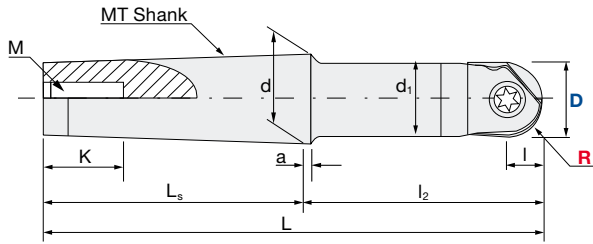
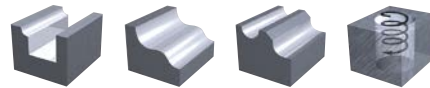


## Indexable Milling Tools

### ABPF | Ball High Precision Finish

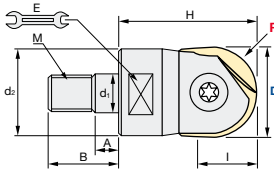
<b>V max</b> High Speed	<b>▽▽</b> Semi Finishing	<b>▽▽▽</b> Finishing	<b>HRC</b> 65	<b>No. of Teeth</b> 2
----------------------------	-----------------------------	-------------------------	------------------	--------------------------



Tolerance R:	Tolerance Dia.:
<b>± 0.005 mm</b>	<b>± 0.01 mm</b>

### ABPF-MT Ball High Precision Finish - MT Shank

ID Code	Item Code	Flutes	D	R	I	MT	L	l <sub>2</sub>	L <sub>s</sub>	d	d <sub>1</sub>	a	K	M	Inserts
FH461	<b>ABPF-20MT2</b>	2	20	10	11	MT2	129	65	64	17.78	19.5	5	24	M10	Z...FG-200...
FH462	<b>ABPF-25MT3</b>		25	12.5	13.7	MT3	166	85	81	23.825	24.5	5	28	M12	Z...FG-250...
FH463	<b>ABPF-32MT4</b>		32	16	17.6	MT4	217.5	115	102.5	31.267	30.8	6.5	32	M16	Z...FG-320...



### ABPF-M Ball High Precision Finish Modular

ID Code	Item Code	Flutes	D	R	I	H	d <sub>1</sub>	M	d <sub>2</sub>	A	B	E	Inserts
FH510	<b>ABPFM-10</b>	2	10	5	5.5	26	6.5	M6	9.8	5	14.5	7	Z...FG-100...
FH511	<b>ABPFM-12</b>		12	6	6.6	26	6.5	M6	9.8	5	14.5	7	Z...FG-120...
FH512	<b>ABPFM-16</b>		16	8	8.8	32	8.5	M8	12.8	6	17	10	Z...FG-160...
FH513	<b>ABPFM-20</b>		20	10	11	38	10.5	M10	17.8	6	19	15	Z...FG-200...
FH514	<b>ABPFM-25</b>		25	12.5	13.7	38	12.5	M12	20.8	7	22	17	Z...FG-250...
FH515	<b>ABPFM-32</b>		32	16	17.6	43	17	M16	28.8	7	23	22	Z...FG-320...



Inserts p. 7

### ABPF | Insert selection – Geometry + Grade



Insert Grade	ZPFG-xxx	ZPFG-xxx-GH	ZPFG-xxx-GF	ZDFG-xxx-WH	ZDFG-xxx-WF	ZDFG-xxx-SF
<b>Ball geometry</b>	180° R + straight 			Full-R 		180° R + straight ✖ 
<b>Rake angle</b>	Negative Small helix 			Positive Straight 		
<b>Edge shape</b>	Wide & Tough			Small & Sharp	Wide & Tough	Small & Sharp
<b>Chisel shape</b>	Wide & Tough		Small & Sharp	Wide & Tough	Small & Sharp	
<b>Available grades</b>	PTH08M PCA08M PCA12M	ATH80D	ACS05E	ATH80D	ACS05E	ATH10E



Insert Grade	ATH10E	ACS05E	PCA12M	PCA08M	PTH08M	ATH80D
<b>Substrate</b>	Ultra Micro					
<b>Hardness</b>	93.0 HRA	93.4 HRA	93.0 HRA	93.3 HRA	93.3 HRA	94.0 HRA
<b>Coating</b>	Code					
	ATH	ACS	PCA	PCA	TH	ATH
<b>Hardness</b>	3800Hv	3200Hv	2600Hv	2600Hv	3600Hv	3800Hv
<b>Target hardness of workpiece</b>	Cast iron Carbon steel ( < 30 HRC)	Cast iron Carbon steel ( < 30 HRC)	Tool steels < 45 HRC	Tool steels, Pre hardened steels	Pre hardened steel Hardened steel > 45 HRC	Hardened steel > 50 HRC

**Indexable Milling Tools | Grades Overview**

**INSERTS | Ball High Precision Finish**

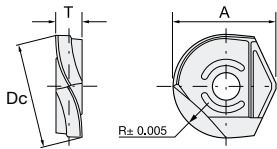


Fig. 1: ZPFG

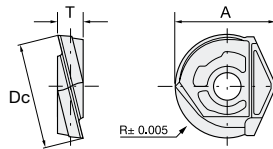


Fig. 2: ZDFG

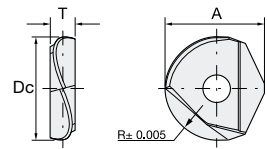
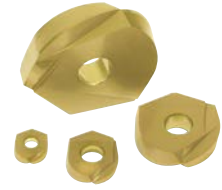
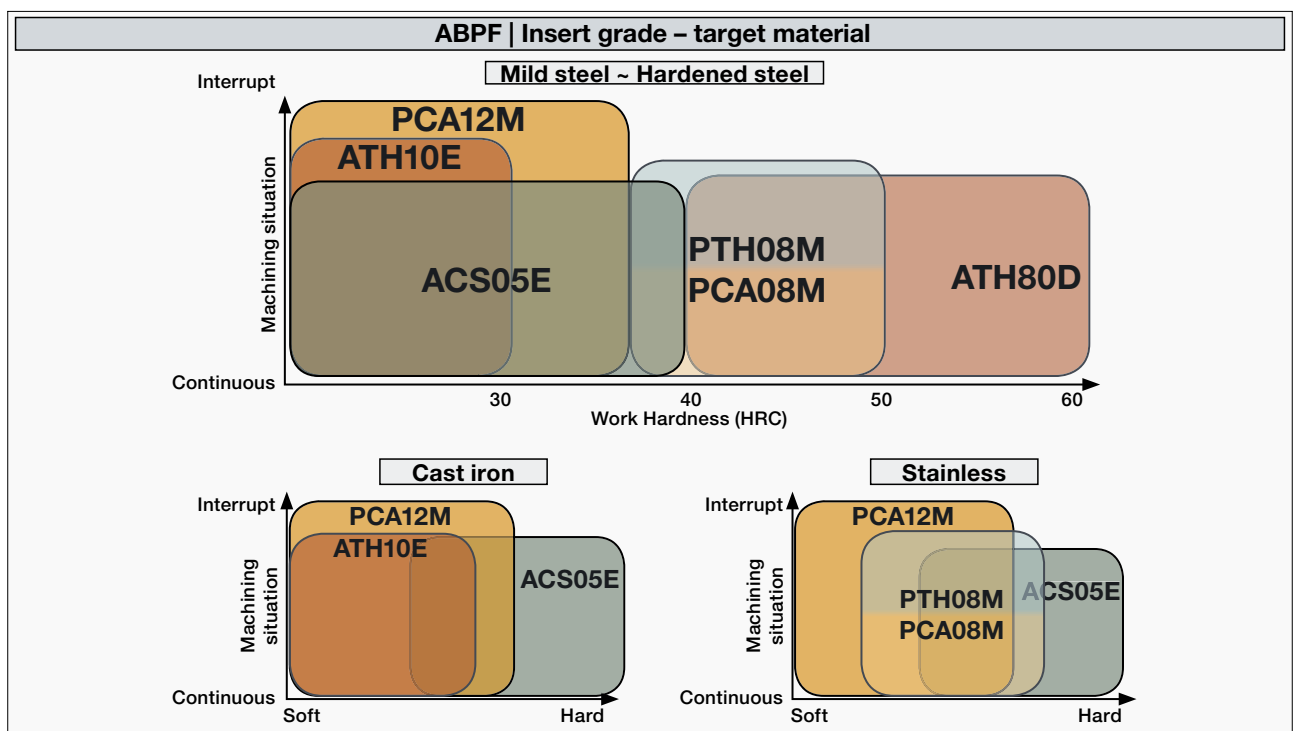


Fig. 3: ZDFG-SF

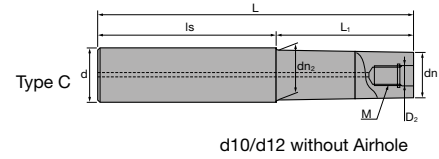
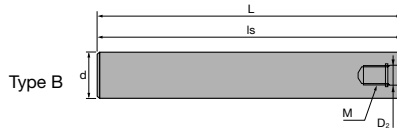
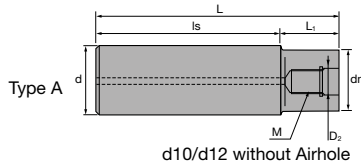


Item Code	Size				Grade					Shape		
	Dc	R	A	T	ATH10E	ACS05E	PCA12M	PCA08M	PTH08M		ATH80D	
ZPFG-080	8	4	9.7	2.1			WF547	WF594	WF645			
ZPFG-080-GH												WF267
ZPFG-080-GF						WF266						
ZPFG-100	10	5	12.1	2.7			WF548	WF595	WF646			
ZPFG-100-GH											WF269	
ZPFG-100-GF						WF268						
ZPFG-120	12	6	14.6	3.2			WF549	WF596	WF647			
ZPFG-120-GH											WF271	
ZPFG-120-GF						WF270						
ZPFG-160	16	8	16.6	4.2			WF598	WF597	WF648			
ZPFG-160-GH											WF273	
ZPFG-160-GF						WF272						
ZPFG-200	20	10	20.3	5.2			WF600	WF599	WF649			
ZPFG-200-GH											WF275	
ZPFG-200-GF						WF274						
ZPFG-250	25	12.5	24.1	6.2			WF602	WF601	WF650			
ZPFG-250-GH											WF277	
ZPFG-250-GF						WF276						
ZPFG-320	32	16	30	7.2			WF604	WF603	WF651			
ZPFG-320-GH											WF279	
ZPFG-320-GF						WF278						
ZDFG-080-WH	8	4	9.7	2.1						WF281		
ZDFG-080-WF						WF280						
ZDFG-100-WH					10	5	12.1	2.7				
ZDFG-100-WF		WF282										
ZDFG-120-WH	12	6	14.6	3.2								
ZDFG-120-WF						WF284						
ZDFG-160-WH					16	8	16.6	4.2				
ZDFG-160-WF		WF168										
ZDFG-200-WH	20	10	20.3	5.2								
ZDFG-200-WF						WF169						
ZDFG-250-WH					25	12.5	24.1	6.2				
ZDFG-250-WF		WF170										
ZDFG-320-WH	32	16	30	7.2								
ZDFG-320-WF						WF171						
ZDFG-160-SF					16	8	16.6	4.2	WF263			
ZDFG-200-SF	20	10	20.3	5.2	WF264							
ZDFG-250-SF	25	12.5	24.1	6.2	WF265							



**Indexable Milling Tools**

**ASC | Carbide Shanks** for Modular Mills



**Carbide Shank**

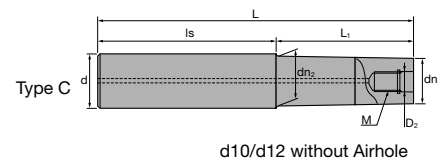
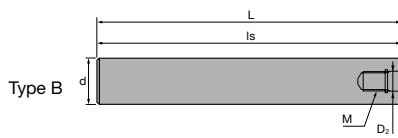
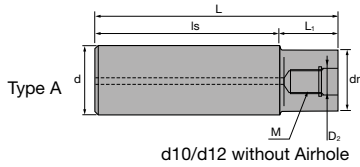
	ID Code	Item Code	D <sub>2</sub>	M	L	L <sub>1</sub>	Is	dn	dn <sub>2</sub>	d	Type	
Without Airhole	FH137	<b>ASC10-6.5-74-24</b>	6.5	M6	74	24	50	9.3	-	10	A	
	FH254	<b>ASC10-6.5-84-34</b>			84	34						
	FH255	<b>ASC10-6.5-114-24</b>			114	24						90
	FH138	<b>ASC10-6.5-114-49</b>			114	49						65
	FH139	<b>ASC12-6.5-74-24</b>			74	24	50	11	11.5	12	C	
	FH256	<b>ASC12-6.5-94-44</b>			94	44						
	FH257	<b>ASC12-6.5-129-24</b>			129	24						105
	FH140	<b>ASC12-6.5-129-64</b>			129	64						65
With Airhole	FH141	<b>ASC16-8.5-95-30</b>	8.5	M8	95	30	65	14.5	15.5	16	C	
	FH258	<b>ASC16-8.5-120-55</b>			120	55						
	FH142	<b>ASC16-8.5-140-75</b>			140	75						
	FH260	<b>ASC16-8.5-160-30</b>			160	30						130
	FH259	<b>ASC16-8.5-160-95</b>			160	95						65
	FH143	<b>ASC20-10.5-120-50</b>	10.5	M10	120	50	70	18	-	20	A	
	FH261	<b>ASC20-10.5-170-90Z</b>			170	90	80	18.5	19.5		C	
	FH144	<b>ASC20-10.5-220-50</b>			220	50	170	18	-		A	
	FH262	<b>ASC20-10.5-220-120Z</b>			220	120	100	18.5	19.5	20	C	
	FH263	<b>ASC20-10.5-270-150Z</b>			270	150	120					
	FH264	<b>ASC20-10.5-270-50Z</b>			270	50	220					
	FH145	<b>ASC25-12.5-145-65</b>	12.5	M12	145	65	80	23	-	25	A	
	FH146	<b>ASC25-12.5-265-65</b>			265		200					
	FH265	<b>ASC25-12.5-215-115</b>			215	115	100					
	FH266	<b>ASC25-12.5-265-145</b>			265	145	120					
	FH268	<b>ASC25-12.5-315-65</b>			315	65	250					
	FH267	<b>ASC25-12.5-315-195</b>			315	195	120					
	FH147	<b>ASC32-17-160-80</b>	17	M16	160	80	80	28	-	32	A	
FH269	<b>ASC32-17-260-140</b>	260			140	120						
FH148	<b>ASC32-17-310-80</b>	310			80	230						
FH270	<b>ASC32-17-360-240</b>	360			240	120						

- SUPER Lock milling chucks or shrink-fit holders can be used.
- SUPER Lock Aufnahmen oder Schrumpffutter können verwendet werden.
- Possono essere utilizzati mandrini a forte serraggio SUPER Lock.

- Aptos para amarrar en portapinzas SUPER Lock.
- Les attachements SUPER Lock peuvent être utilisés.
- Cones hidráulicos de grande aperto e aperto térmico podem ser usados.

**Indexable Milling Tools**

**AS | Steel Shanks** for Modular Mills



Steel Shank											
	ID Code	Item Code	D <sub>2</sub>	M	L	L <sub>1</sub>	ls	dn	dn <sub>2</sub>	d	Type
Without Airhole	FH131	<b>AS10-6.5-74-0</b>	6.5	M6	74	-	74	-	-	10	B
	FH132	<b>AS12-6.5-84-4</b>			84	4	80	11	-	12	A
With Airhole	FH133	<b>AS16-8.5-95-15</b>	8.5	M8	95	15	80	14.5	15.5	16	A
	FH134	<b>AS20-10.5-100-20</b>	10.5	M10	100	20		18	-	20	
	FH271	<b>AS25-12.5-115-35</b>	12.5	M12	115	35		23	23	25	
	FH272	<b>AS32-17-110-30</b>	17	M16	110	30		28	28	32	

🇬🇧 SUPER Lock milling chucks can be used.

🇪🇸 SUPER Lock Aufnahmen können verwendet werden.

🇮🇹 Possono essere utilizzati mandrini a forte serraggio SUPER Lock.

🇪🇸 Aptos para amarrar en portapinzas SUPER Lock.

🇫🇷 Les attachements SUPER Lock peuvent être utilisés.

🇵🇹 Cones hidráulicos de grande aperto e aperto térmico podem ser usados.

- 🇬🇧 For further information about modular chucks please see our brochure *Indexable Modular Series No. 328.2*
- 🇪🇸 Weitere Informationen über modulare Werkzeugaufnahmen finden Sie in unserem Prospekt: *Indexable Modular Series No. 328.2*
- 🇪🇸 Para obtener más información sobre conos modulares consulte nuestro folleto *Indexable Modular Series No. 328.2*
- 🇮🇹 Per maggiori informazioni riguardanti la gamma dei mandrini avvitabili consultate il catalogo *Indexable Modular Series No. 328.2*
- 🇫🇷 Pour de plus amples informations concernant les attachements modulaires, voyez SVP notre brochure *Indexable Modular Series No. 328.2*
- 🇵🇹 Para mais informações sobre Conos Modulares consulte o nosso folheto *Indexable Modular Series No. 328.2*

