Tungaloy

Keeping the Customer First

Tungaloy Report TE1008-E6

Milling cutter

EXP & TXP

Super “Quick motion” milling cutter

Super “Quick motion” milling cutter

Features

Modern machine tool centres allow for highly economic production by means of increased number of revolutions and higher table feed rates. So far, these cutting parameter have been applied for smooth milling rev. precision finishing. The innovative EXP & TXP milling cutter now optimize also the more time consuming roughing operation. The EXP & TXP milling cutter are suited for **feed rates > 2 mm/tooth** and thus lead to a substantial reduction in machining time.

With the EXP & TXP milling cutter, surface milling operations, ramping and cavity enlarging at maximum cutting depths of 1.5 mm (2.5 mm TXOP09) are possible. Compared to conventional cutting parameter the machining time can be reduced by one half. The economic design of the insert with three cutting edges with chipbreaker reduces cutting forces and thus enables the use of the larger TXP milling cutter also on machines with low spindle speed.

Benefits

- Highly economic design with 3 cutting edges
- New chipbreaker geometries for optimum performance
- Stable double clamping system of the insert
- All EXP milling cutter with inner coolant
- Extremely quiet running at large cutting depths

Feed rate up to 3 mm/tooth for maximal productivity in roughing operations

Grade

AH120

- Coated fine grain carbide for milling of steels, alloy steels and cast irons
- The TiAlN-PVD coating provides for application in medium to high cutting speed operations

NEW AH130

- New (TiAl)N coated grade for general milling of stainless steels
- Excellent adhesion and improved hardness
- Extraordinary toughness
- Well balanced wear resistance and fracture toughness

AH140

- High toughness for medium finishing and roughing of stainless steels at low cutting speeds

NEW T3130

- New MT-CVD coated grade for general milling operations of carbon steels and alloy steels at medium cutting speeds
- Improved balance between wear-resistance and toughness

T1015

- New MT-CVD coated grade for universal milling operations of cast iron materials at high cutting speeds
- Extremely wear resistant

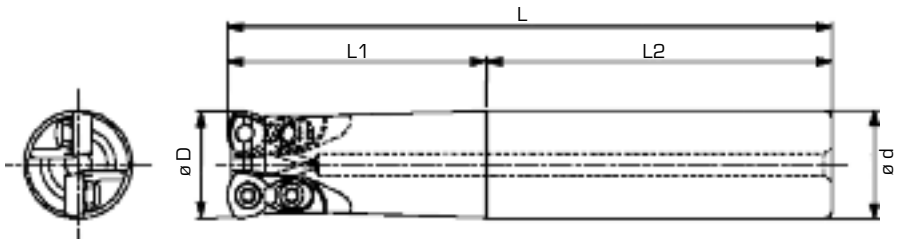
Chipbreaker

-MH

- Negative chamfered cutting edge for increased stability
- High performance for interrupted cutting

-ML

- Positive rake angle for reduced cutting forces
- For low power machine tools



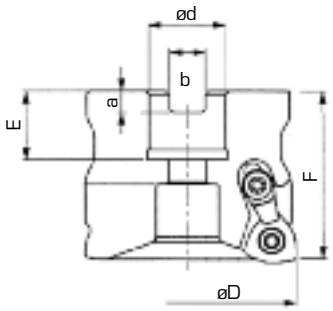
Cylindrical shank with air hole

Specifications: EXP 05/06/08 milling cutter

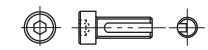
● Standard stock in Europe

	Item code	Stock	No. of inserts	Dimensions (mm)					Inserts	Replacement parts		
				ø D	ø d	L	L1	L2		Clamping screw	Clamp-set	Wrench
Standard	EXP05020RS	●	2	20	20	130	50	80	WPM*05H315ZPR-**	CSPB-3.5S	–	IP-15D
	EXP05021RS	●		21								
	EXP06025RS	●		25	25	140	60		WPM*06X415ZPR-**	CSPB-4S	CSY-15	IP-15D
	EXP06026RS	●		26								
	EXP06032RS	●		32	32	150	70					
	EXP06032RSB	●	3									
	EXP06033RS	●	2	33								
	EXP06033RSB	●	3									
	EXP06040RS	●		40			50	100				
	EXP08040RSA	●	2						WPMT080615Z*R-**	CSTB-5	CSX20	T-20T
Long	EXP05020RL	●	2	20	20	180	100	80	WPM*05H315ZPR-**	CSPB-3.5S	–	IP-15D
	EXP05021RL	●		21								
	EXP06025RL	●		25	25	200	120		WPM*06X415ZPR-**	CSPB-4S	CSY-15	IP-15D
	EXP06026RL	●		26								
	EXP06032RL	●		32	32							
	EXP06032RLB	●	3									
	EXP06033RL	●	2	33								
	EXP06033RLB	●	3									
	EXP06040RL	●		40		250	50	200				
	EXP08040RLA	●	2						WPMT080615Z*R-**	CSTB-5	CSX20	T-20T
Extra long	EXP05020RLL	●	2	20	20	250	130	120	WPM*05H315ZPR-**	CSPB-3.5S	–	IP-15D
	EXP05021RLL	●		21			50	200				
	EXP06025RLL	●		25	25	300	180	120	WPM*06X415ZPR-**	CSPB-4S	CSY-15	IP-15D
	EXP06026RLL	●		26			60	240				
	EXP06032RLL	●		32	32		180	120				
	EXP06033RLL	●		33			70	230				
	EXP06040RLL	●	3	40			50	250				
	EXP08040RLL	●	2						WPMT080615Z*R-**	CSTB-5	CSX20	T-20T

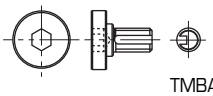
EXP & TXP milling cutter



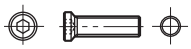
Centre bolt



CM10x30H, CM12x30H



TMBA-M20



FSHM10-40

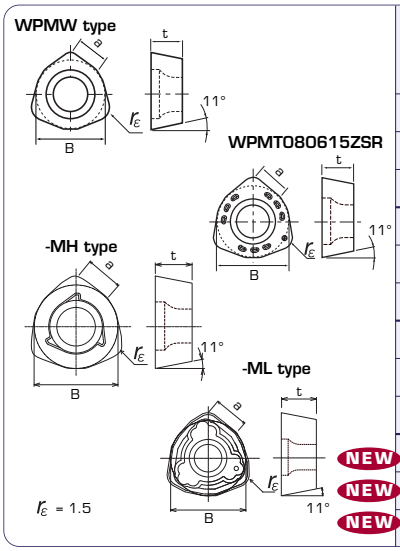
Specifications: TXP 05/06/08/09 milling cutter

● Standard stock in Europe

Item code	Stock	No. of inserts	Dimensions (mm)						Inserts	Replacement parts			
			ø D	ø d	F	E	a	b		Clamping screw	Clamp-set	Wrench	Centre bolt
TXP05063RB-E	●	6	63	22	50	20	6,3	10,4	WPM*05H315ZPR-**	CSPB-3.5S	–	IP-15D	CM10x30H
TXP05080RB-E	●	7	80	27	63	22	7	12,4					CM12x30H
TXP06063RB-E	●	5	63	22	50	20	6,3	10,4	WPM*06X415ZPR-**	CSPB-4S	CSY-15		CM10x30H
TXP06080RB-E	●	6	80	27	63	22	7	12,4					CM12x30H
TXP08050R-E	●	3	50	22	50	20	6.3	10.4	WPMT080615Z*R-**	CSTB-5	CSX20	T-20T	FSHM10-40
TXP08052R-E	●		52										
TXP08063R-E	●	4	63										–
TXP08066R-E	●		66	27		22	7.0	12.4					
TXP08080R-E	●	5	80		63								
NEW TXP08100R-E	●	6	100	32		25	8	14.4					
NEW TXP08125R-E	●	7	125	40		32	9	16.4					TMBA-M20
NEW TXP09063R-E	●	3	63	22	50	20	6.3	10.4	WPMT090725Z*R-**	CSPB-5	CSY-20	IP-20T	–
NEW TXP09080R-E	●	4	80	27	63	22	7	12.4					
NEW TXP09100R-E	●	5	100	32		25	8	14.4					
NEW TXP09125R-E	●	6	125	40		32	9	16.4					TMBA-M20

Specifications: Inserts

● Standard stock in Europe



Item code	Tolerance	Honing	Dimensions (mm)			Grade				
			a	t	B		NEW PVD		NEW CVD	
						AH120	AH130	AH140	T3130	T1015
WPMW05H315ZPR	M	with	5	3.50	7.94	●	●	●	●	●
WPMT05H315ZPR-MH						●	●	●		
WPMT05H315ZPR-ML						●	●	●	●	
WPMW06X415ZPR			6	4.20	9.525	●	●	●	●	●
WPMT06X415ZPR-MH						●	●	●		
WPMT06X415ZPR-ML						●	●	●	●	
WPMT080615ZSR			8	6.35	12.7	●	●	●	●	●
WPMT080615ZSR-MH						●	●	●		
WPMT080615ZPR-ML						●	●	●	●	
NEW WPMT090725ZSR			9	7	15	●	●	●	●	●
NEW WPMT090725ZSR-MH						●	●	●		
NEW WPMT090725ZPR-ML						●	●	●	●	

Cutting data
EXP 05/06 type

Work materials	Grade	Cutting speed V_c (m/min)	Feed per tooth f_t (mm/t)	Recommended cutting conditions			
				ø 20, ø 21	ø 25, ø 26	ø 32, ø 33	ø 40
Carbon steels Ck45 etc. < 300HB	**AH120** (T3130)	100 – 250	0.5 – 2.0	v_c = 150 m/min, f_t = 0.8 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm	v_c = 150 m/min, f_t = 1.0 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm		
				Z-axis plunging: f_t = 0.2 mm/t			
Alloy steels 42CrMo4, 16MnCr5 etc. < 300HB	**AH120** (T3130)	100 – 200	0.5 – 2.0	v_c = 130 m/min, f_t = 0.8 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm	v_c = 130 m/min, f_t = 1.0 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm		
				Z-axis plunging: f_t = 0.2 mm/t			
Die steels X96CrMoV12 etc. 30 – 40HRC	**AH120** (T3130)	80 – 150	0.5 – 1.0	v_c = 100 m/min, f_t = 0.5 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm	v_c = 100 m/min, f_t = 0.5 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm		
				Z-axis plunging: f_t = 0.1 mm/t			
Hardened steels 40 – 50HRC	**AH120**	50 – 80	0.5 – 1.0	v_c = 60 m/min, f_t = 0.5 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm	v_c = 60 m/min, f_t = 0.5 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm		
				Z-axis plunging: f_t = 0.1 mm/t			
Cast irons GG25 etc.	**T1015**	100 – 250	0.8 – 2.5	v_c = 150 m/min, f_t = 1.0 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm	v_c = 180 m/min, f_t = 1.5 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm		
				Z-axis plunging: f_t = 0.2 mm/t			
Stainless steels X5CrNi1810 etc. < 250HB	NEW **AH130** (AH140)	100 – 230	0.5 – 2.0	v_c = 150 m/min, f_t = 0.8 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm	v_c = 150 m/min, f_t = 1.0 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm		
				Z-axis plunging: f_t = 0.2 mm/t			

EXP/TXP 05/06/08 type

Work materials	Grade	Cutting speed V_c (m/min)	Feed per tooth f_t (mm/t)	Recommended cutting conditions					
				ø 40	ø 50	ø 63	ø 80	ø 100	ø 125
Carbon steels Ck45 etc. < 300HB	**AH120** (T3130)	100 – 250	0.5 – 2.0	v_c = 180 m/min, f_t = 1.0 mm/t a_p = 1.0 mm, a_e = 40 mm	v_c = 200 m/min, f_t = 1.5 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm				
				Z-axis plunging: f_t = 0.2 mm/t					
Alloy steels 42CrMo4, 16MnCr5 etc. < 300HB	**AH120** (T3130)	100 – 200	0.5 – 2.0	v_c = 130 m/min, f_t = 1.0 mm/t a_p = 1.0 mm, a_e = 40 mm	v_c = 150 m/min, f_t = 1.5 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm				
				Z-axis plunging: f_t = 0.2 mm/t					
Die steels X96CrMoV12 etc. 30-40 HRC	**AH120** (T3130)	80 – 150	0.5 – 1.0	v_c = 100 m/min, f_t = 0.5 mm/t a_p = 1.0 mm, a_e = 40 mm	v_c = 120 m/min, f_t = 0.8 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm				
				Z-axis plunging: f_t = 0.1 mm/t					
Hardened steels 40-50 HRC	**AH120**	50 – 80	0.5 – 1.0	v_c = 70 m/min, f_t = 0.6 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm					
				Z-axis plunging: f_t = 0.1 mm/t					
Cast irons GG25 etc.	**T1015**	100 – 250	0.8 – 2.5	v_c = 180 m/min, f_t = 1.5 mm/t a_p = 1.0 mm, a_e = 40 mm	v_c = 200 m/min, f_t = 2.0 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm				
				Z-axis plunging: f_t = 0.2 mm/t					
Stainless steels X5CrNi1810 etc. < 250HB	NEW **AH130** (AH140)	100 – 230	0.5 – 2.0	v_c = 150 m/min, f_t = 1.0 mm/t a_p = 1.0 mm, a_e = 40 mm	v_c = 180 m/min, f_t = 1.5 mm/t a_p = 1.0 mm, a_e = 1.0 x D mm				
				Z-axis plunging: f_t = 0.2 mm/t					

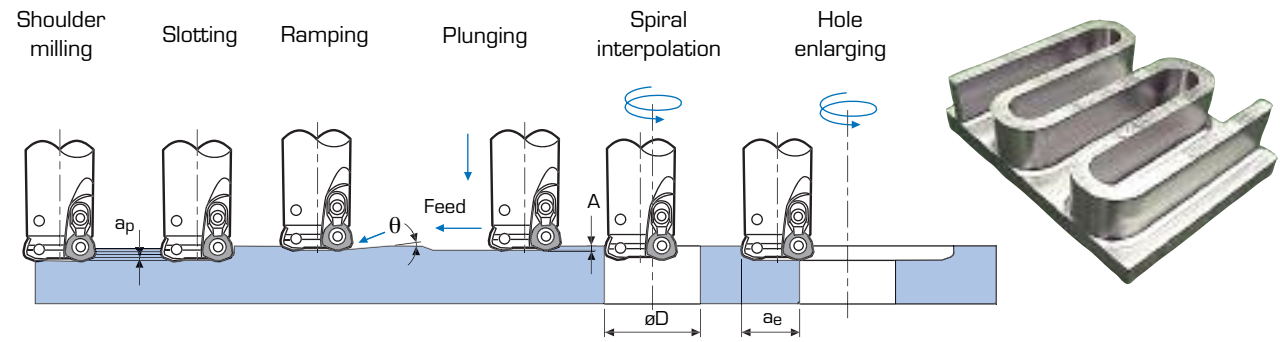
TXP 09 type

Work materials	Grade	Cutting speed V_c (m/min)	Feed per tooth f_t (mm/t)	Recommended cutting conditions			
				ø 63	ø 80	ø 100	ø 125
Carbon steels Ck45 etc. < 300HB	**AH120** (T3130)	100 – 250	0.5 – 2.0	v_c = 200 m/min, f_t = 1.5 mm/t a_p = 2.0 mm, a_e = 1.0 x D mm			
				Z-axis plunging: f_t = 0.2 mm/t			
Alloy steels 42CrMo4, 16MnCr5 etc. < 300HB	**AH120** (T3130)	100 – 200	0.5 – 2.0	v_c = 150 m/min, f_t = 1.5 mm/t a_p = 2.0 mm, a_e = 1.0 x D mm			
				Z-axis plunging: f_t = 0.2 mm/t			
Die steels X96CrMoV12 etc. 30-40 HRC	**AH120** (T3130)	80 – 150	0.5 – 1.0	v_c = 120 m/min, f_t = 0.8 mm/t a_p = 2.0 mm, a_e = 1.0 x D mm			
				Z-axis plunging: f_t = 0.1 mm/t			
Hardened steels 40-50 HRC	**AH120**	50 – 80	0.5 – 1.0	v_c = 80 m/min, f_t = 0.7 mm/t a_p = 2.0 mm, a_e = 1.0 x D mm			
				Z-axis plunging: f_t = 0.1 mm/t			
Cast irons GG25 etc.	**T1015**	100 – 250	0.8 – 2.5	v_c = 200 m/min, f_t = 2.0 mm/t a_p = 2.0 mm, a_e = 1.0 x D mm			
				Z-axis plunging: f_t = 0.2 mm/t			
Stainless steels X5CrNi1810 etc. < 250HB	NEW **AH130** (AH140)	100 – 230	0.5 – 2.0	v_c = 180 m/min, f_t = 1.5 mm/t a_p = 2.0 mm, a_e = 1.0 x D mm			
				Z-axis plunging: f_t = 0.2 mm/t			

The recommended cutting parameter are merely a starting guideline and should be optimised according to individual machining requirements

EXP & TXP milling cutter

Application

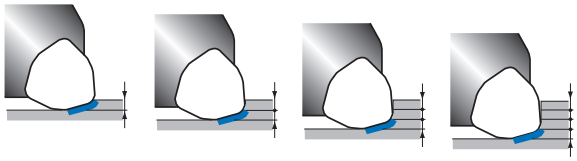


Item code	Tool ø (mm)	Max. cutting depth ap (mm)	Max. ramping angle (θ)	Max. plunging A (mm)	Min. machining øD (mm)	Max. machining øD (mm)	Max. cutting width for enlarging ae (mm)
EXP05020RS/L/LL	20	1.5	3°	0.5	30	37	16
EXP05021RS/L/LL	21		2° 30'		32	39	17
EXP06025RS/L/LL	25		5°	1.0	33	47	20
EXP06026RS/L/LL	26		4° 30'		35	49	21
EXP06032RS/L/LL	32		3° 30'		47	61	27
EXP06033RS/L/LL	33		3°		49	63	28
EXP06040RS/L/LL	40		2°		63	77	35
EXP08040R/L/LL			6°		53		34
TXP05063RB-E	63		1°	0.5	116	123	59
TXP05080RB-E	80		0° 30'		150	157	76
TXP06063RB-E	63		1°	1.0	109	123	58
TXP06080RB-E	80		0° 30'		143	157	75
TXP08050R-E	50		4°		72	97	44
TXP08052R-E	52				76	101	46
TXP08063R-E	63		2° 30'		98	123	57
TXP08066R-E	66				104	129	60
TXP08080R-E	80		1° 30'		132	157	74
NEW TXP08100R-E	100		1°		172	197	94
NEW TXP08125R-E	125		0° 45'		222	247	119
NEW TXP09063R-E	63	3.0	2°	1.5	98	123	56
NEW TXP09080R-E	80		1° 30'		132	157	73
NEW TXP09100R-E	100		1°		172	197	93
NEW TXP09125R-E	125		0° 45'		222	247	118

EXP & TXP milling cutter

Constant load on the cutting egde independent of cutting depth

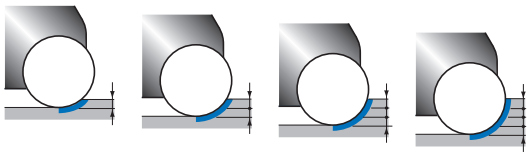
➡ Constant spindle load



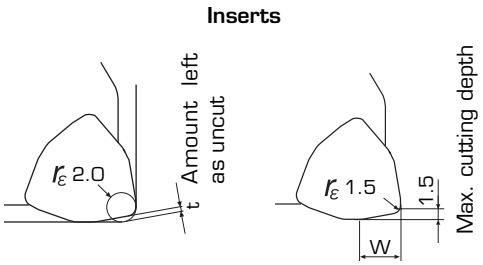
Milling cutter with round inserts

Increased cutting depth leeds to increased load at the cutting edge

➡ varying spindle load



Tool geometry on programming



Milling type	W (mm)	t (mm)	r_ε (mm)
TXP/EXP05	3.8	0.5	2.0
TXP/EXP06	4.3	0.7	2.5
TXP/EXP08	5.7	0.7	2.0
NEW TXP09	6.8	1.4	3.0
		1.2	4.0

When programming the machine path, a theoretical radius (r_ε) and the residual amount (t) should be calculated.

Practical examples

Mounting plate: 200 x 300

Face milling

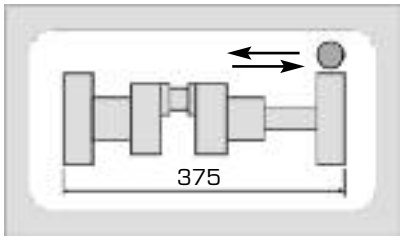
Cutter:	TXP08080R-E (t = 5)
Insert:	WPMT080615ZSR
Grade:	AH120
Work materials:	X155CrVMo12-1 (1.2379)
Cutting speed:	Vc = 160 m/min
Table feed:	Vf = 7035 mm/min
Feed rate:	f = 11.05 mm/rev
Feed per tooth:	ft = 2.21 mm/t
Axial cutting depth:	ap = 3x1.0 mm
Chip removal:	Q = 492 cm³/min
Coolant:	Without

Result:
Compared to conventional surface milling with 45° milling cutter, the machining time was reduced by 80 %.

45° Milling head ø125 mm:
1 min 52 sec/Mounting plate

TXP08080R-E ø80 mm:
0 min 23 sec/Mounting plate

Die for crank shaft



Copy milling

Cutter:	EXP06040RS (t = 3)
Insert:	WPMW06X415ZPR
Grade:	AH120
Work material:	40CrMnMo7 (1.2311)
Cutting speed:	Vc = 150 m/min
Table feed:	Vf = 4500 mm/min
Feed per tooth:	ft = 1.25 mm/t
Axial cutting depth:	ap = 1.0 mm
Coolant:	Air
Machining time:	29 minutes (roughing cycle)

Result:
With the EXP milling cutter stable machining conditions for roughing operations were achieved and thus machining time was reduced by almost 50 %. Change of inserts was unnecessary.

EXP & TXP milling cutter

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