Advanced Engineering

MMC Hitachi Tool

No. 337

Indexable Milling +Modular Series

ABP4F Precision Ball Series

High Efficiency 4 Flute · D 20

Available Coatings:
ATH10E
PN15M
ATH80D

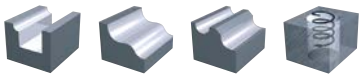
MMC Hitachi Tool Engineering Europe GmbH

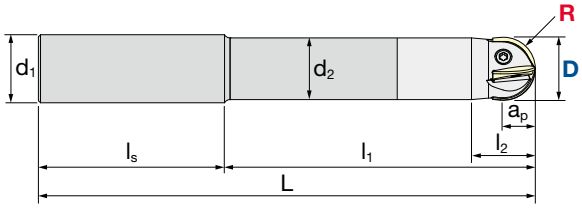
www.high-speed-cutting.com

Indexable Milling Tools

ABP4F

V max			HRC	No. of Teeth
High Speed	Semi Finishing	Finishing	65	4





CARBIDE

R	Set-up
±0.01 mm	±0.015 mm

ID Code	Item Code	Flutes	D	R	L	l_1	l_2	l_s	d_1	d_2	Shank	Primary insert	Sec. Insert
FH277	**ABP4F-20S20WL80**	4	20	10	160	17	80	80	20	19	Carbide	ZDFG-200CE ZDFG-200CT	ZDFG-200SE
FH278	**ABP4F-20S20WL100**				180		100						
FH279	**ABP4F-20S20WL120**				200		120						

STEEL

R	Set-up
±0.01 mm	±0.015 mm

ID Code	Item Code	Flutes	D	R	L	l_1	l_2	l_s	d_1	d_2	Shank	Primary insert	Sec. Insert
FH280	**ABP4F-20S20L60**	4	20	10	140	17	60	80	20	19	Steel	ZDFG-200CE ZDFG-200CT	ZDFG-200SE
FH281	**ABP4F-20S20L80**				160		80						
FH282	**ABP4F-20S20L100**				190		100						

INSERTS ABP4F

Main Insert

Item Code	Tolerance	Grade			Size (mm)		
		ATH10E	ATH80D	PN15M	R	A	T
ZDFG-200CE	F class	WF376			10	13.8	3.2
ZDFG-200CT			WF379	WF382			

Sub Insert

Item Code	Tolerance	Grade			Size (mm)		
		ATH10E	ATH80D	PN15M	R	A	T
ZDFG-200SE	F class	WF377	WF380	WF383	10	13.8	2.4

Insert Set

Item Code	Tolerance	Grade			Size (mm)
		ATH10E	ATH80D	PN15M	Set Items
ZDFG-200SET	F class	WF378	WF381	WF384	1 Main + 2 Sub Inserts

	Description	Target
ATH10E	High wear resistance PVD coat + Micro grain substrate	Cast iron
PN15M	Lower friction high hardness PVD coat + Micro grain substrate	Carbon steel, pre-hardened steel
ATH80D	High wear and heat resistance PVD coat + Micro grain substate	Hardened Steel

ABP4F | Recommended Cutting Conditions

Work piece material		Semi Finishing	Finishing	Parameter		D 20			
						Semi Finishing ▽▽		Finishing ▽▽▽	
						▽▽ General	▽▽ High Speed	▽▽▽ General	▽▽▽ High Speed
I II	Carbon Steel Alloy Steel <30HRC	PN15M	PN15M	V_c	m/min	400	520	520	720
				n	min^{-1}	6369	8280	8280	11465
				f_z	mm/t	0.20	0.24	0.21	0.28
				V_f	mm/min	5096	7949	6955	12841
				a_p	mm	0.50	0.50	0.20	0.15
				a_e	mm	1.20	1.20	0.40	0.40
				Q	mm^3	3057	4769	556	770
III	Alloy Steel Tool Steel 30–40HRC	PN15M ATH80D	PN15M ATH80D	V_c	m/min	320	416	416	576
				n	min^{-1}	5096	6624	6624	9172
				f_z	mm/t	0.19	0.23	0.20	0.27
				V_f	mm/min	3873	6041	5286	9759
				a_p	mm	0.50	0.50	0.20	0.15
				a_e	mm	1.20	1.20	0.40	0.40
				Q	mm^3	2324	3625	423	586
IV	Pre-Hardened Steel Tool-Steel 40–50HRC	ATH80D	ATH10E ATH80D	V_c	m/min	260	338	338	468
				n	min^{-1}	4140	5382	5382	7452
				f_z	mm/t	0.17	0.20	0.18	0.24
				V_f	mm/min	2815	4392	3843	7095
				a_p	mm	0.45	0.45	0.18	0.14
				a_e	mm	1.08	1.08	0.36	0.36
				Q	mm^3	1368	2134	249	345
V	Hardened Steel Tool Steel 50–55HRC	ATH80D PN15M	ATH80D PN15M	V_c	m/min	240	312	312	432
				n	min^{-1}	3822	4968	4968	6879
				f_z	mm/t	0.17	0.20	0.18	0.24
				V_f	mm/min	2599	4054	3547	6549
				a_p	mm	0.43	0.43	0.17	0.13
				a_e	mm	1.02	1.02	0.34	0.34
				Q	mm^3	1127	1757	205	284
V	Hardened Steel Tool Steel > 55HRC	ATH80D	ATH80D	V_c	m/min	200	260	260	360
				n	min^{-1}	3185	4140	4140	5732
				f_z	mm/t	0.16	0.19	0.17	0.22
				V_f	mm/min	2038	3180	2782	5136
				a_p	mm	0.40	0.36	0.16	0.11
				a_e	mm	0.96	0.96	0.32	0.32
				Q	mm^3	783	1099	142	178
VIII	Cast Iron GG EN-JL10** EN-GJL-***	ATH80D	ATH10E ATH80D	V_c	m/min	380	494	494	684
				n	min^{-1}	6051	7866	7866	10892
				f_z	mm/t	0.20	0.24	0.21	0.28
				V_f	mm/min	4841	7552	6608	12199
				a_p	mm	0.50	0.50	0.20	0.15
				a_e	mm	1.20	1.20	0.40	0.40
				Q	mm^3	2904	4531	529	732
VIII	Cast Iron GGG EN-JS10** EN-GJS-***	ATH80D PN15M	ATH80D PN15M	V_c	m/min	360	468	468	648
				n	min^{-1}	5732	7452	7452	10318
				f_z	mm/t	0.20	0.24	0.21	0.27
				V_f	mm/min	4586	7154	6260	10979
				a_p	mm	0.50	0.50	0.20	0.15
				a_e	mm	1.20	1.20	0.40	0.40
				Q	mm^3	2752	4292	501	659
VI	Stainless Steels High alloy Steels	ATH80D	ATH80D	V_c	m/min	320	416	416	576
				n	min^{-1}	5096	6624	6624	9172
				f_z	mm/t	0.17	0.20	0.18	0.23
				V_f	mm/min	3465	5405	4730	8295
				a_p	mm	0.45	0.45	0.18	0.14
				a_e	mm	1.08	1.08	0.36	0.36
				Q	mm^3	1684	2627	306	403
Maximum f_z (mm/t)						0.5			
Maximum a_e (mm)						10.0			

Overhang	V_c (m/min)	f_z (mm/t)
4xD	100%	100%

Overhang	V_c (m/min)	f_z (mm/t)
4xD ~ 8xD	85%	100%

This cutting condition is recommended for using 15–20 degree contact point from the chisel. Therefore you get the best result of tool life and surface quality.

Die Schnittwerte beziehen sich auf einen Kontaktpunkt an der Kugel von 15–20 Grad außerhalb des Werkzeug-Zentrums. Somit erhalten Sie die beste Standzeit in Verbindung mit der bestmöglichen Oberflächengüte.

Condizione di taglio consigliata con un inclinazione di 15–20 gradi rispetto al punto di contatto. In questo modo è possibile ottenere il miglior risultato in termini di vita utensile e qualità superficiale.

Ces conditions de coupe sont recommandées pour un usinage avec un angle de 15–20 degrés par rapport à l'arête de coupe. Vous obtiendrez ainsi les meilleurs résultats en termes de longévité de vos outils et de qualité surfacique.

Estas condiciones de corte están recomendadas para trabajar con un punto de contacto a 15-20 grados del centro de la herramienta (chisel). Por lo que se obtiene mejor resultado en cuanto a vida de herramienta y calidad superficial.

Estas condições de corte são recomendadas para uso do chanfro em contato a 15–20 graus de inclinação. Consegue, assim, os melhores resultados em termos de tempo de vida e de qualidade de superfície.

Clamp Screw

Primary insert			Secondary insert		
ID Code	ItemCode	Tightening torque	ID Code	Item Code	Tightening torque
ET065	**155-158**	**2.2 Nm**	ET066	**250-140**	**0.5 Nm**

Screw driver

ID Code	Item Code	ID Code	Item Code
ET012	**104-T15**	ET056	**104-T6**

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To meet the specification for radius tolerance ± 0.01 mm, attach inserts according to the procedure below.

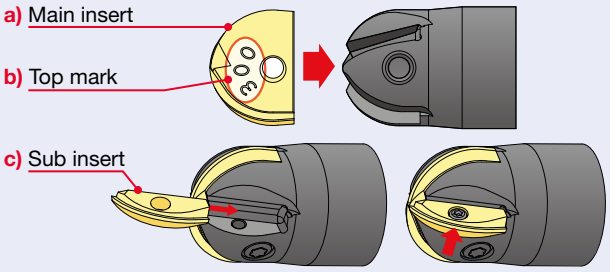
Set-up procedures of main insert:

1. Place a top mark on the insert as shown toward a screw thightening side.
2. Tighten the insert screw without pressing down the insert too much strongly.

Set-up procedures of sub inserts:

1. Install a sub insert along the restraining wall.
2. Pressing the insert firmly against the wall while tighten the insert screw.

Tightening torque:	Main insert	Sub insert
	2.2 Nm	0.5 Nm



Damit die bestmögliche Genauigkeit von +/- 0,01mm gewährleistet werden kann, beachten Sie bitte die Handhabung des Plattenwechsels wie folgt.

Wendeschneidplattenwechsel der Hauptschneide (große Platte):

1. Die beschriftete Seite der Hauptschneide muss in Richtung Schraubenkopf zeigen, gem. Grafik
2. Ziehen Sie die Schraube mit dem angegebenen Drehmoment an (2,2 Nm), ohne die Wendeschneidplatte zu stark in die Anlage zu drücken.

Wendeschneidplattenwechsel der beiden Nebenschneiden (2x kleine Platten):

1. Schieben Sie die beiden Nebenschneiden an der geraden Anlagefläche bis hin zum endgültigen Plattensitz im Radius
2. Pressen Sie die Nebenschneiden kräftig in ihren Sitz und ziehen Sie diese mit dem angegebenen Drehmoment an (0,5 Nm).

Anzugsdrehmoment:	Hauptschneidplatte	Sekundärschneidplatte
	2,2 Nm	0,5 Nm

a) Hauptschneide b) Markierung c) Nebenschneiden

Al fine di soddisfare la tolleranza sul raggio di ± 0.01 mm, seguire la procedura sottostante.

Montaggio inserto principale:

1. Inserire l'inserto con posizione di riferimento rivolta verso la testa della vite
2. Serrare la vite senza esercitare forte pressione sull'inserto

Montaggio inserti secondari:

1. Alloggiare l'inserto nella sede di riferimento
2. Premere l'inserto contro la parete di riferimento e serrare la vite

Serrare le viti con le Coppie di serraggio specificate	Inserto principale	Inserto secondario
	2.2 Nm	0.5 Nm

a) Inserto Principale b) Posizione di riferimento c) Inserto secondario

Para cumplir la especificación de la tolerancia del radio ± 0,01 mm, monte las placas según el procedimiento de abajo.

Procedimiento de montaje de la placa principal:

1. Coloque la marca superior de la placa, como se muestra en el dibujo, hacia el lado de apriete del tornillo.
2. Apriete el tornillo de la placa sin presionar hacia abajo la placa demasiado fuerte.

Procedimiento de montaje de las placas secundarias:

1. Coloque la placa secundaria a lo largo del alojamiento de la pared
2. Presione firmemente la placa secundaria contra la pared mientras apriete el tornillo de la placa secundaria.

Par de apriete:	Placa principal	Placa secundaria
	2.2 Nm	0.5 Nm

a) Placa principal b) Marca superior c) Placa secundaria

Fixez les plaquettes selon les indications ci-dessous, afin de répondre aux conditions de tolérance du rayon +/-0.01mm.

Procédure d'installation des plaquettes principales:

1. Placez la marque de la plaquette comme indiqué, du côté du pas de vis de serrage.
2. Serrez la vis sans exercer une pression verticale trop importante

Procédure d'installation des plaquettes secondaires:

1. Positionnez une plaquette secondaire dans le logement prévu à cet effet
2. Maintenez fermement la plaquette contre le corps en serrant la vis

Couple de serrage:	Plaquette principale	Plaquette secondaire
	2.2 Nm	0.5 Nm

a) Plaquette principale b) Marque c) Plaquette secondaire

De modo a cumprir a especificação para a tolerância de raio ± 0.01mm, aplique as plaquetes de acordo com o procedimento indicado.

Procedimentos de instalação da plaquete principal:

1. Coloque a marca de topo na plaquete como demonstrado, num dos encaixes de aperto de parafuso.
2. Aperte o parafuso sem pressionar a plaquete para baixo com muita força.

Procedimentos de instalação das plaquetes secundárias:

1. Aplique as plaquetes secundárias ao longo das paredes limitadoras
2. Pressione as plaquetes firmemente contra as paredes, enquanto aperta os parafusos das plaquetes.

Torque de aperto:	Plaquete principal	Plaquete secundária
	2.2 Nm	0.5 Nm

a) Plaquete principal b) Marca de topo c) Plaquete secundária

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