

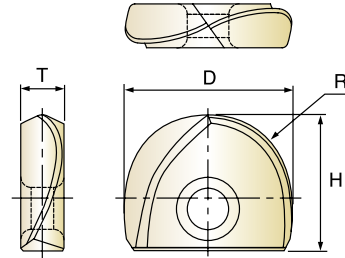


### i-Xmill BALL INSERTS

- i-Xmill WECHSELPLATTE mit RUNDER STIRN
- i-Xmill - Plaquette hémisphérique
- i-Xmill Placca emisferica

- ▶ Indexable Ball End Mill for economic use
- ▶ Three Types of Inserts are available
  - For General Purpose (~HRc50)
  - For Hardened Material (HRc40~HRc65)
  - For Graphite
- ▶ Special Geometry and Coating for Excellent Performance

- ▶ Kopierfräser mit Wechselplatte für wirtschaftlichen Einsatz.
- ▶ Drei Typen von Schneideinsätzen lieferbar
  - Für allgemeinen Einsatz (HRc50)
  - Für gehärtete Materialien (HRc40~HRc65)
  - Für Graphit
- ▶ Spezielle Geometrie und Beschichtung für höchste Leistu



cutting conditions : p.76

Unit : mm

EDP No.			Radius of Ball Nose	Mill Diameter	Height	Thickness
AlTiN	X-Coating	Z-Coating				
For General Purpose	For Pre-Hardened Steels	For High Hardened Steels	R	D	H	T
XMB110A080	XMB120C080	XMB260T080	R4.0	8.0	8.0	2.4
XMB110A100	XMB120C100	XMB260T100	R5.0	10.0	9.5	2.7
XMB110A110	XMB120C110	XMB260T110	R5.5	11.0	10.0	2.7
XMB110A120	XMB120C120	XMB260T120	R6.0	12.0	11.0	3.2
XMB110A130	XMB120C130	XMB260T130	R6.5	13.0	11.5	3.2
XMB110A160	XMB120C160	XMB260T160	R8.0	16.0	13.0	4.2
XMB110A170	XMB120C170	XMB260T170	R8.5	17.0	13.5	4.2
XMB110A200	XMB120C200	XMB260T200	R10.0	20.0	16.0	5.2
XMB110A210	XMB120C210	XMB260T210	R10.5	21.0	16.5	5.2
XMB110A250	XMB120C250	XMB260T250	R12.5	25.0	19.5	6.2
XMB110A260	XMB120C260	XMB260T260	R13.0	26.0	20.0	6.2
XMB110A300	XMB120C300	XMB260T300	R15.0	30.0	23.5	7.2
XMB110A320	XMB120C320	XMB260T320	R16.0	32.0	24.5	7.2
XMB110A330	XMB120C330	XMB260T330	R16.5	33.0	25.0	7.2

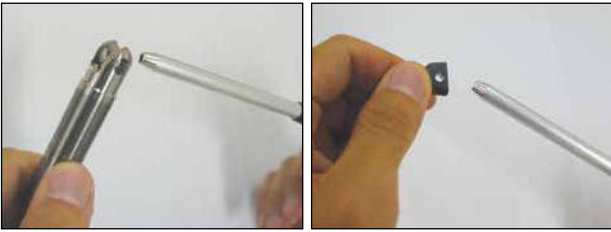
▶ The ball radius tolerance is ±0.01mm and the set-up accuracy is ±0.02mm.

◎ : Excellent ○ : Good

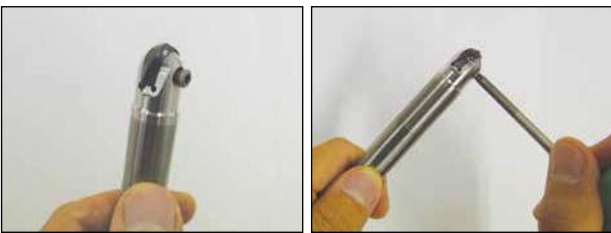
ISO	P											M			K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc	13	25	28	32	38	42	48	52	58	62	68	72	78	82	88	92	98	102	108	112
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
XMB110A	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎				◎	◎	◎	◎	◎	◎
XMB120C																				
XMB260T																				

ISO	N										S							H			
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
XMB110A																					
XMB120C																					
XMB260T																		◎	◎	○	◎

**ASSEMBLY of i-Xmill  
MONTAGE DES i-Xmill**


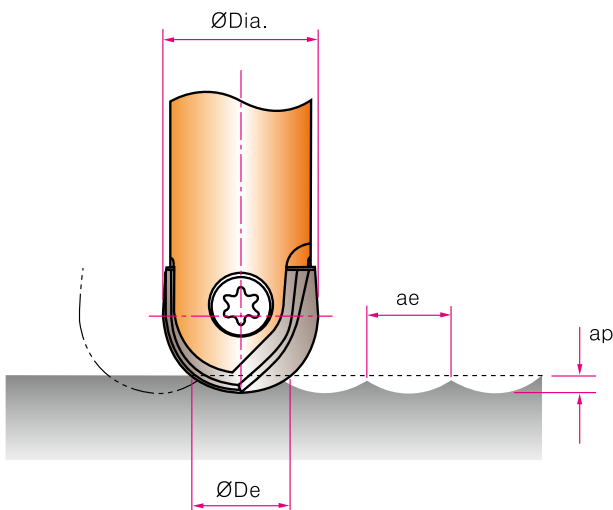
▲ Make sure to clean the insert and insert seat.  
Wechselplatte und Plattensitz sorgfältig reinigen.



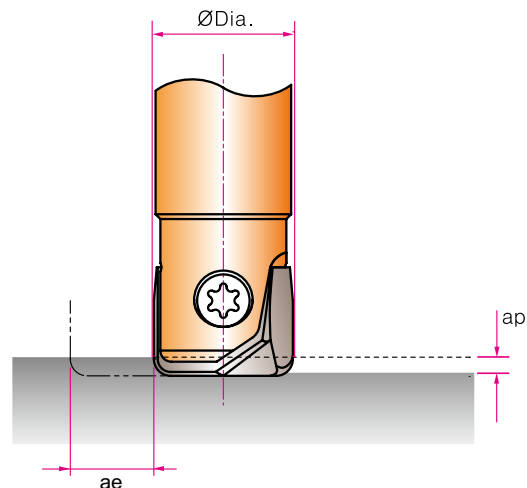
▲ Slide the insert into the slot of the holder.  
Tighten the screw using anti-seize compound.  
Wechselplatte in den Sitz des Halters einführen.  
Die Schraube fest anziehen und dabei Spezialfett verwenden

SIZE (ØD)	CLAMPING TORQUE [ N·m ]
Ø8.0	1.0
Ø10.0	1.5
Ø12.0, Ø13.0	2.5
Ø16.0, Ø17.0	3.5
Ø20.0, Ø21.0	5.0
Ø25.0, Ø26.0	6.0
Ø30.0, Ø32.0	6.5

- \* When the screw is worn out, please change the a new screw.  
\* Wenn das Schraubengewinde verschlissen ist, bitte neue Schraube verwenden.
- \* Please tighten up the screw with recommended torque.  
(Please refer to the table)  
\* Die Feststellschraube mit dem empfohlenen Anzugsmoment anziehen (siehe Tabelle).
- \* Don't press down the insert, when the screw is tightened.  
\* Die Wechselplatte nicht nach unten drücken, wenn die Schraube angezogen ist.


**CUTTING CONDITION  
SCHNEIDKONDITIONEN**


RPM = revolution per minute (rev/min)  
Vc = surface meter per minute (M/min)  
Dia. = diameter of insert (mm)  
Vf = feed speed (mm/min)  
f = feed per revolution (mm/rev)  
De = effective tool diameter (mm)  
ap = axial depth of cut (mm)  
ae = radial depth of cut (mm)



$$Vc [M/min] = \frac{(RPM) \cdot (\pi) \cdot (Dia.)}{1000}$$

$$Vf [mm/min] = (RPM) \cdot (f)$$

$$RPM [rev/min] = \frac{(Vc) \cdot (1000)}{(\pi) \cdot (Dia.)}$$

$$De [mm] = 2 \sqrt{ap \cdot (Dia. - ap)}$$

SELECTION GUIDE



SERIES	XMB110A	XMB120C	XMB260T	XMB130A
FLUTE	2	2	2	2
HELIX ANGLE	-	-	-	-
CUTTING EDGE SHAPE	BALL NOSE	BALL NOSE	BALL NOSE	BALL NOSE
SIZE MIN	R4.0	R4.0	R4.0	R4.0
SIZE MAX	R16.5	R16.5	R16.5	R16.5
PAGE	58	58	58	59

**CARBIDE INSERT & HOLDER** *i-Xmill*  
**END MILLS**

Available for General Steels, Pre-Hardened Steels, High Hardened Steels, Stainless Steel and Graphite

Please visit [globalyg1.com/mat](http://globalyg1.com/mat) for material search

◎ : Excellent ○ : Good

Recommended cutting conditions : P 75



ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRc	AITiN	X-Coating	Z-Coating	AITiN
P	1	Non-alloy steel	About 0.15% C Annealed	125		◎			
	2		About 0.45% C Annealed	190	13	◎			
	3		About 0.45% C Quenched & Tempered	250	25	◎			
	4		About 0.75% C Annealed	270	28	◎			
	5		About 0.75% C Quenched & Tempered	300	32	◎			
	6	Low alloy steel	Annealed	180	10	◎			
	7		Quenched & Tempered	275	29	◎			
	8		Quenched & Tempered	300	32	◎			
	9		Quenched & Tempered	350	38		◎		
	10		High alloyed steel, and tool steel	Annealed	200	15		○	
	11	Quenched & Tempered		325	35		◎		
M	12	Stainless steel	Ferritic / Martensitic Annealed	200	15				◎
	13		Martensitic Quenched & Tempered	240	23				◎
	14		Austenitic	180	10				◎
K	15	Grey cast iron	Pearlitic / ferritic	180	10		◎		
	16		Pearlitic (Martensitic)	260	26		◎		
	17	Nodular cast iron	Ferritic	160	3		◎		
	18		Pearlitic	250	25		◎		
	19		Ferritic	130			◎		
20	Malleable cast iron	Pearlitic	230	21		◎			
N	21	Aluminum-wrought alloy	Not Curable	60					
	22		Curable Hardened	100					
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable	75					
	24		≤ 12% Si, Curable Hardened	90					
	25		> 12% Si, Not Curable	130					
	26	Copper and Copper Alloys (Bronze / Brass)	Cutting Alloys, PB>1%	110					
	27		CuZn, CuSnZn (Brass)	90					
	28		CuSn, lead-free copper and electrolytic copper	100					
	29	Non Metallic Materials	Duroplastic, Fiber Reinforced Plastic						
30	Rubber, Wood, etc.								
S	31	Heat Resistant Super Alloys	Fe Based Annealed	200	15				
	32		Cured	280	30				
	33		Annealed	250	25				
	34		Ni or Co Based Cured	350	38				
	35	Cast	320	34					
	36	Titanium Alloys	Pure Titanium	400 Rm					
	37		Alpha + Beta Alloys Hardened	1050 Rm					
H	38	Hardened steel	Hardened	550	55		○	◎	
	39		Hardened	630	60			◎	
	40	Hardened Cast Iron	Cast	400	42			○	
	41		Hardened	550	55			◎	


**XMB110A SERIES BALL INSERTS for GENERAL PURPOSE**

 Vc = m/min.  
 Fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)						
				8	10, 11	12, 13	16, 17	20, 21	25, 26	30, 32, 33
P	1-4	Non-alloy steel	Vc	160~320	160~360	160~380	160~480	160~580	160~600	160~700
			fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.25~0.40	0.25~0.50	0.25~0.60
			RPM	6370~12730	5090~11460	4240~10080	3180~9550	2550~9230	2040~7640	1700~7430
			FEED	2550~5090	2040~4580	1700~4030	1590~5730	1270~7380	1020~7640	850~8910
			Vc	120~280	120~300	120~350	120~380	120~420	120~480	120~550
			fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.25~0.40	0.25~0.50	0.25~0.60
	5	Non-alloy steel	RPM	4770~11140	3820~9550	3180~9280	2390~7560	1910~6680	1530~6110	1270~5840
			FEED	1910~4460	1530~3820	1270~3710	1190~4540	950~5350	760~6110	640~7000
			Vc	160~320	160~360	160~380	160~480	160~580	160~600	160~700
			fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.25~0.40	0.25~0.50	0.25~0.60
			RPM	6370~12730	5090~11460	4240~10080	3180~9550	2550~9230	2040~7640	1700~7430
			FEED	2550~5090	2040~4580	1700~4030	1590~5730	1270~7380	1020~7640	850~8910
6-7	Low alloy steel	Vc	120~280	120~300	120~350	120~380	120~420	120~480	120~550	
		fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.25~0.40	0.25~0.50	0.25~0.60	
		RPM	4770~11140	3820~9550	3180~9280	2390~7560	1910~6680	1530~6110	1270~5840	
		FEED	1910~4460	1530~3820	1270~3710	1190~4540	950~5350	760~6110	640~7000	
		Vc	160~320	160~360	160~380	160~480	160~580	160~600	160~700	
		fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.25~0.40	0.25~0.50	0.25~0.60	
8	Low alloy steel	RPM	6370~12730	5090~11460	4240~10080	3180~9550	2550~9230	2040~7640	1700~7430	
		FEED	2550~5090	2040~4580	1700~4030	1590~5730	1270~7380	1020~7640	850~8910	
		Vc	120~280	120~300	120~350	120~380	120~420	120~480	120~550	
		fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.25~0.40	0.25~0.50	0.25~0.60	
		RPM	4770~11140	3820~9550	3180~9280	2390~7560	1910~6680	1530~6110	1270~5840	
		FEED	1910~4460	1530~3820	1270~3710	1190~4540	950~5350	760~6110	640~7000	

**XMB120C SERIES BALL INSERTS for PRE-HARDENED STEELS**

ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)						
				8	10, 11	12, 13	16, 17	20, 21	25, 26	30, 32, 33
P	9-11	Low alloy steel High alloyed steel, and tool steel	Vc	100~220	100~260	100~280	100~350	100~400	100~450	100~500
			fz	0.15~0.20	0.15~0.20	0.15~0.20	0.20~0.30	0.20~0.40	0.20~0.50	0.20~0.60
			RPM	3980~8750	3180~8280	2650~7430	1990~6960	1590~6370	1270~5730	1060~5310
			FEED	1190~3500	950~3310	800~2970	800~4180	640~5090	510~5730	420~6370
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	Vc	160~320	160~360	160~400	160~500	160~550	160~620	160~720
			fz	0.30~0.30	0.30~0.30	0.30~0.30	0.35~0.40	0.35~0.40	0.35~0.50	0.35~0.60
			RPM	6370~12730	5090~11460	4240~10610	3180~9950	2550~8750	2040~7890	1700~7640
			FEED	3820~7640	3060~6880	2550~6370	2230~7960	1780~7000	1430~7890	1190~9170
H	38	Hardened steel	Vc	80~180	80~200	80~220	80~260	80~320	80~360	80~400
			fz	0.10~0.20	0.10~0.20	0.10~0.20	0.15~0.30	0.15~0.40	0.15~0.50	0.15~0.60
			RPM	3180~7160	2550~6370	2120~5840	1590~5170	1270~5090	1020~4580	850~4240
			FEED	640~2860	510~2550	420~2330	480~3100	380~4070	310~4580	250~5090

**XMB260T SERIES BALL INSERTS for HIGH HARDENED STEELS**

ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)						
				8	10, 11	12, 13	16, 17	20, 21	25, 26	30, 32, 33
H	38-41	Hardened steel	Vc	80~180	80~200	80~220	80~260	80~320	80~360	80~400
			fz	0.10~0.15	0.10~0.15	0.10~0.15	0.15~0.25	0.15~0.25	0.15~0.25	0.15~0.30
			RPM	3180~7160	2550~6370	2120~5840	1590~5170	1270~5090	1020~4580	850~4240
			FEED	640~2150	510~1910	420~1750	480~2590	380~2550	310~2290	250~2550

**XMB130A SERIES BALL INSERTS for STAINLESS STEELS**

ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)						
				8	10, 11	12, 13	16, 17	20, 21	25, 26	30, 32, 33
M	12-14	Stainless steel	Vc	90~130	90~130	90~130	90~130	90~130	90~130	90~130
			fz	0.10~0.12	0.13~0.15	0.15~0.20	0.15~0.20	0.15~0.20	0.20~0.25	0.20~0.25
			RPM	3580~5170	2860~4140	2390~3450	1790~2590	1430~2070	1150~1660	950~1380
			FEED	720~1290	720~1240	720~1380	540~1030	430~830	460~830	380~690

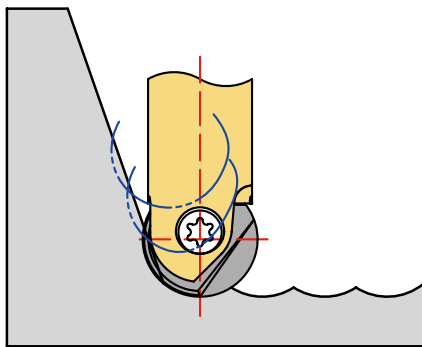
Vc = m/min.  
Fz = mm/tooth  
RPM = rev./min.  
FEED = mm/min.

**XMM110V SERIES BALL INSERTS for GENERAL PURPOSE - FULL RADIUS**

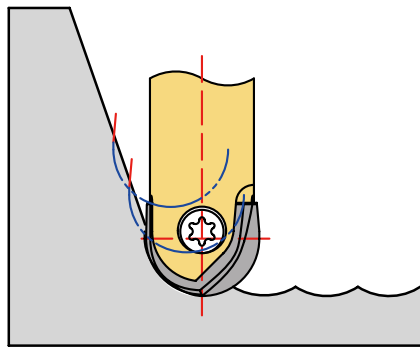
ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)						
				8	10, 11	12, 13	16, 17	20, 21	25, 26	30, 32, 33
P	1-4	Non-alloy steel	Vc	160~320	160~360	160~380	160~480	160~580	160~600	160~700
			fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.25~0.40	0.25~0.50	0.25~0.60
			RPM	6370~12730	5090~11460	4240~10080	3180~9550	2550~9230	2040~7640	1700~7430
	6-7	Low alloy steel	FEED	2550~5090	2040~4580	1700~4030	1590~5730	1270~7380	1020~7640	850~8910
			Vc	160~320	160~360	160~380	160~480	160~580	160~600	160~700
			fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.25~0.40	0.25~0.50	0.25~0.60
	10	High alloyed steel, and tool steel	RPM	6370~12730	5090~11460	4240~10080	3180~9550	2550~9230	2040~7640	1700~7430
			FEED	2550~5090	2040~4580	1700~4030	1590~5730	1270~7380	1020~7640	850~8910
			Vc	160~320	160~360	160~380	160~480	160~580	160~600	160~700
fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.25~0.40	0.25~0.50	0.25~0.60			
RPM	6370~12730	5090~11460	4240~10080	3180~9550	2550~9230	2040~7640	1700~7430			
FEED	2550~5090	2040~4580	1700~4030	1590~5730	1270~7380	1020~7640	850~8910			

**XMB110D SERIES BALL INSERTS for GRAPHITE**

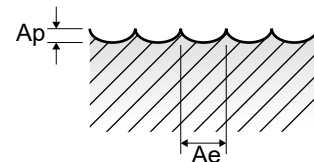
ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)						
				8	10, 11	12, 13	16, 17	20, 21	25, 26	30, 32, 33
N	21~22	Aluminum-wrought alloy	Vc	300~400	300~400	300~400	300~400	300~480	300~560	300~650
			fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.30~0.35	0.35~0.40	0.40~0.50
			RPM	11940~15920	9550~12730	7960~10610	5970~7960	4770~7640	3820~7130	3180~6900
	23~24	Aluminum-cast, alloyed	FEED	4770~6370	3820~5090	3180~4240	2980~4770	2860~5350	2670~5700	2550~6900
			Vc	300~400	300~400	300~400	300~400	300~480	300~560	300~650
			fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.30~0.35	0.35~0.40	0.40~0.50
	29.2	Graphite	RPM	11940~15920	9550~12730	7960~10610	5970~7960	4770~7640	3820~7130	3180~6900
			FEED	4770~6370	3820~5090	3180~4240	2980~4770	2860~5350	2670~5700	2550~6900
			Vc	300~400	300~400	300~400	300~400	300~480	300~560	300~650
fz	0.20~0.20	0.20~0.20	0.20~0.20	0.25~0.30	0.30~0.35	0.35~0.40	0.40~0.50			
RPM	11940~15920	9550~12730	7960~10610	5970~7960	4770~7640	3820~7130	3180~6900			
FEED	4770~6370	3820~5090	3180~4240	2980~4770	2860~5350	2670~5700	2550~6900			



Full Radius Type



Ball Radius Type



ae : Roughing - 0.1 x D  
Finishing - Under Ø12 : 0.25mm  
Under Ø20 : 0.30mm  
From Ø20 : 0.40mm

ap : Roughing - Under Ø16 : 0.025 x D  
From Ø16 : 0.05 x D  
Finishing - Under Ø16 : 0.1mm

- ▶ When the length of overhang exceed 4xD, we recommend to use carbide shank holder. (Feed 20% down)
- ▶ Recommend to reduce the feed rate to 70~85% when you use long(long & intermediate Type Holder) tools.