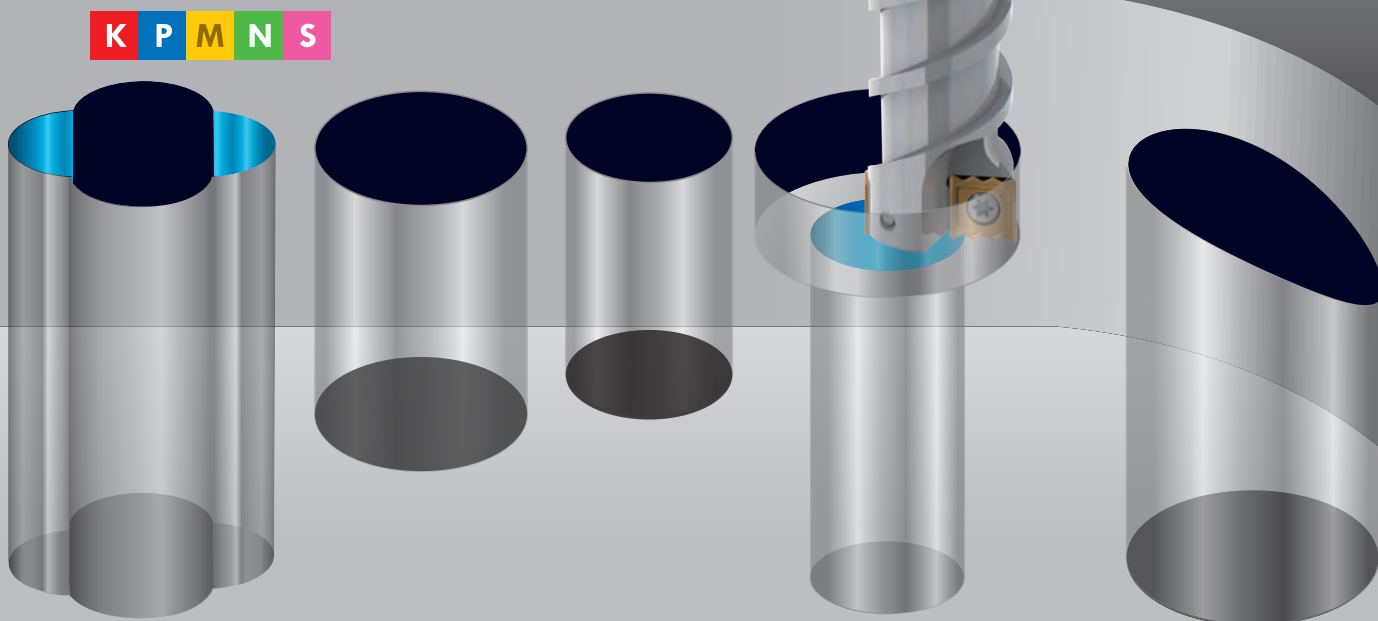




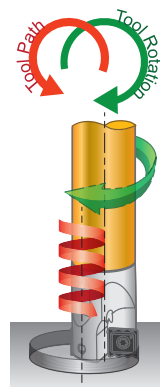
One Tool Performs
Multiple Applications



NC Helix Drill

Helical Interpolation

Cat. 04



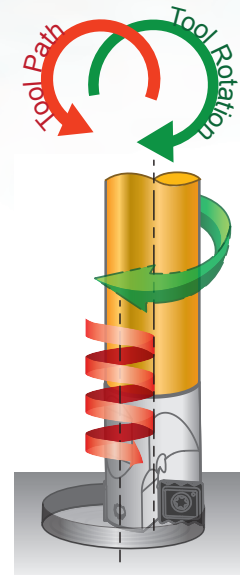
Principle



NC Helix Drill

Milling, Drilling & Slotting

Cuts material by helical interpolation;
serrated cutting edge minimizes chip length.
Low spindle power is required, good for drilling
material that generates long, soft chips.



20° Ramping Angle

Either linear or circular ramping.



Reduce Your Tool Inventory

Only six tools for making $\varnothing .512'' \sim \varnothing 2.65''$ ($\varnothing 13 \sim \varnothing 65\text{mm}$) hole from solid.

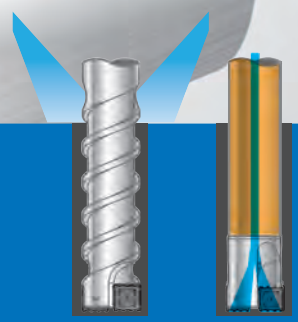
Each holder can machine different diameters and hole depths,
saving your tool inventory and cost!
No need to peck drill or dwell in operation,
even without internal coolant.





◀ **Cylindrical shank**
Apply external coolant

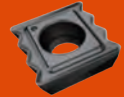



Screw fit type ▶
With center coolant hole
Apply internal coolant



Two shank types

Made from hardened high alloy steel

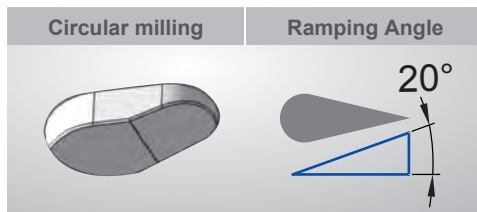
Contents

Insert		Page 03
Holder		Page 03
Technical Guide		Page 05
Application		Page 10

01

Feature
<Page 11>

Lower Spindle Power Consumption Easy to cut!

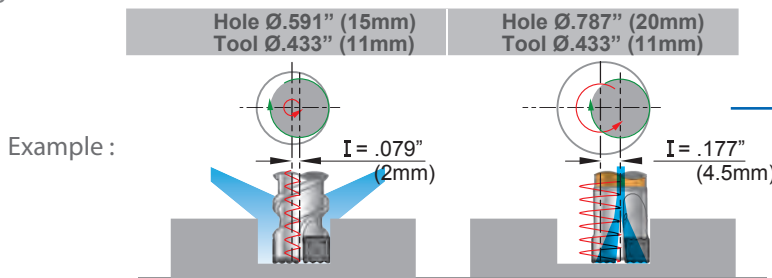


- Thanks to the small cutting load of the serrated cutting edge and helical interpolation, low power consumption of the spindle is required.
- Circular ramping milling, maximum ramping angle is 20°.
For example: tool HD27 machining $\text{Ø}1.969''$ (50 mm) hole, $.354''$ (9 mm) pitch for aluminum, $.236''$ (6 mm) pitch for carbon steel.

02

Feature
<Page 11>

Only six tools for drilling $\text{Ø}.512'' \sim \text{Ø}2.65''$ ($\text{Ø}13 \sim 65\text{mm}$)

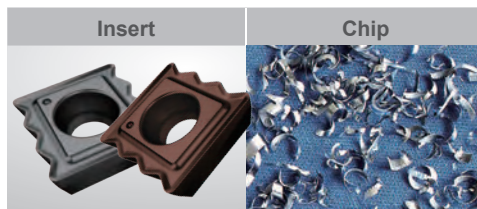


- Cuts by helical interpolation.
- Each holder can machine different diameters and hole depths.

03

Feature
<Page 10>

Special insert geometry for cutting different materials



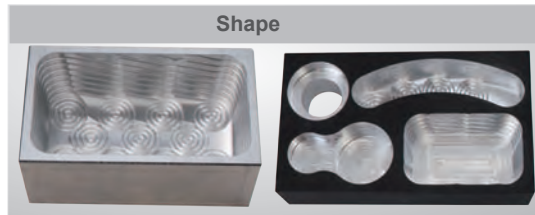
- Serrated cutting edge makes the chips short and small, and easier to evacuate.
- Eliminate swarf and vibration problems while drilling difficult or deep holes.



One tool performs multiple applications

04

Feature
<Page 12>

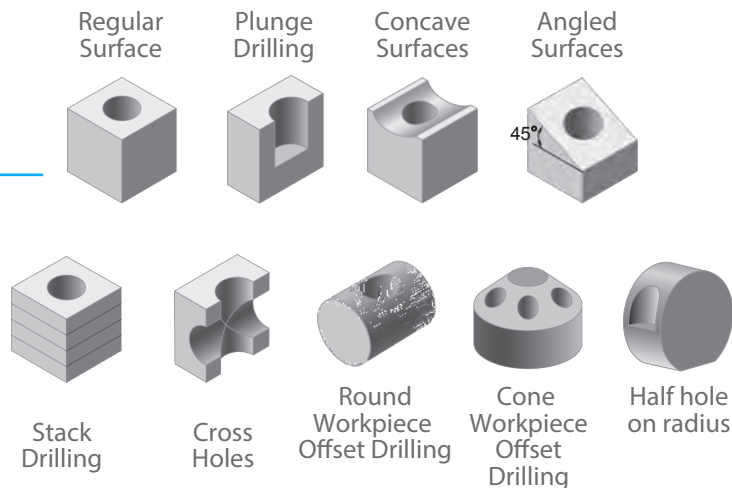


- Not only a drill, but an end mill too.
- Small radius path to cut a hole or step hole, various curved cavity shapes on different materials.

Functions in variable conditions

05

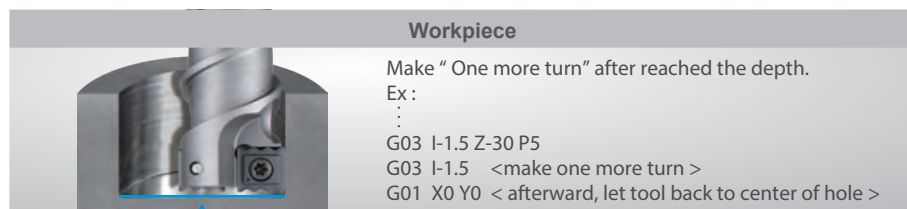
Feature
<Page 10>



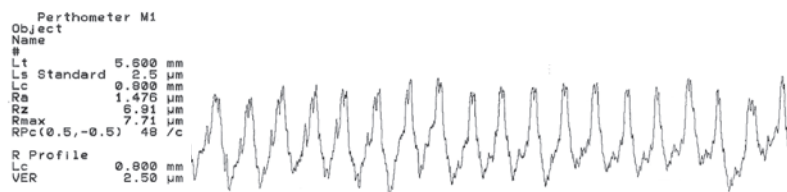
Roughness Measuring

Feature
<Page 10>

06



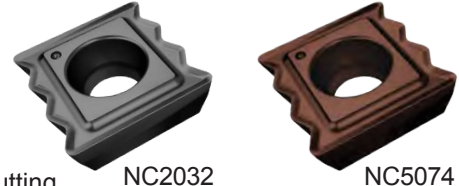
Flatness





Specification

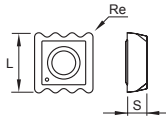
Insert



NC2032 : For general purpose. Suitable for almost any material.
Top recommendation is 2xDc machining, high performance cutting.

NC5074 : For smooth cutting. It resolves the chatter from weak clamping devices or low power machines.
Top recommendation is 3xDc or above. Also prevents chipping.

Ordering code	Grade	Coating	Dimensions			Screw	Key	* Max. Pitch	
			L	S	Re				
N9MX04T002	NC2032	K20F	TiAlN	.187" (4.75)	.071" (1.8)	.008" (0.2)	NS-18037 5.31 in.-lb. (0.6 Nm)	NK-T6	.118" (3.0)
	NC5074	P40	AlCrN						
N9MX05T103	NC2032	K20F	TiAlN	.226" (5.75)	.079" (2.0)	.012" (0.3)	NS-20045 5.31 in.-lb. (0.6 Nm)	NK-T6	.177" (4.5)
	NC5074	P40	AlCrN						
N9MX070204	NC2032	K20F	TiAlN	.295" (7.5)	.094" (2.4)	.016" (0.4)	NS-25045 7.97 in.-lb. (0.9 Nm)	NK-T7	.236" (6.0)
	NC5074	P40	AlCrN						
N9MX100306	NC2032	K20F	TiAlN	.394" (10.0)	.125" (3.18)	.024" (0.6)	NS-30072 17.7 in.-lb. (2.0 Nm)	NK-T9	.295" (7.5)
	NC5074	P40	AlCrN						
N9MX12T308	NC2032	K20F	TiAlN	.492" (12.5)	.156" (3.97)	.031" (0.8)	NS-35080 22.13 in.-lb. (2.5 Nm)	NK-T15	.354" (9.0)
	NC5074	P40	AlCrN						



* Maximum pitch refers to maximum ramping angle. Please see page 6.

Holder

Cylindrical Shank

► Helical chip-removing groove ►►

- Designed for CNC machines with external coolant
- Unique helical groove design generates chip-removing coolant stream.
- The helical groove is designed for the coolant to remove swarf from the cutting zone.
- For horizontal machining, it is necessary to increase coolant volume.

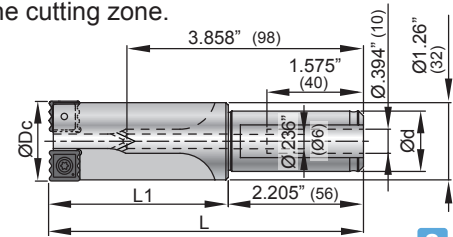
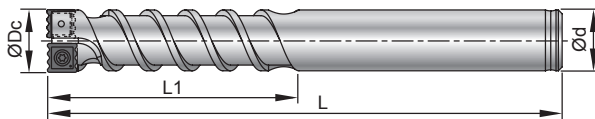


Fig.	Ordering Code	Type	Capable of drill dia. mm		Ød	ØDc	L	L1	Max. Depth	Insert type	* Max. ramping angle
			Dmin.	Dmax.							
	99321-010-1320	BC10-HD11-1320	.512" (13)	.787" (20)	.394" (10)	.433" (11)	3.150" (80)	1.575" (40)	1.181" (30)	N9MX04T002	20°
	99321-012-1525	BC12-HD13-1525	.591" (15)	.984" (25)	.472" (12)	.512" (13)	3.937" (100)	1.969" (50)	1.417" (36)	N9MX05T103	20°
1	99321-016-2030	BC16-HD17-2030	.787" (20)	1.181" (30)	.630" (16)	.669" (17)	4.331" (110)	2.362" (60)	1.969" (50)	N9MX070204	20°
	99321-020-2540	BC20-HD22-2540	.984" (25)	1.575" (40)	.787" (20)	.866" (22)	4.921" (125)	2.756" (70)	2.362" (60)	N9MX100306	20°
	99321-025-3050	BC25-HD27-3050	1.181" (30)	1.969" (50)	.984" (25)	1.063" (27)	6.496" (165)	3.346" (85)	2.953" (75)	N9MX12T308	20°
2	* 99321-025-4265	SL25-HD33-4265	1.654" (42)	2.559" (65)	.984" (25)	1.299" (33)	5.118" (130)	2.913" (74)	1.969" (50)		9°

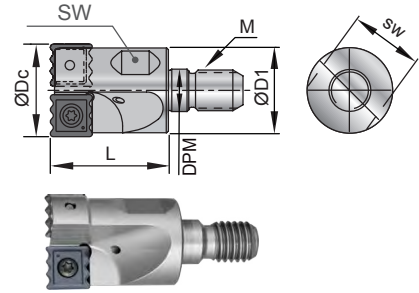
3 * 99321-025-4265 is Ø0.984" Side Lock Shank with internal coolant. * Maximum ramping angle refers to maximum pitch. Please see page 6.

Screw Fit Cutter

► Internal Coolant

- Designed for CNC machines with internal coolant.
- Standard screw-fit body adapts to almost any kind of the screw-fit tool holder or extension bar in the market.
- Use for enlarge hole.

* Use open ended spanner to tighten the cutter.



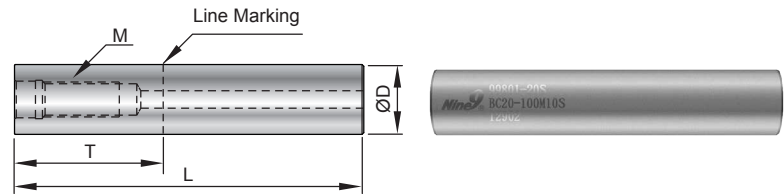
Ordering Code	Type	Capable of drill dia. mm		ØDc	ØD1	L	M	DPM	SW	Insert type	* Max. ramping angle
		Dmin.	Dmax.								
99323-010-1320	M05-HD11-1320	.512" (13)	.787" (20)	.433" (11)	.394" (10)	.787" (20)	M5	.217" (5.5)	.315" (8)	N9MX04T002	20°
99323-012-1525	M06-HD13-1525	.591" (15)	.984" (25)	.512" (13)	.472" (12)	.984" (25)	M6	.256" (6.5)	.394" (10)	N9MX05T103	20°
99323-016-2030	M08-HD17-2030	.787" (20)	1.181" (30)	.669" (17)	.630" (16)	.984" (25)	M8	.335" (8.5)	.551" (14)	N9MX070204	20°
99323-020-2540	M10-HD22-2540	.984" (25)	1.575" (40)	.866" (22)	.787" (20)	1.181" (30)	M10	.413" (10.5)	.709" (18)	N9MX100306	20°
99323-025-3050	M12-HD27-3050	1.181" (30)	1.969" (50)	1.063" (27)	.984" (25)	1.378" (35)	M12	.492" (12.5)	.906" (23)	N9MX12T308	20°

* Maximum ramping angle refers to maximum pitch. Please see page 6.

Extension Bar

Steel Type

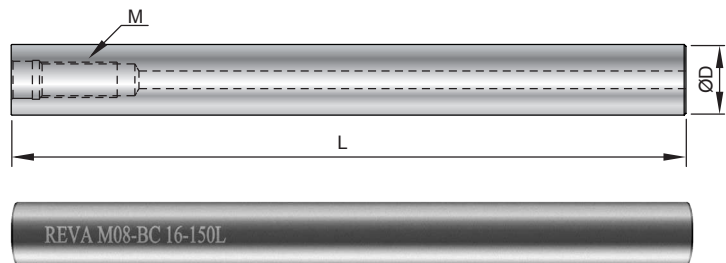
- T is the maximum overhang length.
- With internal coolant hole.



Ordering Code	Type	ØD	T	L	M
99801-10S	BC10-075M05S	.394" (10)	.984" (25)	2.953" (75)	M5
99801-12S	BC12-075M06S	.472" (12)	.984" (25)	2.953" (75)	M6
99801-16S	BC16-090M08S	.630" (16)	1.378" (35)	3.543" (90)	M8
99801-20S	BC20-100M10S	.787" (20)	1.575" (40)	3.937" (100)	M10
99801-25S	BC25-120M12S	.984" (25)	1.969" (50)	4.724" (120)	M12

Solid Carbide Type

- Insert NC5074 is recommended for deep hole cutting.
- With internal coolant hole.



Ordering Code	Type	ØD	L	M
398010-100M05	M05-BC10-100L	.394" (10)	3.937" (100)	M5
398012-100M06	M06-BC12-100L	.472" (12)	3.937" (100)	M6
398016-150M08	M08-BC16-150L	.630" (16)	5.906" (150)	M8
398020-200M10	M10-BC20-200L	.787" (20)	7.874" (200)	M10
398025-200M12	M12-BC25-200L	.984" (25)	7.874" (200)	M12



Technical Guide

Nine9



NC Helix Drill

※ Before you start, please pay attention the following conditions >>

1	2	3	4	5									
<p>Programming</p> <p>All NC Helix Drills must be programmed using helical interpolation</p>	<p>Recommend of Direction</p> <p>Tool path of moving downward by CCW (G03), Tool Rotation by CW direction is recommended.</p>	<p>For Start</p> <table border="1"> <tr> <td>Vc Low Value</td> <td>f Middle Value</td> <td>Pitch High Value</td> </tr> </table> <p style="text-align: center;">Result adjusting</p> <table border="1"> <tr> <td>Upgrade condition</td> <td>Improve condition</td> </tr> <tr> <td>Vc ↑ adj. 1</td> <td>f ↓ adj. 1</td> </tr> <tr> <td>f ↓ adj. 2</td> <td>P ↓ adj. 2</td> </tr> </table>	Vc Low Value	f Middle Value	Pitch High Value	Upgrade condition	Improve condition	Vc ↑ adj. 1	f ↓ adj. 1	f ↓ adj. 2	P ↓ adj. 2	<p>Through hole</p> <p>Reduce Vc 50% at last cycle.</p>	<p>Through hole Add 0.039" to the required depth (Z)</p> <p>Failure to program beyond the through hole may result in insert breakage due to the force from circular interpolation.</p>
Vc Low Value	f Middle Value	Pitch High Value											
Upgrade condition	Improve condition												
Vc ↑ adj. 1	f ↓ adj. 1												
f ↓ adj. 2	P ↓ adj. 2												

- The NC Helix Drill is programmed using "Helical interpolation" on CNC machine, the CNC controller must have 3-axis simultaneously motion function.

NC Helix Drill	Cutting Parameters (S & F)	Formula	
	$S = \frac{3.82 \times \text{SFM}}{D_c} \text{ r.p.m.}$	$D_c = \text{Dia. of Drill} \text{ Inch}$	
	$F = S \times \text{IPR} \text{ IPM}$	$D = \text{Dia. of Hole} \text{ Inch}$	
	$d = D - D_c \text{ Inch}$	$L = \text{Depth of Drilling} \text{ Inch}$	
	$I = \frac{(D - D_c)}{2} \text{ Inch}$	$V_c = \text{Cutting Speed} \text{ SFM}$	
	Cutting time (T)	$T = \frac{\pi \times d \times L \times 60}{F \times P} \text{ sec.}$	$S = \text{Spindle Speed} \text{ r.p.m.}$
	Chip removal Volume rate (Q)	$Q = \frac{\pi \times D^2 \times L \times 60}{4 \times T} \text{ Inch}^3 / \text{min.}$	$I = \text{Circular radius} \text{ Inch}$
		$f = \text{Feed rate} \text{ IPR}$	
		$F = \text{Table feed rate} \text{ IPM}$	
		$d = \text{Circular diameter (D-Dc)} \text{ Inch}$	
		$P = \text{Pitch of helical interpolation} \text{ Inch}$	
		$T = \text{Cutting time} \text{ sec.}$	
		$Q = \text{Chip removal volume rate} \text{ Inch}^3 / \text{min.}$	

Example	
Material	S45C (JIS)
Tool	99321-016-BC16-HD17, Dc= Ø0.669"
Insert	N9MX070204-NC2032
D= Ø1.181", L= 0.8"	
S =	(3.82x 393.6) / 0.669" = 2248 r.p.m.
F = S x f	2248 x 0.0102 = 22.93 IPM
P = 0.1575" (refer to cutting data P for Carbon Steel 0.45%C)	
d = D - Dc	1.181" - 0.669" = 0.512"
	$T = \frac{3.14 \times 0.512 \times 0.8 \times 60}{22.93 \times 0.1575} = 21 \text{ sec.}$
	$Q = \frac{3.14 \times 1.181^2 \times 0.8 \times 60}{4 \times 21} = 2.503 \text{ In.}^3 / \text{min.}$

Technical Guide

✂ Before you start, please pay attention the following conditions >>



6	7	8	9	10
<p>Flatness on blind hole bottom</p> <p>Make one more turn after reaching depth. Ex. : G03 I-1.5 Z-30 P5 G03 I-1.5 <make one more turn > G01 X0 Y0 < afterward return tool back to center of hole ></p> <p>Flatness</p>	<p>Step Hole</p>	<p>Enlarge Hole</p> <p>Choosing a drill body with internal coolant. Max. Ae=Dc- (Rex2) for enlarging hole.</p>	<p>External coolant</p> <p>Lower pressure higher volume is recommended. Minimum 73 psi.(5 bar). Aim nozzle toward the tool body, let the coolant effectively enter the hole.</p>	<p>Internal coolant</p> <p>High pressure is recommended. Minimum 145 psi. (10 bar).</p>

⚠ Choosing a suitable drill body.

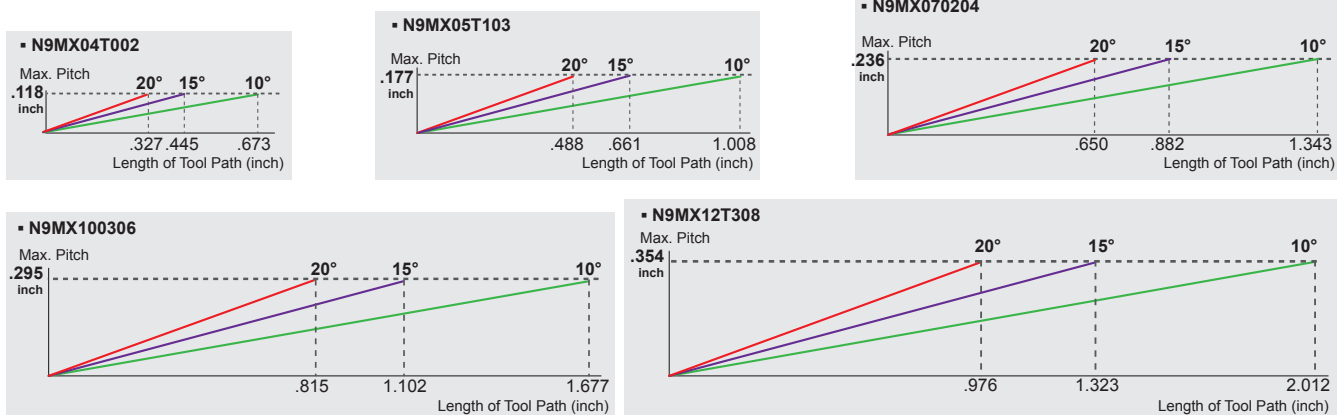
- Required hole diameter is within the recommended range (blue numbers).
- Required hole diameters (more than one size), choose the drill can cover more different hole diameters. Example 0.709", 0.787" and 0.866" hole diameter, choose 99323-012-1525.
- Hole tolerance : 0/-0.02 inch.

Drilling diameter	Coolant type	Max. drilling depth	Tool type	Dc	Insert type	Re	Max. pitch	Max. Ae
.512"~ .590"~ .787"	Internal	3.150"	99323-010-1320	.433"	N9MX04T002	.008"	.118"	.417"
	External	1.181"	99321-010-1320	.433"				
.590"~ .787"~ .984"	Internal	3.346"	99323-012-1525	.512"	N9MX05T103	.012"	.177"	.488"
	External	1.417"	99321-012-1525	.512"				
.787"~ .984"~ 1.181"	Internal	4.134"	99323-016-2030	.669"	N9MX070204	.016"	.236"	.638"
	External	1.969"	99321-016-2030	.669"				
.984"~ 1.181"~ 1.575"	Internal	5.118"	99323-020-2540	.866"	N9MX100306	.024"	.295"	.819"
	External	2.362"	99321-020-2540	.866"				
1.181"~ 1.575"~ 1.969"	Internal	6.299"	99323-025-3050	1.063"	N9MX12T308	.031"	.354"	1.000"
	External	2.953"	99321-025-3050	1.063"				
1.654"~ 1.969"~ 2.559"	Internal	1.969"	99321-025-4265	1.299"	N9MX12T308	.031"	.354"	1.236"

⚠ Choosing a suitable insert grade for hole drilling.

- NC2032 for drill depth below 3xDc.
- NC5074 for drill depth 3xDc and above.

⚠ Length of tool path for linear ramping.



⚠ Length of tool path for Circular ramping= (D-Dc) x 3.14

Cutting Data >> Boldface number is recommended for start.

Nine9



NC Helix Drill

▶ 99321-010-1320 / 99323-010-1320 >>

Workpiece material	SFM		Ø .512"		Ø .551"		Ø .630"		Ø .709"		Ø .787"		
	99321	99323	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	
P Carbon steel	0.25%C	197~295~426	328~525~722	.0016 .0020 .0028	.0236 .0315 .0394	.0024 .0031 .0039	.0276 .0374 .0492	.0031 .0043 .0055	.0354 .0472 .0591	.0039 .0055 .0071	.0394 .0511 .0689	.0047 .0063 .0079	.0472 .0630 .0787
	0.45% C	197~295~394	328~492~656	.0016 .0020 .0028	.0236 .0315 .0394	.0024 .0031 .0039	.0276 .0374 .0492	.0031 .0043 .0055	.0354 .0472 .0591	.0039 .0055 .0071	.0394 .0511 .0689	.0047 .0063 .0079	.0472 .0630 .0787
	0.60%C	164~230~361	262~426~590	.0016 .0020 .0024	.0236 .0295 .0354	.0024 .0028 .0035	.0276 .0354 .0441	.0028 .0039 .0047	.0315 .0433 .0531	.0035 .0047 .0063	.0354 .0472 .0618	.0039 .0055 .0071	.0394 .0511 .0709
	Low alloy steel	131~230~328	262~394~525	.0012 .0016 .0020	.0197 .0256 .0315	.0020 .0024 .0031	.0236 .0315 .0394	.0028 .0039 .0047	.0315 .0374 .0472	.0031 .0043 .0059	.0315 .0433 .0551	.0035 .0047 .0063	.0394 .0512 .0630
	High alloy steel	131~197~262	197~295~394	.0012 .0016 .0020	.0197 .0256 .0315	.0020 .0024 .0031	.0236 .0315 .0394	.0028 .0039 .0047	.0315 .0374 .0472	.0031 .0043 .0059	.0315 .0433 .0551	.0035 .0047 .0063	.0394 .0512 .0630
M Stainless steel	131~197~262	197~295~394	.0012 .0016 .0020	.0197 .0256 .0315	.0020 .0024 .0031	.0236 .0315 .0394	.0028 .0039 .0047	.0315 .0374 .0472	.0031 .0043 .0059	.0315 .0433 .0551	.0035 .0047 .0063	.0394 .0512 .0630	
K Cast Iron	131~230~328	262~394~525	.0016 .0020 .0028	.0354 .0315 .0394	.0024 .0031 .0039	.0433 .0374 .0492	.0031 .0043 .0055	.0512 .0472 .0591	.0039 .0055 .0071	.0394 .0511 .0689	.0047 .0063 .0079	.0472 .0630 .0787	
N Al		262~426~590	394~689~984	.0016 .0020 .0028	.0354 .0472 .0591	.0024 .0031 .0039	.0433 .0591 .0736	.0031 .0043 .0055	.0512 .0709 .0886	.0039 .0055 .0071	.0394 .0827 .1031	.0047 .0063 .0079	.0709 .0945 .1181
	Cu	197~344~492	328~558~787	.0016 .0020 .0028	.0276 .0374 .0472	.0024 .0031 .0039	.0354 .0472 .0591	.0031 .0043 .0055	.0394 .0511 .0709	.0039 .0055 .0071	.0472 .0669 .0827	.0047 .0063 .0079	.0511 .0748 .0945
S Ni-Alloy		33~66~98	49~92~131	.0004 .0008 .0012	.0197 .0256 .0315	.0004 .0008 .0016	.0236 .0315 .0394	.0008 .0012 .0020	.0276 .0374 .0472	.0012 .0020 .0028	.0315 .0433 .0551	.0016 .0024 .0031	.0354 .0512 .0630
	Titanium	98~131~164	131~197~262	.0004 .0008 .0012	.0197 .0256 .0315	.0004 .0008 .0016	.0236 .0315 .0394	.0008 .0012 .0020	.0276 .0374 .0472	.0012 .0020 .0028	.0315 .0433 .0551	.0016 .0024 .0031	.0354 .0512 .0630



▶ 99321-012-1525 / 99323-012-1525 >>

Workpiece material	SFM		Ø .590"		Ø .669"		Ø .787"		Ø .866"		Ø .984"		
	99321	99323	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	
P Carbon steel	0.25%C	197~295~426	328~525~722	.0020 .0028 .0035	.0472 .0630 .0787	.0028 .0039 .0051	.0512 .0701 .0886	.0035 .0051 .0063	.0591 .0787 .0984	.0047 .0063 .0079	.0630 .0858 .1083	.0051 .0071 .0087	.0709 .0945 .1181
	0.45% C	197~295~394	328~492~656	.0020 .0028 .0035	.0472 .0630 .0787	.0028 .0039 .0051	.0512 .0701 .0886	.0035 .0051 .0063	.0591 .0787 .0984	.0047 .0063 .0079	.0630 .0858 .1083	.0051 .0071 .0087	.0709 .0945 .1181
	0.60%C	164~230~361	262~426~590	.0020 .0024 .0031	.0433 .0591 .0709	.0028 .0035 .0043	.0472 .0634 .0795	.0031 .0047 .0059	.0512 .0701 .0886	.0039 .0055 .0071	.0511 .0764 .0972	.0047 .0063 .0079	.0630 .0846 .1063
	Low alloy steel	131~230~328	262~394~525	.0016 .0020 .0028	.0394 .0512 .0630	.0024 .0031 .0039	.0394 .0551 .0709	.0028 .0039 .0051	.0472 .0630 .0787	.0035 .0051 .0063	.0512 .0709 .0866	.0039 .0055 .0067	.0511 .0748 .0945
	High alloy steel	131~197~262	197~295~394	.0016 .0020 .0028	.0394 .0512 .0630	.0024 .0031 .0039	.0394 .0551 .0709	.0028 .0039 .0051	.0472 .0630 .0787	.0035 .0051 .0063	.0512 .0709 .0866	.0039 .0055 .0067	.0511 .0748 .0945
M Stainless steel	131~197~262	197~295~394	.0016 .0020 .0028	.0394 .0512 .0630	.0024 .0031 .0039	.0394 .0551 .0709	.0028 .0039 .0051	.0472 .0630 .0787	.0035 .0051 .0063	.0512 .0709 .0866	.0039 .0055 .0067	.0511 .0748 .0945	
K Cast Iron	131~230~328	262~394~525	.0020 .0028 .0035	.0472 .0630 .0787	.0028 .0039 .0051	.0512 .0701 .0886	.0035 .0051 .0063	.0512 .0748 .0984	.0047 .0063 .0079	.0630 .0858 .1083	.0051 .0071 .0087	.0709 .0945 .1181	
N Al		262~426~590	394~689~984	.0020 .0028 .0035	.0709 .0945 .1181	.0028 .0039 .0051	.0787 .1059 .1327	.0035 .0051 .0063	.0512 .0713 .0916	.0047 .0063 .0079	.0630 .0858 .1083	.0051 .0071 .0087	.0709 .0945 .1181
	Cu	197~344~492	328~558~787	.0020 .0028 .0035	.0512 .0748 .0945	.0028 .0039 .0051	.0630 .0846 .1063	.0035 .0051 .0063	.0511 .0748 .0984	.0047 .0063 .0079	.0630 .0846 .1063	.0051 .0071 .0087	.0709 .0945 .1181
S Ni-Alloy		33~66~98	49~92~131	.0008 .0010 .0012	.0394 .0512 .0630	.0012 .0016 .0020	.0394 .0551 .0709	.0012 .0018 .0024	.0472 .0630 .0787	.0016 .0024 .0031	.0512 .0709 .0866	.0016 .0024 .0031	.0511 .0748 .0945
	Titanium	98~131~164	131~197~262	.0008 .0010 .0012	.0394 .0512 .0630	.0012 .0016 .0020	.0394 .0551 .0709	.0012 .0018 .0024	.0472 .0630 .0787	.0016 .0024 .0031	.0512 .0709 .0866	.0016 .0024 .0031	.0511 .0748 .0945



Cutting Data

>> Boldface number is recommended for start.

▶ 99321-016-2030 / 99323-016-2030 >>

Workpiece material	SFM		Ø .787"		Ø .866"		Ø .984"		Ø1.063"		Ø1.181"	
	99321	99323	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch
												
P Carbon steel 0.25%C	197~295~426	328~525~722	.0024 .0031 .0039	.0709 .0945 .1181	.0035 .0047 .0059	.0748 .1008 .1280	.0047 .0063 .0079	.0827 .1102 .1378	.0055 .0075 .0094	.0866 .1165 .1476	.0059 .0083 .0102	.0945 .1260 .1575
	197~295~394	328~492~656	.0024 .0031 .0039	.0709 .0945 .1181	.0035 .0047 .0059	.0748 .1008 .1280	.0047 .0063 .0079	.0827 .1102 .1378	.0055 .0075 .0094	.0866 .1165 .1476	.0059 .0083 .0102	.0945 .1260 .1575
	164~230~361	262~426~590	.0020 .0028 .0035	.0630 .0846 .1063	.0031 .0043 .0051	.0669 .0906 .1142	.0039 .0055 .0071	.0748 .1004 .1260	.0051 .0071 .0087	.0866 .1063 .1339	.0051 .0071 .0091	.0827 .1122 .1417
	131~230~328	262~394~525	.0020 .0024 .0031	.0551 .0748 .0945	.0028 .0039 .0047	.0591 .0807 .1024	.0035 .0051 .0063	.0630 .0866 .1102	.0043 .0059 .0075	.0709 .0945 .1181	.0047 .0063 .0079	.0748 .1004 .1260
	131~197~262	197~295~394	.0020 .0024 .0031	.0551 .0748 .0945	.0028 .0039 .0047	.0591 .0807 .1024	.0035 .0051 .0063	.0630 .0866 .1102	.0043 .0059 .0075	.0709 .0945 .1181	.0047 .0063 .0079	.0748 .1004 .1260
M Stainless steel	131~197~262	197~295~394	.0020 .0024 .0031	.0551 .0748 .0945	.0028 .0039 .0047	.0591 .0807 .1024	.0035 .0051 .0063	.0630 .0866 .1102	.0043 .0059 .0075	.0709 .0945 .1181	.0047 .0063 .0079	.0748 .1004 .1260
	131~230~328	262~394~525	.0024 .0031 .0039	.0709 .0945 .1181	.0035 .0047 .0059	.0748 .1016 .1280	.0047 .0063 .0079	.0827 .1102 .1378	.0055 .0075 .0094	.0866 .1173 .1476	.0059 .0083 .0102	.0945 .1260 .1575
N Al	262~426~590	394~689~984	.0024 .0031 .0039	.1063 .1417 .1772	.0035 .0047 .0059	.1102 .1512 .1917	.0047 .0063 .0079	.1220 .1594 .1969	.0055 .0075 .0094	.1299 .1752 .2205	.0059 .0083 .0102	.1417 .1890 .2362
	197~344~492	328~558~787	.0024 .0031 .0039	.0827 .1122 .1417	.0035 .0047 .0059	.0906 .1220 .1535	.0047 .0063 .0079	.0984 .1319 .1654	.0055 .0075 .0094	.1063 .1417 .1772	.0059 .0083 .0102	.1102 .1496 .1890
S Ni-Alloy	33~66~98	49~92~131	.0008 .0012 .0016	.0551 .0748 .0945	.0012 .0020 .0024	.0591 .0807 .1024	.0016 .0024 .0031	.0630 .0866 .1102	.0016 .0028 .0035	.0709 .0945 .1181	.0020 .0031 .0039	.0748 .1004 .1260
	98~131~164	131~197~262	.0008 .0012 .0016	.0551 .0748 .0945	.0012 .0020 .0024	.0591 .0807 .1024	.0016 .0024 .0031	.0630 .0866 .1102	.0016 .0028 .0035	.0709 .0945 .1181	.0020 .0031 .0039	.0748 .1004 .1260

▶ 99321-020-2540 / 99323-020-2540 >>

Workpiece material	SFM		Ø .984"		Ø1.102"		Ø1.260"		Ø1.417"		Ø1.575"	
	99321	99323	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch
												
P Carbon steel 0.25%C	197~295~426	328~525~722	.0028 .0039 .0047	.0709 .0945 .1181	.0039 .0055 .0067	.0827 .1102 .1378	.0055 .0075 .0091	.0945 .1260 .1575	.0067 .0091 .0110	.1063 .1417 .1772	.0071 .0094 .0118	.1181 .1575 .1969
	197~295~394	328~492~656	.0028 .0039 .0047	.0709 .0945 .1181	.0039 .0055 .0067	.0827 .1102 .1378	.0055 .0075 .0091	.0945 .1260 .1575	.0067 .0091 .0110	.1063 .1417 .1772	.0071 .0094 .0118	.1181 .1575 .1969
	164~230~361	262~426~590	.0024 .0031 .0039	.0630 .0846 .1063	.0035 .0051 .0063	.0748 .1004 .1260	.0047 .0063 .0079	.0866 .1142 .1417	.0059 .0079 .0098	.0945 .1260 .1575	.0063 .0087 .0106	.1063 .1417 .1772
	131~230~328	262~394~525	.0020 .0028 .0035	.0551 .0748 .0945	.0031 .0043 .0055	.0669 .0886 .1102	.0039 .0055 .0071	.0748 .1004 .1260	.0051 .0071 .0087	.0866 .1142 .1417	.0055 .0075 .0094	.0945 .1260 .1575
	131~197~262	197~295~394	.0020 .0028 .0035	.0551 .0748 .0945	.0031 .0043 .0055	.0669 .0886 .1102	.0039 .0055 .0071	.0748 .1004 .1260	.0051 .0071 .0087	.0866 .1142 .1417	.0055 .0075 .0094	.0945 .1260 .1575
M Stainless steel	131~197~262	197~295~394	.0020 .0028 .0035	.0551 .0748 .0945	.0031 .0043 .0055	.0669 .0886 .1102	.0039 .0055 .0071	.0748 .1004 .1260	.0051 .0071 .0087	.0866 .1142 .1417	.0055 .0075 .0094	.0945 .1260 .1575
	131~230~328	262~394~525	.0028 .0039 .0047	.0709 .0945 .1181	.0039 .0055 .0067	.0827 .1102 .1378	.0055 .0075 .0091	.0945 .1260 .1575	.0067 .0091 .0110	.1063 .1417 .1772	.0071 .0094 .0118	.1181 .1575 .1969
N Al	262~426~590	394~689~984	.0028 .0039 .0047	.1063 .1417 .1772	.0039 .0055 .0067	.1220 .1634 .2047	.0055 .0075 .0091	.1417 .1890 .2362	.0067 .0091 .0110	.1575 .2106 .2638	.0071 .0094 .0118	.1181 .1772 .2362
	197~344~492	328~558~787	.0028 .0039 .0047	.0827 .1122 .1417	.0039 .0055 .0067	.0984 .1319 .1654	.0055 .0075 .0091	.1142 .1516 .1890	.0067 .0091 .0110	.1260 .1693 .2126	.0071 .0094 .0118	.1417 .1890 .2362
S Ni-Alloy	33~66~98	49~92~131	.0008 .0016 .0020	.0551 .0748 .0945	.0012 .0020 .0028	.0669 .0886 .1102	.0016 .0028 .0035	.0748 .1004 .1260	.0020 .0031 .0039	.0866 .1142 .1417	.0024 .0035 .0047	.0945 .1260 .1575
	98~131~164	131~197~262	.0008 .0016 .0020	.0551 .0748 .0945	.0012 .0020 .0028	.0669 .0886 .1102	.0016 .0028 .0035	.0748 .1004 .1260	.0020 .0031 .0039	.0866 .1142 .1417	.0024 .0035 .0047	.0945 .1260 .1575





Cutting Data >> Boldface number is recommended for start.

▶ 99321-025-3050 / 99323-025-3050 >>


Nine9



NC Helix Drill

Workpiece material	SFM		Ø1.181"		Ø1.378"		Ø1.575"		Ø1.772"		Ø1.969"	
	 99321	 99323	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch
P Carbon steel 0.25%C	197~295~426	328~525~722	.0031	.0945	.0047	.1063	.0067	.1181	.0075	.1299	.0079	.1417
			.0043	.1260	.0063	.1417	.0091	.1575	.0102	.1732	.0106	.1890
	197~295~394	328~492~656	.0051	.1575	.0079	.1772	.0110	.1969	.0126	.2165	.0134	.2362
			.0031	.0945	.0047	.1063	.0067	.1181	.0075	.1299	.0079	.1417
	197~295~394	328~492~656	.0043	.1260	.0063	.1417	.0091	.1575	.0102	.1732	.0106	.1890
197~295~394	328~492~656	.0051	.1575	.0079	.1772	.0110	.1969	.0126	.2165	.0134	.2362	
		.0028	.0866	.0039	.0945	.0059	.1063	.0067	.1181	.0071	.1260	
P Carbon steel 0.60%C	164~230~361	262~426~590	.0039	.1142	.0055	.1260	.0079	.1417	.0091	.1575	.0094	.1693
			.0047	.1417	.0071	.1575	.0098	.1772	.0110	.1969	.0118	.2126
Low alloy steel	131~230~328	262~394~525	.0024	.0748	.0035	.0866	.0051	.0945	.0059	.1024	.0063	.1142
			.0031	.1004	.0051	.1142	.0071	.1260	.0079	.1378	.0087	.1516
High alloy steel	131~197~262	197~295~394	.0039	.1260	.0063	.1417	.0087	.1575	.0098	.1732	.0106	.1890
			.0024	.0748	.0035	.0866	.0051	.0945	.0059	.1024	.0063	.1142
M Stainless steel	131~197~262	197~295~394	.0031	.1004	.0051	.1142	.0071	.1260	.0079	.1378	.0087	.1516
			.0039	.1260	.0063	.1417	.0087	.1575	.0098	.1732	.0106	.1890
K Cast Iron	131~230~328	262~394~525	.0031	.0945	.0047	.1063	.0067	.1181	.0075	.1299	.0079	.1417
			.0043	.1260	.0063	.1417	.0091	.1575	.0102	.1732	.0106	.1890
Al	262~426~590	394~689~984	.0051	.1575	.0079	.1772	.0110	.1969	.0126	.2165	.0134	.2362
			.0031	.1417	.0047	.1575	.0067	.1772	.0075	.1929	.0079	.2126
N Cu	197~344~492	328~558~787	.0043	.1890	.0063	.2106	.0091	.2362	.0102	.2579	.0106	.2835
			.0051	.2362	.0079	.2638	.0110	.2953	.0126	.3228	.0134	.3543
Ni-Alloy	33~66~98	49~92~131	.0031	.1142	.0047	.1260	.0067	.1417	.0075	.1575	.0079	.1693
			.0043	.1516	.0063	.1693	.0091	.1890	.0102	.2087	.0106	.2264
S Titanium	98~131~164	131~197~262	.0051	.1890	.0079	.2126	.0110	.2362	.0126	.2598	.0134	.2835
			.0008	.0748	.0016	.0866	.0024	.0945	.0024	.1024	.0028	.1142
Titanium	98~131~164	131~197~262	.0016	.1004	.0024	.1142	.0035	.1260	.0035	.1378	.0043	.1516
			.0020	.1260	.0031	.1417	.0047	.1575	.0047	.1732	.0055	.1890
Titanium	98~131~164	131~197~262	.0008	.0748	.0016	.0866	.0024	.0945	.0024	.1024	.0028	.1142
			.0016	.1004	.0024	.1142	.0035	.1260	.0035	.1378	.0043	.1516
Titanium	98~131~164	131~197~262	.0020	.1260	.0031	.1417	.0047	.1575	.0047	.1732	.0055	.1890

▶ 99321-025-4265 >>

Workpiece material	SFM		Ø1.654"		Ø1.969"		Ø2.165"		Ø2.362"		Ø2.559"	
	 99323		f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch	f IPR	Pitch Inch
P Carbon steel 0.25%C	328 ~ 525 ~ 722		.0047	.1181	.0059	.1220	.0071	.1299	.0075	.1339	.0079	.1417
			.0063	.1575	.0079	.1634	.0094	.1732	.0102	.1791	.0106	.1890
Carbon steel 0.45% C	328 ~ 492 ~ 656		.0079	.1969	.0094	.2047	.0118	.2165	.0126	.2244	.0134	.2362
			.0047	.1181	.0059	.1220	.0071	.1299	.0075	.1339	.0079	.1417
P Carbon steel 0.60%C	262 ~ 426 ~ 590		.0063	.1575	.0079	.1634	.0094	.1732	.0102	.1791	.0106	.1890
			.0079	.1969	.0094	.2047	.0118	.2165	.0126	.2244	.0134	.2362
Low alloy steel	262 ~ 394 ~ 525		.0043	.1063	.0051	.1102	.0063	.1181	.0067	.1181	.0071	.1260
			.0059	.1417	.0071	.1476	.0087	.1575	.0091	.1594	.0094	.1693
High alloy steel	197 ~ 295 ~ 394		.0071	.1772	.0087	.1850	.0106	.1969	.0114	.2008	.0118	.2126
			.0039	.0945	.0043	.0984	.0055	.1024	.0059	.1102	.0063	.1142
M Stainless steel	197 ~ 295 ~ 394		.0051	.1260	.0059	.1319	.0075	.1378	.0079	.1457	.0087	.1516
			.0063	.1575	.0075	.1654	.0094	.1732	.0098	.1811	.0106	.1890
K Cast Iron	262 ~ 394 ~ 525		.0039	.0945	.0043	.0984	.0055	.1024	.0059	.1102	.0063	.1142
			.0079	.1969	.0094	.2047	.0118	.2165	.0126	.2244	.0134	.2362
Al	394 ~ 689 ~ 984		.0047	.1181	.0059	.1220	.0071	.1299	.0075	.1339	.0079	.1417
			.0063	.1575	.0079	.1634	.0094	.1732	.0102	.1791	.0106	.1890
N Cu	328 ~ 558 ~ 787		.0079	.1969	.0094	.2047	.0118	.2165	.0126	.2244	.0134	.2362
			.0047	.1181	.0059	.1220	.0071	.1299	.0075	.1339	.0079	.1417
Ni-Alloy	49 ~ 92 ~ 131		.0063	.2362	.0079	.2461	.0094	.2579	.0102	.2717	.0106	.2835
			.0079	.2362	.0094	.3071	.0118	.3228	.0126	.3386	.0134	.3543
S Titanium	131 ~ 197 ~ 262		.0047	.1181	.0059	.1220	.0071	.1299	.0075	.1339	.0079	.1417
			.0047	.1181	.0059	.1220	.0071	.1299	.0075	.1339	.0079	.1417
Titanium	131 ~ 197 ~ 262		.0063	.1890	.0079	.1988	.0094	.2087	.0102	.2165	.0106	.2264
			.0079	.2362	.0094	.2480	.0118	.2598	.0126	.2717	.0134	.2835
Titanium	131 ~ 197 ~ 262		.0016	.0945	.0020	.0984	.0024	.1024	.0024	.1102	.0028	.1142
			.0024	.1260	.0031	.1319	.0035	.1378	.0039	.1457	.0043	.1516
Titanium	131 ~ 197 ~ 262		.0031	.1575	.0039	.1654	.0047	.1732	.0051	.1811	.0055	.1890
			.0016	.0945	.0020	.0984	.0024	.1024	.0024	.1102	.0028	.1142
Titanium	131 ~ 197 ~ 262		.0024	.1260	.0031	.1319	.0035	.1378	.0039	.1457	.0043	.1516
			.0031	.1575	.0039	.1654	.0047	.1732	.0051	.1811	.0055	.1890

Application Example

► Special insert geometry for cutting different materials >>

- Serrated cutting edge makes the chips short and small, and easier to evacuate.
- Recommended for almost all material types, good for drilling material that generates long, soft chips.



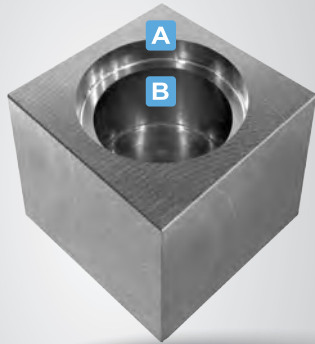
Material: SAE8620	P	Material: SUS304 (Stainless steel 304)	M
Vc = 262.4 SFM		Vc = 262.4 SFM	
S = 1500 r.p.m.		S = 1500 r.p.m.	
f = .0059 IPR		f = .0031 IPR	
F = 8.850 IPM		F = 4.65 IPM	
P = .236 Inch		P = .236 Inch	
Material: C1100	N	Material: AL6061T6	N
Vc = 393.6 SFM		Vc = 590.4 SFM	
S = 2250 r.p.m.		S = 3370 r.p.m.	
f = .0039 IPR		f = .0079 IPR	
F = 8.775 IPM		F = 26.623 IPM	
P = .236 Inch		P = .236 Inch	
Material: TiAl6V4	S	Material: Inconel 718 (Drill with internal coolant)	S
Vc = 262.4 SFM		Vc = 131.2 SFM	
S = 1500 r.p.m.		S = 750 r.p.m.	
f = .0031 IPR		f = .0118 IPR	
F = 4.65 IPM		F = 8.85 IPM	
P = .236 Inch		P = .079 Inch	

► To cut Titanium in different conditions >>

Example 2										
Material		Ti6Al4V, Titanium								
Tool		99323-016-2030 M08-HD17-2030								
Insert		N9MX070204-NC2032								
Machine		HAAS VM-3, BT40, 22.5KW								
Coolant		Internal								
Fig.	Dc Inch	D Inch	L Inch	Vc SFM	S r.p.m.	f IPR	F IPM	P Inch	T sec.	
1	Ø .669	Ø1.201	.787	196.8	1200	.0020	2.4	.079	423	
2		Ø .807	.787	196.8	1200	.0012	1.44	.039	366	
3		Ø .787	1.969	196.8	1200	.0012	1.44	.039	785	
5		Ø .787	.787	196.8	1200	.0020	2.4	.079	94	
Counter sink for M20 bolt		For M20 bolt hole		Cross hole		Surfacing		Half hole on radius		

► To produce step hole Ø2.106" & Ø1.772" with one tool >>

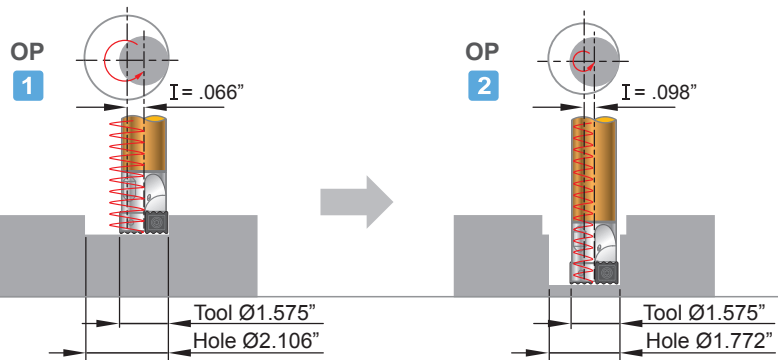
Example 3



Material	S50C (JIS). High carbon steel										
Tool	99323-LS32-HD40 (Non-standard size)										
Insert	N9MX12T308-NC2032										
Machine	BT40, 22.5 Kw										
Coolant	Internal										
Hole	Dc Inch	D Inch	L Inch	Vc SFM	S r.p.m	f IPR	F IPM	I Inch	P Inch	T sec.	
A	Ø1.575	Ø2.106	.394	984	2400	.0059	14.16	.266	.197	14	
B		Ø1.772	1.260	984	2400	.0059	14.16	.098	.079	42	

Application

- Hydraulic port for plug-in valve cylinders, counterbore for bolt, and more!



► Each holder "NC Helix Drill" can machine different diameters and hole depths.

► Producing a Ø2.362" x 1.063" hole with just one tool.
Eliminates 2nd operation from the process. Machine load 8%. >>

Example 4



Material	Stainless Steel SUS304										
Tool	99321-025-4265 (25mm Side Lock Shank)										
Insert	N9MX12T308-NC2032										
Machine	BT40										
Coolant	External coolant										
Dc Inch	D Inch	L Inch	Vc SFM	S r.p.m	f IPR	F IPM	I Inch	P Inch	T sec.	Q In. ³ /min.	
Ø1.299	Ø2.362	1.063	328	1000	.0079	7.90	.531	.157	172	1.624	

► Requires low spindle power!
BT30 machine, Ø1.181" hole diameter, 3.3xDc drill depth >>

Example 5

Maximum drilling capacity of the 5.5 kw spindle is Ø0.63"



Material	S50C (JIS), High carbon steel										
Tool	99321-020-2540 / BC20-HD22-2540										
Insert	N9MX100306-NC2032										
Machine	BT30, 5.5 Kw										
Coolant	External coolant										
Dc Inch	D Inch	L Inch	Vc SFM	S r.p.m	f IPR	F IPM	I Inch	P Inch	T sec.		
Ø.866	Ø1.181	2.756	656	* 2893	.0079	22.85	.157	.110	62		

* 3000 r.p.m. is used.

► Drill bigger holes using lower power spindles. Increase flexibility and occupy fewer tool positions in CNC machines.



► Replace your end mill with an NC helix drill.
Make the impossible become possible >>

Tool Path : 2.047"

Example 6									
Rough Slotting									
Slot Dimension		W: 0.669" x 0.709" x 2.756"							
Material		S45C (JIS), Medium Carbon Steel							
Tool		99323-016-2030 M08-HD17-2030							
Insert		N9MX070204-NC2032							
Machine		BT40							
Coolant		Internal coolant, emulsion							
Dc	L	Vc	S	f	F	P	T	Q	
Inch	Inch	SFM	r.p.m	IPR	IPM	Inch	sec.	In. ³ /min.	
Ø .669	2.756	656	3800	.0039	14.82	.157*	91	2.075	
* Ramping depth per cut = 0.079"									

Notch of Tool Path : 5.039"

Example 6									
Rough Slotting									
Slot Dimension		W: 1.575" x 0.984" x 2.756"							
Material		C95400, Aluminium Bronze							
Tool		99323-020-2540 M10-HD22-2540							
Insert		N9MX100306-NC2032							
Machine		HAAS BT40							
Coolant		External / Internal coolant							
Dc	L	Vc	S	f	F	P	T	Q	
Inch	Inch	SFM	r.p.m	IPR	IPM	Inch	sec.	In. ³ /min.	
Ø .866	.984	1148	5000	.0079	39.50	.197	23	12.937	

► One tool performs multiple patterns. >>

Example 7

Material		AL6061T6							
Tool		99323-016-2030 M08-HD17-2030							
Insert		N9MX070204-NC5074							
Machine		HAAS VM-3, BT40, 22.5KW							
Coolant		Internal							
Fig.	Dc	Vc	S	f	F	P	T		
	Inch	SFM	r.p.m	IPR	IPM	Inch	sec.		
1	Ø .669	656	3800	.0059	22.42	.157	67		
2		656	3800	.0059	22.42	.157	80		
3		656	3800	.0059	22.42	.157	95		
4		656	3800	.0059	22.42	.197	101		

Tool Path 1

2

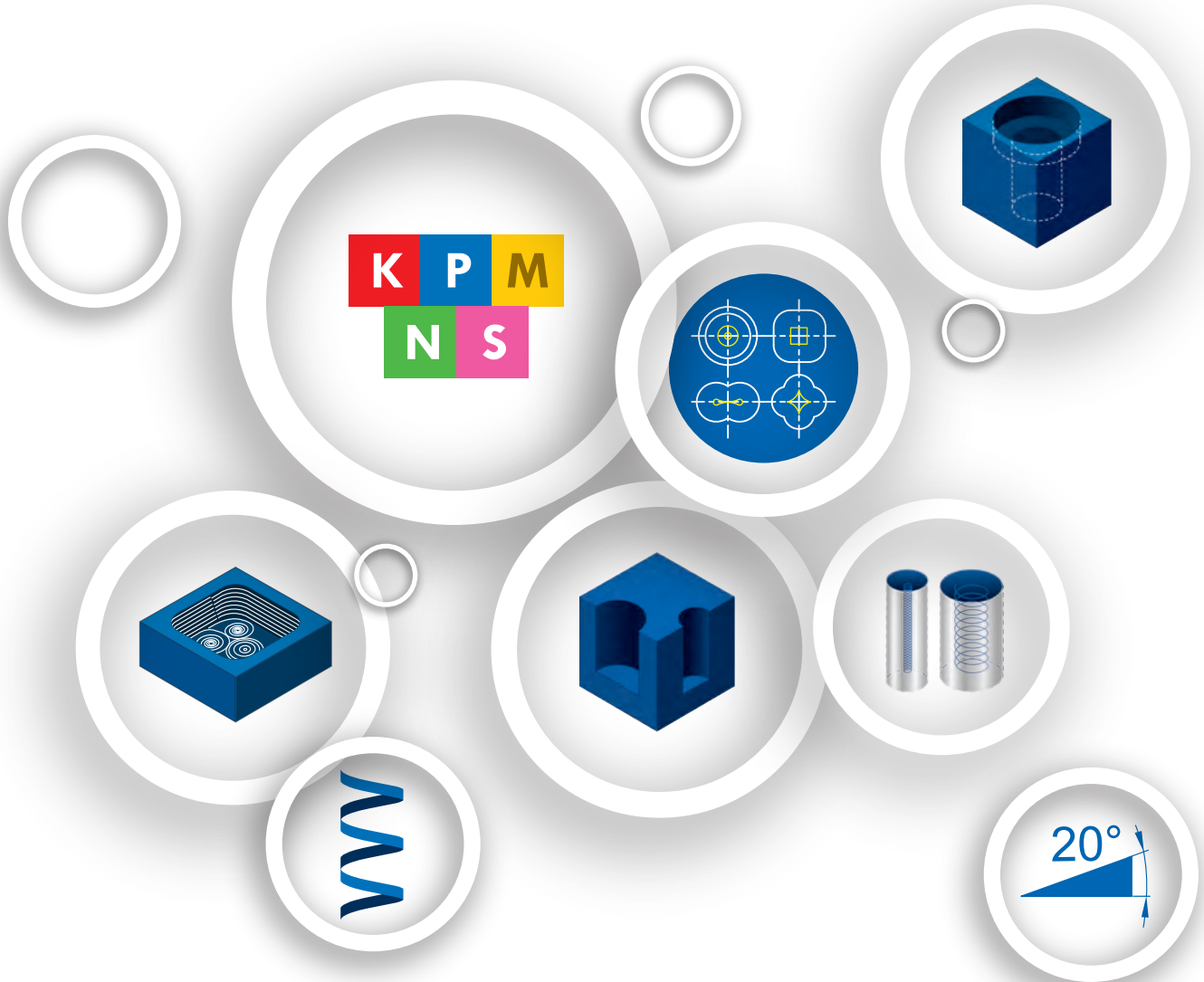
3

4

Not only a drill, but an end mill too. Maximum ramping angle is 20°.
Small radius path to cut holes, countersink holes, and create various cavity shapes in different materials.
Less inventory of different sizes of drills and indexable end mills, NC Helix Drill cuts it all !



No Need To Choose Nine9 Does It All



 **EVEREDE TOOL COMPANY**
5296 N. Northwest Highway
Chicago, Illinois 60630



AHB Tooling & Machinery, Inc.
Complete Metalworking Solutions
Roseville Saginaw & Jackson, MI

ISO Certified
(800) 991-4225
www.ahbinc.com
customerservice@ahbinc.com