



Being the best through innovation

**CARBIDE INSERT & HOLDER**

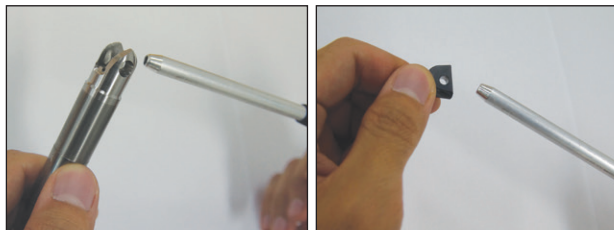
# *i*-Xmill END MILLS

- Various Applications Type of Inserts Available for General Steels, Pre-Hardened Steels, High Hardened Steels, Stainless Steels and Graphite

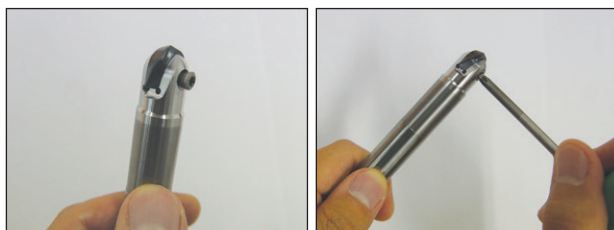
# i-Xmill END MILLS

## RECOMMENDED CUTTING CONDITIONS

### ASSEMBLY OF *i-Xmill*



◀ Make sure to clean the insert and insert seat.






◀ Slide the insert into the slot of the holder.  
Tighten the screw using anti-seize compound.

SIZE		CLAMPING TORQUE
ØD		[ in · lbs ]
Ø5/16	(Ø8)	9.0
Ø3/8	(Ø10)	13.5
Ø1/2	(Ø12~Ø13)	22.5
Ø5/8	(Ø16~Ø17)	31.5
Ø3/4	(Ø20~Ø21)	44.5
Ø1	(Ø25~Ø26)	53.0
Ø1-1/4	(Ø30~Ø32)	58.0

- \* When the screw is worn out, please change the new screw.
- \* Please tighten up the screw with recommended torque. (Please refer to the table)
- \* Don't press down the insert, when the screw is tightened.

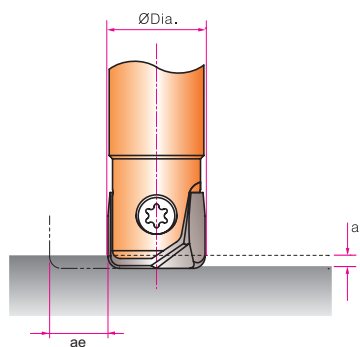
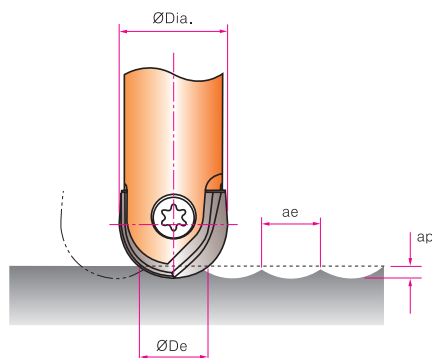


### Wrench No.

WRENCH TYPE	PRODUCT NO.	T-HANDLE No.
WING TYPE 	TWFT10	-
	TWFT15	-
TORX BIT TYPE 	● TWBT20	TWH600 
	● TWBT25	
	● TWBT30	

\* ● Required to use T-HANDLE (TWH600)

### CUTTING CONDITION SCHNEIDKONDITIONEN



- RPM = revolution per minute (rev/min)
- SFM = surface feet per minute (ft/min)
- Dia. = diameter of insert (inch)
- IPR = feed rate (inch/rev)
- IPM = inch per minute penetration rate
- De = effective tool diameter (inch)
- ap = axial depth of cut (inch)
- ae = radial depth of cut (inch)

$$\text{SFM [ft/min]} = \frac{(\text{RPM}) \cdot (\pi) \cdot (\text{Dia.})}{12}$$

$$\text{RPM [rev/min]} = \frac{(\text{SFM}) \cdot (12)}{(\pi) \cdot (\text{Dia.})}$$

$$\text{IPM [inch/min]} = (\text{RPM}) \cdot (\text{IPR})$$

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

SFM(Vc) = ft./min.  
 IPT(fz) = in./tooth  
 RPM = rev./min.  
 IPM(Feed) = in./min.

**XB1A SERIES BALL INSERTS for General Material**

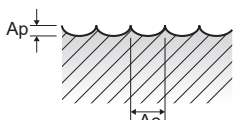
ISO	VDI 3323	Material Description	Parameter	O.D SIZE (Ø)							
				5/16 (8)	3/8 (10)	1/2 (12, 13)	5/8 (16, 17)	3/4 (20, 21)	1 (25, 26)	1-1/4 (30, 32)	
				Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	
P	1-4	Non-alloy steel	SFM(Vc)	525~1050	525~1181	525~1247	525~1575	525~1903	525~1969	525~2297	
			IPT(fz)	.008~.008	.008~.008	.008~.008	.010~.012	.010~.016	.010~.020	.010~.024	
			RPM	6370~12730	5090~11460	4240~10080	3180~9550	2550~9230	2040~7640	1700~7430	
			IPM(FEED)	100~200	80~180	70~160	60~230	50~290	40~300	30~350	
			5	SFM(Vc)	394~919	394~984	394~1148	394~1247	394~1378	394~1575	394~1804
				IPT(fz)	.008~.008	.008~.008	.008~.008	.010~.012	.010~.016	.010~.020	.010~.024
	RPM	4770~11140		3820~9550	3180~9280	2390~7560	1910~6680	1530~6110	1270~5840		
	IPM(FEED)	80~180		60~150	50~150	50~180	40~210	30~240	30~280		
	6-7	SFM(Vc)		525~1050	525~1181	525~1247	525~1575	525~1903	525~1969	525~2297	
		IPT(fz)		.008~.008	.008~.008	.008~.008	.010~.012	.010~.016	.010~.020	.010~.024	
		RPM	6370~12730	5090~11460	4240~10080	3180~9550	2550~9230	2040~7640	1700~7430		
		IPM(FEED)	100~200	80~180	70~160	60~230	50~290	40~300	30~350		
8		SFM(Vc)	394~919	394~984	394~1148	394~1247	394~1378	394~1575	394~1804		
		IPT(fz)	.008~.008	.008~.008	.008~.008	.010~.012	.010~.016	.010~.020	.010~.024		
	RPM	4770~11140	3820~9550	3180~9280	2390~7560	1910~6680	1530~6110	1270~5840			
	IPM(FEED)	80~180	60~150	50~150	50~180	40~210	30~240	30~280			

**XB2C SERIES BALL INSERTS for Hardened Material**

ISO	VDI 3323	Material Description	Parameter	O.D SIZE (Ø)								
				5/16 (8)	3/8 (10)	1/2 (12, 13)	5/8 (16, 17)	3/4 (20, 21)	1 (25, 26)	1-1/4 (30, 32)		
				Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing		
P	9	Low alloy steel	SFM(Vc)	328~722	328~853	328~919	328~1148	328~1312	328~1476	328~1640		
			IPT(fz)	.006~.008	.006~.008	.006~.008	.008~.012	.008~.016	.008~.020	.008~.024		
			RPM	3980~8750	3180~8280	2650~7430	1990~6960	1590~6370	1270~5730	1060~5310		
			IPM(FEED)	50~140	40~130	30~120	30~160	30~200	20~230	20~250		
			10-11	SFM(Vc)	328~722	328~853	328~919	328~1148	328~1312	328~1476	328~1640	
				IPT(fz)	.006~.008	.006~.008	.006~.008	.008~.012	.008~.016	.008~.020	.008~.024	
	RPM	3980~8750		3180~8280	2650~7430	1990~6960	1590~6370	1270~5730	1060~5310			
	IPM(FEED)	50~140		40~130	30~120	30~160	30~200	20~230	20~250			
	K	15-16		Grey cast iron	SFM(Vc)	525~1050	525~1181	525~1312	525~1640	525~1804	525~2034	525~2362
					IPT(fz)	.012~.012	.012~.012	.012~.012	.014~.016	.014~.016	.014~.020	.014~.024
			RPM		6370~12730	5090~11460	4240~10610	3180~9950	2550~8750	2040~7890	1700~7640	
			IPM(FEED)		150~300	120~270	100~250	90~310	70~280	60~310	50~360	
17-18			Nodular cast iron		SFM(Vc)	525~1050	525~1181	525~1312	525~1640	525~1804	525~2034	525~2362
					IPT(fz)	.012~.012	.012~.012	.012~.012	.014~.016	.014~.016	.014~.020	.014~.024
	RPM	6370~12730		5090~11460	4240~10610	3180~9950	2550~8750	2040~7890	1700~7640			
	IPM(FEED)	150~300		120~270	100~250	90~310	70~280	60~310	50~360			
	19-20	Malleable cast iron		SFM(Vc)	525~1050	525~1181	525~1312	525~1640	525~1804	525~2034	525~2362	
				IPT(fz)	.012~.012	.012~.012	.012~.012	.014~.016	.014~.016	.014~.020	.014~.024	
RPM			6370~12730	5090~11460	4240~10610	3180~9950	2550~8750	2040~7890	1700~7640			
IPM(FEED)			150~300	120~270	100~250	90~310	70~280	60~310	50~360			
H			38	Hardened steel	SFM(Vc)	262~591	262~656	262~722	262~853	262~1050	262~1181	262~1312
					IPT(fz)	.004~.008	.004~.008	.004~.008	.006~.012	.006~.016	.006~.020	.006~.024
	RPM	3180~7160			2550~6370	2120~5840	1590~5170	1270~5090	1020~4580	850~4240		
	IPM(FEED)	30~110			20~100	20~90	20~120	20~160	10~180	10~200		

**XB1D SERIES BALL INSERTS for Graphite**

ISO	VDI 3323	Material Description	Parameter	O.D SIZE (Ø)								
				5/16 (8)	3/8 (10)	1/2 (12, 13)	5/8 (16, 17)	3/4 (20, 21)	1 (25, 26)	1-1/4 (30, 32)		
				Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing		
N	21~22	Aluminum-wrought alloy	SFM(Vc)	984~1312	984~1312	984~1312	984~1312	984~1575	984~1837	984~2133		
			IPT(fz)	.008~.008	.008~.008	.008~.008	.010~.012	.012~.014	.014~.016	.016~.020		
			RPM	11940~15920	9550~12730	7960~10610	5970~7960	4770~7640	3820~7130	3180~6900		
			IPM(FEED)	190~250	150~200	130~170	120~190	110~210	110~220	100~270		
			23~24	Aluminum-cast, alloyed	SFM(Vc)	984~1312	984~1312	984~1312	984~1312	984~1575	984~1837	984~2133
					IPT(fz)	.008~.008	.008~.008	.008~.008	.010~.012	.012~.014	.014~.016	.016~.020
	RPM	11940~15920			9550~12730	7960~10610	5970~7960	4770~7640	3820~7130	3180~6900		
	IPM(FEED)	190~250			150~200	130~170	120~190	110~210	110~220	100~270		
	29.2	Graphite			SFM(Vc)	984~1312	984~1312	984~1312	984~1312	984~1575	984~1837	984~2133
					IPT(fz)	.008~.008	.008~.008	.008~.008	.010~.012	.012~.014	.014~.016	.016~.020
			RPM	11940~15920	9550~12730	7960~10610	5970~7960	4770~7640	3820~7130	3180~6900		
			IPM(FEED)	190~250	150~200	130~170	120~190	110~210	110~220	100~270		



ae : Roughing - 0.1 x D  
 Finishing - Under Ø1/2 : .01"  
 Under Ø3/4 : .012"  
 From Ø3/4 : .016"

ap : Roughing - Under Ø5/8 : 0.025 x D  
 From Ø5/8 : 0.05 x D  
 Finishing - .004"

- ▶ When the length of overhang exceeds 4xD, we recommend using the carbide shank holder with 20% lower feed
- ▶ When using long (long & intermediate type holder) tools, we recommend reducing the feed rate to 70 ~ 85%.



RECOMMENDED CUTTING CONDITIONS

SFM(Vc) = ft./min.  
 IPT(fz) = in./tooth  
 RPM = rev./min.  
 IPM(Feed) = in./min.

**XR1A SERIES**

**CORNER RADIUS INSERTS for General Material**

ISO	VDI 3323	Material Description	Parameter	O.D SIZE (Ø)							
				5/16 (8)	3/8 (10)	1/2 (12, 13)	5/8 (16, 17)	3/4 (20, 21)	1 (25, 26)	1-1/4 (30, 32)	
				Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	
<b>P</b>	1-4	Non-alloy steel	SFM(Vc)	525~984	525~984	525~984	525~984	525~984	525~984	525~984	525~984
			IPT(fz)	.008~.006	.008~.006	.008~.006	.010~.008	.010~.008	.010~.008	.010~.008	
			RPM	6370~11940	5090~9550	4240~7960	3180~5970	2550~4770	2040~3820	1700~3180	
			IPM(FEED)	100~140	80~110	70~90	60~90	50~80	40~60	30~50	
			5	SFM(Vc)	394~919	394~919	394~919	394~919	394~919	394~919	394~919
				IPT(fz)	.008~.006	.008~.006	.008~.006	.010~.008	.010~.008	.010~.008	.010~.008
	RPM	4770~11140		3820~8910	3180~7430	2390~5570	1910~4460	1530~3570	1270~2970		
	6-7	Low alloy steel	SFM(Vc)	525~984	525~984	525~984	525~984	525~984	525~984	525~984	
			IPT(fz)	.008~.006	.008~.006	.008~.006	.010~.008	.010~.008	.010~.008	.010~.008	
			RPM	6370~11940	5090~9550	4240~7960	3180~5970	2550~4770	2040~3820	1700~3180	
			IPM(FEED)	100~140	80~110	70~90	60~90	50~80	40~60	30~50	
			8	SFM(Vc)	394~919	394~919	394~919	394~919	394~919	394~919	394~919
IPT(fz)				.008~.006	.008~.006	.008~.006	.010~.008	.010~.008	.010~.008	.010~.008	
RPM	4770~11140	3820~8910		3180~7430	2390~5570	1910~4460	1530~3570	1270~2970			
<b>M</b>	12-14	Stainless steel	SFM(Vc)	295~427	295~427	295~427	295~427	295~427	295~427	295~427	
			IPT(fz)	.004~.004	.004~.004	.005~.004	.005~.005	.005~.005	.005~.005	.005~.005	
			RPM	3580~5170	2860~4140	2390~3450	1790~2590	1430~2070	1150~1660	950~1380	
			IPM(FEED)	30~40	20~40	20~30	20~30	10~20	10~20	10~10	

**XR2A SERIES**

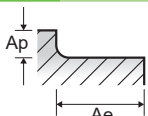
**CORNER RADIUS INSERTS for Hardened Material**

ISO	VDI 3323	Material Description	Parameter	O.D SIZE (Ø)								
				5/16 (8)	3/8 (10)	1/2 (12, 13)	5/8 (16, 17)	3/4 (20, 21)	1 (25, 26)	1-1/4 (30, 32)		
				Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing		
<b>P</b>	9	Low alloy steel	SFM(Vc)	328~919	328~919	328~919	328~919	328~919	328~919	328~919		
			IPT(fz)	.005~.002	.005~.002	.005~.002	.006~.003	.006~.003	.006~.003	.006~.003		
			RPM	3980~11140	3180~8910	2650~7430	1990~5570	1590~4460	1270~3570	1060~2970		
			IPM(FEED)	40~50	30~40	30~40	20~40	20~30	20~20	10~20		
			10-11	High alloyed steel, and tool steel	SFM(Vc)	328~919	328~919	328~919	328~919	328~919	328~919	328~919
					IPT(fz)	.005~.002	.005~.002	.005~.002	.006~.003	.006~.003	.006~.003	.006~.003
	RPM	3980~11140			3180~8910	2650~7430	1990~5570	1590~4460	1270~3570	1060~2970		
	<b>K</b>	15-16	Grey cast iron	SFM(Vc)	525~1247	525~1247	525~1247	525~1247	525~1247	525~1247	525~1247	
				IPT(fz)	.012~.008	.012~.008	.012~.008	.014~.012	.014~.012	.014~.012	.014~.012	
				RPM	6370~15120	5090~12100	4240~10080	3180~7560	2550~6050	2040~4840	1700~4030	
				IPM(FEED)	150~240	120~190	100~160	90~180	70~140	60~110	50~100	
				17-18	Nodular cast iron	SFM(Vc)	525~1247	525~1247	525~1247	525~1247	525~1247	525~1247
IPT(fz)						.012~.008	.012~.008	.012~.008	.014~.012	.014~.012	.014~.012	.014~.012
RPM		6370~15120	5090~12100			4240~10080	3180~7560	2550~6050	2040~4840	1700~4030		
19-20		Malleable cast iron	SFM(Vc)	525~1247	525~1247	525~1247	525~1247	525~1247	525~1247	525~1247		
			IPT(fz)	.012~.008	.012~.008	.012~.008	.014~.012	.014~.012	.014~.012	.014~.012		
			RPM	6370~15120	5090~12100	4240~10080	3180~7560	2550~6050	2040~4840	1700~4030		
<b>H</b>		38	Hardened steel	SFM(Vc)	262~722	262~722	262~722	262~722	262~722	262~722	262~722	
				IPT(fz)	.004~.002	.004~.002	.004~.002	.006~.002	.006~.002	.006~.002	.006~.002	
	RPM			3180~8750	2550~7000	2120~5840	1590~4380	1270~3500	1020~2800	850~2330		
	IPM(FEED)			30~30	20~30	20~20	20~20	20~20	10~10	10~10		

**XR1D SERIES**

**CORNER RADIUS INSERTS for Graphite**

ISO	VDI 3323	Material Description	Parameter	O.D SIZE								
				5/16 (8)	3/8 (10)	1/2 (12, 13)	5/8 (16, 17)	3/4 (20, 21)	1 (25, 26)	1-1/4 (30, 32)		
				Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing	Semi ~ finishing		
<b>N</b>	21~22	Aluminum-wrought alloy	SFM(Vc)	984~1312	984~1312	984~1312	984~1312	984~1312	984~1312	984~1312		
			IPT(fz)	.008~.008	.008~.008	.008~.008	.008~.008	.010~.010	.010~.010	.010~.010		
			RPM	11940~15920	9550~12730	7960~10610	5970~7960	4770~6370	3820~5090	3180~4240		
			IPM(FEED)	190~250	150~200	130~170	90~130	90~130	80~100	60~80		
			23~24	Aluminum-cast, alloyed	SFM(Vc)	984~1312	984~1312	984~1312	984~1312	984~1312	984~1312	984~1312
					IPT(fz)	.008~.008	.008~.008	.008~.008	.008~.008	.010~.010	.010~.010	.010~.010
	RPM	11940~15920			9550~12730	7960~10610	5970~7960	4770~6370	3820~5090	3180~4240		
	29.2	Graphite	SFM(Vc)	984~1312	984~1312	984~1312	984~1312	984~1312	984~1312	984~1312		
			IPT(fz)	.008~.008	.008~.008	.008~.008	.008~.008	.010~.010	.010~.010	.010~.010		
			RPM	11940~15920	9550~12730	7960~10610	5970~7960	4770~6370	3820~5090	3180~4240		
	IPM(FEED)	190~250	150~200	130~170	90~130	90~130	80~100	60~80				



ae : Roughing - 0.1 x D      ap : Roughing - Under Ø5/8 : 0.025 x D      Finishing - Under Ø5/8 : .004"  
 Finishing - .008"      From Ø5/8 : 0.05 x D      From Ø5/8 : .008"

- ▶ When the length of overhang exceeds 4xD, we recommend using the carbide shank holder with 20% lower feed
- ▶ When using long (long & intermediate type holder) tools, we recommend reducing the feed rate to 70 ~ 85%.