

YE-IO26

EUROPE



1st-cut Tooling Solutions e.K.
Advanced Tooling & Machining

Anwendungstechnik
Prozessoptimierung
Zerspanungslösungen
Werkzeugvertrieb

**Fragen zu Werkzeugen,
Standzeiten oder
Prozessoptimierung?**

Andreas Stolze

Telefon · E-Mail · WhatsApp
+49 15174271616
+49 8422 8269345
info@1st-cut.de
www.1st-cut.de



i-ONE DRILLS

**MICRO GRAIN CARBIDE INSERTS
AND PREMIUM TOOL STEEL HOLDERS**

High-Performance Exchangeable
for General Steels, Cast Iron and Stainless Steels

NEW

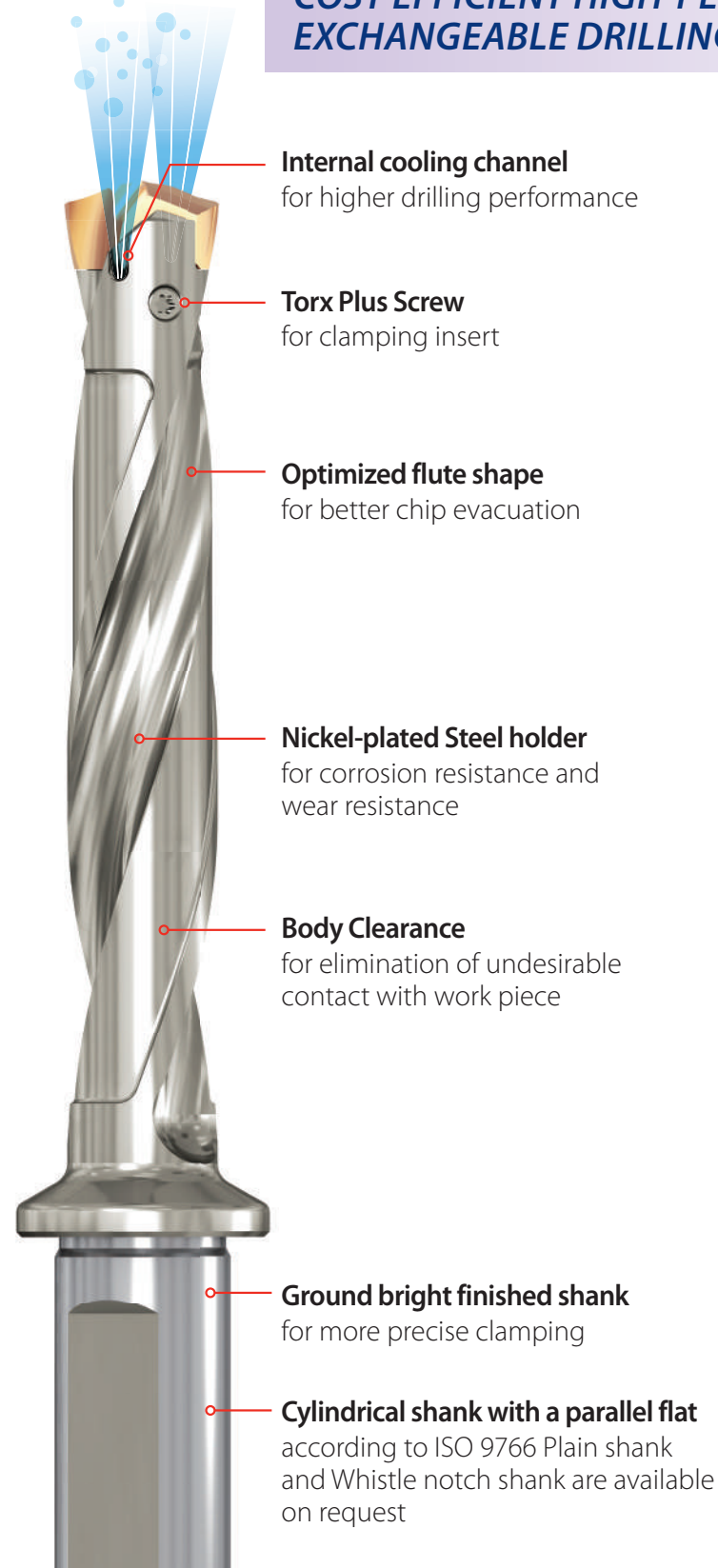
Inserts for Stainless Steel



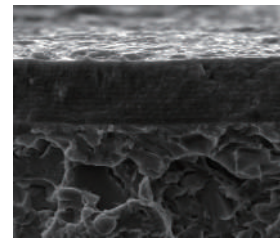
FEATURES

Micro Grain Carbide Inserts and Premium Tool Steel Holder with Coolant Holes

COST EFFICIENT HIGH-PERFORMANCE EXCHANGEABLE DRILLING TOOLS



• Secure & Quick clamping system



• Multi-layered Coating

H-Coating

Reduces cracking and provides high shear strength with excellent oxidation resistance and hot hardness

NEW Z-Coating

Provides outstanding heat resistance for high-temperature machining

• Optimized point geometry

of i-ONE Drills ensures centering ability and smoother cutting

• Optimized Edge Honing (for Stainless Steel)

Provides superior chipping resistance and consistent performance under high-load conditions

• Ground Negative land (for General Steel)

on cutting edge for reliable tool life

• Self-Centering and Chip Breaking by radius thinning

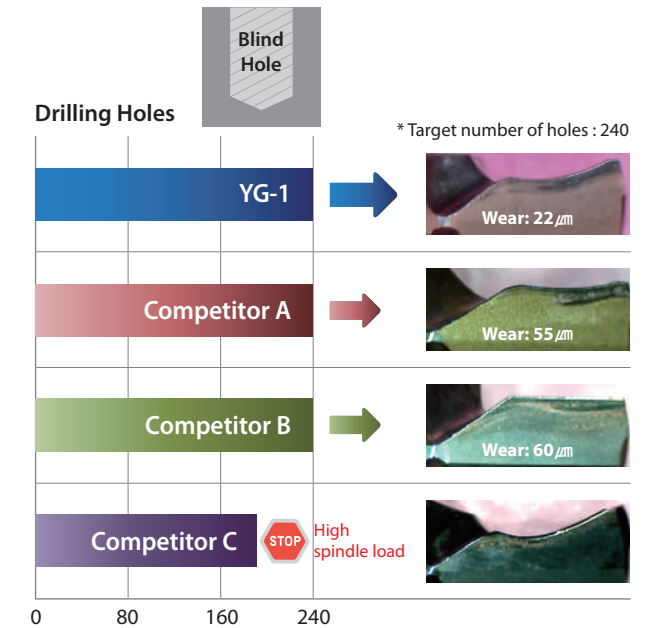
CASE STUDY

i-ONE DRILLS GENERAL

► Ø14.0mm, Alloy Steel

Cutting Condition

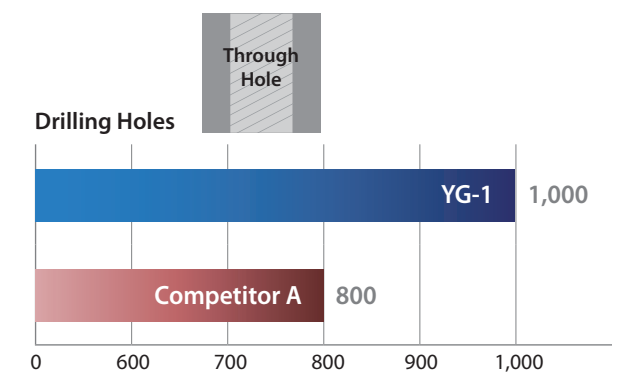
O.D Size	Ø14.0
Work Material	- DIN: 42CrMo4 - AISI: 4140 - JIS: SCM440 (HRC30)
Cutting Speed	80 m/min.
RPM	1,819 rev./min.
Feed	0.18 mm/rev.
Drilling Depth	65.0 mm (Blind)
Cooling Method	Internal Cooling (35 bar) Water Soluble (9% Emulsion)
Machine	Machining Center



► Ø16.0mm, Pre-Hardened

Cutting Condition

O.D Size	Ø16.0
Work Material	- DIN: CK45 - AISI: 1045 - JIS: S45C (HRC20)
Cutting Speed	75 m/min.
RPM	1,493 rev./min.
Feed	0.3 mm/rev.
Drilling Depth	35.0 mm (Through)
Cooling Method	Internal Cooling (10 bar) Water Soluble (9% Emulsion)
Machine	Machining Center



GUIDE TO ICONS

Tool Raw Material



Point Angle



Cutting Condition



Tolerance of Dimension



Tolerance of Outside Diameter



Tolerance of Shank Diameter

Surface Treatment



H Coating



Z Coating

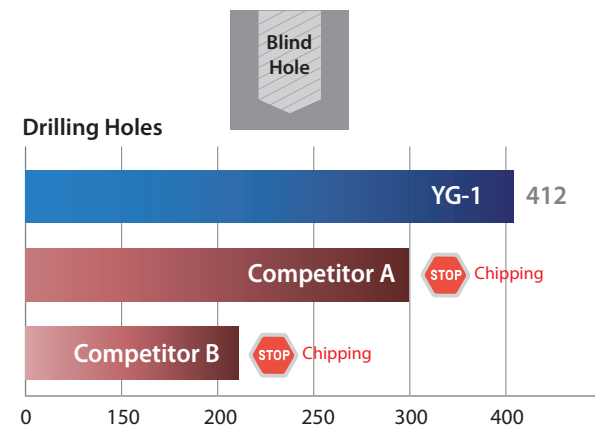
CASE STUDY

i-ONE DRILLS INOX

► Ø14.0mm, SUS304

Cutting Condition

O.D Size	Ø14.0
Work Material	- DIN: X5CrNi18-9 - AISI: 304 - JIS: SUS304
Cutting Speed	50 m/min.
RPM	1,137 rev./min.
Feed	0.15 mm/rev.
Drilling Depth	66.0 mm (Blind)
Cooling Method	Internal Cooling (15 bar) Water Soluble (9% Emulsion)
Machine	Vertical Machining Center



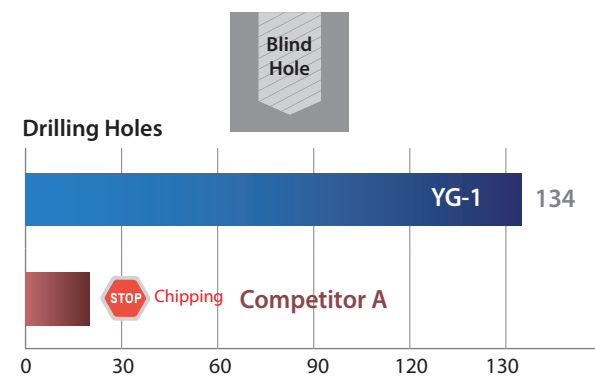
Tool Wear Comparison



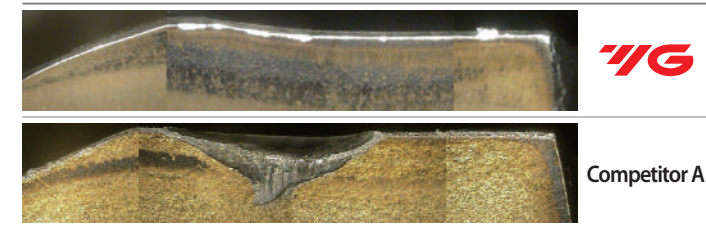
► Ø25.0mm, SUS304

Cutting Condition

O.D Size	Ø25.0
Work Material	- DIN: X5CrNi18-9 - AISI: 304 - JIS: SUS304
Cutting Speed	50 m/min.
RPM	637 rev./min.
Feed	0.20 mm/rev.
Drilling Depth	110.0 mm (Blind)
Cooling Method	Internal Cooling (15 bar) Water Soluble (9% Emulsion)
Machine	Vertical Machining Center



Tool Wear Comparison



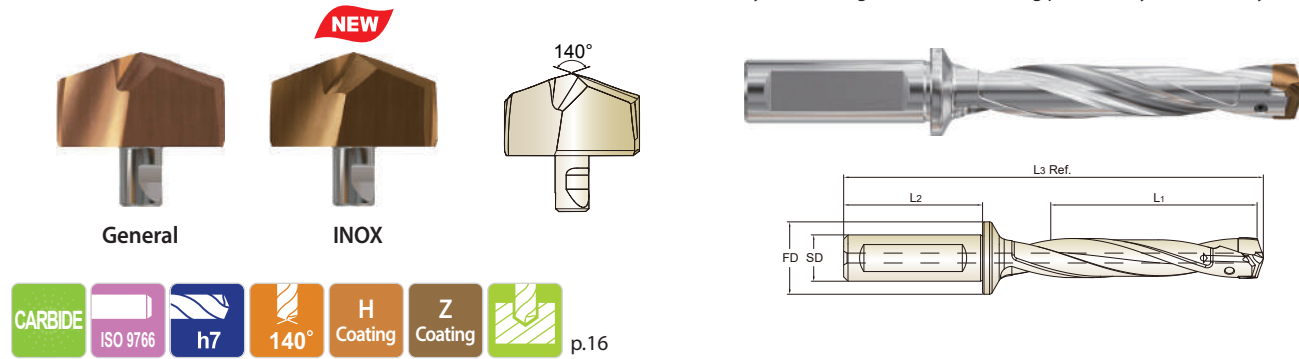
 SELECTION GUIDE						General	INOX					
						SERIES	Y*1H				Y*2Z	
							SIZE MIN				10.00	10.00
							SIZE MAX				33.50	33.50
						H-Coating	Z-Coating	3XD	5XD	8XD		
 High-Performance Exchangeable for General Steels, Cast Iron and Stainless Steels												
						© : Excellent ○ : Good						
ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment		HB	HRc						
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	Malleable cast iron	Ferritic		130		◎		◎	◎	◎	
	20		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	Cutting Alloys, PB>1%		110							
	27		CuZn, CuSnZn (Brass)		90							
	28	Copper Alloys (Bronze / Brass)	CuSn, lead-free copper and electrolytic copper		100							
	29		Duroplastic, Fiber Reinforced Plastic									
	30	Non Metallic Materials	Rubber, Wood, etc.									
S	31	Heat Resistant Super Alloys	Fe Based	Annealed	200	15						
	32			Cured	280	30						
	33		Ni or Co Based	Annealed	250	25						
	34			Cured	350	38						
	35		Titanium Alloys	Cast		320	34					
	36	Pure Titanium		400 Rm								
	37	Alpha + Beta Alloys Hardened		1050 Rm								
H	38	Hardened steel	Hardened		550	55						
	39		Hardened		630	60						
	40	Chilled Cast Iron	Cast		400	42						
	41	Hardened Cast Iron	Hardened		550	55						

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

SERIES
General **Y101H**
INOX **Y102Z**

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
- Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
- High-Performance with cost efficiency
- Multi-layered coating delivers outstanding productivity and reliability



Unit : mm											
Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1	L3 Ref.	Screw No.	
S10 Ø10.00 to Ø11.90	Y101H1000	Y102Z1000	10.00	ZD10003016	16	48	23	3D	31.5	103.0	TX1011P5
	Y101H1010	Y102Z1010	10.10					5D	52.5	123.0	
	Y101H1020	Y102Z1020	10.20					8D	84.0	153.0	
	Y101H1030	Y102Z1030	10.30								
	Y101H1040	Y102Z1040	10.40	ZD10503016	16	48	23	3D	33.0	104.0	
	Y101H1050	Y102Z1050	10.50					5D	55.0	125.0	
	Y101H1060	Y102Z1060	10.60					8D	88.0	156.5	
	Y101H1070	Y102Z1070	10.70								
	Y101H1080	Y102Z1080	10.80	ZD11003016	16	48	23	3D	34.5	105.0	
	Y101H1090	Y102Z1090	10.90					5D	57.5	127.0	
	Y101H1100	Y102Z1100	11.00					8D	92.0	160.0	
	Y101H1110	Y102Z1110	11.10								
	Y101H1120	Y102Z1120	11.20	ZD11503016	16	48	23	3D	36.0	106.0	
	Y101H1130	Y102Z1130	11.30					5D	60.0	129.0	
	Y101H1140	Y102Z1140	11.40					8D	96.0	163.5	
	Y101H1150	Y102Z1150	11.50								
	Y101H1160	Y102Z1160	11.60	ZD11508016	16	48	23	3D	36.0	106.0	
	Y101H1170	Y102Z1170	11.70					5D	60.0	129.0	
	Y101H1180	Y102Z1180	11.80					8D	96.0	163.5	
	Y101H1190	Y102Z1190	11.90								

► Other diameters of insert and shank types of holder are available upon request.

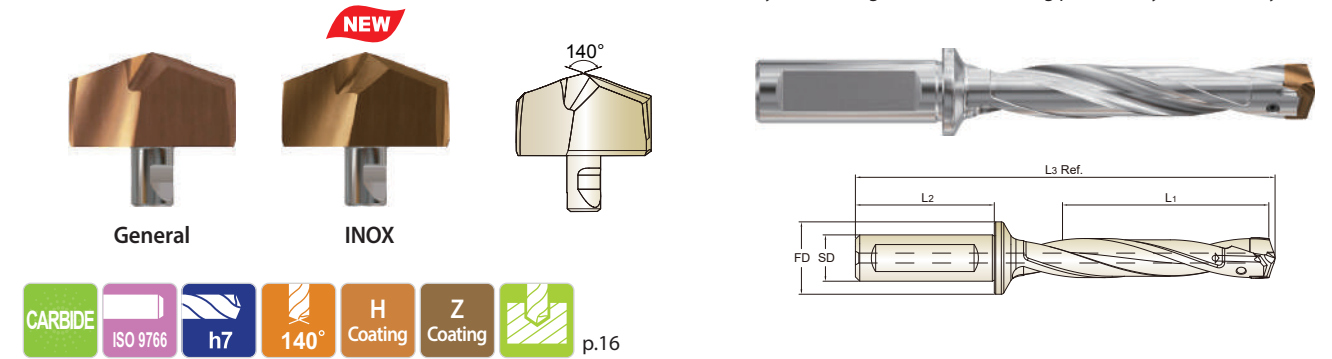
																				◎ : Excellent ○ : Good			
ISO	P										M				K								
Material Description	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel				Grey cast iron		Nodular cast iron		Malleable cast iron		
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
HRC		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21			
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230			
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎				◎	◎	◎	◎	◎	◎			
INOX	○	○	○	○		○	○			○		◎	◎	◎									
ISO	N										S							H					
Material Description	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	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41		
HRC											15	30	25	38	34			55	60	42	55		
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550		
General																							
INOX																							

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

General **Y121H**
INOX **Y122Z**

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
- Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
- High-Performance with cost efficiency
- Multi-layered coating delivers outstanding productivity and reliability



Unit : mm

Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	 Screw No.
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1		L3 Ref.	
S12 Ø12.00 to Ø13.90	Y121H1200	Y122Z1200	12.00	ZD12003016	16	48	23	3D	37.5	109.8	TX1213P5
	Y121H1210	Y122Z1210	12.10					5D	62.5	133.8	
	Y121H1220	Y122Z1220	12.20					8D	100.0	169.8	
	Y121H1230	Y122Z1230	12.30								
	Y121H1240	Y122Z1240	12.40								
	Y121H1250	Y122Z1250	12.50	ZD12503016	16	48	23	3D	39.0	110.8	
	Y121H1260	Y122Z1260	12.60					5D	65.0	135.8	
	Y121H1270	Y122Z1270	12.70					8D	104.0	173.3	
	Y121H1280	Y122Z1280	12.80								
	Y121H1290	Y122Z1290	12.90								
	Y121H1300	Y122Z1300	13.00	ZD13003016	16	48	23	3D	40.5	112.8	
	Y121H1310	Y122Z1310	13.10					5D	67.5	138.8	
	Y121H1320	Y122Z1320	13.20					8D	108.0	177.8	
	Y121H1330	Y122Z1330	13.30								
	Y121H1340	Y122Z1340	13.40								
	Y121H1350	Y122Z1350	13.50	ZD13503016	16	48	23	3D	42.0	113.8	
	Y121H1360	Y122Z1360	13.60					5D	70.0	140.8	
	Y121H1370	Y122Z1370	13.70					8D	112.0	181.3	
	Y121H1380	Y122Z1380	13.80								
	Y121H1390	Y122Z1390	13.90								

► Other diameters of insert and shank types of holder are available upon request.

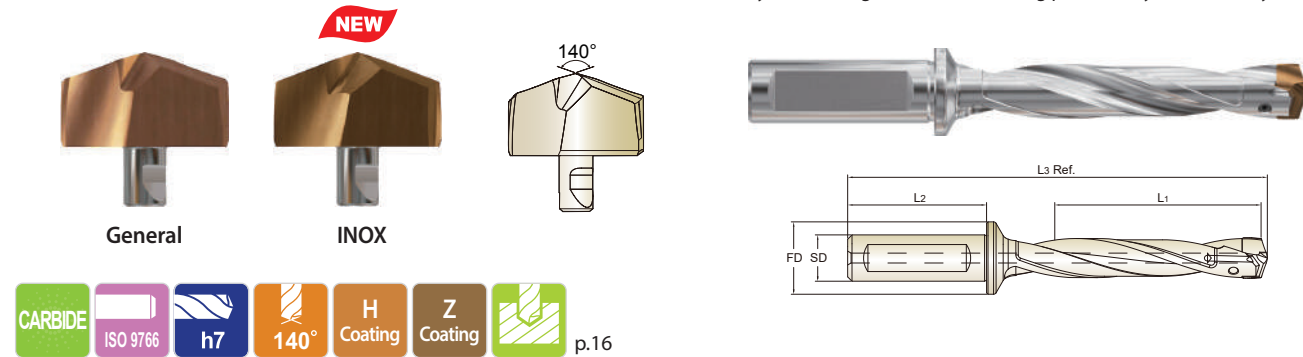
◎ : Excellent ○ : Good																				
ISO	P										M				K					
Material Description	Non-alloy steel					Low alloy steel				High alloy steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRC		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎				◎	◎	◎	◎	◎	◎
INOX	○	○	○	○		○	○			○		◎		◎						
ISO	N									S						H				
Material Description	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
VDI 3323	21	22	23	24	25	26	27	28	29 30	31	32	33	34	35	36	37	38	39	40	41
HRC										15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100		200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
General																				
INOX																				

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

SERIES
General **Y141H**
INOX **Y142Z**

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
- Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
- High-Performance with cost efficiency
- Multi-layered coating delivers outstanding productivity and reliability



Unit : mm											
Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	 Screw No.
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1	L3 Ref.		
S14 Ø14.00 to Ø15.90	Y141H1400	Y142Z1400	14.00	ZD14003016	16	48	23	3D	43.5	116.3	TX1415P7
	Y141H1410	Y142Z1410	14.10					5D	72.5	144.3	
	Y141H1420	Y142Z1420	14.20					8D	116.0	186.3	
	Y141H1430	Y142Z1430	14.30								
	Y141H1440	Y142Z1440	14.40	ZD14503016	16	48	23	3D	45.0	118.3	
	Y141H1460	Y142Z1460	14.60					5D	75.0	147.3	
	Y141H1470	Y142Z1470	14.70					8D	120.0	190.8	
	Y141H1480	Y142Z1480	14.80								
	Y141H1490	Y142Z1490	14.90	ZD15003016	16	48	23	3D	46.5	120.3	
	Y141H1500	Y142Z1500	15.00					5D	77.5	150.3	
	Y141H1510	Y142Z1510	15.10					8D	124.0	195.3	
	Y141H1520	Y142Z1520	15.20								
	Y141H1530	Y142Z1530	15.30	ZD15503016	16	48	23	3D	48.0	121.3	
	Y141H1540	Y142Z1540	15.40					5D	80.0	152.3	
	Y141H1550	Y142Z1550	15.50					8D	128.0	198.8	
	Y141H1560	Y142Z1560	15.60								
	Y141H1570	Y142Z1570	15.70								
	Y141H1580	Y142Z1580	15.80								
	Y141H1590	Y142Z1590	15.90								

► Other diameters of insert and shank types of holder are available upon request.

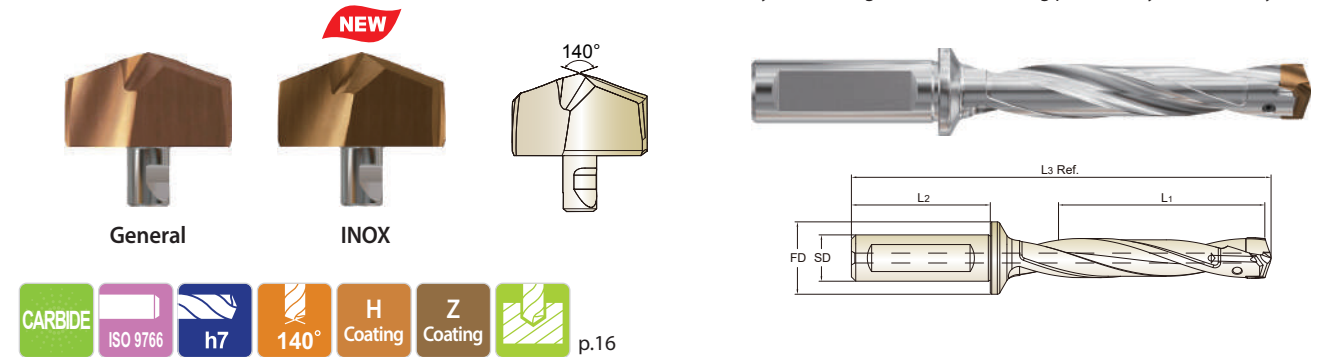
ISO	P										M				K							
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel				Grey cast iron		Nodular cast iron		Malleable cast iron		
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
HRC		13	25	28	32	10	29	32	38	15	35	15	23	10	15	26	3	25		21		
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230		
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎				◎	◎	◎	◎	◎	◎		
INOX	○	○	○	○		○	○			○		◎	◎	◎								
ISO	N										S						H					
Material Description	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	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRC											15	30	25	38	34			55	60	42	55	
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550	
General																						
INOX																						

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

General **Y161H**
INOX **Y162Z**

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
- Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
- High-Performance with cost efficiency
- Multi-layered coating delivers outstanding productivity and reliability



Unit : mm

Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	 Screw No.
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1	L3 Ref.		
S16 Ø16.00 to Ø17.90	Y161H1600	Y162Z1600	16.00	ZD16003020	20	50	25	3D	51.0	127.0	TX1617P7
	Y161H1610	Y162Z1610	16.10					5D	85.0	160.0	
	Y161H1620	Y162Z1620	16.20					8D	136.0	209.5	
	Y161H1630	Y162Z1630	16.30								
	Y161H1640	Y162Z1640	16.40	ZD16005020	20	50	25	3D	54.0	130.0	
	Y161H1650	Y162Z1650	16.50					5D	90.0	165.0	
	Y161H1660	Y162Z1660	16.60					8D	144.0	217.5	
	Y161H1670	Y162Z1670	16.70								
	Y161H1680	Y162Z1680	16.80	ZD17003020	20	50	25	3D	54.0	130.0	
	Y161H1690	Y162Z1690	16.90					5D	90.0	165.0	
	Y161H1700	Y162Z1700	17.00					8D	144.0	217.5	
	Y161H1710	Y162Z1710	17.10								
	Y161H1720	Y162Z1720	17.20	ZD17005020	20	50	25	3D	54.0	130.0	
	Y161H1730	Y162Z1730	17.30					5D	90.0	165.0	
	Y161H1740	Y162Z1740	17.40					8D	144.0	217.5	
	Y161H1750	Y162Z1750	17.50								
	Y161H1760	Y162Z1760	17.60	ZD17008020	20	50	25	3D	54.0	130.0	
	Y161H1770	Y162Z1770	17.70					5D	90.0	165.0	
	Y161H1780	Y162Z1780	17.80					8D	144.0	217.5	
	Y161H1790	Y162Z1790	17.90								

► Other diameters of insert and shank types of holder are available upon request.

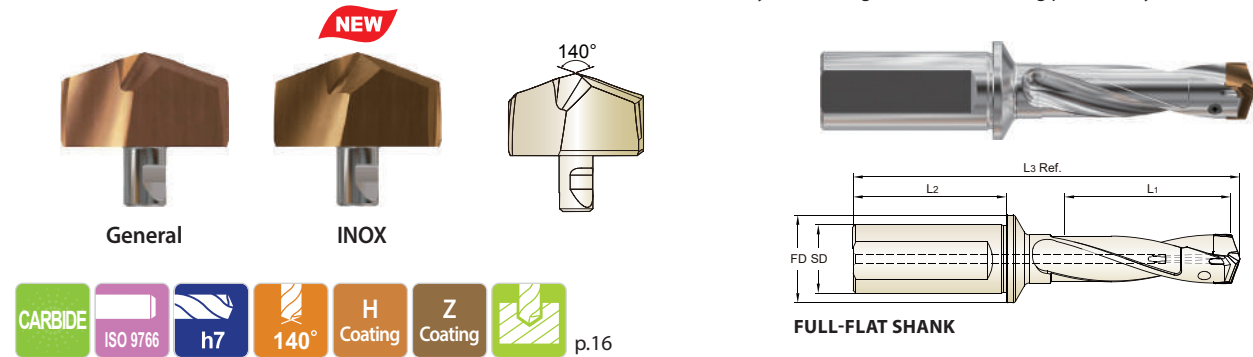
◎ : Excellent ○ : Good																					
ISO	P										M				K						
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel				Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRC		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎				◎	◎	◎	◎	◎	◎	
INOX	○	○	○	○		○	○			○		◎	◎	◎							
ISO	N										S						H				
Material Description	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
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRC											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
General																					
INOX																					

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

SERIES
General **Y181H**
INOX **Y182Z**

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
- Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
- High-Performance with cost efficiency
- Multi-layered coating delivers outstanding productivity and reliability



Unit : mm																				
Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	 Screw No.									
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1	L3 Ref.											
S18 Ø18.00 to Ø19.90	Y181H1800	Y182Z1800	18.00	ZD18003025	25	56	32	3D	57.0	141.3	TX1819P9									
	Y181H1810	Y182Z1810	18.10																	
	Y181H1820	Y182Z1820	18.20																	
	Y181H1830	Y182Z1830	18.30																	
	Y181H1840	Y182Z1840	18.40																	
	Y181H1850	Y182Z1850	18.50	ZD18005025				5D	95.0	178.3										
	Y181H1860	Y182Z1860	18.60									ZD18008025								
	Y181H1870	Y182Z1870	18.70																	
	Y181H1880	Y182Z1880	18.80	8D			152.0	233.8												
	Y181H1890	Y182Z1890	18.90																	
	Y181H1900	Y182Z1900	19.00	ZD19003025	25	56	32	3D	60.0	145.3										
	Y181H1910	Y182Z1910	19.10																	
	Y181H1920	Y182Z1920	19.20																	
	Y181H1930	Y182Z1930	19.30																	
	Y181H1940	Y182Z1940	19.40																	
	Y181H1950	Y182Z1950	19.50	ZD19005025				5D	100.0	184.3	TX1920P9									
	Y181H1960	Y182Z1960	19.60									ZD19008025								
	Y181H1970	Y182Z1970	19.70																	
	Y181H1980	Y182Z1980	19.80																	
	Y181H1990	Y182Z1990	19.90	8D			160.0	242.8												

► Other diameters of insert and shank types of holder are available upon request.

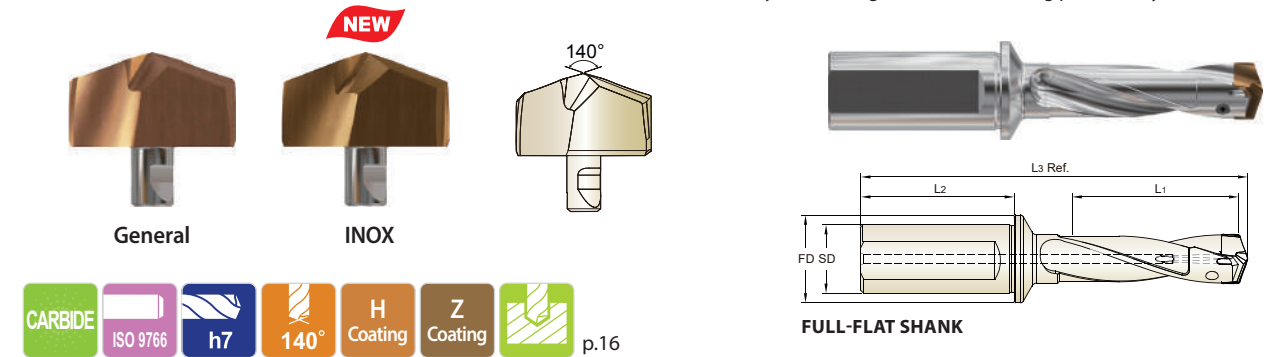
ISO	P										M				K			
Material Description	Non-alloy steel					Low alloy steel					Stainless steel				Grey cast iron			
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
HRC	13	25	28	32	38	10	29	32	38	15	23	10	26	3	25	3	25	21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	130
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
INOX	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
ISO	N										S				H			
Material Description	Aluminum-wrought alloy					Aluminum-cast, alloyed					Copper and Copper Alloys (Bronze / Brass)				Non Metallic Materials			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
HRC	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	15	30	25
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550
General																		
INOX																		

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

General **Y201H**
INOX **Y202Z**

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
- Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
- High-Performance with cost efficiency
- Multi-layered coating delivers outstanding productivity and reliability



Unit : mm

Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	 Screw No.
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1		L3 Ref.	
S20 Ø20.00 to Ø21.90	Y201H2000	Y202Z2000	20.00	ZD20003025	25	56	32	3D	63.0	147.5	TX2021P9
	Y201H2010	Y202Z2010	20.10								
	Y201H2020	Y202Z2020	20.20								
	Y201H2030	Y202Z2030	20.30								
	Y201H2040	Y202Z2040	20.40								
	Y201H2050	Y202Z2050	20.50								
	Y201H2060	Y202Z2060	20.60								
	Y201H2070	Y202Z2070	20.70								
	Y201H2080	Y202Z2080	20.80								
	Y201H2090	Y202Z2090	20.90								
	Y201H2100	Y202Z2100	21.00	ZD21003025	25	56	32	3D	66.0	150.5	TX2122P9
	Y201H2110	Y202Z2110	21.10								
	Y201H2120	Y202Z2120	21.20								
	Y201H2130	Y202Z2130	21.30								
	Y201H2140	Y202Z2140	21.40								
	Y201H2150	Y202Z2150	21.50								
	Y201H2160	Y202Z2160	21.60								
	Y201H2170	Y202Z2170	21.70								
	Y201H2180	Y202Z2180	21.80								
	Y201H2190	Y202Z2190	21.90								

► Other diameters of insert and shank types of holder are available upon request.

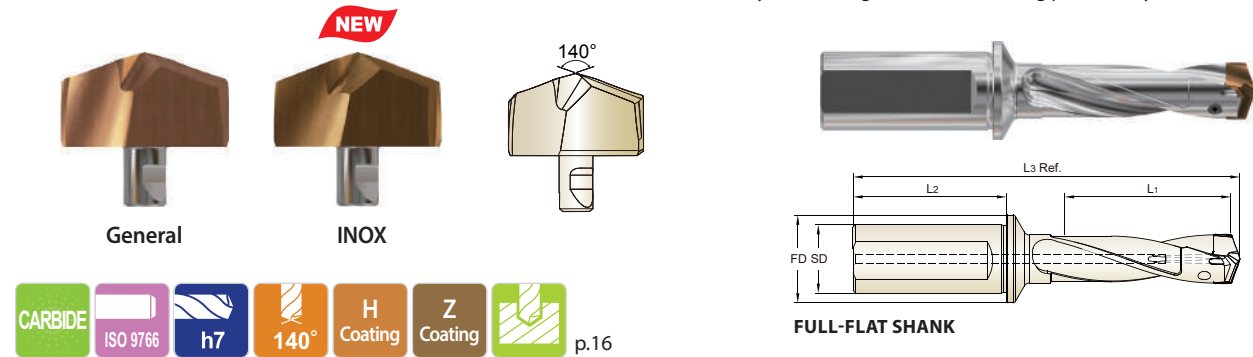
ISO	P										M				K			
Material Description	Non-alloy steel					Low alloy steel					Stainless steel				Grey cast iron			
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
HRC	13	25	28	32	38	10	29	32	38	15	23	10	26	3	25	3	25	21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	130
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
INOX	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
ISO	N										S				H			
Material Description	Aluminum-wrought alloy					Aluminum-cast, alloyed					Copper and Copper Alloys (Bronze / Brass)				Non Metallic Materials			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
HRC	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	15	30	25
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550
General																		
INOX																		

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

SERIES
General **Y221H**
INOX **Y222Z**

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
- Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
- High-Performance with cost efficiency
- Multi-layered coating delivers outstanding productivity and reliability



Unit : mm

Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	 Screw No.
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1	L3 Ref.		
S22 Ø22.00 to Ø23.90	Y221H2200	Y222Z2200	22.00	ZD22003025	25	56	32	3D	69.0	153.4	TX2223P9
	Y221H2210	Y222Z2210	22.10								
	Y221H2220	Y222Z2220	22.20								
	Y221H2230	Y222Z2230	22.30								
	Y221H2240	Y222Z2240	22.40								
	Y221H2250	Y222Z2250	22.50								
	Y221H2260	Y222Z2260	22.60	ZD22008025	25	56	32	5D	115.0	198.4	TX2223P9
	Y221H2270	Y222Z2270	22.70								
	Y221H2280	Y222Z2280	22.80								
	Y221H2290	Y222Z2290	22.90	ZD23003025	25	56	32	3D	72.0	157.4	TX2324P9
	Y221H2300	Y222Z2300	23.00								
	Y221H2310	Y222Z2310	23.10								
	Y221H2320	Y222Z2320	23.20								
	Y221H2330	Y222Z2330	23.30								
	Y221H2340	Y222Z2340	23.40								
	Y221H2350	Y222Z2350	23.50					5D	120.0	204.4	TX2324P9
	Y221H2360	Y222Z2360	23.60								
	Y221H2370	Y222Z2370	23.70								
	Y221H2380	Y222Z2380	23.80	ZD23008025	25	56	32	8D	192.0	274.9	
	Y221H2390	Y222Z2390	23.90								

► Other diameters of insert and shank types of holder are available upon request.

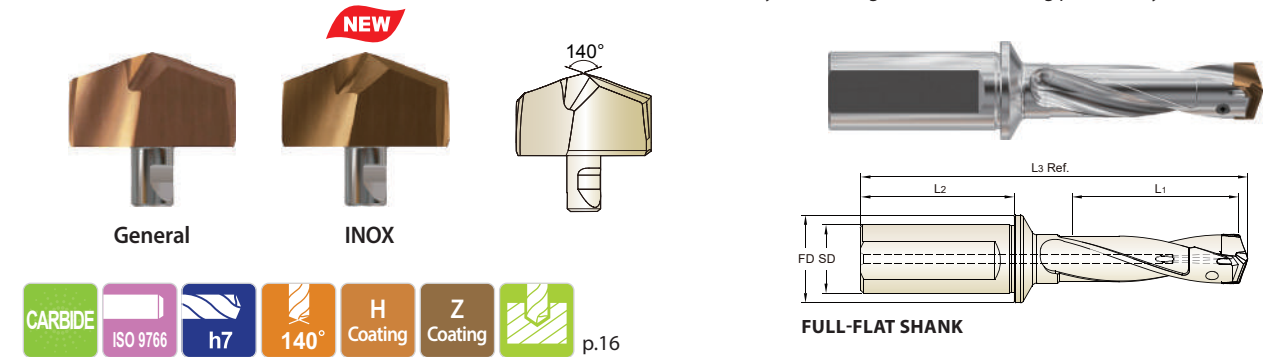
ISO	P										M				K			
Material Description	Non-alloy steel					Low alloy steel					Stainless steel				Grey cast iron			
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
HRC	13	25	28	32	38	10	29	32	38	15	23	10	10	26	3	25	3	25
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	130
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
INOX	○	○	○	○	○	○	○	○	○	○	◎	◎	◎	◎				
ISO	N										S				H			
Material Description	Aluminum-wrought alloy					Aluminum-cast, alloyed					Copper and Copper Alloys (Bronze / Brass)				Non Metallic Materials			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
HRC	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	15	30	25
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550
General																		
INOX																		

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

General **Y241H**
INOX **Y242Z**

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
- Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
- High-Performance with cost efficiency
- Multi-layered coating delivers outstanding productivity and reliability



Unit : mm

Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	 Screw No.
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1	L3 Ref.		
S24 Ø24.00 to Ø25.90	Y241H2400	Y242Z2400	24.00	ZD24003032	32	60	37	3D	75.0	165.8	TX2425P10
	Y241H2410	Y242Z2410	24.10								
	Y241H2420	Y242Z2420	24.20								
	Y241H2430	Y242Z2430	24.30								
	Y241H2440	Y242Z2440	24.40								
	Y241H2450	Y242Z2450	24.50	ZD24005032	32	60	37	5D	125.0	214.8	TX2425P10
	Y241H2460	Y242Z2460	24.60								
	Y241H2470	Y242Z2470	24.70								
	Y241H2480	Y242Z2480	24.80	ZD24008032	32	60	37	8D	200.0	288.3	
	Y241H2490	Y242Z2490	24.90								
	Y241H2500	Y242Z2500	25.00	ZD25003032	32	60	37	3D	78.0	170.8	TX2526P10
	Y241H2510	Y242Z2510	25.10								
	Y241H2520	Y242Z2520	25.20								
	Y241H2530	Y242Z2530	25.30								
	Y241H2540	Y242Z2540	25.40								
	Y241H2550	Y242Z2550	25.50					5D	130.0	221.8	TX2526P10
	Y241H2560	Y242Z2560	25.60								
	Y241H2570	Y242Z2570	25.70								
	Y241H2580	Y242Z2580	25.80	ZD25008032	32	60	37	8D	208.0	298.3	
	Y241H2590	Y242Z2590	25.90								

► Other diameters of insert and shank types of holder are available upon request.

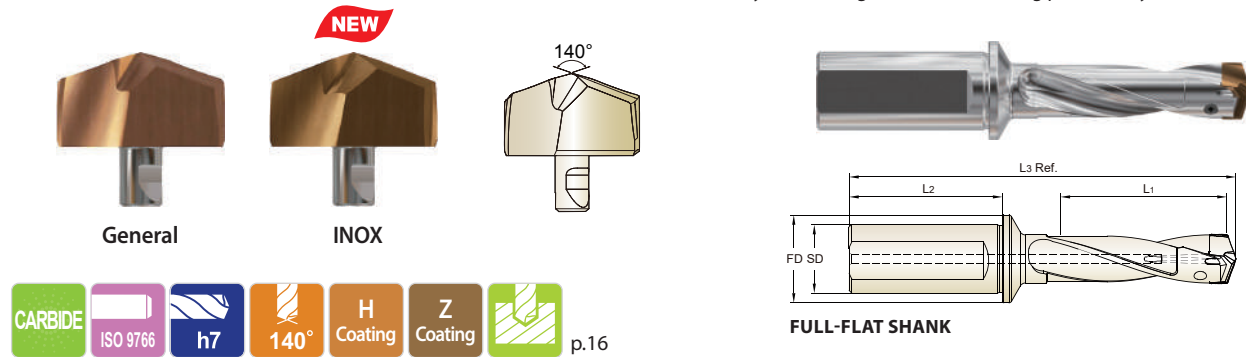
ISO	P										M				K			
Material Description	Non-alloy steel					Low alloy steel					Stainless steel				Grey cast iron			
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
HRC	13	25	28	32	38	10	29	32	38	15	23	10	10	26	3	25	3	25
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	130
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
INOX	○	○	○	○	○	○	○	○	○	○	◎	◎	◎	◎				
ISO	N										S				H			
Material Description	Aluminum-wrought alloy					Aluminum-cast, alloyed					Copper and Copper Alloys (Bronze / Brass)				Non Metallic Materials			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
HRC	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	15	30	25
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550
General																		
INOX																		

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

General	Y261H	Y281H
INOX	Y262Z	Y282Z

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
 - Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
 - High-Performance with cost efficiency
 - Multi-layered coating delivers outstanding productivity and reliability



Unit : mm											
Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	 Screw No.
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1	L3 Ref.		
S26 Ø26.00 to Ø27.50	Y261H2600	Y262Z2600	26.00	ZD26003032	32	60	37	3D	81.0	172.2	TX2627P10
	Y261H2650	Y262Z2650	26.50	ZD26005032				5D	135.0	225.2	
				ZD26008032				8D	216.0	304.7	
	Y261H2700	Y262Z2700	27.00	ZD27003032	32	60	37	3D	84.0	175.2	TX2728P10
	Y261H2750	Y262Z2750	27.50	ZD27005032				5D	140.0	230.2	
			ZD27008032	8D				224.0	312.7		
S28 Ø28.00 to Ø29.50	Y281H2800	Y282Z2800	28.00	ZD28003032	32	60	37	3D	87.0	179.2	TX2829P10
	Y281H2850	Y282Z2850	28.50	ZD28005032				5D	145.0	236.2	
				ZD28008032				8D	232.0	321.7	
	Y281H2900	Y282Z2900	29.00	ZD29003032	32	60	37	3D	90.0	183.2	TX2930P10
	Y281H2950	Y282Z2950	29.50	ZD29005032				5D	150.0	242.2	
			ZD29008032	8D				240.0	330.7		

► Other diameters of insert and shank types of holder are available upon request.

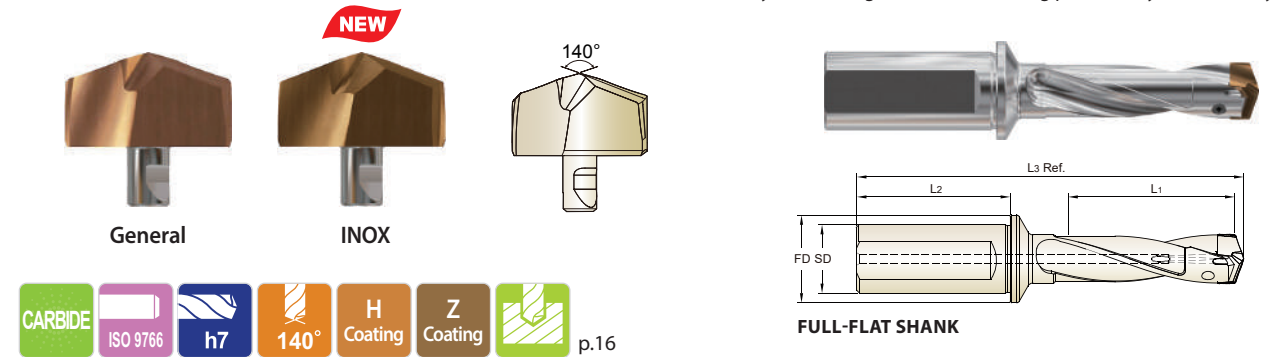
◎ : Excellent ○ : Good																						
ISO	P										M				K							
Material Description	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron		
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
HRC		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21		
HB	125	190	250		270	300	180	275	300	350	200	325		200	240	180	180	260	160	250	130	230
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎					◎	◎	◎	◎	◎	◎	
INOX	○	○	○	○		○	○			○			◎	◎	◎							
ISO	N										S							H				
Material Description	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
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRC											15	30	25	38	34			55	60	42	55	
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550	
General																						
INOX																						

MICRO GRAIN CARBIDE INSERTS and PREMIUM TOOL STEEL HOLDERS
i-ONE DRILLS INSERTS & HOLDERS

General	Y301H	Y321H
INOX	Y302Z	Y322Z

- Applications
- For Carbon Steels, Alloy Steels, Cast Iron and Stainless Steels
 - Holder length: 3xD, 5xD, 8xD

- Benefits
- Secure and quick clamping system
 - High-Performance with cost efficiency
 - Multi-layered coating delivers outstanding productivity and reliability



Unit : mm											
Series Range	Insert EDP No.		Insert O.D.	Holder EDP No.	Shank Dia.	Shank Length	Flange Dia.	Drilling Depth		Overall Length	
	General (H-Coating)	INOX (Z-Coating)	h7		SD	L2	FD	L1		L3 Ref.	Screw No.
S30 Ø30.00 to Ø31.50	Y301H3000	Y302Z3000	30.00	ZD30003032	32	60	37	3D	93.0	187.0	TX3031P15
	Y301H3050	Y302Z3050	30.50	ZD30005032				5D	155.0	248.0	
				ZD30008032				8D	248.0	339.5	
	Y301H3100	Y302Z3100	31.00	ZD31003032	32	60	37	3D	96.0	191.0	TX3132P15
Y301H3150	Y302Z3150	31.50	ZD31005032	5D				160.0	254.0		
			ZD31008032	8D				256.0	348.5		
S32 Ø32.00 to Ø33.50	Y321H3200	Y322Z3200	32.00	ZD32003032	32	60	37	3D	99.0	197.2	TX3233P15
	Y321H3250	Y322Z3250	32.50	ZD32005032				5D	165.0	262.2	
				ZD32008032				8D	264.0	359.7	
	Y321H3300	Y322Z3300	33.00	ZD33003032	32	60	37	3D	102.0	201.2	TX3334P15
Y321H3350	Y322Z3350	33.50	ZD33005032	5D				170.0	268.2		
			ZD33008032	8D				272.0	368.7		

► Other diameters of insert and shank types of holder are available upon request.

◎ : Excellent ○ : Good																				
ISO	P										M				K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel	Stainless steel				Grey cast iron		Nodular cast iron		Malleable cast iron	
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	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
General	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎			◎	◎	◎	◎	◎
INOX	○	○	○	○		○	○			○			◎		◎					
ISO	N										S						H			
Material Description	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
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Hrc											15	30	25	38	34			55	60	42
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400
General																				
INOX																				

i-ONE DRILLS - General

Vc=m/min.
Feed=mm/rev.

ISO	VDI 3323	Material Description	Vc	Feed					
				Ø10.00 - 13.99	Ø14.00 - 17.99	Ø18.00 - 21.99	Ø22.00 - 25.99	Ø26.00 - 29.99	Ø30.00 - 33.99
P	1	Non-alloy steel	80 - 135	0.13 - 0.29	0.20 - 0.35	0.26 - 0.41	0.31 - 0.47	0.35 - 0.51	0.38 - 0.53
	2		70 - 120						
	3		70 - 95						
	4		70 - 95						
	5		40 - 80						
	6	Low alloy steel	80 - 100	0.12 - 0.28	0.19 - 0.34	0.25 - 0.40	0.30 - 0.45	0.34 - 0.49	0.36 - 0.51
	7		70 - 90						
	8		60 - 80						
	9		50 - 60						
	10	High alloyed steel, and tool steel	45 - 80	0.12 - 0.25	0.17 - 0.30	0.22 - 0.35	0.26 - 0.39	0.29 - 0.42	0.32 - 0.45
	11		35 - 70						
K	15	Grey cast iron	100 - 180	0.15 - 0.35	0.25 - 0.45	0.32 - 0.52	0.38 - 0.58	0.42 - 0.62	0.45 - 0.65
	16		90 - 160						
	17	Nodular cast iron	100 - 150						
	18		90 - 140						
	19	Malleable cast iron	100 - 150						
	20		90 - 140						

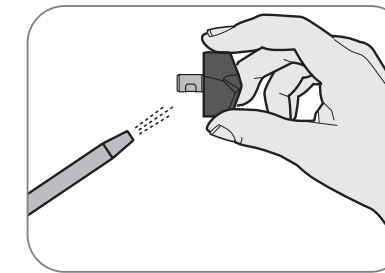
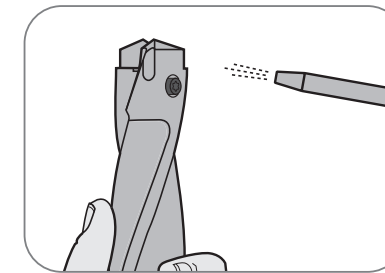
i-ONE DRILLS - INOX

Vc=m/min.
Feed=mm/rev.

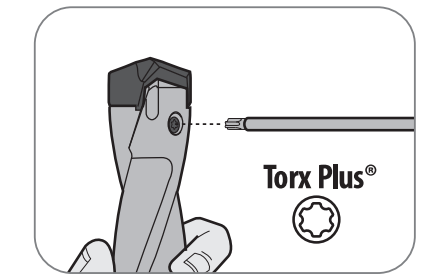
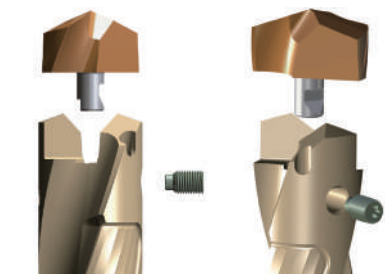
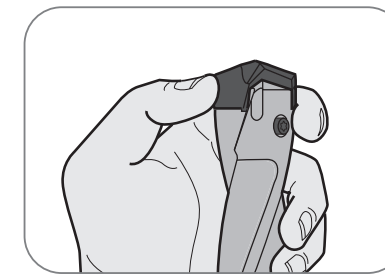
ISO	VDI 3323	Material Description	Vc	Feed					
				Ø10.00 - 13.99	Ø14.00 - 17.99	Ø18.00 - 21.99	Ø22.00 - 25.99	Ø26.00 - 29.99	Ø30.00 - 33.99
P	1	Non-alloy steel	80 - 135	0.13 - 0.29	0.20 - 0.35	0.26 - 0.41	0.31 - 0.47	0.35 - 0.51	0.38 - 0.53
	2		70 - 120						
	3		70 - 95						
	4		70 - 95						
	6	Low alloy steel	80 - 100	0.12 - 0.28	0.19 - 0.34	0.25 - 0.40	0.30 - 0.45	0.34 - 0.49	0.36 - 0.51
	7		70 - 90						
	10	High alloyed steel, and tool steel	45 - 80	0.12 - 0.25	0.17 - 0.30	0.22 - 0.35	0.26 - 0.39	0.29 - 0.42	0.32 - 0.45
M	12	Stainless steel	40 - 70	0.09 - 0.14	0.13 - 0.17	0.16 - 0.20	0.19 - 0.24	0.22 - 0.27	0.25 - 0.30
	13		35 - 60						
	14		35 - 60						

- 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, 8xD holders.
- For use of 8xD holder, we recommend to use a pilot drill with equal to or larger than 140° point angle (0.5xD -1.5xD). The use of the centering pre-hole improves hole location, roundness and surface finish.

ASSEMBLY OF i-ONE 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.

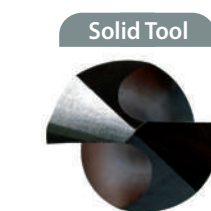
After confirming the insert is pressed down to the bottom of the slot, tighten the screw using anti-seize compound.

Wrench Type	Product No.	Series (Insert Size)	Torx Plus®	Torque(N·m)
	TWFP05	S10~S12 (Ø10.00 ~ Ø13.90)	5 IP	0.6
	TWDP07	S14~S16 (Ø14.00 ~ Ø17.90)	7 IP	1.0
	TWDP09	S18~S22 (Ø18.00 ~ Ø23.90)	9 IP	1.5
	TWDP10	S24~S28 (Ø24.00 ~ Ø29.77)	10 IP	2.2
	TWDP15	S30~S32 (Ø30.00 ~ Ø33.73)	15 IP	3.2

Use the Torx Plus wrench

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

Comparison with Split Point Drill - Spade Drill & Dream Drill



Normal Split Point Drill



Spade Drill



Dream Drill

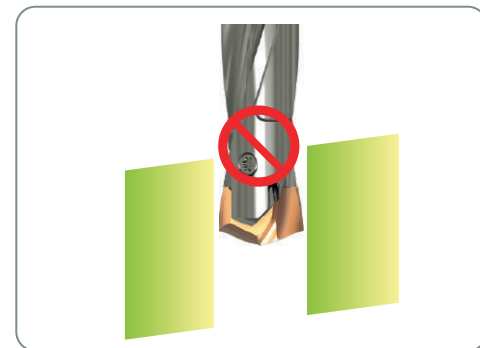


i-ONE Drills

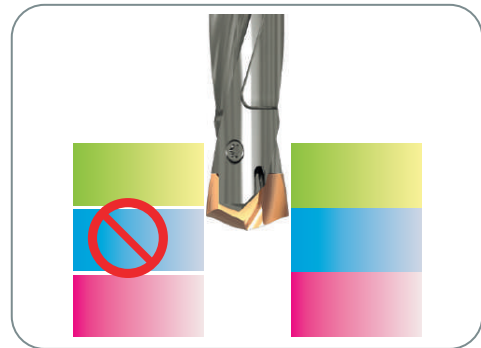
CAUTION-NOT RECOMMENDABLE APPLICATION



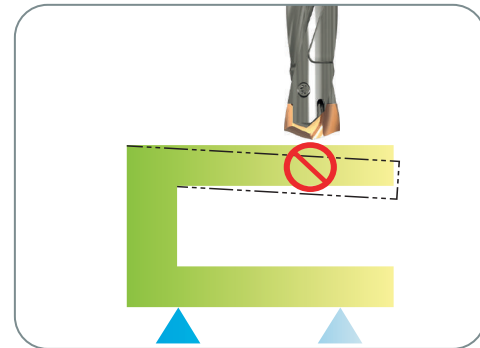
Intersecting cross hole is bigger than the drill insert's Margin Length.



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

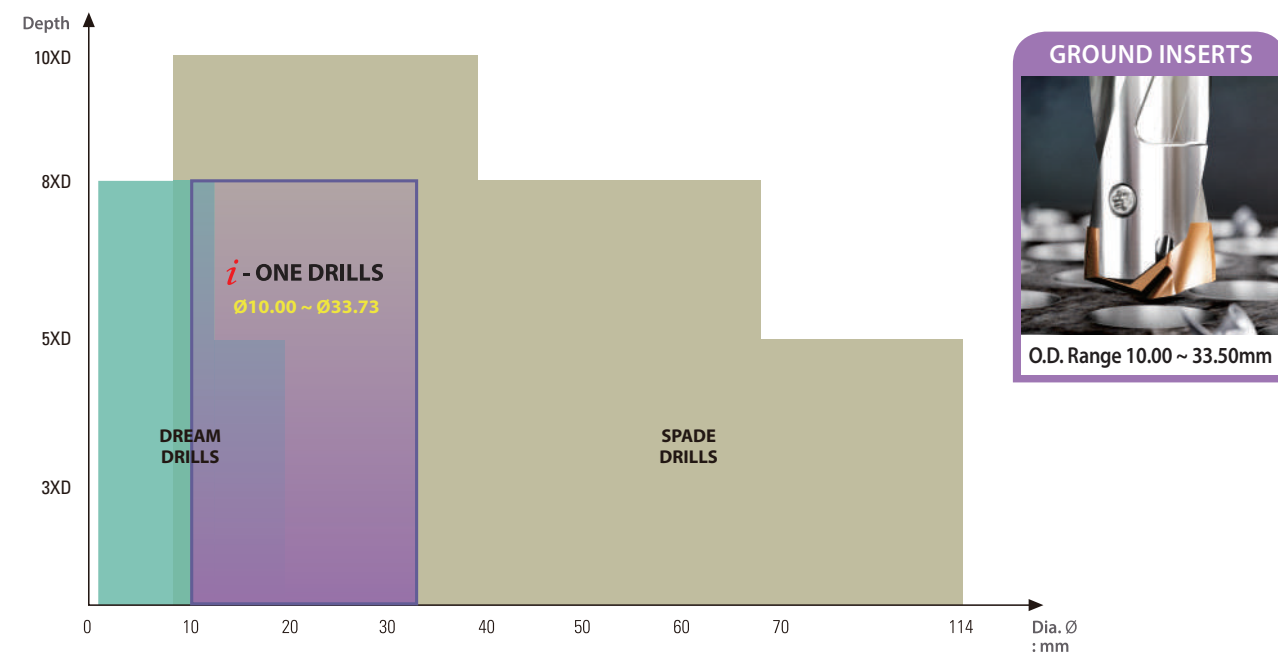


For drilling stacked plates, minimize the space between the plates. The space between stacked plates can cause insert breakage or poor chip control.

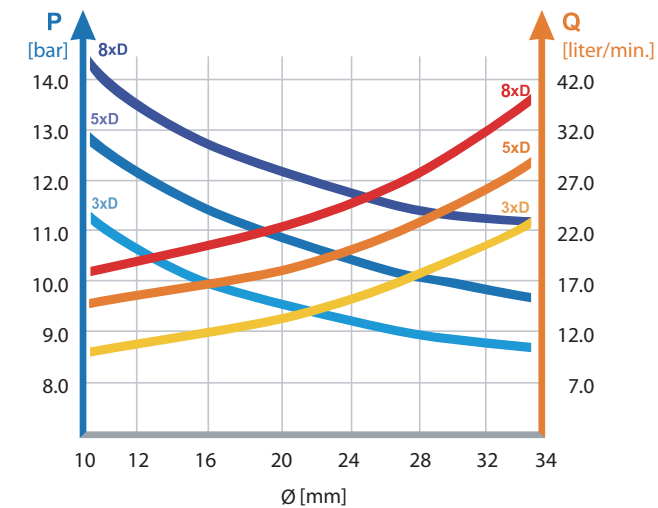


The material needs to be fixtured securely before drilling.

YG-1 EXCHANGEABLE RANGE OF DRILLS - POSITIONING MAP



RECOMMENDED COOLANT PRESSURE AND FLOW RATE ON VERTICAL DRILLING



- Recommended emulsion mix is 6 - 8%.
- For Drilling into 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.

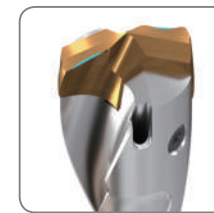
TROUBLE SHOOTING



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



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



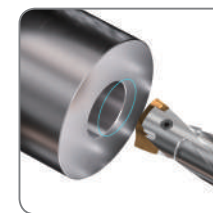
- 3) Build up on cutting edge
 - Increase cutting speed
 - Use a coated insert



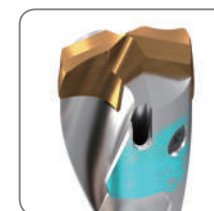
- 4) Chipping or break down on outer corner
 - Reduce feed
 - Rigid clamping of workpiece



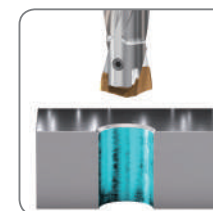
- 5) Wear of land margin
 - Rigid clamping of workpiece
 - Reduce cutting speed
 - Increase coolant flow



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



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



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



High-Performance Exchangeable for General Steels, Cast Iron and Stainless Steels

YG-1 CO., LTD.

HEAD OFFICE

13-40, Songdogwahak-ro 16beon-gil,
Yeonsu-gu, Incheon 21984, South Korea

Phone: +82-32-526-0909

www.yg1.solutions

E-mail: yg1@yg1.solutions

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