STARK

Solid Carbide Gun Drill

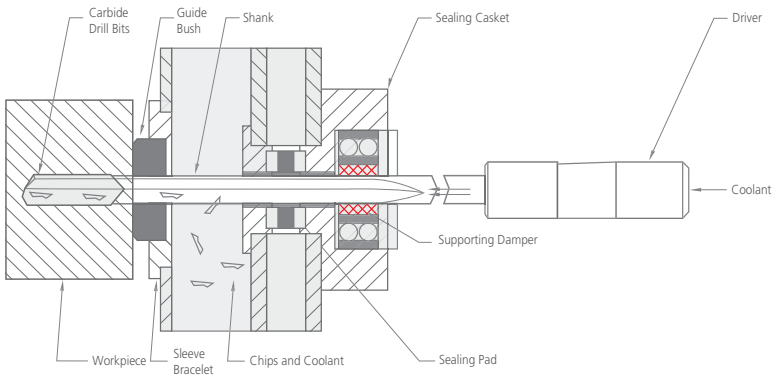
The solid carbide gun drill is made of drill body (drill tip and drill rodintegrated) and drill driver by brazing as a whole. It can also be made by the whole carbide. (drill tip, rod, and driver integrated). Its stability, efficiency, and tool life are better than the brazed type. This design ensures higher reliability and cutting performance,while its higher rigidity and lower distorting vibrations result in longer tool life.

SHIN - IL MACHINERY CO. , LTD.

The gun drill has a decisive impact on the generation and development of deep hole drilling technology. The single flute drills can achieve high quality drilling tolerance, surface and small vibration variance. This allows the gun drill to be used in precise hole machining. In practical application, the direct drills operation can replace part of the reaming operation, which has a strong sense of mechanical reliability.

The gun drill is composed of carbide drill bit, drill rod, and driver, which can be suitable for most of material processing, such as cast iron, stainless steel, aluminum, graphite, wood products, and all kinds of nonferrous metals. The gun drill is a single flute cutting tool, the hole needs to be guided by the guide bush. With the development of the CNC machine industry, gun drill tools are suitable not only for their own use, but also for CNC lathes and machining centers.

Shin-IL company can produce drill tools with diameter of 1 mm-50mm, the length ratio is more than 250x, and the longest length can reach 5000mm. The pattern of drill tool is divided into standard gun drills and non standard (step gun drills, spherical gun drills, etc.). Coating and PCD gun drills, overall solid carbide drills, and indexable insert gun drills etc are all available.



- Use vertical and horizontal equipment with a high pressure internal cooling system
- Use special cutting oil or coolant for deep hole drilling and make sure to provide sufficient pressure and flowrate.
- Because the gun drill without self-center orientation, so in the processing it must use guide sleeve or pilot hole, serves as centering for gun drill machining.
- Using the correct machining parameters for optimal drilling hole processing.

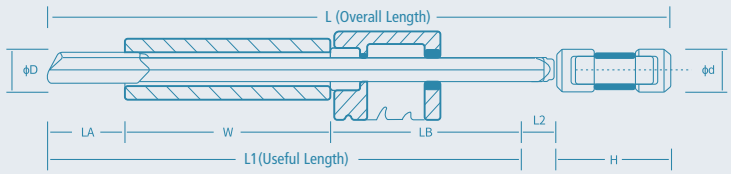
Maximum Length
5000mm

Diameter Range
1mm-50mm

Gun Drill Order Format And The Calculation of Length

1. The nominal cutting blade diameter can be subdivided to 0.001mm according to customer needs
2. Please mark the order according to the following standard

D(Drill Bit Diameter) x L(Overall Length) – Driver Number



L(overall length)	D=drill bit diameter	W=drilling depth	L=overall length	LB=width of supporting guide casket
L1(useful length)	H=driver number	LA=drill tip length	L1=useful length	L2=minimum for chips discharge allow

overall length calculated as follows:

overall length= LA (drill tip length) + W (drilling depth) + LB (width of supporting guide casket) + L2 (minimum for chips discharge allow) + H (driver length)

3. Please highlight the workpiece material, hardness, hole tolerance, and hole roughness
4. Mark the driver code number (catalog page23, page24. page28.)

Extra Technical Service

Grinding Tools

Provide carbide gun drill grinding service according to customer request

Replace, and weld the new carbide drill (Assume drill driver and rod are available for use)

1.Check the status of the gun drill
2.Remove worn or damaged drill bits and drill rods
3.Install and weld a new bit
4.Calibrate the gun drill

Replace and renew drill tips and rods. (Assume drill driver is available for use)

1.Check the status of the gun drill
2.Remove worn or damaged drill bits and drill rods
3.Install and weld new drill bits and drill rods
4.Calibrate the gun drill

Coating Service

Provide standard and necessary coating service for drilling tools.

Solid Carbide Gun Drill

The solid carbide gun drill is made of drill body (drill tip and drill rod integrated) and drill driver by welding as a whole. It can also be made by the whole carbide.(drill tip, rod, and driver integrated). Its stability, efficiency and tool life are better than the brazed type. This design ensures higher reliability and cutting performance while compromising higher rigidity and less distorted vibration. This results in longer tool life.

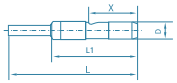
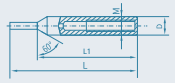
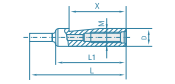
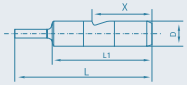
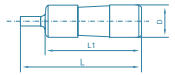
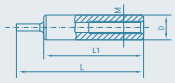
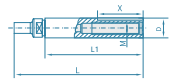
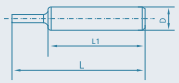
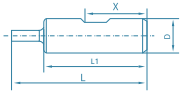
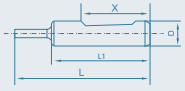
Maximum Length
550mm

Diameter Range
1.00-12.00

Solid Carbide Gun Drill Stock Table		
Φ1.52*160-10*55	Φ2.0*250-10*135	Φ3.8*185-4*38/50-L
Φ1.80*160-10*55	Φ2.2*170-4*38/50	Φ3.8*240-10*100-L
Φ2.02*160-10*55	Φ2.5*175-4*38/50-L	Φ3.8*275-10*135-L
Φ2.02*180-10*55	Φ2.5*230-10*100-L	Φ4.0*185-4*38/50-L
Φ2.02*180-10*55-L	Φ2.5*265-10*135-L	Φ4.0*240-10*100-L
Φ2.02*200-10*55	Φ2.6*175-4*38/50-L	Φ4.0*275-10*135-L
Φ2.02*200-10*55-L	Φ2.6*265-10*135-L	Φ4.2*185-4*38/50-L
Φ2.52*180-10*55	Φ2.8*175-4*38/50-L	Φ4.2*240-10*100-L
Φ2.52*180-10*55-L	Φ2.8*265-10*135-L	Φ4.2*275-10*135-L
Φ3.02*180-10*55	Φ3.0*175-4*38/50-L	Φ4.5*285-10*135-L
Φ3.02*200-10*55	Φ3.0*230-10*100-L	Φ4.8*250-10*100-L
Φ3.02*200-10*55-L	Φ3.0*265-10*135-L	Φ5.0*250-10*100-L
Φ2.8*170-2.9*30-L	Φ3.2*180-4*38/50-L	Φ5.0*260-10*100-L
Φ3.0*170-2.9*30-L	Φ3.2*230-10*100-L	Φ6.0*260-10*100-L
Φ3.2*170-3.1*30-L	Φ3.2*265-10*135-L	Φ6.0*295-10*135-L
Φ1.80*200-10*100	Φ3.5*180-4*38/50-L	Φ7.0*280-10*100-L
Φ2.0*170-4*38/50	Φ3.5*230-10*100-L	Φ9.0*280-10*100-L
Φ2.0*220-10*100	Φ3.5*265-10*135-L	Φ10.0*280-10*100-L

● L : TIALN

Standard Driver of Soild Carbide Gun Drill

Specification	Diameter (mm)	Drawing	Length Calculation		Fix Position X	Screw Spec M
			L1	L		
SH6-03	6		30	45	17	
SH10-15	10		55	70		M6x0.5
SH10-37	10		40	55	32.7	M6x0.5
SH10-42	10		40	55	24	
SH12.7-01	12.7		38	48	25.4	
SH12.7-09	12.7		51	65		M6x0.5
SH16-75	16		80	105	37	M10x1
SH4-08	4		34	46		
SH6-12	6		36	50		
SH10-51	10		40	55		
SH12-27	12		45	60		
SH16-86	16		48	63		
SH6-13	6		36	50	20	
SH10-47	10		40	55	23.5	
SH12-30	12		45	60	26.5	
SH16-78	16		48	63	29	
SH6-01	6		36	50	25	
SH10-49	10		40	55	28	
SH12-28	12		45	60	33	
SH16-84	16		48	63	36	

SOLID CARBIDE GUN DRILLS

Machining Parameters of Solid Carbide Gun Drill

Workpiece Material	Spring Steel Preharden Steel Cast Iron Chilled Cast Iron Titanium Alloy Special Steel (Nickel Base Heat Resistant Alloy Nickel Alloy)	Stainless Steel Anti Corrosive Stainless Steel Austenitic Stainless Steel 18~25%Cr Ni＞8%	Martensitic Stainless Steel Ferritic Steel (Normal Stainless Steel Cast Stainless Steel) 13~25%Cr Free Cutting Steel (Sulphurized Steel)	Allov Steel Quenching and Tempered Steel Case Hardened Steel Nitriding Steel Tool Steel (＞900N/mm²)	Cast Iron Grey Cast Iron (＜300N/mm²) Nodular Cast Iron (＜400N/mm²)	Cast Iron Grey Cast Iron (＜300N/mm²) Grey Cast Iron (＜400N/mm²) Malleable Cast Iron White Heart Malleable Cast Iron Black Heart Malleable Cast Iron	Structural Steel Quenching and Tempered Steel High Carbon Low Alloy Steel Case Hardened Steel Nitriding Steel Tool Steel (＞900N/mm²) Free Cutting Steel	Brass Bronze Copper Plastic	Aluminium Cast Aluminium Si＞5% Free Cutting Aluminium	Aluminium Cast Aluminium Si＞5% Non Quenched Aluminium
Cutting Speed m / min	25~60	30~60	40~70	60~80	60~90	70~100	70~100	80~150	80~160	100~300
Diameter Φ	Feed Rate: mm / rev									
0.7~0.79	0.0004~0.0012	0.0005~0.0012	0.0007~0.0012	0.0005~0.0012	0.0009~0.0014	0.0007~0.0018	0.0004~0.0018	0.0005~0.0012	0.0007~0.0012	0.0005~0.0009
0.8~0.89	0.0006~0.0016	0.0070~0.0015	0.0011~0.0014	0.0006~0.0015	0.0012~0.0018	0.0010~0.0023	0.0004~0.0022	0.0008~0.0015	0.0012~0.0014	0.0008~0.0012
0.9~0.99	0.0009~0.0020	0.0011~0.0019	0.0014~0.0017	0.0009~0.0019	0.0015~0.0024	0.0014~0.0028	0.0007~0.0026	0.0011~0.0019	0.0017~0.0020	0.0011~0.0017
1.0~1.09	0.0013~0.0024	0.0014~0.0022	0.0019~0.0022	0.0010~0.0023	0.0019~0.0029	0.0018~0.0032	0.0010~0.0032	0.0015~0.0024	0.0020~0.0024	0.0015~0.0024
1.1~1.19	0.0017~0.0028	0.0017~0.0025	0.0022~0.0026	0.0013~0.0029	0.0025~0.0035	0.0022~0.0038	0.0014~0.0038	0.0019~0.0029	0.0022~0.0029	0.0019~0.0034
1.2~1.29	0.0020~0.0033	0.0020~0.0027	0.0024~0.0028	0.0015~0.0035	0.0031~0.0041	0.0030~0.0048	0.0018~0.0041	0.0024~0.0034	0.0024~0.0034	0.0024~0.0041
1.3~1.39	0.0023~0.0036	0.0022~0.0029	0.0031~0.0035	0.0020~0.0041	0.0040~0.0051	0.0039~0.0060	0.0020~0.0050	0.0028~0.0039	0.0026~0.0045	0.0026~0.0044
1.4~1.49	0.0026~0.0038	0.0023~0.0031	0.0034~0.0037	0.0021~0.0047	0.0047~0.0060	0.0049~0.0079	0.0021~0.0054	0.0031~0.0047	0.0028~0.0055	0.0032~0.0048
1.5~1.59	0.0029~0.0042	0.0024~0.0035	0.0035~0.0042	0.0021~0.0051	0.0053~0.0068	0.0056~0.0100	0.0021~0.0067	0.0032~0.0053	0.0035~0.0066	0.0038~0.0059
1.6~1.79	0.0035~0.0054	0.0036~0.0049	0.0040~0.0051	0.0024~0.0066	0.0064~0.0095	0.0064~0.0150	0.0028~0.0075	0.0035~0.0095	0.0040~0.0085	0.0040~0.0075
1.8~1.99	0.0040~0.0065	0.0040~0.0065	0.0050~0.0065	0.0030~0.0075	0.0070~0.0130	0.0070~0.0220	0.0030~0.0095	0.0040~0.0130	0.0050~0.0110	0.0050~0.0110
2.0~2.49	0.0050~0.0075	0.0050~0.0075	0.0050~0.0075	0.0030~0.0095	0.0100~0.0220	0.0090~0.0330	0.0040~0.0120	0.0040~0.0180	0.0050~0.0200	0.0070~0.0130
2.5~2.99	0.0060~0.0095	0.0060~0.0095	0.0060~0.0110	0.0040~0.0110	0.0130~0.0320	0.0110~0.0430	0.0050~0.0160	0.0050~0.0250	0.0060~0.0360	0.0080~0.0170
3.0~3.49	0.0080~0.0110	0.0080~0.0110	0.0080~0.0130	0.0050~0.0140	0.0150~0.0390	0.0140~0.0530	0.0080~0.0180	0.0060~0.0370	0.0080~0.0540	0.0100~0.0200
3.5~3.99	0.0090~0.0125	0.0100~0.0160	0.0090~0.0160	0.0070~0.0160	0.0180~0.0480	0.0180~0.0620	0.0090~0.0230	0.0070~0.0490	0.0110~0.0750	0.0100~0.0250
4.0~4.49	0.0100~0.0135	0.0110~0.0180	0.0100~0.0190	0.0080~0.0190	0.0200~0.0560	0.0200~0.0690	0.0120~0.0260	0.0080~0.0600	0.0120~0.0950	0.0130~0.0300
4.5~4.99	0.0110~0.0160	0.0140~0.0220	0.0110~0.0220	0.0110~0.0210	0.0230~0.0640	0.0230~0.0780	0.0140~0.0280	0.0090~0.0690	0.0140~0.1300	0.0160~0.0360
5.0~5.99	0.0130~0.0220	0.0150~0.0240	0.0130~0.0250	0.0120~0.0250	0.0250~0.0760	0.0250~0.0950	0.0150~0.0380	0.0100~0.0800	0.0150~0.1550	0.0200~0.0470
6.0~7.99	0.0150~0.0300	0.0180~0.0290	0.0150~0.0370	0.0150~0.0330	0.0300~0.1100	0.0300~0.1250	0.0180~0.0490	0.0120~0.0960	0.0180~0.0250	0.0260~0.0660
8.0~12.0	0.0180~0.0380	0.0210~0.0330	0.0170~0.0410	0.0180~0.0380	0.0330~0.1190	0.0350~0.1360	0.0210~0.0570	0.0140~0.1100	0.0210~0.2080	0.0290~0.0780

- The cutting speed and feed rate depend on : tool diameter, tool length, cutting fluid, workpiece material, characterization of machine and clamping condition. The processing parameters in the above table are the standard normal value for reference. The practical actual working conditions on site are the true value.

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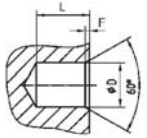
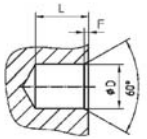
Guiding Hole Dimensions for Brazed Gun Drill

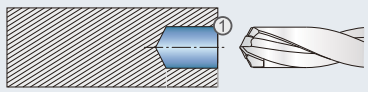
Diameter Range	Diameter of Drill	Diameter of Guiding Hole	Contrast of The Guiding Hole and Drilling Depth							
			L×D Drilling depth	Guiding Hole Depth						
				Φ1.805 -4.000	Φ4.001 -8.500	Φ8.501 -12.000	Φ12.001 -20.999	Φ21.000 -30.999	Φ31.000 -40.999	Φ41.000 -55.000
	1.85mm - 4.00mm	+0.005 to +0.010	ap.10×D	2.0×D	1.0×D	1.0×D	1.0×D	1×D	1×D	1×D
	4.01mm - 12.00mm	+0.010 to +0.020	ap.20×D	3.0×D	1.5×D	1.5×D	1.5×D			
	12.01mm - 50.00mm	+0.015 to +0.040	ap.25×D	4.0×D	2.0×D	2.0×D	1.5×D			
			ap.30×D	6.0×D	3.0×D	3.0×D	1.5×D			
			ap.35×D	30mm	35mm	3.0×D	1.5×D			
			ap.40×D	30mm	35mm	3.0×D	1.5×D			

Guiding Hole Dimensions for Solid Carbide Gun Drill

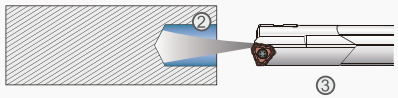
Diameter Range	Diameter of Drill	Diameter of Guiding Hole	Contrast of The Guiding Hole and Drilling Depth				
			L×D Drilling Depth	Guiding Hole Depth			
				Φ0.500-1.599	Φ1.600-3.999	Φ4.000-6.999	Φ7.000-12.000
	0.500mm - 4.000mm	+0.005 to +0.010	ap.20×D	2.0×D	2.0×D	2.0×D	2.5×D
	4.001mm - 12.000mm	+0.010 to +0.020	ap.30×D		3.0×D	3.0×D	3.5×D
			ap.40×D		4.0×D	4.0×D	40mm
			ap.50×D	6.0×D	6.0×D	35mm	
			ap.60×D		30mm		
			>40×D				

Indexable Insert Gun Drill Apply on CNC Machine and Lathe

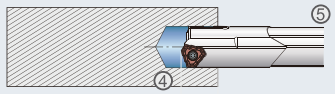
Please Follow The Instructions For Good Performance



① Prepare a pilot hole
Hole tolerance: +0.01-+0.1mm
Depth of hole: H=15mm

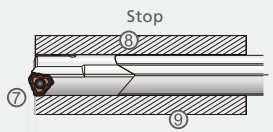


② Turn on coolant
③ Drill slowly into the pilot hole
Revolving speed: n=50-100min-1
Feed rate: Vf=100-300mm/min
Notice: do not enter the pilot hole at high speed



④ Stop at 10mm after enter the pilot hole
⑤ Start process at normal revolving speed

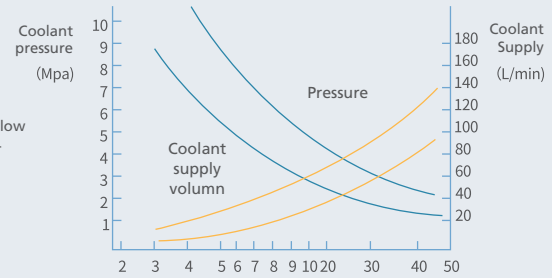
⑥ Start axial moving at 10-20mm while entering the hole at feed rate 80% of the program speed. After drilling depth more than 20mm, drilling speed trends toward to 100% of the program speed.



⑦ Drilling through hole: Continuous drilling till the drill tip thrust 5mm out of the hole.
⑧ Stop spindle revolving and turn off the coolant.
⑨ Withdraw the drill tip.

1

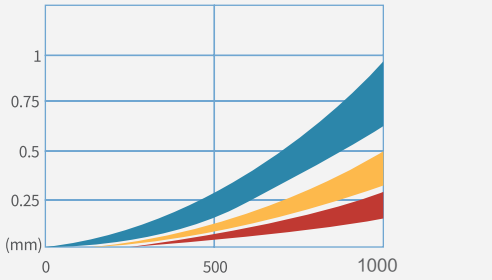
Coolant pressure, coolant flow rate varies on the diameter of the gun drill. (horizontal axis)



2

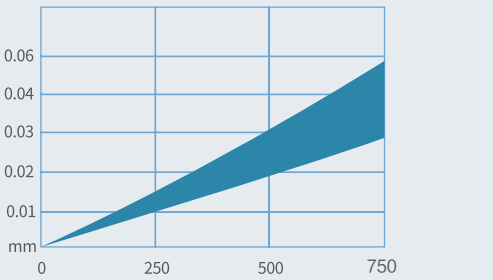
Drilling deviation (vertical axis) varies with the drilling depth (horizontal axis)

- Tools revolving, workpiece standstill
- Tools standstill, workpiece revolving
- Tools revolving, workpiece anti-revolving



3

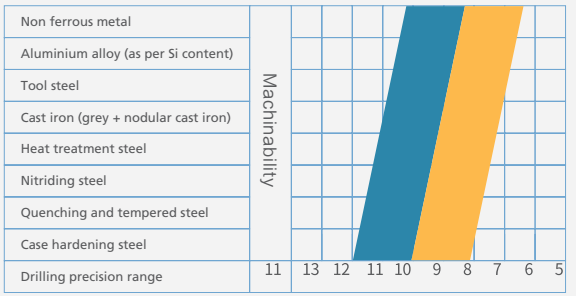
Straightness (vertical axis) varies with drilling depth (horizontal axis)



4

Single Flute Tolerance

- Normal Condition
- Good Condition



Recommended Value

5

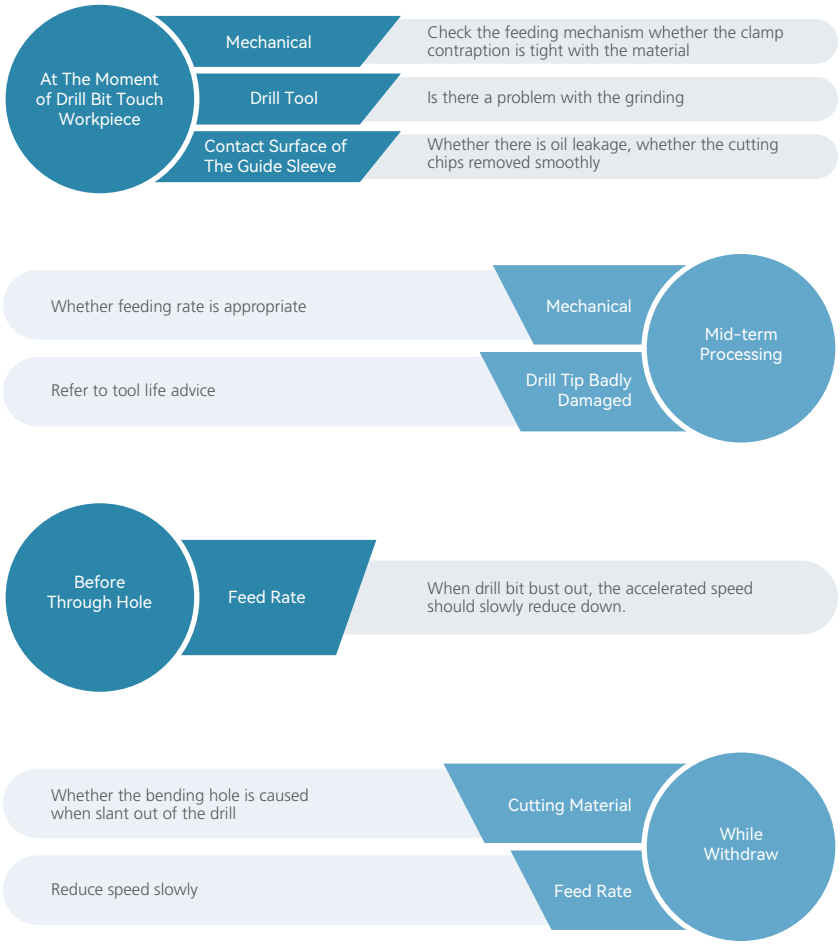
Surface Quality

- Normal Condition
- Good Condition

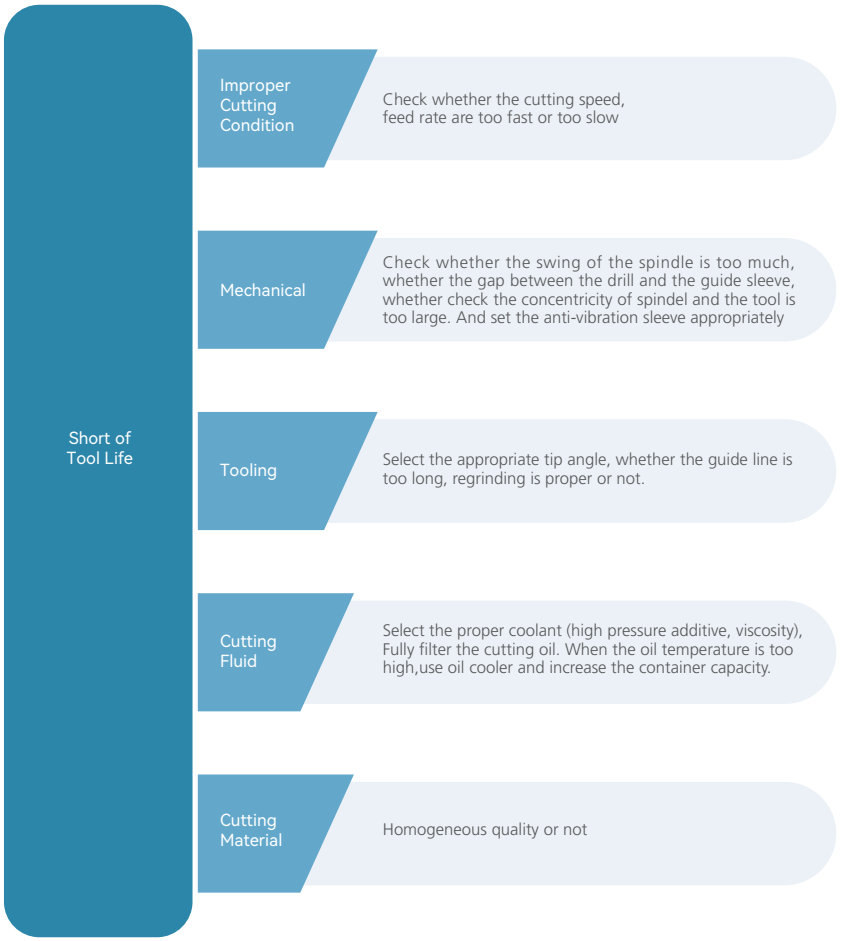
Grade of Roundness		N8	N7	N6	N5	N4	N3
Quality Zone							
Surface Roughness	R1μm	21	11.5	6.2	3.4	1.9	1.0
	Raμm	3.2	1.6	0.8	0.4	0.2	0.1
	Rzμm	14	7.6	4.5	2.2	1.2	0.65

Recommended Value

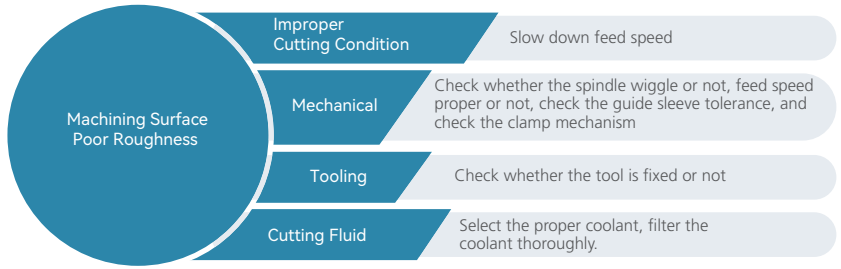
Wear and Broken Problem

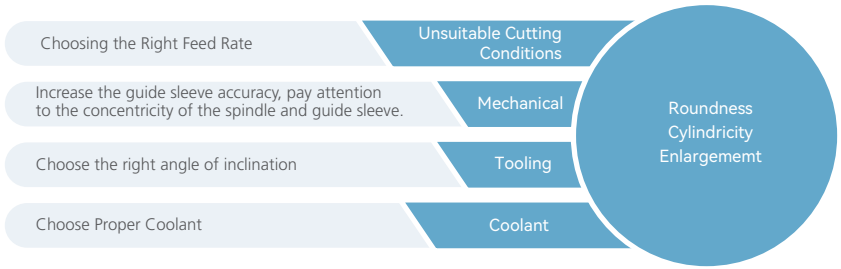


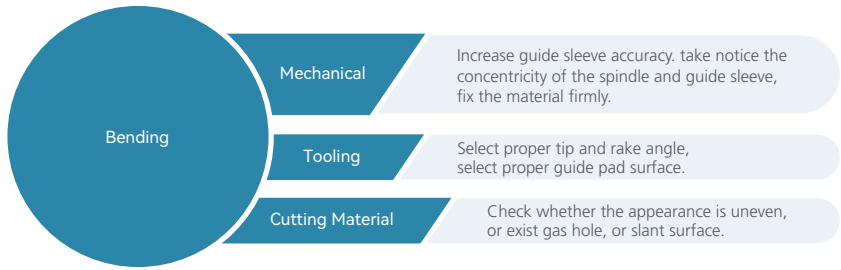
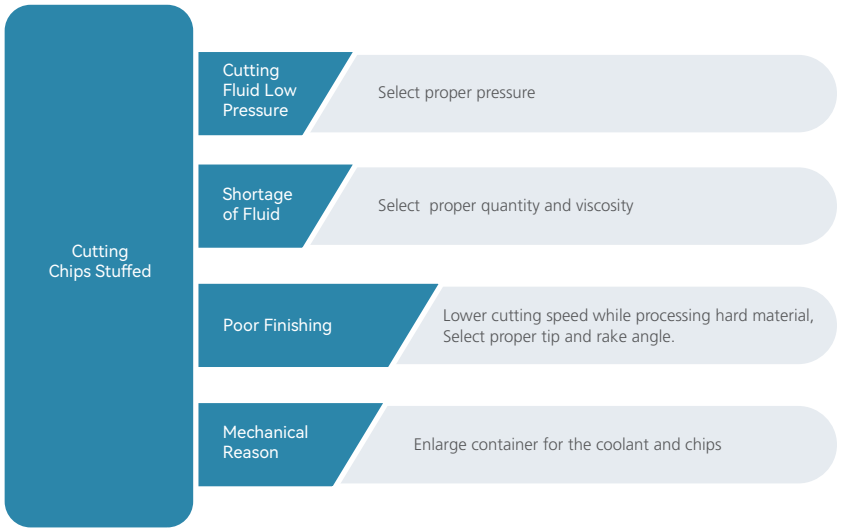
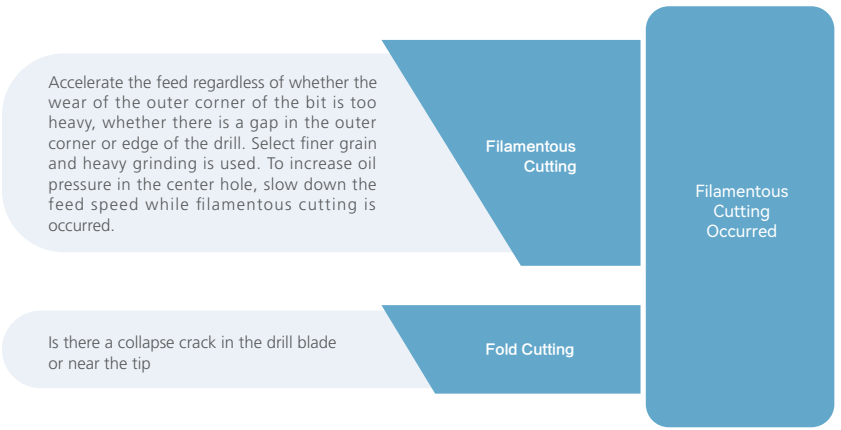
Tooling Life



Machining Accuracy







Cutting Solution