SELECTION GUIDE

i-DREAM DRILLS, CARBIDE INSERT

◎ : Excellent
○ : Good

ITEM	MODEL	DESCRIPTION	Non-alloyed Steels, Free Machining Steels	Carbon Steels		Alloy Steels		High Alloyed steels		Structural Steels		Tool Steels		Stainless Steels	Cast Iron		Aluminum	Copper Alloys
			~HRc24 (~HB250)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc37 (~HB350)	HRc37~ (HB350~)	~HRc24 (~HB250)	HRc24~ (HB250~)	~HRc13 (~HB200)	HRc13~ (HB200~)	~HRc28 (~HB275)	~HRc19 (~HB220)	HRc19~ (HB220~)	~HRc8 (~HB180)	~HB110
Y03A / Y03B		i-Dream Drills General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎	◎		
YI3A / YI3B		i-Dream Drills INOX	○	○		○				○		○		◎			○	○
Y03B / Y03C		i-Dream Drills General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎	◎		
YI3B / YI3C		i-Dream Drills INOX	○	○		○				○		○		◎			○	○
Y03C / Y03D		i-Dream Drills General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎	◎		
YI3C / YI3D		i-Dream Drills INOX	○	○		○				○		○		◎			○	○
Y03E / Y03F		i-Dream Drills General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎	◎		
YI3E / YI3F		i-Dream Drills INOX	○	○		○				○		○		◎			○	○
Y03G / Y03H		i-Dream Drills General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎	◎		
YI3G / YI3H		i-Dream Drills INOX	○	○		○				○		○		◎			○	○
Y03I / Y03J		i-Dream Drills General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎	◎		
YI3I / YI3J		i-Dream Drills INOX	○	○		○				○		○		◎			○	○

METRIC

Material			Tensile Strength	Hardness		Cutting Speed	Feed [mm/rev]				
			[N/mm²]	HB	HRc	Vc [M/min]	Ø12.0 ~Ø14.9	Ø15.0 ~Ø17.9	Ø18.0 ~Ø21.9	Ø22.0 ~Ø26.9	Ø27.0 ~Ø31.9
Non-alloyed steels, Cast steels Free-machining steels	1213, 13L13, 1215, 12L14,1118 etc	YG03□ / YI3□	~500	100~150		95~120	0.16~0.28	0.21~0.35	0.27~0.40	0.34~0.52	0.37~0.55
			500~850	150~250	~24	80~105	0.14~0.24	0.21~0.35	0.27~0.40	0.34~0.52	0.37~0.55
Low-alloyed steels, Cast steels(<5%) Carbon steels	1015, 1020, 1140, 1025,1035, 1050, 1045, 1055 etc		~450	85~125		90~115	0.14~0.25	0.20~0.33	0.25~0.39	0.31~0.47	0.34~0.50
			450~755	125~225	~19	70~90	0.12~0.20	0.17~0.28	0.22~0.32	0.30~0.46	0.33~0.49
			755~900	225~265	19~27	60~80	0.12~0.20	0.17~0.28	0.22~0.32	0.30~0.46	0.33~0.49
			900~1200	265~350	27~37	55~70	0.10~0.16	0.15~0.25	0.21~0.30	0.25~0.38	0.29~0.43
Alloyed steels	8620, 4130, 4137, 4140,6150 etc		~600	125~175	~7	80~100	0.14~0.24	0.17~0.28	0.22~0.32	0.30~0.46	0.34~0.50
			600~800	175~235	7~22	70~90	0.12~0.20	0.17~0.28	0.22~0.32	0.30~0.46	0.34~0.50
			800~950	235~280	22~29	60~80	0.12~0.20	0.15~0.25	0.22~0.32	0.30~0.46	0.34~0.50
			950~1110	280~330	29~35	55~70	0.10~0.16	0.13~0.21	0.21~0.30	0.25~0.38	0.29~0.43
			1110~1230	330~360	35~39	45~60	0.08~0.12	0.13~0.21	0.21~0.30	0.25~0.38	0.29~0.43
High-alloyed steels	A355. 9840, 4340 etc		600~1020	225~300	19~32	45~60	0.12~0.20	0.15~0.25	0.21~0.30	0.20~0.31	0.24~0.35
			1020~1200	300~355	32~38	40~55	0.10~0.16	0.11~0.18	0.21~0.30	0.20~0.31	0.24~0.35
			1200~1330	355~390	38~42	40~50	0.08~0.12	0.09~0.14	0.18~0.26	0.19~0.29	0.23~0.34
Structural steels	A36, A516, A182 etc		350~500	100~150		75~95	0.14~0.24	0.21~0.35	0.27~0.39	0.29~0.44	0.32~0.47
			500~850	150~250	~24	60~75	0.12~0.20	0.20~0.33	0.22~0.32	0.25~0.38	0.29~0.43
			850~1200	250~355	24~38	50~65	0.10~0.16	0.17~0.28	0.21~0.30	0.21~0.32	0.26~0.38
Tool steels	H13, H21, A2, S1 etc		500~705	150~210	~16	50~65	0.10~0.16	0.13~0.21	0.18~0.26	0.20~0.31	0.24~0.35
			705~950	210~280	16~29	40~50	0.10~0.16	0.13~0.21	0.18~0.26	0.20~0.31	0.24~0.35
Grey cast iron	Pearlitic, Ferritic		500~700	150~210	~16	100~125	0.15~0.26	0.20~0.37	0.27~0.42	0.36~0.51	0.40~0.55
	Pearlitic		700~850	210~250	16~24	75~95	0.11~0.20	0.16~0.29	0.20~0.30	0.25~0.35	0.29~0.40
Cast iron nodular	Ferritic		540	165	4	95~120	0.13~0.22	0.17~0.31	0.21~0.32	0.28~0.40	0.32~0.44
	Pearlitic		850	250	24	75~95	0.11~0.20	0.14~0.26	0.19~0.29	0.25~0.35	0.29~0.40
Malleable cast iron	Ferritic		450	125		100~125	0.13~0.22	0.17~0.31	0.21~0.32	0.28~0.40	0.32~0.44
	Pearlitic		780	230	21	75~95	0.11~0.18	0.14~0.26	0.19~0.29	0.25~0.35	0.29~0.40
Aluminum alloys (Wrought)	not heat treatable			65		250~330	0.30~0.40	0.35~0.45	0.40~0.50	0.45~0.55	0.50~0.60
	hardened			150		200~250	0.30~0.40	0.35~0.45	0.40~0.50	0.45~0.55	0.50~0.60
Aluminum alloys (Cast)	≤12% Si, not heat treatable			75		200~50	0.25~0.35	0.30~0.40	0.35~0.45	0.40~0.50	0.45~0.55
	≤12% Si, hardened			90		150~220	0.25~0.35	0.30~0.40	0.35~0.45	0.40~0.50	0.45~0.55
	>12% Si, not heat treatable			130		100~200	0.20~0.30	0.25~0.35	0.30~0.40	0.35~0.45	0.40~0.50
Copper alloys	Free machining(Pb>1%)			110		115~145	0.16~0.28	0.23~0.36	0.29~0.36	0.37~0.45	0.41~0.48
	Brass			90		145~185	0.17~0.29	0.24~0.37	0.30~0.38	0.38~0.46	0.42~0.49
	Electrolitic copper			100		95~120	0.06~0.09	0.09~0.13	0.11~0.13	0.15~0.18	0.19~0.22
Non ferrous material	Duroplastics										
	Fiber plastics										
	Hard rubber										
Stainless steels	Austenitic and Austenitic/ferritic	YI3□	450~610	135~185	~9	45~60	0.10~0.16	0.12~0.18	0.14~0.20	0.15~0.26	0.18~0.28
			610~930	185~275	9~28	30~45	0.08~0.14	0.09~0.15	0.10~0.16	0.12~0.20	0.14~0.22

RPM = revolution per minute (rev/min)
M/min = surface meter per minute(M/min)
DIA. = diameter of drill (mm)
mm/rev = feed rate(mm/rev)

*Formulas :

$$\text{M/min} = \frac{(\text{RPM}) \cdot \pi \cdot (\text{DIA.})}{1000}$$

$$\text{mm/min} = (\text{RPM}) \cdot (\text{mm/rev})$$

$$\text{RPM} = \frac{(\text{M/min}) \cdot 1000}{(\pi) \cdot (\text{DIA.})}$$

▶ The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.
Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.
▶ Recommend you to reduce the feed rate to 85%,70% when you use 5xD,7xD holders.
▶ For use of 7xD holder, we recommend to drill a centering pre-hole with equal to or larger than 140° point angle to min. 2/3 cutting diameter.
The use of the centering pre-hole improves hole location, roundness and surface finish.

INCH

Material			Tensile Strength	Hardness		Cutting Speed	Feed [IPR]				
			MPa	HB	HRc	Vc [SFM]	Ø31/64 ~Ø37/64	Ø19/32 ~Ø45/64	Ø23/32 ~Ø55/64	Ø7/8 ~Ø1-1/16	Ø1-3/32 ~Ø1-1/4
Non-alloyed steels, Cast steels Free-machining steels	1213, 13L13, 1215, 12L14,1118 etc	YO3□ / YI3□	~500	100~150		312~394	.006~.011	.008~.014	.011~.016	.013~.020	.015~.022
			500~850	150~250	~24	262~344	.006~.009	.008~.014	.011~.016	.013~.020	.015~.022
Low-alloyed steels, Cast steels(<5%) Carbon steels	1015, 1020, 1140, 1025,1035, 1050, 1045, 1055 etc		~450	85~125		295~377	.006~.010	.008~.013	.010~.015	.012~.019	.013~.020
			450~755	125~225	~19	230~295	.005~.008	.007~.011	.009~.013	.012~.018	.013~.019
			755~900	225~265	19~27	197~262	.005~.008	.007~.011	.009~.013	.012~.018	.013~.019
			900~1200	265~350	27~37	180~230	.004~.006	.006~.010	.008~.012	.010~.015	.011~.017
Alloyed steels	8620, 4130, 4137, 4140,6150 etc		~600	125~175	~7	262~328	.006~.009	.007~.011	.009~.013	.012~.018	.013~.020
			600~800	175~235	7~22	230~295	.005~.008	.007~.011	.009~.013	.012~.018	.013~.020
			800~950	235~280	22~29	197~262	.005~.008	.006~.010	.009~.013	.012~.018	.013~.020
			950~1110	280~330	29~35	180~230	.004~.006	.005~.008	.008~.012	.010~.015	.011~.017
			1110~1230	330~360	35~39	148~197	.003~.005	.005~.008	.008~.012	.010~.015	.011~.017
High-alloyed steels	A355. 9840, 4340 etc		600~1020	225~300	19~32	148~197	.005~.008	.006~.010	.008~.012	.008~.012	.009~.014
			1020~1200	300~355	32~38	131~180	.004~.006	.004~.007	.008~.012	.008~.012	.009~.014
			1200~1330	355~390	38~42	131~164	.003~.005	.004~.006	.007~.010	.007~.011	.009~.013
Structural steels	A36, A516, A182 etc		350~500	100~150		246~312	.006~.009	.008~.014	.011~.015	.011~.017	.013~.019
			500~850	150~250	~24	197~246	.005~.008	.008~.013	.009~.013	.010~.015	.011~.017
			850~1200	250~355	24~38	164~213	.004~.006	.007~.011	.008~.012	.008~.013	.010~.015
Tool steels	H13, H21, A2, S1 etc		500~705	150~210	~16	164~213	.004~.006	.005~.008	.007~.010	.008~.012	.009~.014
			705~950	210~280	16~29	131~164	.004~.006	.005~.008	.007~.010	.008~.012	.009~.014
Grey cast iron	Pearlitic, Ferritic		500~700	150~210	~16	328~410	.006~.010	.008~.015	.011~.017	.014~.020	.016~.022
	Pearlitic		700~850	210~250	16~24	246~312	.004~.008	.006~.011	.008~.012	.010~.014	.011~.016
Cast iron nodular	Ferritic		540	165	4	312~394	.005~.009	.007~.012	.008~.013	.011~.016	.013~.017
	Pearlitic		850	250	24	246~312	.004~.008	.006~.010	.007~.011	.010~.014	.011~.016
Malleable cast iron	Ferritic		450	125		328~410	.005~.009	.007~.012	.008~.013	.011~.016	.013~.017
	Pearlitic		780	230	21	246~312	.004~.007	.006~.010	.007~.011	.010~.014	.011~.016
Aluminum alloys (Wrought)	not heat treatable			65		820~1083	.0118~.0157	.0138~.0177	.0157~.0197	.0177~.0217	.0197~.0236
	hardened			150		656~820	.0118~.0157	.0138~.0177	.0157~.0197	.0177~.0217	.0197~.0236
Aluminum alloys (Cast)	≤12% Si, not heat treatable			75		656~820	.0098~.0138	.0118~.0157	.0138~.0177	.0157~.0197	.0177~.0217
	≤12% Si, hardened			90		492~722	.0098~.0138	.0118~.0157	.0138~.0177	.0157~.0197	.0177~.0217
	>12% Si, not heat treatable			130		328~656	.0079~.0118	.0098~.0138	.0118~.0157	.0138~.0177	.0157~.0197
Copper alloys	Free machining(Pb>1%)			110		377~476	.006~.011	.009~.014	.011~.014	.015~.018	.016~.019
	Brass			90		476~607	.007~.011	.009~.015	.012~.015	.015~.018	.017~.019
	Electrolitic copper			100		312~394	.002~.004	.004~.005	.004~.005	.006~.007	.007~.009
Non ferrous material	Duroplastics										
	Fiber plastics										
	Hard rubber										
Stainless steels	Austenitic and Austenitic/ferritic	YI3□	450~610	135~185	~9	145~197	.004~.006	.005~.007	.006~.008	.006~.011	.007~.011
			610~930	185~275	9~28	89~145	.003~.005	.004~.006	.004~.006	.005~.008	.006~.009

RPM = revolution per minute (rev/min)
SFM = surface feet per minute (ft/min)
DIA. = diameter of drill (inch)
IPR = feed rate (inch/rev)
IPM = inch per minute penetration rate

*Formulas :

$$SFM = \frac{(RPM) \cdot \pi \cdot (DIA.)}{12}$$

$$IPM = (RPM) \cdot (IPR)$$

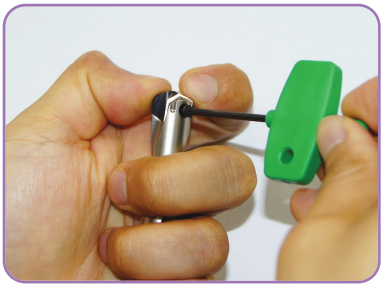
$$RPM = \frac{(SFM) \cdot 12}{(\pi) \cdot (DIA.)}$$

- The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.
  Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.
- Recommend you to reduce the feed rate to 85%,70% when you use 5xD,7xD holders.
- For use of 7xD holder, we recommend to drill a centering pre-hole with equal to or larger than 140° point angle to min. 2/3 cutting diameter.
  The use of the centering pre-hole improves hole location, roundness and surface finish.

Assembly of *i*-Dream Drills

Make sure to clean the insert and insert seat.

Slide the drill insert into the slot of the holder and press down the insert to touch the bottom of the slot.



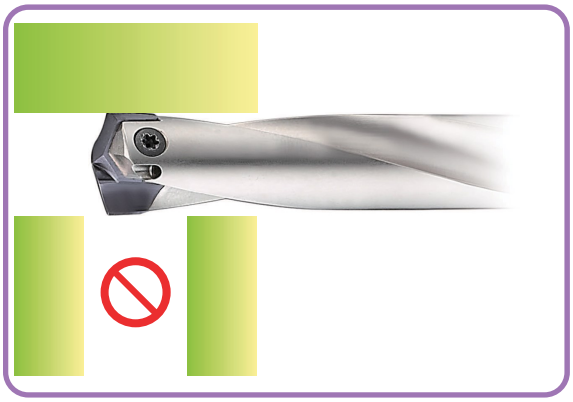
After confirming the insert is pressed down to the bottom of the slot, tighten the screw using anti-seize compound.

WRENCH TYPE	PRODUCT No.	T-HANDLE No.	SERIES
WING TYPE 	TWWT08	—	A
			B
			C
TORX BIT TYPE 	TWBT15	TWH600 	D
	TWBT20		E, F, G
	TWBT25		H, I, J

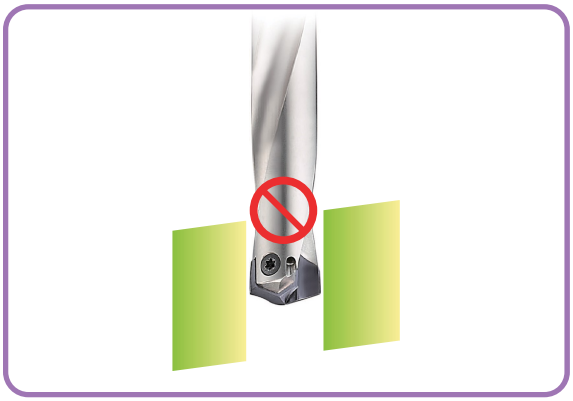
Use the wing type or T-type wrench.

- ▶ Need to use appropriate wrenches and screws as indicated.
- ▶ It's important to tighten up the screw properly.

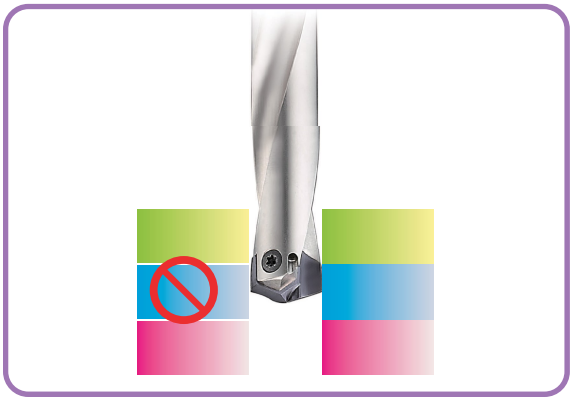
CAUTION-NOT RECOMMENDABLE APPLICATION



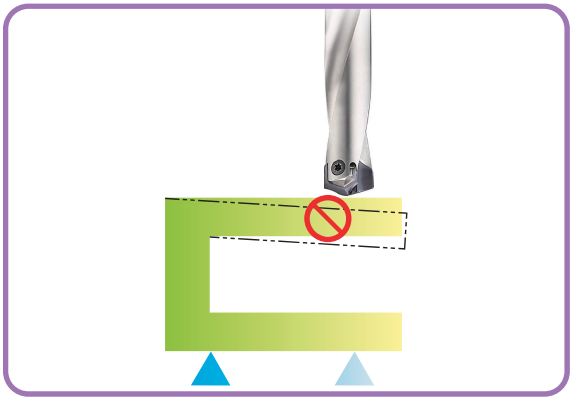
Intersecting cross hole is bigger than the drill insert's Margin Length.



Material with slanting entrance and exit over 7 degree. (If drilling 7 degree or under slanting surface, reduce the feed about 30-50 %)

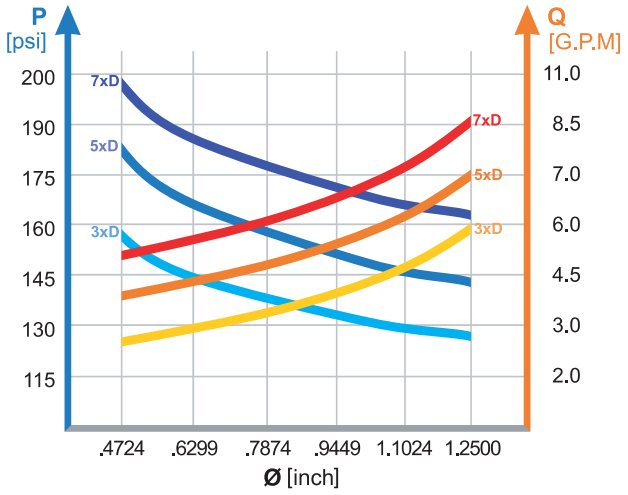


For drilling stacked plates, minimize the space between the plates.
The space stacked plates can cause insert breakage or poor chip control.



The material needs to be fixtured securely before drilling.

RECOMMENDED COOLANT PRESSURE AND FLOW RATE ON VERTICAL DRILLING



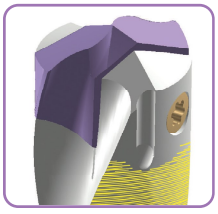
- Recommended emulsion mix is 6% - 8%.
- For Drilling in Stainless and High Strength steels, a mix of 10% is recommended.
- For horizontal drilling, 30% reduction on the coolant pressure and flow rate is possible.
- Dry drilling is possible for 1-2xD drilling. But not recommended.

TROUBLE SHOOTING

1) Heavy flank wear / Fast flank wear
- Reduce cutting speed
- Increase feed

3) Build up on cutting edge
- Increase cutting speed
- Use a coated insert

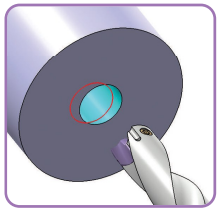
5) Wear of land margin
- Rigid clamping of workpiece
- Reduce cutting speed
- Increase coolant flow



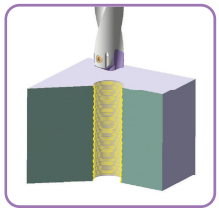
7) Scratching on holder
- Rigid clamping of workpiece
- Reduce feed
- Increase coolant flow

2) Chipping on cutting edge
- Reduce feed
- Check the rigidity of spindle and chuck
- Rigid clamping of workpiece

4) Chipping or break down on outer corner
- Reduce feed
- Rigid clamping of workpiece



6) Unsatisfactory positioning of the hole
- Rigid clamping of workpiece
- Reduce feed during entrance or exit



8) Unsatisfactory surface finish
- Rigid clamping of workpiece
- Increase coolant flow and pressure