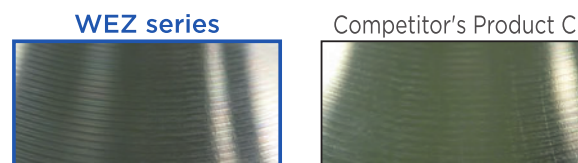
Machine : Vertical Machining Centre BT40
Tool : WEZ 11020E03 ($\phi 20$, 3 teeth)
Insert : AOMT 11T308PEER-G (ACU2500)
Cutting Conditions : $vc=150\text{m/min}$, $fz=0.15\text{mm/t}$, $ap=6\text{mm}$ x 4 Passes, $ae=5\text{mm}$, Dry

● Lower Cutting Force Helps Reduce Machining Noise



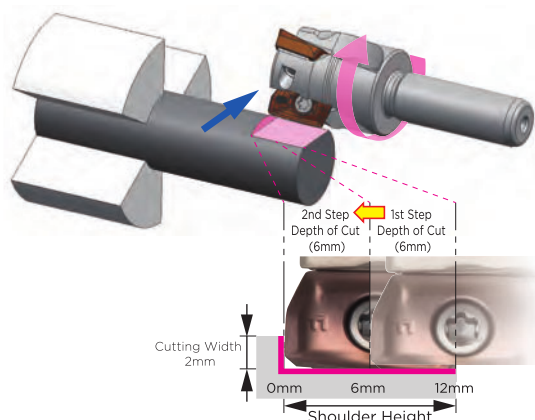
Machine : Vertical Machining Centre BT40,
Work Material: S50C
Tool : WEZ 11020E03 ($\phi 20$, 3 teeth)
Insert : AOMT 11T308PEER-G (ACU2500)
Cutting Conditions : $vc=150\text{m/min}$, $fz=0.15\text{mm/t}$, $ap=8\text{mm}$, $ae=5\text{mm}$, Dry

● Excellent Surface Quality

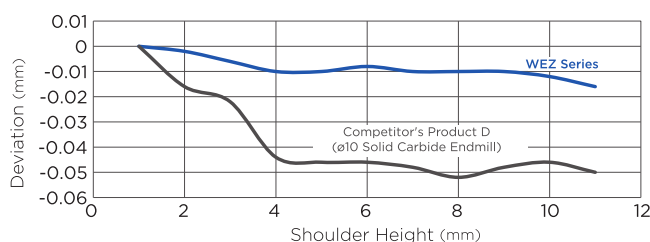


Machine : Vertical Machining Centre BT50,
Work Material: SCM440
Tool : WEZ 17100RS08 ($\phi 100$, 8 teeth)
Insert : AOMT 170508PEER-G (ACU2500)
Cutting Conditions : $vc=250\text{m/min}$, $fz=0.15\text{mm/t}$, $ap=2\text{mm}$, $ae=85\text{mm}$, Dry

● Good Wall Accuracy (for Multi-tasking Machines)

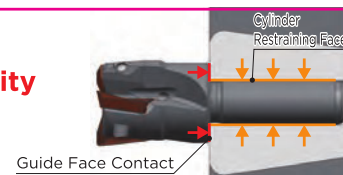


Machine : Multi-tasking Machine
Tool : WEZ 11020ES03-10 ($\phi 20$, 3 teeth)
Insert : AOET 11T308PEER-F (ACU2500)
Cutting Conditions : $vc=100\text{m/min}$, $fz=0.08\text{mm/t}$, $ap=6\text{mm}$ x 2 Passes, $ae=2\text{mm}$, Wet

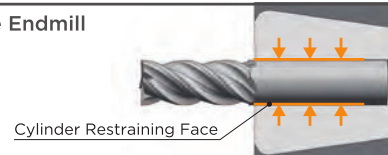


WEZ series

High rigidity via face contact



Solid Carbide Endmill

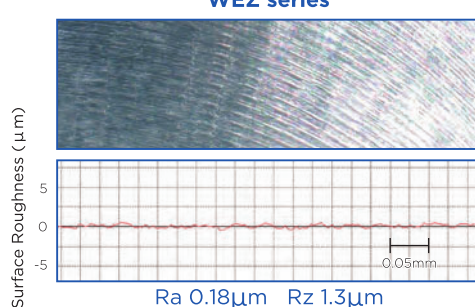
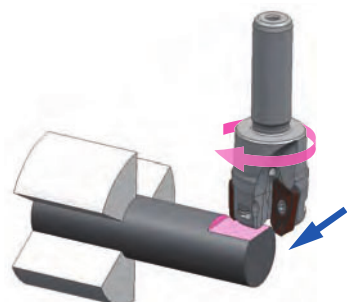


● Excellent machine surface quality (for multi-tasking machines)

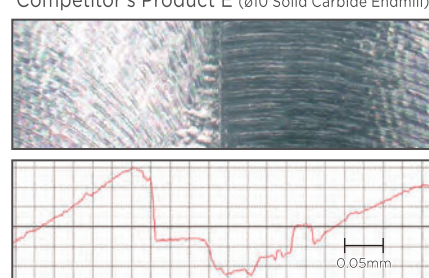
Larger tool diameter than solid carbide endmills enables reduced number of passes for high-efficiency machining!
Good wall accuracy and machined surface quality, eliminating the finishing process!

WEZ series

Competitor's Product E ($\phi 10$ Solid Carbide Endmill)



Ra 0.18 μm Rz 1.3 μm



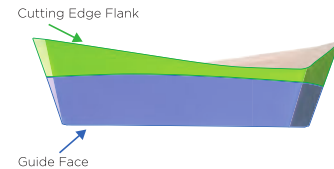
Ra 2.94 μm Rz 13.8 μm

Machine : Multi-tasking Machine
Insert : AOET 11T308PEER-F (ACU2500)
Cutting Conditions : WEZ series $vc=100\text{m/min}$, $fz=0.05\text{mm/t}$, $ap=2\text{mm}$, $ae=12\text{mm}$, Wet
Competitor's Product E $vc=100\text{m/min}$, $fz=0.05\text{mm/t}$, $ap=2\text{mm}$, $ae=6\text{mm}$ x 2 Passes, Wet (Solid Carbide Endmill)

High-precision Ground type Insert with Excellent Sharpness

Ground finish on cutting edge and guide face

The cutting edge, as well as the guide faces are ground finish to minimize corner variations when mounted on the body. Stable edge run-out accuracy and machining quality can be realized!



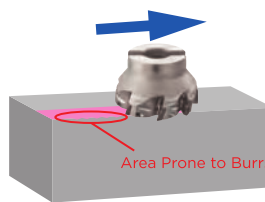
Lineup of Chipbreakers for Ground type Inserts

F type Chipbreaker - Emphasises Edge Sharpness

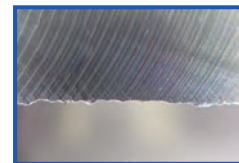


- Sharpness from ground finish enables burr control
- Good wall accuracy with all cutter diameters

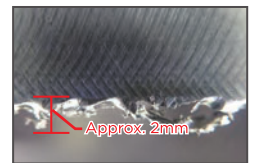
Machine : Vertical Machining Centre BT50
Work Material : SUS304
Tool : WEZ 11050RS07 (ø50, 7 teeth)
Insert : AOET 11T308PEER-F (ACU2500)
Cutting Conditions : vc= 120m/min, fz= 0.12mm/t, ap=1mm, ae= 30mm, Dry



WEZ series



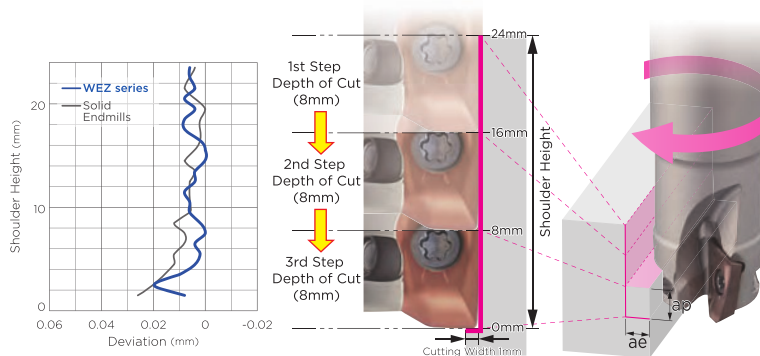
Competitor's Product F



P type Chipbreaker - Achieves Wall Squareness Equivalent to Using Solid Endmills



- High-precision type with cutting edge shape optimised for each cutter diameter while maintaining the F type chipbreaker's sharpness
- Enables wall squareness equal to using solid endmills, through cutting edge shape optimisation for each cutter diameter



Machine : Vertical Machining Centre BT50
Work Material : S50C
Tool : WEZ 11020E03 (ø20, 3 teeth)
Insert : AOET 11T308PEER-P20 (ACU2500)
Cutting Conditions : vc= 150m/min, fz= 0.1mm/t, ap=8mm x 3 Passes, ae= 1mm, Dry

P type Chipbreaker Selection Guide

Cat. No.	Dia. (mm)										
	ø14	ø16	ø18	ø20	ø22	ø25	ø28	ø30	ø32	ø35	ø40 and above
AOET11T300PEER-P00	-P16	-P20		Not applicable	-P25	Not applicable					
AOET170500PEER-P00	Not applicable				-P25	-P32				Not applicable	

S type Chipbreaker - Sharp-Edged Breaker for Non-Ferrous Metals with Excellent Adhesion Resistance



- Suppresses adhesion with rake face lapping
- DLC Coat inserts available for further improved adhesion resistance

Machine : Vertical Machining Centre BT30
Work Material : ADC12
Tool : WEZ 11020E03 (ø20, 3 teeth)
Insert : AOET 11T308PEER-S (H20)
Cutting Conditions : vc= 350m/min, fz= 0.1mm/t, ap=3mm, ae= 10mm, Dry

WEZ series



No Adhesion

Competitor's Product G



Adhesion

Competitor's Product H



Adhesion

Grade Application Range

New-generation coated carbide grades **XCU2500/XCK2000** now available!
Enhanced lineup of coated grades in addition to cemented carbide and cermet for milling steel, stainless steel, cast iron, and aluminum alloy.

Work Material	Finishing to Light Cutting	Medium Cutting	Rough to Heavy Cutting
P Steel	Coated Carbide		
	ACU2500 XCU2500 ACP2000 ACP3000		
	Cermet		
M Stainless Steel	Coated Carbide		
	ACU2500 XCU2500 ACM200 ACM300		
	Coated Carbide		
K Cast Iron	ACU2500 XCU2500 XCK2000 ACK2000 ACK3000		
	Coated Carbide		
	DL2000 H20		
N Non-Ferrous Metal	Coated Carbide		
	Coated Carbide		
	Cemented Carbide		

Finishing to Light Cutting Medium Cutting Rough to Heavy Cutting
Grade indicate the coating type. ▽: CVD ▲: PVD

Grade Characteristic Values

CVD					
Work Material	Grade	Hardness (HRA)	TRS (GPa)	Coating type	Coating Thickness (μm)
P Steel	ACP2000	89.5	3.2	ABSOTECH	10
	XCU2500	89.5	3.2	ABSOTECH X	6
M Stainless Steel	ACM200	89.8	3.4	Super FF Coat	6
K Cast Iron	ACK2000	91.7	3.1	ABSOTECH	10
	XCK2000	91.7	2.5	ABSOTECH X	6
PVD					
Work Material	Grade	Hardness (HRA)	TRS (GPa)	Coating type	Coating Thickness (μm)
P Steel	ACU2500	91.6	3.8	ABSOTECH	3
	ACP3000	89.5	3.2	ABSOTECH	3
M Stainless Steel	ACM300	89.8	3.4	(New) Super ZX Coat	3
K Cast Iron	ACK3000	91.7	3.1	ABSOTECH	3
N Non-Ferrous Metal	DL2000	91.6	3.8	AURORA Coat (DLC)	0.5
Cermet					
Work Material	Grade	Hardness (HRA)	TRS (GPa)	Coating type	Coating Thickness (μm)
P Steel	M Stainless Steel	T2500A	91.8	2.4	—

Grade Features

New coating technology that realises absolute stability
ABSOTECH™ (Absolute Technology)

ABSOTECH

CVD

Special Surface Treatment
Suppresses thermal cracking by introducing high compressive stress, resulting in chipping resistance more than twice that of conventional types

Crystal Orientation Control Al₂O₃
By controlling the growth direction, Al₂O₃ is reinforced for crater wear resistance more than twice that of conventional types

High Hardness TiCN
Increased TiCN hardness by using a C-rich composition for flank wear resistance more than twice that of conventional types

Applicable Grades: ACP2000, ACK2000

ABSOTECH

PVD

New Super Multi-Layered Structure
Higher hardness and twice the conventional wear resistance due to a fine crystal structure AlTiCrBN-based nano-layered coating

High Adhesion Strength
Significantly improved coating adhesion has more than twice the chipping resistance as conventional coatings.

Applicable Grades: ACU2500, ACP3000, ACK3000

ABSOTECH X

CVD

Pure Cubic Crystal AlTiN with High Al Content:
With proprietary structural control technology, differently composed layers of AlTiN are stacked at the nanometre level. With a high-Al composition containing over 80% Al on average, it also maintains a cubic crystalline structure to achieve excellent thermal resistance and high hardness. Vastly improved wear resistance.

Special Surface Treatment:
Proprietary surface treatment introduces high compression stress to the coating, suppressing the development of cracks. Greatly improved fracture and thermal crack resistance.

Applicable Grades: XCU2500, XCK2000

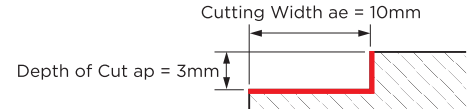
Features		Grade
- For high-speed machining of steel - Stable long tool life in high-speed machining is realised by adopting a tough carbide substrate and a new coating with excellent thermal crack resistance		P100
- General-purpose grade for a wide variety of materials such as steel, cast iron and stainless steel - New coating combining wear and fracture resistance realises long tool life in medium-speed to high-speed machining		—
- For machining high-hardness stainless steel - Adopts a newly developed high-strength cemented carbide substrate with excellent wear resistance and thermal resistance, realizing outstanding stability when machining hardened stainless steel		C230
- For high-speed cast iron milling - Stable long tool life in high-speed machining is realised by adopting a tough carbide substrate and a new coating with excellent thermal resistance		K100 K200
- For high-speed cast iron milling - Along with a high-hardness carbide substrate, the new coating combining wear and fracture resistance realises superb long tool life in medium-speed to high-speed machining		—
Features		Grade
- General-purpose grade supporting steel, stainless steel, and cast iron machining - Adopts a carbide substrate with excellent fracture resistance and wear resistance, plus a new coating with excellent wear resistance and chipping resistance, realising stable long tool life with various work material grades		—
- Our 1st recommended grade for milling steel - Carbide substrate with excellent thermal crack resistance, plus a new coating with excellent wear resistance and chipping resistance, realises stable long tool life over a wide range of cutting conditions		P200 P300
- Our 1st recommended grade for milling stainless steel - Adopts a high-strength carbide substrate and super multi-layered coating for next-level wear resistance and fracture resistance		—
- Our 1st recommended grade for milling cast iron - Adopts a high thermal conductivity carbide substrate and a new coating with excellent wear resistance and chipping resistance, realizing stable long tool life over a wide range of cast iron machining operations		K300
Grade for milling non-ferrous metal, utilising DLC coat with a low coefficient of friction and excellent adhesion resistance		—
Features		Grade
- For finishing of steel and stainless steel - Fine, uniform grain structure greatly improves toughness, realising long tool life and excellent surface finishes		50A

Recommended Cutting Conditions

WEZ11 type

Tool: WEZ11020E03, Insert: AO®T11T3 type

Cutting Conditions: Depth of Cut ap = 3mm, Cutting Width ae = 10mm, Dry



ISO Classification	Work Material	Work Material Hardness (HB)	Chipbreaker	Grade										
				ACU2500	XCU2500	ACP2000	ACP3000	T2500A	XCK2000	ACK2000	ACK3000	ACM200	ACM300	DL2000
				Feed Rate per Tooth fz (mm/t) Min. - Optimum - Max.										
				0.08 - 0.15 - 0.20	0.08 - 0.15 - 0.20	0.08 - 0.15 - 0.20	0.08 - 0.15 - 0.20	0.08 - 0.12 - 0.18	0.08 - 0.15 - 0.20	0.08 - 0.15 - 0.20	0.08 - 0.15 - 0.20	0.08 - 0.15 - 0.20	0.08 - 0.15 - 0.20	0.05 - 0.10 - 0.15
				Cutting Speed vc (m/min) Min. - Optimum - Max.										
P	Steel, Carbon Steel S15C	125	G	270 - 320 - 370	300 - 350 - 400	300 - 350 - 400	250 - 300 - 350	230 - 280 - 330						
	S45C	190	G	170 - 220 - 270	200 - 250 - 300	200 - 250 - 300	150 - 200 - 250	130 - 180 - 230						
	S45C Hardened	250	G	140 - 180 - 220	160 - 200 - 245	160 - 200 - 245	120 - 160 - 200	105 - 145 - 185						
	S75C	270	G	110 - 145 - 175	130 - 165 - 195	130 - 165 - 195	100 - 130 - 165	85 - 115 - 150						
	S75C Hardened	300	G	70 - 90 - 110	80 - 100 - 120	80 - 100 - 120	60 - 80 - 100	50 - 70 - 90						
	Low-alloy Steel SCM, SNCM	180	G	160 - 205 - 255	190 - 235 - 280	190 - 235 - 280	140 - 190 - 235	120 - 170 - 215						
	SCM, SNCM Hardened	275	G	95 - 120 - 150	110 - 135 - 165	110 - 135 - 165	80 - 110 - 140	70 - 100 - 125						
	SCM, SNCM Hardened	300	G	85 - 110 - 130	100 - 125 - 150	100 - 125 - 150	75 - 100 - 125	65 - 90 - 115						
	SCM, SNCM Hardened	350	G	60 - 80 - 100	70 - 90 - 110	70 - 90 - 110	50 - 70 - 90	45 - 65 - 85						
M	High-alloy Steel SKD, SKT, SKH	200	G	140 - 180 - 220	160 - 200 - 245	160 - 200 - 245	120 - 160 - 205							
	SKD, SKT, SKH Hardened	325	G	55 - 70 - 85	60 - 80 - 100	60 - 80 - 100	50 - 65 - 80							
	Stainless Steel SUS430, Others (Martensitic/ Ferritic)	200	G	110 - 140 - 170	160 - 190 - 210						140 - 170 - 190	90 - 110 - 140		
	SUS403 and Others (Martensitic Hardened)	240	G	100 - 125 - 150	145 - 170 - 190						125 - 150 - 170	80 - 100 - 125		
K	SUS304, SUS316 (Austenitic)	180	G	120 - 150 - 180	170 - 200 - 220						150 - 180 - 200	100 - 120 - 150		
	Cast Iron		G	150 - 200 - 250	250 - 300 - 350			250 - 300 - 350	250 - 300 - 350	170 - 220 - 270				
S	Ductile Cast Iron		G	90 - 120 - 150	150 - 180 - 210			150 - 180 - 210	150 - 180 - 210	100 - 130 - 160				
	Exotic Alloy Heat-Resistant Alloy		G	30 - 40 - 55							35 - 45 - 60	25 - 35 - 50		
N	Ti Alloy		G	60 - 80 - 100							70 - 90 - 110	50 - 70 - 90		
	Aluminum Alloy Si content of 12.6% or less		S										500 - 750 - 1000	
	Si content of over 12.6%		S										170 - 200 - 250	
	Copper Alloy		S										300 - 330 - 350	

- The recommended cutting conditions may not be practical depending on the operating conditions (e.g. machine, work material shape, clamping system).
- For groove milling, adjust the feed rate to around 70% of the above values.

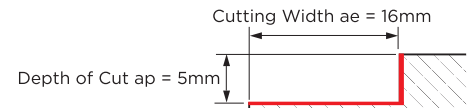
Note - The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

- The above are the recommended conditions for WEZ11 type overall. Use within the maximum allowable spindle speed.

WEZ17 type

Tool: WEZ17032E03, Insert: AO®T1705 type

Cutting Conditions: Depth of Cut ap = 5mm, Cutting Width ae = 16mm, Dry



ISO Classification	Work Material	Work Material Hardness (HB)	Chipbreaker	Grade											
				ACU2500	XCU2500	ACP2000	ACP3000	T2500A	XCK2000	ACK2000	ACK3000	ACM200	ACM300	DL2000	
				Feed Rate per Tooth fz (mm/t) Min. - Optimum - Max.											
				0.10 - 0.20 - 0.28	0.10 - 0.20 - 0.28	0.10 - 0.20 - 0.28	0.10 - 0.20 - 0.28	0.10 - 0.15 - 0.22	0.10 - 0.20 - 0.28	0.10 - 0.20 - 0.28	0.10 - 0.20 - 0.28	0.10 - 0.20 - 0.28	0.10 - 0.20 - 0.28	0.05 - 0.10 - 0.15	
Cutting Speed vc (m/min) Min. - Optimum - Max.															
P	Steel, Carbon Steel S15C	125	G	285 - 335 - 390	315 - 360 - 420	315 - 360 - 420	265 - 315 - 370	240 - 295 - 345							
	S45C	190	G	180 - 230 - 285	210 - 265 - 315	210 - 265 - 315	160 - 210 - 265	135 - 190 - 240							
	S45C Hardened	250	G	145 - 190 - 230	170 - 210 - 255	170 - 210 - 255	130 - 170 - 215	110 - 155 - 195							
	S75C	270	G	115 - 150 - 185	135 - 170 - 205	135 - 170 - 205	100 - 135 - 170	90 - 125 - 155							
	S75C Hardened	300	G	70 - 90 - 115	85 - 105 - 125	85 - 105 - 125	65 - 85 - 105	55 - 75 - 95							
	Low-alloy Steel SCM, SNCM	180	G	170 - 220 - 265	200 - 245 - 295	200 - 245 - 295	150 - 200 - 250	130 - 180 - 225							
	SCM, SNCM Hardened	275	G	100 - 130 - 155	115 - 145 - 175	115 - 145 - 175	85 - 115 - 145	75 - 105 - 135							
	SCM, SNCM Hardened	300	G	90 - 115 - 140	105 - 130 - 155	105 - 130 - 155	75 - 105 - 130	65 - 90 - 120							
	SCM, SNCM Hardened	350	G	65 - 85 - 100	75 - 95 - 115	75 - 95 - 115	55 - 75 - 95	50 - 70 - 85							
M	High-alloy Steel SKD, SKT, SKH	200	G	145 - 185 - 230	170 - 215 - 255	170 - 215 - 255	130 - 170 - 215								
	SKD, SKT, SKH Hardened	325	G	55 - 75 - 90	65 - 85 - 100	65 - 85 - 100	50 - 65 - 85								
	Stainless Steel SUS430 and Others (Martensitic/ Ferritic)	200	G	115 - 145 - 175	165 - 195 - 215						145 - 175 - 195	100 - 115 - 145			
	SUS403 and Others (Martensitic Hardened)	240	G	105 - 130 - 155	150 - 175 - 195						130 - 155 - 175	85 - 105 - 130			
K	SUS304, SUS316 (Austenitic)	180	G	125 - 155 - 190	180 - 210 - 230						160 - 190 - 210	105 - 125 - 160			
	Cast Iron		G	160 - 210 - 265	265 - 315 - 370				265 - 315 - 370	265 - 315 - 370	180 - 230 - 285				
S	Ductile Cast Iron		G	95 - 125 - 160	160 - 190 - 220				160 - 190 - 220	160 - 190 - 220	105 - 140 - 170				
	Exotic Alloy Heat-Resistant Alloy		G	30 - 40 - 60								35 - 45 - 60	25 - 35 - 50		
N	Ti Alloy		G	60 - 85 - 105								75 - 95 - 115	50 - 75 - 95		
	Aluminum Alloy Si content of 12.6% or less		S												500 - 750 - 1000
	Si content of over 12.6%		S												170 - 200 - 250
	Copper Alloy		S									300 - 330 - 350			

- The recommended cutting conditions may not be practical depending on the operating conditions (e.g. machine, work material shape, clamping system).
- For groove milling, adjust the feed rate to around 70% of the above values.

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

Maximum Allowable Spindle Speed

WEZ11

Dia. DC(mm)	n max(min ⁻¹)	Dia. DC(mm)	n max(min ⁻¹)
14	12,000(7,500)	32	17,200
16	29,000	35	16,250
18	26,150	40	14,950
20	24,000	50	13,100
22	22,300	63	11,500
25	20,300	80	10,050
28	18,800	100	8,900
30	17,950		

WEZ17

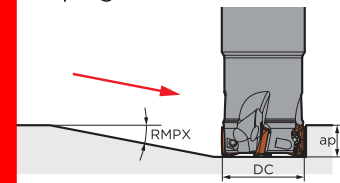
Dia. DC(mm)	n max(min ⁻¹)	Dia. DC(mm)	n max(min ⁻¹)
25	15,700	80	7,250
28	14,350	100	6,400
30	13,650	125	5,650
32	13,000	160	4,950
35	12,200		
40	11,100		
50	9,600		
63	8,350		

*The parentheses above refer to the use of WEZ11014EL01.

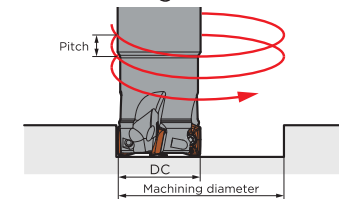
*The maximum allowable spindle speeds are set to prevent the inserts from dislodging by centrifugal force.

Ramping/Helical Milling Upper Limit

Ramping



Helical Milling



WEZ11 type

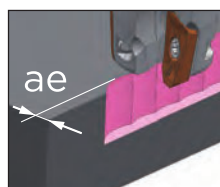
Dia. DC (mm)	Max. Ramping Angle RMPX (°)	Helical Milling					
		Max. Machining Dia. (mm)	Maximum Pitch (mm/rev)	Standard Diameter (mm)	Maximum Pitch (mm/rev)	Min. Machining Dia. (mm)	Maximum Pitch (mm/rev)
14	8.0	25.3	5.0	23.1	3.4	19.0	1.5
16	10.5	29.3	7.6	27.0	5.6	21.7	1.5
18	8.1	33.3	6.7	30.9	5.0	25.2	1.4
20	6.5	37.3	6.0	34.9	4.6	29.1	1.3
22	5.3	41.3	5.4	38.8	4.3	32.9	1.3
25	4.1	47.3	4.8	44.8	3.9	38.9	1.3
28	3.4	53.3	4.4	50.7	3.6	44.9	1.3
30	3.0	57.3	4.2	54.7	3.5	48.8	1.3
32	2.7	61.3	4.0	58.7	3.3	52.8	1.2
35	2.3	67.3	3.8	64.6	3.1	58.8	1.2
40	1.8	77.3	3.4	74.6	2.9	68.8	1.2
50	1.2	97.3	3.0	94.6	2.6	88.8	1.1
63	0.8	123.3	2.8	120.5	2.5	114.7	1.1
80		Not recommended					
100		Not recommended					

*The table above shows values with corner radius 0.8mm. Helical milling is not recommended for WEZR type products.

WEZ17 type

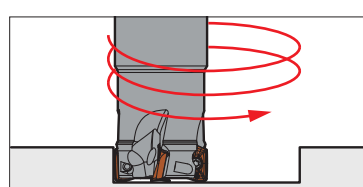
Dia. DC (mm)	Max. Ramping Angle RMPX (°)	Helical Milling					
		Max. Machining Dia. (mm)	Maximum Pitch (mm/rev)	Standard Diameter (mm)	Maximum Pitch (mm/rev)	Min. Machining Dia. (mm)	Maximum Pitch (mm/rev)
25	10.8	47.3	13.0	41.0	8.3	33.1	1.8
28	8.1	53.3	11.1	46.9	7.5	39.0	1.8
30	7.0	57.3	10.2	50.9	7.0	43.0	1.8
32	6.1	61.3	9.5	54.9	6.7	47.0	1.7
35	5.1	67.3	8.7	60.8	6.2	53.0	1.7
40	4.0	77.3	7.7	70.8	5.7	63.0	1.7
50	2.5	97.3	6.5	90.7	5.0	83.0	1.6
63	1.8	123.3	5.6	116.7	4.5	109.0	1.6
80	1.2	156.0	5.0	149.4	4.1	141.8	1.5
100	0.9	197.3	4.7	190.7	4.0	183.1	1.5
125		Not recommended					
160		Not recommended					

Plunge Cutting Upper Limit



	Max. ae (mm)
WEZ11 type	3
WEZ17 type	5

Precautions for Helical Milling



- For helical milling, if the work diameter is smaller than the standard diameter, there will be a centre uncut portion.
- A prepared centre hole should be made.
- Above the standard diameter, this portion can be removed by traverse cutting with the same cutter.