Bore machining tools

BORE MACHINING TOOLS

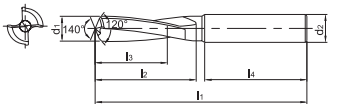
How to choose the right solid carbide drills

Shape

Product category

Shape size

SH series for high hardness steel



- For drilling high hardness steel (HRC 40~60)
- Small helical angle and large core designed, greatly improve tool rigidity.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.0	3	External coolant	Straight shank	**1534SH03-0300**	6	62	20	14	36	☆
3.3	3			**1534SH03-0330**	6	62	20	14	36	☆
4.0	3			**1534SH03-0400**	6	66	24	17	36	☆
4.2	3			**1534SH03-0420**	6	66	24	17	36	☆
5.0	3			**1534SH03-0500**	6	66	28	20	36	☆
6.0	3			**1534SH03-0600**	6	66	28	20	36	☆
6.75	3			**1534SH03-0675**	8	79	34	24	36	☆
7.0	3			**1534SH03-0700**	8	79	34	24	36	☆
8.0	3			**1534SH03-0800**	8	79	41	29	36	☆
8.5	3			**1534SH03-0850**	10	89	47	35	40	☆
9.0	3			**1534SH03-0900**	10	89	47	35	40	☆
10.0	3			**1534SH03-1000**	10	89	47	35	40	☆
10.25	3			**1534SH03-1025**	12	102	55	40	45	☆
10.5	3			**1534SH03-1050**	12	102	55	40	45	☆
12.0	3			**1534SH03-1200**	12	102	55	40	45	☆
12.5	3			**1534SH03-1250**	14	107	60	43	45	☆
14.0	3			**1534SH03-1400**	14	107	60	43	45	☆
14.5	3			**1534SH03-1450**	16	115	65	45	48	☆
16.0	3			**1534SH03-1600**	16	115	65	45	48	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303				◎	◎						

Code key C6 | Cutting parameters C69 | Technical information C76-C82 | Non-standard tailor made C83-C87

Specifications

Type, depth of drilling, cooling system, type of shank, basic dimensions and grade.

Applicable workpiece material range

Product features

Code key, cutting parameters, technical information, non-standard tailor made

BORE MACHINING TOOLS

Drills

Drilling tools overview

Application	Type of drills	Type	Shape of drills	Coolant mode	Diameter range	Workpiece material							Page	
						P		M	K	N	S	H	Specification	Cutting parameters
						Soft steel	Common steel	Stainless steel	Cast iron	Non-ferrous metal	Heat resistant alloy	High hardness steel		
General machining	Twist drill	**1534SU03**		External coolant	Ø2-Ø20	○	◎	○	◎	○	○		C7-37	C64-66
		1534SU03C		Internal coolant	Ø3-Ø20	○	◎	○	◎	○	○			
		1734SU03C		Internal coolant	Ø3-Ø20	○	◎	○	◎	○	○			
		1536SU05		External coolant	Ø2-Ø20	○	◎	○	◎	○	○			
		1536SU05C		Internal coolant	Ø3-Ø20	○	◎	○	◎	○	○			
		1736SU05C		Internal coolant	Ø3-Ø20	○	◎	○	◎	○	○			
		1538SU08C		Internal coolant	Ø3-Ø18	○	◎	○	◎	○	○			
	Step drill	**1557SU03**		External coolant	M4-M16	○	◎	○	◎	○	○		C38	C67
For soft steel, stainless steel	Twist drill	**1534ST03C**		Internal coolant	Ø3-Ø20	◎	○	◎			○		C39-51	C68
		1536ST05C		Internal coolant	Ø3-Ø20	◎	○	◎			○			
		1736ST05C		Internal coolant	Ø3-Ø20	◎	○	◎			○			
For high hardness steel	Twist drill	**1534SH03**		External coolant	Ø3-Ø16							◎	C52-53	C69
For aluminum, cast iron	Twist drill	**1105SC03**		External coolant	Ø2-Ø16				◎	◎			C54-57	C70
		1101SC05		External coolant	Ø2-Ø16				◎	◎				
	Three-lips drill	**1165PA03**		External coolant	Ø3-Ø20			○	◎	◎	○		C58-60	C71-72
	Straight flute drill	**1576PC05**		External coolant	Ø4-Ø20				◎	◎			C61-62	C73-74
		1579PC15C		Internal coolant	Ø5-Ø14				◎	◎				
	Centering drill	**1143SC90**		External coolant	Ø5-Ø20				◎	◎			C63	C75
		1143SC120		External coolant	Ø5-Ø20				◎	◎				
Indexable drills series	Shallow drills	**ZD03**		Internal coolant	Ø16-Ø58	◎	◎	○	◎	○			C90-91	C99

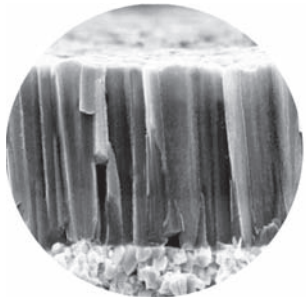
◎Very suitable ○Suitable

Grade introduction for solid carbide drills

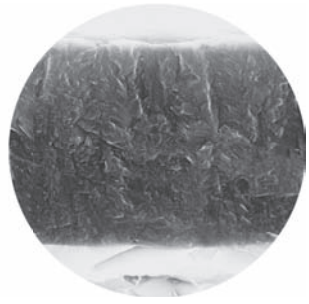
Coated grade

KDG303

It is a combination of ultra-fine carbide substrate with good strength, toughness and wear resistance and Nano structure nc-TiAlN coating aiming at optimizing drilling operations, make sure the tools possess very high toughness and hardness. Unique coating technology make the tools have smooth surface and excellent wear resistance, and prominent thermal stability and chemical stability supply effective protection for cutting edges.

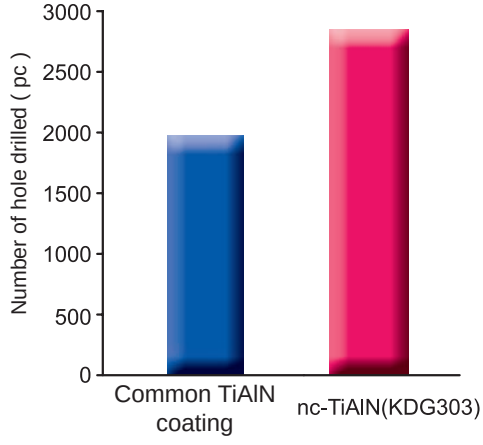


Common TiAlN coating



nc-TiAlN coating

Application of nc-TiAlN coating in drilling	
Tool type	1534SU03C-1200
Size	Ø12mm
Workpiece material	42CrMo(32HRC)
Cutting speed	100m/min
Rotating speed	2652r/min
Feed rate per revolution	0.25mm/r
Feed speed	663mm/min
Drilling depth	36mm
Cooling system	Water-soluble liquid (internal coolant)
Machine	Mikron UCP 1000



Uncoated grade

YK20F

Ultra-fine grain carbide substrate with high hardness, outstanding wear resistance, long tool life.

YK30F

Ultra-fine carbide substrate with good strength, toughness and wear resistance makes tool to possess perfect strength.

Solid carbide drills code key

Code	Description
1	As per DIN338
2	As per DIN1897
3	As per QJ/ZZQ(TO)01.001.002
4	As per DIN6537K
5	As per DIN6537K
6	As per DIN6537K
7	As per the rule ZZC-C in QJ/ZZQ(TO)01.001.002
8	As per the rule ZZC-D in QJ/ZZQ(TO)01.001.002
9	As per the rule ZZC-E in QJ/ZZQ(TO)01.001.002

Length code

Code	Description
SU	Twist drill for general purpose
ST	Twist drill for soft steel, stainless steel
SH	Twist drill for high hardness steel
SC	Twist drill for aluminum, cast iron
PA	Three-lips drill for aluminum, cast iron
PC	Straight flute drill for aluminum, cast iron

Geometry

Code	Description
1	Drills

Type to tool

Code	Description
C	Internal coolant
Default	External coolant

Mode of cooling

1 7 3 6 SU 05 C -0850

Type of shank

Code	Description
1	Straight shank
2	Square head straight shank as per DIN10
3	Double flattened straight shank as per DIN1809
5	Straight shank as per DIN6535HA
7	Whistle notch shank as per DIN6535HE
9	Tapered shank

Type of drill

Code	Description
0	Twist drill
3	Multiple functions twist drill
4	Centering drill
5	Step drill
6	Three-lips drill
7	Straight flute drill

Specification

Code	Description
0850	Nominal cutting diameter of stepless drill
M6	Step drill for standard pitch
M8×1	Step drill for fine pitch

Identification of drilling depth or point angle

If the tool is not a centering drill, it indicate the drilling depth		If the tool is a centering drill, it indicate the point angle	
Code	Description	Code	Description
03	(2~3) d	90	Centering drill with 90° point angle
05	(4~5) d		
08	(7~8) d	120	Centering drill with 120° point angle
15	(15) d		

SU series twist drill

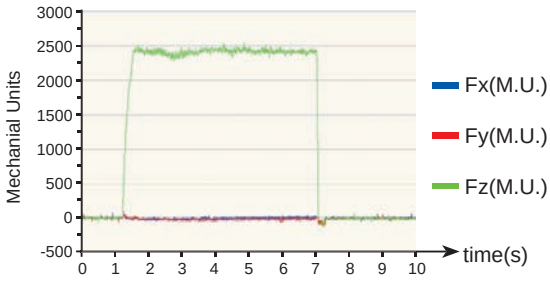
General machining

★Wide applications, for high efficient machining of various materials P(steel), M(stainless steel),K(cast iron), and S(heat resistant alloy).

★Optimized flute structure and waveform cutting edge achieve outstanding sharpness and strength, make the chip removal more fluent.

★140° point angle reduces the feed force of drilling in the preliminary stage, achieving perfect self-centering capability and improving quality of hole machined.

★Nano structure TiAlN coating , improving thermal hardness and avoiding build-up chip.

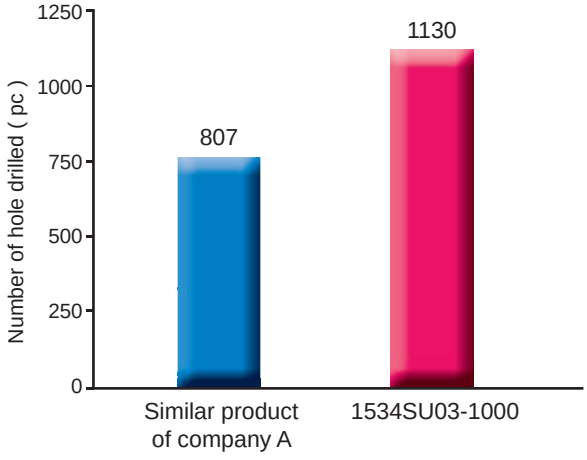


Cutting force chart of su series

Drill diameter：Ø12mm
Workpiece material：40Cr
Hardness：HB280
Cutting speed：90m/min
Feed speed：715mm/min
Drilling depth：40mm
Cooling system: emulsion (internal coolant)

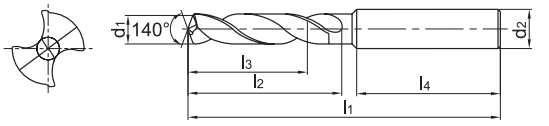
SU series twist drills comparison with company A's similar product

Tool type：1534SU03-1000
Size：Ø10mm
Workpiece material：42CrMo(35HRC)
Cutting speed：100m/min
Rotating speed：3200r/min
Feed rate per revolution：0.20mm/r
Feed speed：640mm/min
Drilling depth：30mm(L/D=3)
Cooling system: water soluble liquid (external coolant)
Machine：Mikron UCP 1000

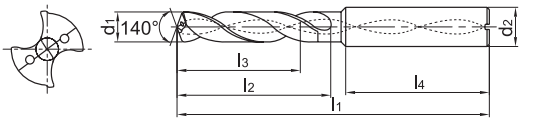


SU series General machining

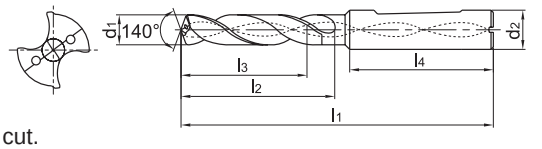

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
2.0	3	External coolant	Straight shank	**1534SU03-0200**	6	62	20	14	36	☆
	5			**1536SU05-0200**	6	66	28	23	36	☆
2.1	3			**1534SU03-0210**	6	62	20	14	36	☆
	5			**1536SU05-0210**	6	66	28	23	36	☆
2.2	3			**1534SU03-0220**	6	62	20	14	36	☆
	5			**1536SU05-0220**	6	66	28	23	36	☆
2.3	3			**1534SU03-0230**	6	62	20	14	36	☆
	5			**1536SU05-0230**	6	66	28	23	36	☆
2.4	3			**1534SU03-0240**	6	62	20	14	36	☆
	5			**1536SU05-0240**	6	66	28	23	36	☆
2.5	3			**1534SU03-0250**	6	62	20	14	36	☆
	5			**1536SU05-0250**	6	66	28	23	36	☆
2.6	3			**1534SU03-0260**	6	62	20	14	36	☆
	5			**1536SU05-0260**	6	66	28	23	36	☆
2.7	3			**1534SU03-0270**	6	62	20	14	36	☆
	5			**1536SU05-0270**	6	66	28	23	36	☆
2.8	3			**1534SU03-0280**	6	62	20	14	36	☆
	5			**1536SU05-0280**	6	66	28	23	36	☆
2.9	3			**1534SU03-0290**	6	62	20	14	36	☆
				1536SU05-0290	6	66	28	23	36	☆
3.0	3			**1534SU03-0300**	6	62	20	14	36	☆
	5			**1536SU05-0300**	6	66	28	23	36	☆
	3	Internal coolant		**1534SU03C-0300**	6	62	20	14	36	☆
	5			**1536SU05C-0300**	6	66	28	23	36	☆
	3		Whistle notch shank	**1734SU03C-0300**	6	62	20	14	36	☆
	5			**1736SU05C-0300**	6	66	28	23	36	☆
	8		Straight shank	**1538SU08C-0300**	6	72	34	29	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.1	3	External coolant	Straight shank	1534SU03-0310	6	62	20	14	36	☆
	5			1536SU05-0310	6	66	28	23	36	☆
	3	Internal coolant		1534SU03C-0310	6	62	20	14	36	☆
	5			1536SU05C-0310	6	66	28	23	36	☆
	3		Whistle notch shank	1734SU03C-0310	6	62	20	14	36	☆
	5			1736SU05C-0310	6	66	28	23	36	☆
	8		Straight shank	1538SU08C-0310	6	72	34	29	36	☆
3.2	3	External coolant		1534SU03-0320	6	62	20	14	36	☆
	5			1536SU05-0320	6	66	28	23	36	☆
	3	Internal coolant		1534SU03C-0320	6	62	20	14	36	☆
	5			1536SU05C-0320	6	66	28	23	36	☆
	3		Whistle notch shank	1734SU03C-0320	6	62	20	14	36	☆
	5			1736SU05C-0320	6	66	28	23	36	☆
	8		Straight shank	1538SU08C-0320	6	72	34	29	36	☆
3.25	3	External coolant		1534SU03-0325	6	62	20	14	36	☆
	5			1536SU05-0325	6	66	28	23	36	☆
	3	Internal coolant		1534SU03C-0325	6	62	20	14	36	☆
	5			1536SU05C-0325	6	66	28	23	36	☆
	3		Whistle notch shank	1734SU03C-0325	6	62	20	14	36	☆
	5			1736SU05C-0325	6	66	28	23	36	☆
3.3	3	External coolant	Straight shank	1534SU03-0330	6	62	20	14	36	☆
	5			1536SU05-0330	6	66	28	23	36	☆
	3	Internal coolant		1534SU03C-0330	6	62	20	14	36	☆
	5			1536SU05C-0330	6	66	28	23	36	☆
	3		Whistle notch shank	1734SU03C-0330	6	62	20	14	36	☆
	5			1736SU05C-0330	6	66	28	23	36	☆
	8		Straight shank	1538SU08C-0330	6	72	34	29	36	☆
3.4	3	External coolant		1534SU03-0340	6	62	20	14	36	☆
	5			1536SU05-0340	6	66	28	23	36	☆
	3	Internal coolant		1534SU03C-0340	6	62	20	14	36	☆
	5			1536SU05C-0340	6	66	28	23	36	☆
	3		Whistle notch shank	1734SU03C-0340	6	62	20	14	36	☆
	5			1736SU05C-0340	6	66	28	23	36	☆
	8		Straight shank	1538SU08C-0340	6	72	34	29	36	☆

☆Recommended grade and produce according to order

Applicable material table

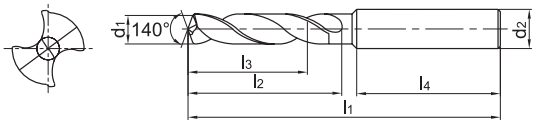
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

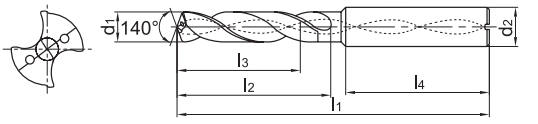
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

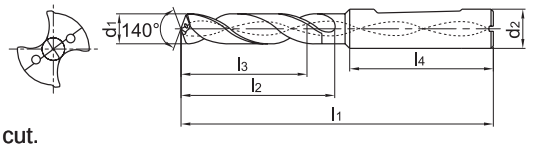

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



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- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.5	3	External coolant	Straight shank	1534SU03-0350	6	62	20	14	36	☆
	5			1536SU05-0350	6	66	28	23	36	☆
	3	Internal coolant		1534SU03C-0350	6	62	20	14	36	☆
	5			1536SU05C-0350	6	66	28	23	36	☆
	3		Whistle notch shank	1734SU03C-0350	6	62	20	14	36	☆
	5			1736SU05C-0350	6	66	28	23	36	☆
	8		Straight shank	1538SU08C-0350	6	72	34	29	36	☆
3.6	3	External coolant		1534SU03-0360	6	62	20	14	36	☆
	5			1536SU05-0360	6	66	28	23	36	☆
	3	Internal coolant		1534SU03C-0360	6	62	20	14	36	☆
	5			1536SU05C-0360	6	66	28	23	36	☆
	3		Whistle notch shank	1734SU03C-0360	6	62	20	14	36	☆
	5			1736SU05C-0360	6	66	28	23	36	☆
	8		Straight shank	1538SU08C-0360	6	72	34	29	36	☆
3.7	3	External coolant		1534SU03-0370	6	62	20	14	36	☆
	5			1536SU05-0370	6	66	28	23	36	☆
	3	Internal coolant		1534SU03C-0370	6	62	20	14	36	☆
	5			1536SU05C-0370	6	66	28	23	36	☆
	3		Whistle notch shank	1734SU03C-0370	6	62	20	14	36	☆
	5			1736SU05C-0370	6	66	28	23	36	☆
	8		Straight shank	1538SU08C-0370	6	72	34	29	36	☆
3.8	3	External coolant		1534SU03-0380	6	66	24	17	36	☆
	5			1536SU05-0380	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0380	6	66	24	17	36	☆
	5			1536SU05C-0380	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0380	6	66	24	17	36	☆
	5			1736SU05C-0380	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0380	6	81	43	36	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.9	3	External coolant	Straight shank	1534SU03-0390	6	66	24	17	36	☆
	5			1536SU05-0390	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0390	6	66	24	17	36	☆
	5			1536SU05C-0390	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0390	6	66	24	17	36	☆
	5			1736SU05C-0390	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0390	6	81	43	36	36	☆
4.0	3	External coolant		1534SU03-0400	6	66	24	17	36	☆
	5			1536SU05-0400	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0400	6	66	24	17	36	☆
	5			1536SU05C-0400	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0400	6	66	24	17	36	☆
	5			1736SU05C-0400	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0400	6	81	43	36	36	☆
4.1	3	External coolant		1534SU03-0410	6	66	24	17	36	☆
	5			1536SU05-0410	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0410	6	66	24	17	36	☆
	5			1536SU05C-0410	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0410	6	66	24	17	36	☆
	5			1736SU05C-0410	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0410	6	81	43	36	36	☆
4.2	3	External coolant		1534SU03-0420	6	66	24	17	36	☆
	5			1536SU05-0420	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0420	6	66	24	17	36	☆
	5			1536SU05C-0420	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0420	6	66	24	17	36	☆
	5			1736SU05C-0420	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0420	6	81	43	36	36	☆
4.3	3	External coolant		1534SU03-0430	6	66	24	17	36	☆
	5			1536SU05-0430	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0430	6	66	24	17	36	☆
	5			1536SU05C-0430	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0430	6	66	24	17	36	☆
	5			1736SU05C-0430	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0430	6	81	43	36	36	☆

☆Recommended grade and produce according to order

Applicable material table

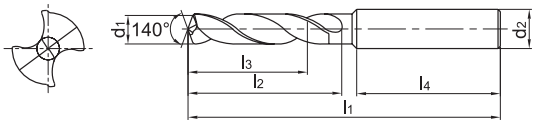
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

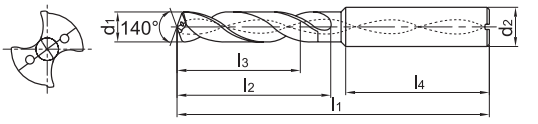
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

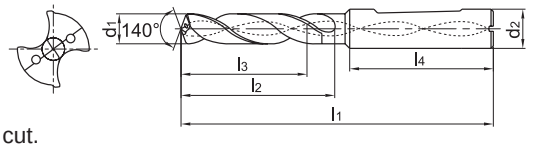

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
4.4	3	External coolant	Straight shank	1534SU03-0440	6	66	24	17	36	☆
	5			1536SU05-0440	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0440	6	66	24	17	36	☆
	5			1536SU05C-0440	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0440	6	66	24	17	36	☆
	5			1736SU05C-0440	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0440	6	81	43	36	36	☆
4.5	3	External coolant		1534SU03-0450	6	66	24	17	36	☆
	5			1536SU05-0450	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0450	6	66	24	17	36	☆
	5			1536SU05C-0450	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0450	6	66	24	17	36	☆
	5			1736SU05C-0450	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0450	6	81	43	36	36	☆
4.6	3	External coolant		1534SU03-0460	6	66	24	17	36	☆
	5			1536SU05-0460	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0460	6	66	24	17	36	☆
	5			1536SU05C-0460	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0460	6	66	24	17	36	☆
	5			1736SU05C-0460	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0460	6	81	43	36	36	☆
4.65	3	External coolant		1534SU03-0465	6	66	24	17	36	☆
	5			1536SU05-0465	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0465	6	66	24	17	36	☆
	5			1536SU05C-0465	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0465	6	66	24	17	36	☆
	5			1736SU05C-0465	6	74	36	29	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
4.7	3	External coolant	Straight shank	1534SU03-0470	6	66	24	17	36	☆
	5			1536SU05-0470	6	74	36	29	36	☆
	3	Internal coolant		1534SU03C-0470	6	66	24	17	36	☆
	5			1536SU05C-0470	6	74	36	29	36	☆
	3		Whistle notch shank	1734SU03C-0470	6	66	24	17	36	☆
	5			1736SU05C-0470	6	74	36	29	36	☆
	8		Straight shank	1538SU08C-0470	6	81	43	36	36	☆
4.8	3	External coolant		1534SU03-0480	6	66	28	20	36	☆
	5			1536SU05-0480	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0480	6	66	28	20	36	☆
	5			1536SU05C-0480	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0480	6	66	28	20	36	☆
	5			1736SU05C-0480	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0480	6	95	57	48	36	☆
4.9	3	External coolant		1534SU03-0490	6	66	28	20	36	☆
	5			1536SU05-0490	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0490	6	66	28	20	36	☆
	5			1536SU05C-0490	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0490	6	66	28	20	36	☆
	5			1736SU05C-0490	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0490	6	95	57	48	36	☆
5.0	3	External coolant		1534SU03-0500	6	66	28	20	36	☆
	5			1536SU05-0500	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0500	6	66	28	20	36	☆
	5			1536SU05C-0500	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0500	6	66	28	20	36	☆
	5			1736SU05C-0500	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0500	6	95	57	48	36	☆
5.1	3	External coolant		1534SU03-0510	6	66	28	20	36	☆
	5			1536SU05-0510	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0510	6	66	28	20	36	☆
	5			1536SU05C-0510	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0510	6	66	28	20	36	☆
	5			1736SU05C-0510	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0510	6	95	57	48	36	☆

☆Recommended grade and produce according to order

Applicable material table

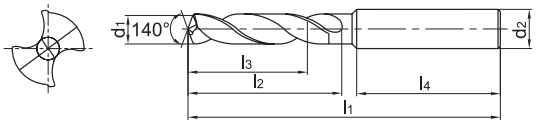
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

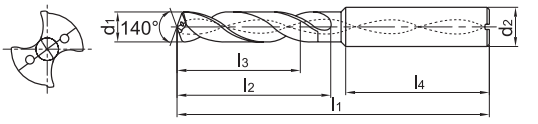
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

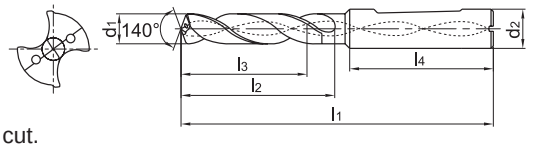

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
5.2	3	External coolant	Straight shank	1534SU03-0520	6	66	28	20	36	☆
	5			1536SU05-0520	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0520	6	66	28	20	36	☆
	5			1536SU05C-0520	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0520	6	66	28	20	36	☆
	5			1736SU05C-0520	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0520	6	95	57	48	36	☆
5.3	3	External coolant		1534SU03-0530	6	66	28	20	36	☆
	5			1536SU05-0530	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0530	6	66	28	20	36	☆
	5			1536SU05C-0530	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0530	6	66	28	20	36	☆
	5			1736SU05C-0530	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0530	6	95	57	48	36	☆
5.4	3	External coolant		1534SU03-0540	6	66	28	20	36	☆
	5			1536SU05-0540	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0540	6	66	28	20	36	☆
	5			1536SU05C-0540	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0540	6	66	28	20	36	☆
	5			1736SU05C-0540	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0540	6	95	57	48	36	☆
5.5	3	External coolant		1534SU03-0550	6	66	28	20	36	☆
	5			1536SU05-0550	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0550	6	66	28	20	36	☆
	5			1536SU05C-0550	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0550	6	66	28	20	36	☆
	5			1736SU05C-0550	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0550	6	95	57	48	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
5.55	3	External coolant	Straight shank	1534SU03-0555	6	66	28	20	36	☆
	5			1536SU05-0555	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0555	6	66	28	20	36	☆
	5			1536SU05C-0555	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0555	6	66	28	20	36	☆
	5			1736SU05C-0555	6	82	44	35	36	☆
5.6	3	External coolant	Straight shank	1534SU03-0560	6	66	28	20	36	☆
	5			1536SU05-0560	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0560	6	66	28	20	36	☆
	5			1536SU05C-0560	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0560	6	66	28	20	36	☆
	5			1736SU05C-0560	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0560	6	95	57	48	36	☆
5.7	3	External coolant		1534SU03-0570	6	66	28	20	36	☆
	5			1536SU05-0570	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0570	6	66	28	20	36	☆
	5			1536SU05C-0570	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0570	6	66	28	20	36	☆
	5			1736SU05C-0570	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0570	6	95	57	48	36	☆
5.8	3	External coolant		1534SU03-0580	6	66	28	20	36	☆
	5			1536SU05-0580	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0580	6	66	28	20	36	☆
	5			1536SU05C-0580	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0580	6	66	28	20	36	☆
	5			1736SU05C-0580	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0580	6	95	57	48	36	☆
5.9	3	External coolant		1534SU03-0590	6	66	28	20	36	☆
	5			1536SU05-0590	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0590	6	66	28	20	36	☆
	5			1536SU05C-0590	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0590	6	66	28	20	36	☆
	5			1736SU05C-0590	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0590	6	95	57	48	36	☆

☆Recommended grade and produce according to order

Applicable material table

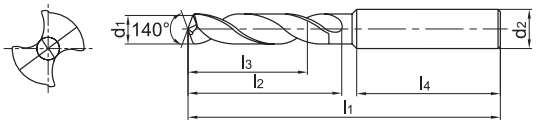
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

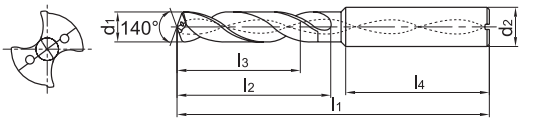
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

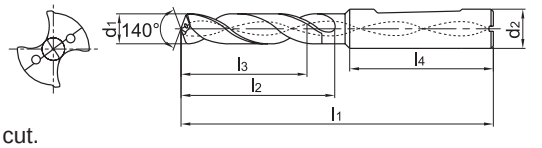

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
6.0	3	External coolant	Straight shank	1534SU03-0600	6	66	28	20	36	☆
	5			1536SU05-0600	6	82	44	35	36	☆
	3	Internal coolant		1534SU03C-0600	6	66	28	20	36	☆
	5			1536SU05C-0600	6	82	44	35	36	☆
	3		Whistle notch shank	1734SU03C-0600	6	66	28	20	36	☆
	5			1736SU05C-0600	6	82	44	35	36	☆
	8		Straight shank	1538SU08C-0600	6	95	57	48	36	☆
6.1	3	External coolant		1534SU03-0610	8	79	34	24	36	☆
	5			1536SU05-0610	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0610	8	79	34	24	36	☆
	5			1536SU05C-0610	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0610	8	79	34	24	36	☆
	5			1736SU05C-0610	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0610	8	114	76	66	36	☆
6.2	3	External coolant		1534SU03-0620	8	79	34	24	36	☆
	5			1536SU05-0620	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0620	8	79	34	24	36	☆
	5			1536SU05C-0620	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0620	8	79	34	24	36	☆
	5			1736SU05C-0620	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0620	8	114	76	66	36	☆
6.3	3	External coolant		1534SU03-0630	8	79	34	24	36	☆
	5			1536SU05-0630	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0630	8	79	34	24	36	☆
	5			1536SU05C-0630	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0630	8	79	34	24	36	☆
	5			1736SU05C-0630	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0630	8	114	76	66	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
6.4	3	External coolant	Straight shank	1534SU03-0640	8	79	34	24	36	☆
	5			1536SU05-0640	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0640	8	79	34	24	36	☆
	5			1536SU05C-0640	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0640	8	79	34	24	36	☆
	5			1736SU05C-0640	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0640	8	114	76	66	36	☆
6.5	3	External coolant		1534SU03-0650	8	79	34	24	36	☆
	5			1536SU05-0650	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0650	8	79	34	24	36	☆
	5			1536SU05C-0650	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0650	8	79	34	24	36	☆
	5			1736SU05C-0650	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0650	8	114	76	66	36	☆
6.6	3	External coolant		1534SU03-0660	8	79	34	24	36	☆
	5			1536SU05-0660	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0660	8	79	34	24	36	☆
	5			1536SU05C-0660	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0660	8	79	34	24	36	☆
	5			1736SU05C-0660	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0660	8	114	76	66	36	☆
6.7	3	External coolant		1534SU03-0670	8	79	34	24	36	☆
	5			1536SU05-0670	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0670	8	79	34	24	36	☆
	5			1536SU05C-0670	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0670	8	79	34	24	36	☆
	5			1736SU05C-0670	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0670	8	114	76	66	36	☆
6.75	3	External coolant		1534SU03-0675	8	79	34	24	36	☆
	5			1536SU05-0675	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0675	8	79	34	24	36	☆
	5			1536SU05C-0675	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0675	8	79	34	24	36	☆
	5			1736SU05C-0675	8	91	53	43	36	☆

☆Recommended grade and produce according to order

Applicable material table

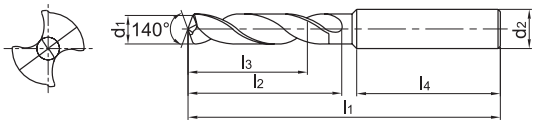
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

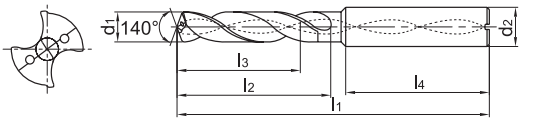
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

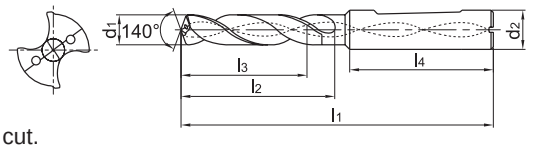

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
6.8	3	External coolant	Straight shank	1534SU03-0680	8	79	34	24	36	☆
	5			1536SU05-0680	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0680	8	79	34	24	36	☆
	5			1536SU05C-0680	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0680	8	79	34	24	36	☆
	5			1736SU05C-0680	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0680	8	114	76	66	36	☆
6.9	3	External coolant		1534SU03-0690	8	79	34	24	36	☆
	5			1536SU05-0690	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0690	8	79	34	24	36	☆
	5			1536SU05C-0690	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0690	8	79	34	24	36	☆
	5			1736SU05C-0690	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0690	8	114	76	66	36	☆
7.0	3	External coolant		1534SU03-0700	8	79	34	24	36	☆
	5			1536SU05-0700	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0700	8	79	34	24	36	☆
	5			1536SU05C-0700	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0700	8	79	34	24	36	☆
	5			1736SU05C-0700	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0700	8	116	76	66	36	☆
7.1	3	External coolant		1534SU03-0710	8	79	41	29	36	☆
	5			1536SU05-0710	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0710	8	79	41	29	36	☆
	5			1536SU05C-0710	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0710	8	79	41	29	36	☆
	5			1736SU05C-0710	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0710	8	116	76	66	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
7.2	3	External coolant	Straight shank	1534SU03-0720	8	79	41	29	36	☆
	5			1536SU05-0720	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0720	8	79	41	29	36	☆
	5			1536SU05C-0720	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0720	8	79	41	29	36	☆
	5			1736SU05C-0720	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0720	8	116	76	66	36	☆
7.3	3	External coolant		1534SU03-0730	8	79	41	29	36	☆
	5			1536SU05-0730	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0730	8	79	41	29	36	☆
	5			1536SU05C-0730	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0730	8	79	41	29	36	☆
	5			1736SU05C-0730	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0730	8	116	76	66	36	☆
7.4	3	External coolant		1534SU03-0740	8	79	41	29	36	☆
	5			1536SU05-0740	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0740	8	79	41	29	36	☆
	5			1536SU05C-0740	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0740	8	79	41	29	36	☆
	5			1736SU05C-0740	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0740	8	116	76	66	36	☆
7.5	3	External coolant		1534SU03-0750	8	79	41	29	36	☆
	5			1536SU05-0750	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0750	8	79	41	29	36	☆
	5			1536SU05C-0750	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0750	8	79	41	29	36	☆
	5			1736SU05C-0750	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0750	8	116	76	66	36	☆
7.6	3	External coolant		1534SU03-0760	8	79	41	29	36	☆
	5			1536SU05-0760	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0760	8	79	41	29	36	☆
	5			1536SU05C-0760	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0760	8	79	41	29	36	☆
	5			1736SU05C-0760	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0760	8	116	76	66	36	☆

☆Recommended grade and produce according to order

Applicable material table

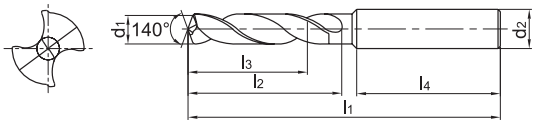
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

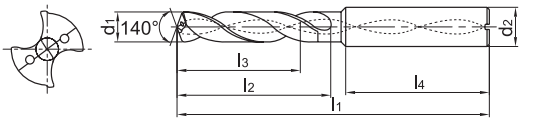
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

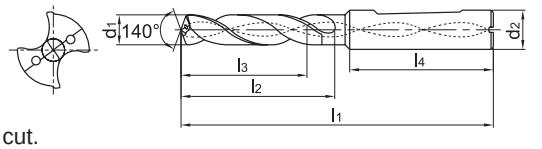

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
7.7	3	External coolant	Straight shank	1534SU03-0770	8	79	41	29	36	☆
	5			1536SU05-0770	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0770	8	79	41	29	36	☆
	5			1536SU05C-0770	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0770	8	79	41	29	36	☆
	5			1736SU05C-0770	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0770	8	116	76	66	36	☆
7.8	3	External coolant		1534SU03-0780	8	79	41	29	36	☆
	5			1536SU05-0780	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0780	8	79	41	29	36	☆
	5			1536SU05C-0780	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0780	8	79	41	29	36	☆
	5			1736SU05C-0780	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0780	8	116	76	66	36	☆
7.9	3	External coolant		1534SU03-0790	8	79	41	29	36	☆
	5			1536SU05-0790	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0790	8	79	41	29	36	☆
	5			1536SU05C-0790	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0790	8	79	41	29	36	☆
	5			1736SU05C-0790	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0790	8	116	76	66	36	☆
8.0	3	External coolant		1534SU03-0800	8	79	41	29	36	☆
	5			1536SU05-0800	8	91	53	43	36	☆
	3	Internal coolant		1534SU03C-0800	8	79	41	29	36	☆
	5			1536SU05C-0800	8	91	53	43	36	☆
	3		Whistle notch shank	1734SU03C-0800	8	79	41	29	36	☆
	5			1736SU05C-0800	8	91	53	43	36	☆
	8		Straight shank	1538SU08C-0800	8	116	76	66	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
8.1	3	External coolant	Straight shank	1534SU03-0810	10	89	47	35	40	☆
	5			1536SU05-0810	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0810	10	89	47	35	40	☆
	5			1536SU05C-0810	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0810	10	89	47	35	40	☆
	5			1736SU05C-0810	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0810	10	142	95	83	40	☆
8.2	3	External coolant		1534SU03-0820	10	89	47	35	40	☆
	5			1536SU05-0820	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0820	10	89	47	35	40	☆
	5			1536SU05C-0820	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0820	10	89	47	35	40	☆
	5			1736SU05C-0820	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0820	10	142	95	83	40	☆
8.3	3	External coolant		1534SU03-0830	10	89	47	35	40	☆
	5			1536SU05-0830	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0830	10	89	47	35	40	☆
	5			1536SU05C-0830	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0830	10	89	47	35	40	☆
	5			1736SU05C-0830	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0830	10	142	95	83	40	☆
8.4	3	External coolant		1534SU03-0840	10	89	47	35	40	☆
	5			1536SU05-0840	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0840	10	89	47	35	40	☆
	5			1536SU05C-0840	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0840	10	89	47	35	40	☆
	5			1736SU05C-0840	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0840	10	142	95	83	40	☆
8.5	3	External coolant		1534SU03-0850	10	89	47	35	40	☆
	5			1536SU05-0850	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0850	10	89	47	35	40	☆
	5			1536SU05C-0850	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0850	10	89	47	35	40	☆
	5			1736SU05C-0850	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0850	10	142	95	83	40	☆

☆Recommended grade and produce according to order

Applicable material table

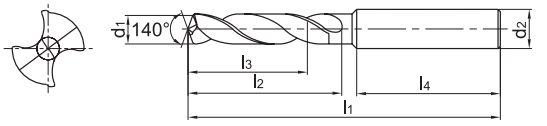
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

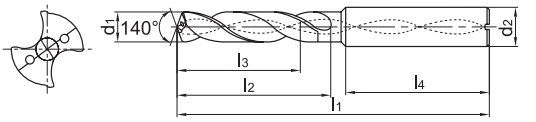
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

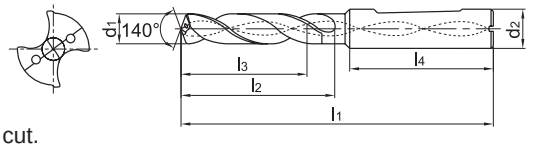

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
8.6	3	External coolant	Straight shank	1534SU03-0860	10	89	47	35	40	☆
	5			1536SU05-0860	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0860	10	89	47	35	40	☆
	5			1536SU05C-0860	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0860	10	89	47	35	40	☆
	5			1736SU05C-0860	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0860	10	142	95	83	40	☆
8.7	3	External coolant		1534SU03-0870	10	89	47	35	40	☆
	5			1536SU05-0870	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0870	10	89	47	35	40	☆
	5			1536SU05C-0870	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0870	10	89	47	35	40	☆
	5			1736SU05C-0870	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0870	10	142	95	83	40	☆
8.8	3	External coolant		1534SU03-0880	10	89	47	35	40	☆
	5			1536SU05-0880	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0880	10	89	47	35	40	☆
	5			1536SU05C-0880	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0880	10	89	47	35	40	☆
	5			1736SU05C-0880	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0880	10	142	95	83	40	☆
8.9	3	External coolant		1534SU03-0890	10	89	47	35	40	☆
	5			1536SU05-0890	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0890	10	89	47	35	40	☆
	5			1536SU05C-0890	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0890	10	89	47	35	40	☆
	5			1736SU05C-0890	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0890	10	142	95	83	40	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
9.0	3	External coolant	Straight shank	1534SU03-0900	10	89	47	35	40	☆
	5			1536SU05-0900	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0900	10	89	47	35	40	☆
	5			1536SU05C-0900	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0900	10	89	47	35	40	☆
	5			1736SU05C-0900	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0900	10	142	95	83	40	☆
9.1	3	External coolant		1534SU03-0910	10	89	47	35	40	☆
	5			1536SU05-0910	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0910	10	89	47	35	40	☆
	5			1536SU05C-0910	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0910	10	89	47	35	40	☆
	5			1736SU05C-0910	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0910	10	142	95	83	40	☆
9.2	3	External coolant		1534SU03-0920	10	89	47	35	40	☆
	5			1536SU05-0920	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0920	10	89	47	35	40	☆
	5			1536SU05C-0920	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0920	10	89	47	35	40	☆
	5			1736SU05C-0920	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0920	10	142	95	83	40	☆
9.3	3	External coolant		1534SU03-0930	10	89	47	35	40	☆
	5			1536SU05-0930	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0930	10	89	47	35	40	☆
	5			1536SU05C-0930	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0930	10	89	47	35	40	☆
	5			1736SU05C-0930	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0930	10	142	95	83	40	☆
9.4	3	External coolant		1534SU03-0940	10	89	47	35	40	☆
	5			1536SU05-0940	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0940	10	89	47	35	40	☆
	5			1536SU05C-0940	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0940	10	89	47	35	40	☆
	5			1736SU05C-0940	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0940	10	142	95	83	40	☆

☆Recommended grade and produce according to order

Applicable material table

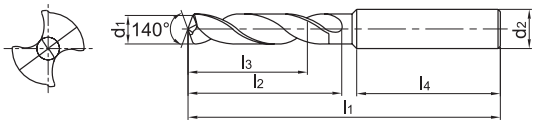
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

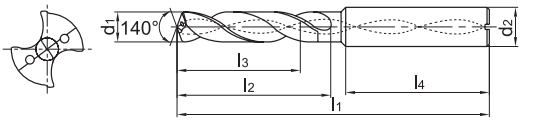
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

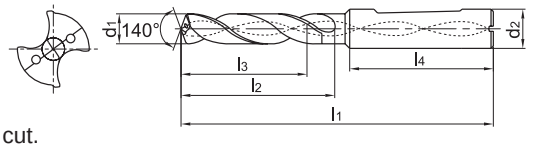

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
9.5	3	External coolant	Straight shank	1534SU03-0950	10	89	47	35	40	☆
	5			1536SU05-0950	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0950	10	89	47	35	40	☆
	5			1536SU05C-0950	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0950	10	89	47	35	40	☆
	5			1736SU05C-0950	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0950	10	142	95	83	40	☆
9.6	3	External coolant		1534SU03-0960	10	89	47	35	40	☆
	5			1536SU05-0960	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0960	10	89	47	35	40	☆
	5			1536SU05C-0960	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0960	10	89	47	35	40	☆
	5			1736SU05C-0960	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0960	10	142	95	83	40	☆
9.7	3	External coolant		1534SU03-0970	10	89	47	35	40	☆
	5			1536SU05-0970	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0970	10	89	47	35	40	☆
	5			1536SU05C-0970	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0970	10	89	47	35	40	☆
	5			1736SU05C-0970	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0970	10	142	95	83	40	☆
9.8	3	External coolant		1534SU03-0980	10	89	47	35	40	☆
	5			1536SU05-0980	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0980	10	89	47	35	40	☆
	5			1536SU05C-0980	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0980	10	89	47	35	40	☆
	5			1736SU05C-0980	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0980	10	142	95	83	40	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
9.9	3	External coolant	Straight shank	1534SU03-0990	10	89	47	35	40	☆
	5			1536SU05-0990	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-0990	10	89	47	35	40	☆
	5			1536SU05C-0990	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-0990	10	89	47	35	40	☆
	5			1736SU05C-0990	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-0990	10	142	95	83	40	☆
10.0	3	External coolant		1534SU03-1000	10	89	47	35	40	☆
	5			1536SU05-1000	10	103	61	49	40	☆
	3	Internal coolant		1534SU03C-1000	10	89	47	35	40	☆
	5			1536SU05C-1000	10	103	61	49	40	☆
	3		Whistle notch shank	1734SU03C-1000	10	89	47	35	40	☆
	5			1736SU05C-1000	10	103	61	49	40	☆
	8		Straight shank	1538SU08C-1000	10	142	95	83	40	☆
10.1	3	External coolant		1534SU03-1010	12	102	55	40	45	☆
	5			1536SU05-1010	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1010	12	102	55	40	45	☆
	5			1536SU05C-1010	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1010	12	102	55	40	45	☆
	5			1736SU05C-1010	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1010	12	162	114	99	45	☆
10.2	3	External coolant		1534SU03-1020	12	102	55	40	45	☆
	5			1536SU05-1020	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1020	12	102	55	40	45	☆
	5			1536SU05C-1020	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1020	12	102	55	40	45	☆
	5			1736SU05C-1020	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1020	12	162	114	99	45	☆
10.25	3	External coolant		1534SU03-1025	12	102	55	40	45	☆
	5			1536SU05-1025	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1025	12	102	55	40	45	☆
	5			1536SU05C-1025	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1025	12	102	55	40	45	☆
	5			1736SU05C-1025	12	118	71	56	45	☆

☆Recommended grade and produce according to order

Applicable material table

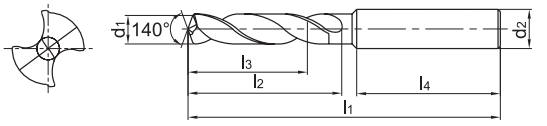
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

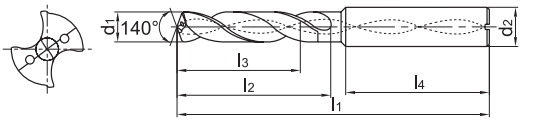
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

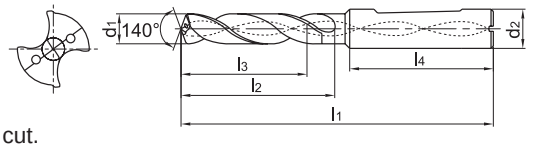

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
10.3	3	External coolant	Straight shank	1534SU03-1030	12	102	55	40	45	☆
	5			1536SU05-1030	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1030	12	102	55	40	45	☆
	5			1536SU05C-1030	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1030	12	102	55	40	45	☆
	5			1736SU05C-1030	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1030	12	162	114	99	45	☆
10.4	3	External coolant		1534SU03-1040	12	102	55	40	45	☆
	5			1536SU05-1040	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1040	12	102	55	40	45	☆
	5			1536SU05C-1040	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1040	12	102	55	40	45	☆
	5			1736SU05C-1040	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1040	12	162	114	99	45	☆
10.5	3	External coolant		1534SU03-1050	12	102	55	40	45	☆
	5			1536SU05-1050	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1050	12	102	55	40	45	☆
	5			1536SU05C-1050	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1050	12	102	55	40	45	☆
	5			1736SU05C-1050	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1050	12	162	114	99	45	☆
10.6	3	External coolant		1534SU03-1060	12	102	55	40	45	☆
	5			1536SU05-1060	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1060	12	102	55	40	45	☆
	5			1536SU05C-1060	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1060	12	102	55	40	45	☆
	5			1736SU05C-1060	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1060	12	162	114	99	45	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
10.7	3	External coolant	Straight shank	1534SU03-1070	12	102	55	40	45	☆
	5			1536SU05-1070	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1070	12	102	55	40	45	☆
	5			1536SU05C-1070	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1070	12	102	55	40	45	☆
	5			1736SU05C-1070	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1070	12	162	114	99	45	☆
10.8	3	External coolant		1534SU03-1080	12	102	55	40	45	☆
	5			1536SU05-1080	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1080	12	102	55	40	45	☆
	5			1536SU05C-1080	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1080	12	102	55	40	45	☆
	5			1736SU05C-1080	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1080	12	162	114	99	45	☆
10.9	3	External coolant		1534SU03-1090	12	102	55	40	45	☆
	5			1536SU05-1090	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1090	12	102	55	40	45	☆
	5			1536SU05C-1090	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1090	12	102	55	40	45	☆
	5			1736SU05C-1090	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1090	12	162	114	99	45	☆
11.0	3	External coolant		1534SU03-1100	12	102	55	40	45	☆
	5			1536SU05-1100	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1100	12	102	55	40	45	☆
	5			1536SU05C-1100	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1100	12	102	55	40	45	☆
	5			1736SU05C-1100	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1100	12	162	114	99	45	☆
11.1	3	External coolant		1534SU03-1110	12	102	55	40	45	☆
	5			1536SU05-1110	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1110	12	102	55	40	45	☆
	5			1536SU05C-1110	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1110	12	102	55	40	45	☆
	5			1736SU05C-1110	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1110	12	162	114	99	45	☆

☆Recommended grade and produce according to order

Applicable material table

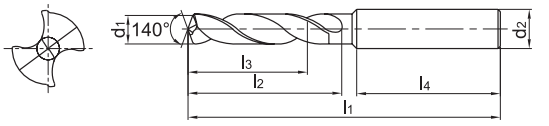
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

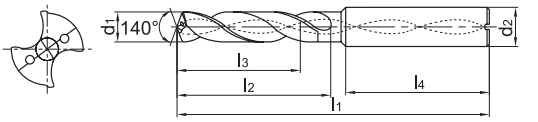
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

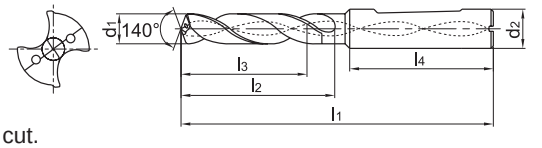

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
11.2	3	External coolant	Straight shank	1534SU03-1120	12	102	55	40	45	☆
	5			1536SU05-1120	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1120	12	102	55	40	45	☆
	5			1536SU05C-1120	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1120	12	102	55	40	45	☆
	5			1736SU05C-1120	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1120	12	162	114	99	45	☆
11.3	3	External coolant		1534SU03-1130	12	102	55	40	45	☆
	5			1536SU05-1130	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1130	12	102	55	40	45	☆
	5			1536SU05C-1130	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1130	12	102	55	40	45	☆
	5			1736SU05C-1130	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1130	12	162	114	99	45	☆
11.4	3	External coolant		1534SU03-1140	12	102	55	40	45	☆
	5			1536SU05-1140	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1140	12	102	55	40	45	☆
	5			1536SU05C-1140	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1140	12	102	55	40	45	☆
	5			1736SU05C-1140	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1140	12	162	114	99	45	☆
11.5	3	External coolant		1534SU03-1150	12	102	55	40	45	☆
	5			1536SU05-1150	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1150	12	102	55	40	45	☆
	5			1536SU05C-1150	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1150	12	102	55	40	45	☆
	5			1736SU05C-1150	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1150	12	162	114	99	45	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
11.6	3	External coolant	Straight shank	1534SU03-1160	12	102	55	40	45	☆
	5			1536SU05-1160	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1160	12	102	55	40	45	☆
	5			1536SU05C-1160	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1160	12	102	55	40	45	☆
	5			1736SU05C-1160	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1160	12	162	114	99	45	☆
11.7	3	External coolant		1534SU03-1170	12	102	55	40	45	☆
	5			1536SU05-1170	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1170	12	102	55	40	45	☆
	5			1536SU05C-1170	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1170	12	102	55	40	45	☆
	5			1736SU05C-1170	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1170	12	162	114	99	45	☆
11.8	3	External coolant		1534SU03-1180	12	102	55	40	45	☆
	5			1536SU05-1180	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1180	12	102	55	40	45	☆
	5			1536SU05C-1180	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1180	12	102	55	40	45	☆
	5			1736SU05C-1180	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1180	12	162	114	99	45	☆
11.9	3	External coolant		1534SU03-1190	12	102	55	40	45	☆
	5			1536SU05-1190	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1190	12	102	55	40	45	☆
	5			1536SU05C-1190	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1190	12	102	55	40	45	☆
	5			1736SU05C-1190	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1190	12	162	114	99	45	☆
12.0	3	External coolant		1534SU03-1200	12	102	55	40	45	☆
	5			1536SU05-1200	12	118	71	56	45	☆
	3	Internal coolant		1534SU03C-1200	12	102	55	40	45	☆
	5			1536SU05C-1200	12	118	71	56	45	☆
	3		Whistle notch shank	1734SU03C-1200	12	102	55	40	45	☆
	5			1736SU05C-1200	12	118	71	56	45	☆
	8		Straight shank	1538SU08C-1200	12	162	114	99	45	☆

☆Recommended grade and produce according to order

Applicable material table

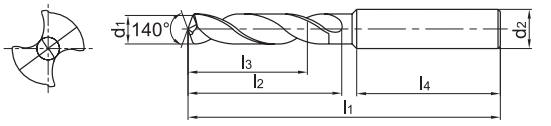
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

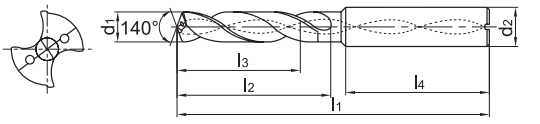
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

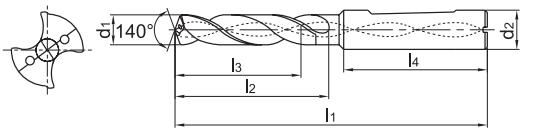

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
12.25	3	External coolant	Straight shank	1534SU03-1225	14	107	60	43	45	☆
	5			1536SU05-1225	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1225	14	107	60	43	45	☆
	5			1536SU05C-1225	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1225	14	107	60	43	45	☆
	5			1736SU05C-1225	14	124	77	60	45	☆
12.3	3	External coolant	Straight shank	1534SU03-1230	14	107	60	43	45	☆
	5			1536SU05-1230	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1230	14	107	60	43	45	☆
	5			1536SU05C-1230	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1230	14	107	60	43	45	☆
	5			1736SU05C-1230	14	124	77	60	45	☆
12.5	3	External coolant	Straight shank	1534SU03-1250	14	107	60	43	45	☆
	5			1536SU05-1250	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1250	14	107	60	43	45	☆
	5			1536SU05C-1250	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1250	14	107	60	43	45	☆
	5			1736SU05C-1250	14	124	77	60	45	☆
	8		Straight shank	1538SU08C-1250	14	178	133	116	45	☆
12.7	3	External coolant	Straight shank	1534SU03-1270	14	107	60	43	45	☆
	5			1536SU05-1270	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1270	14	107	60	43	45	☆
	5			1536SU05C-1270	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1270	14	107	60	43	45	☆
	5			1736SU05C-1270	14	124	77	60	45	☆
	8		Straight shank	1538SU08C-1270	14	178	133	116	45	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
12.75	3	External coolant	Straight shank	1534SU03-1275	14	107	60	43	45	☆
	5			1536SU05-1275	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1275	14	107	60	43	45	☆
	5			1536SU05C-1275	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1275	14	107	60	43	45	☆
	5			1736SU05C-1275	14	124	77	60	45	☆
12.8	3	External coolant	Straight shank	1534SU03-1280	14	107	60	43	45	☆
	5			1536SU05-1280	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1280	14	107	60	43	45	☆
	5			1536SU05C-1280	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1280	14	107	60	43	45	☆
	5			1736SU05C-1280	14	124	77	60	45	☆
	8		Straight shank	1538SU08C-1280	14	178	133	116	45	☆
13.0	3	External coolant		1534SU03-1300	14	107	60	43	45	☆
	5			1536SU05-1300	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1300	14	107	60	43	45	☆
	5			1536SU05C-1300	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1300	14	107	60	43	45	☆
	5			1736SU05C-1300	14	124	77	60	45	☆
	8		Straight shank	1538SU08C-1300	14	178	133	116	45	☆
13.1	3	External coolant		1534SU03-1310	14	107	60	43	45	☆
	5			1536SU05-1310	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1310	14	107	60	43	45	☆
	5			1536SU05C-1310	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1310	14	107	60	43	45	☆
	5			1736SU05C-1310	14	124	77	60	45	☆
13.5	3	External coolant	Straight shank	1534SU03-1350	14	107	60	43	45	☆
	5			1536SU05-1350	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1350	14	107	60	43	45	☆
	5			1536SU05C-1350	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1350	14	107	60	43	45	☆
	5			1736SU05C-1350	14	124	77	60	45	☆
	8		Straight shank	1538SU08C-1350	14	178	133	116	45	☆

☆Recommended grade and produce according to order

Applicable material table

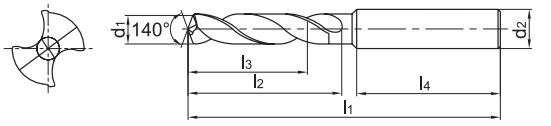
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

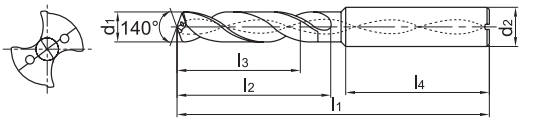
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

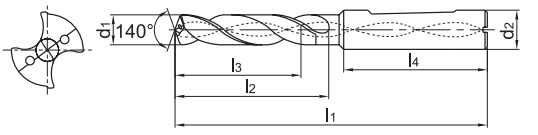

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
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Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
13.8	3	External coolant	Straight shank	1534SU03-1380	14	107	60	43	45	☆
	5			1536SU05-1380	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1380	14	107	60	43	45	☆
	5			1536SU05C-1380	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1380	14	107	60	43	45	☆
	5			1736SU05C-1380	14	124	77	60	45	☆
14.0	3	External coolant	Straight shank	1534SU03-1400	14	107	60	43	45	☆
	5			1536SU05-1400	14	124	77	60	45	☆
	3	Internal coolant		1534SU03C-1400	14	107	60	43	45	☆
	5			1536SU05C-1400	14	124	77	60	45	☆
	3		Whistle notch shank	1734SU03C-1400	14	107	60	43	45	☆
	5			1736SU05C-1400	14	124	77	60	45	☆
	8		Straight shank	1538SU08C-1400	14	178	133	116	45	☆
14.25	3	External coolant		1534SU03-1425	16	115	65	45	48	☆
	5			1536SU05-1425	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1425	16	115	65	45	48	☆
	5			1536SU05C-1425	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1425	16	115	65	45	48	☆
	5			1736SU05C-1425	16	133	83	63	48	☆
14.3	3	External coolant	Straight shank	1534SU03-1430	16	115	65	45	48	☆
	5			1536SU05-1430	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1430	16	115	65	45	48	☆
	5			1536SU05C-1430	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1430	16	115	65	45	48	☆
	5			1736SU05C-1430	16	133	83	63	48	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
14.5	3	External coolant	Straight shank	1534SU03-1450	16	115	65	45	48	☆
	5			1536SU05-1450	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1450	16	115	65	45	48	☆
	5			1536SU05C-1450	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1450	16	115	65	45	48	☆
	5			1736SU05C-1450	16	133	83	63	48	☆
	8		Straight shank	1538SU08C-1450	16	204	152	132	48	☆
14.75	3	External coolant		1534SU03-1475	16	115	65	45	48	☆
	5			1536SU05-1475	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1475	16	115	65	45	48	☆
	5			1536SU05C-1475	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1475	16	115	65	45	48	☆
	5			1736SU05C-1475	16	133	83	63	48	☆
14.8	3	External coolant	Straight shank	1534SU03-1480	16	115	65	45	48	☆
	5			1536SU05-1480	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1480	16	115	65	45	48	☆
	5			1536SU05C-1480	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1480	16	115	65	45	48	☆
	5			1736SU05C-1480	16	133	83	63	48	☆
	8		Straight shank	1538SU08C-1480	16	204	152	132	48	☆
15.0	3	External coolant		1534SU03-1500	16	115	65	45	48	☆
	5			1536SU05-1500	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1500	16	115	65	45	48	☆
	5			1536SU05C-1500	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1500	16	115	65	45	48	☆
	5			1736SU05C-1500	16	133	83	63	48	☆
	8		Straight shank	1538SU08C-1500	16	204	152	132	48	☆
15.1	3	External coolant		1534SU03-1510	16	115	65	45	48	☆
	5			1536SU05-1510	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1510	16	115	65	45	48	☆
	5			1536SU05C-1510	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1510	16	115	65	45	48	☆
	5			1736SU05C-1510	16	133	83	63	48	☆

☆Recommended grade and produce according to order

Applicable material table

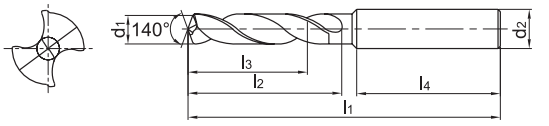
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

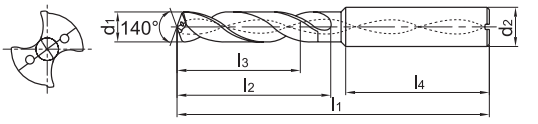
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

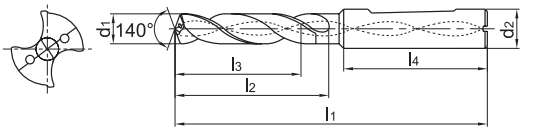

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
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Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
15.5	3	External coolant	Straight shank	1534SU03-1550	16	115	65	45	48	☆
	5			1536SU05-1550	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1550	16	115	65	45	48	☆
	5			1536SU05C-1550	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1550	16	115	65	45	48	☆
	5			1736SU05C-1550	16	133	83	63	48	☆
	8		Straight shank	1538SU08C-1550	16	204	152	132	48	☆
15.8	3	External coolant		1534SU03-1580	16	115	65	45	48	☆
	5			1536SU05-1580	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1580	16	115	65	45	48	☆
	5			1536SU05C-1580	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1580	16	115	65	45	48	☆
	5			1736SU05C-1580	16	133	83	63	48	☆
16.0	3	External coolant	Straight shank	1534SU03-1600	16	115	65	45	48	☆
	5			1536SU05-1600	16	133	83	63	48	☆
	3	Internal coolant		1534SU03C-1600	16	115	65	45	48	☆
	5			1536SU05C-1600	16	133	83	63	48	☆
	3		Whistle notch shank	1734SU03C-1600	16	115	65	45	48	☆
	5			1736SU05C-1600	16	133	83	63	48	☆
	8		Straight shank	1538SU08C-1600	16	204	152	132	48	☆
16.5	3	External coolant		1534SU03-1650	18	123	73	51	48	☆
	5			1536SU05-1650	18	143	93	71	48	☆
	3	Internal coolant		1534SU03C-1650	18	123	73	51	48	☆
	5			1536SU05C-1650	18	143	93	71	48	☆
	3		Whistle notch shank	1734SU03C-1650	18	123	73	51	48	☆
	5			1736SU05C-1650	18	143	93	71	48	☆
	8		Straight shank	1538SU08C-1650	18	223	171	149	48	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
16.75	3	External coolant	Straight shank	1534SU03-1675	18	123	73	51	48	☆
	5			1536SU05-1675	18	143	93	71	48	☆
	3	Internal coolant		1534SU03C-1675	18	123	73	51	48	☆
	5			1536SU05C-1675	18	143	93	71	48	☆
	3		Whistle notch shank	1734SU03C-1675	18	123	73	51	48	☆
	5			1736SU05C-1675	18	143	93	71	48	☆
16.8	3	External coolant	Straight shank	1534SU03-1680	18	123	73	51	48	☆
	5			1536SU05-1680	18	143	93	71	48	☆
	3	Internal coolant		1534SU03C-1680	18	123	73	51	48	☆
	5			1536SU05C-1680	18	143	93	71	48	☆
	3		Whistle notch shank	1734SU03C-1680	18	123	73	51	48	☆
	5			1736SU05C-1680	18	143	93	71	48	☆
17.0	3	External coolant	Straight shank	1534SU03-1700	18	123	73	51	48	☆
	5			1536SU05-1700	18	143	93	71	48	☆
	3	Internal coolant		1534SU03C-1700	18	123	73	51	48	☆
	5			1536SU05C-1700	18	143	93	71	48	☆
	3		Whistle notch shank	1734SU03C-1700	18	123	73	51	48	☆
	5			1736SU05C-1700	18	143	93	71	48	☆
	8		Straight shank	1538SU08C-1700	18	223	171	149	48	☆
17.5	3	External coolant		1534SU03-1750	18	123	73	51	48	☆
	5			1536SU05-1750	18	143	93	71	48	☆
	3	Internal coolant		1534SU03C-1750	18	123	73	51	48	☆
	5			1536SU05C-1750	18	143	93	71	48	☆
	3		Whistle notch shank	1734SU03C-1750	18	123	73	51	48	☆
	5			1736SU05C-1750	18	143	93	71	48	☆
	8		Straight shank	1538SU08C-1750	18	223	171	149	48	☆
17.8	3	External coolant		1534SU03-1780	18	123	73	51	48	☆
	5			1536SU05-1780	18	143	93	71	48	☆
	3	Internal coolant		1534SU03C-1780	18	123	73	51	48	☆
	5			1536SU05C-1780	18	143	93	71	48	☆
	3		Whistle notch shank	1734SU03C-1780	18	123	73	51	48	☆
	5			1736SU05C-1780	18	143	93	71	48	☆

☆Recommended grade and produce according to order

Applicable material table

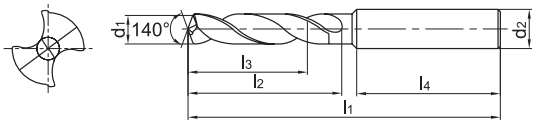
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

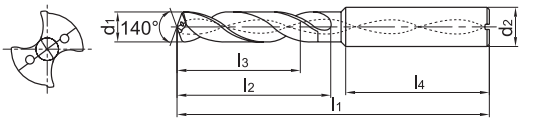
Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining

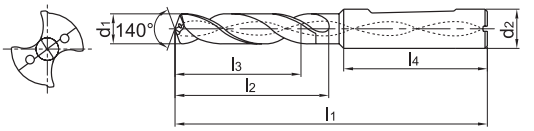

External coolant Straight shank




Internal coolant Straight shank




Internal coolant Whistle notch shank



- For high efficiently drilling from common steel to materials hard to cut.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
18.0	3	External coolant	Straight shank	1534SU03-1800	18	123	73	51	48	☆
	5			1536SU05-1800	18	143	93	71	48	☆
	3	Internal coolant		1534SU03C-1800	18	123	73	51	48	☆
	5			1536SU05C-1800	18	143	93	71	48	☆
	3		Whistle notch shank	1734SU03C-1800	18	123	73	51	48	☆
	5			1736SU05C-1800	18	143	93	71	48	☆
	8		Straight shank	1538SU08C-1800	18	223	171	149	48	☆
18.5	3	External coolant		1534SU03-1850	20	131	79	55	50	☆
	5			1536SU05-1850	20	153	101	77	50	☆
	3	Internal coolant		1534SU03C-1850	20	131	79	55	50	☆
	5			1536SU05C-1850	20	153	101	77	50	☆
	3		Whistle notch shank	1734SU03C-1850	20	131	79	55	50	☆
	5			1736SU05C-1850	20	153	101	77	50	☆
18.8	3	External coolant	Straight shank	1534SU03-1880	20	131	79	55	50	☆
	5			1536SU05-1880	20	153	101	77	50	☆
	3	Internal coolant		1534SU03C-1880	20	131	79	55	50	☆
	5			1536SU05C-1880	20	153	101	77	50	☆
	3		Whistle notch shank	1734SU03C-1880	20	131	79	55	50	☆
	5			1736SU05C-1880	20	153	101	77	50	☆
19.0	3	External coolant	Straight shank	1534SU03-1900	20	131	79	55	50	☆
	5			1536SU05-1900	20	153	101	77	50	☆
	3	Internal coolant		1534SU03C-1900	20	131	79	55	50	☆
	5			1536SU05C-1900	20	153	101	77	50	☆
	3		Whistle notch shank	1734SU03C-1900	20	131	79	55	50	☆
	5			1736SU05C-1900	20	153	101	77	50	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
19.5	3	External coolant	Straight shank	1534SU03-1950	20	131	79	55	50	☆
	5			1536SU05-1950	20	153	101	77	50	☆
	3	Internal coolant		1534SU03C-1950	20	131	79	55	50	☆
	5			1536SU05C-1950	20	153	101	77	50	☆
	3		Whistle notch shank	1734SU03C-1950	20	131	79	55	50	☆
	5			1736SU05C-1950	20	153	101	77	50	☆
19.8	3	External coolant	Straight shank	1534SU03-1980	20	131	79	55	50	☆
	5			1536SU05-1980	20	153	101	77	50	☆
	3	Internal coolant		1534SU03C-1980	20	131	79	55	50	☆
	5			1536SU05C-1980	20	153	101	77	50	☆
	3		Whistle notch shank	1734SU03C-1980	20	131	79	55	50	☆
	5			1736SU05C-1980	20	153	101	77	50	☆
20.0	3	External coolant	Straight shank	1534SU03-2000	20	131	79	55	50	☆
	5			1536SU05-2000	20	153	101	77	50	☆
	3	Internal coolant		1534SU03C-2000	20	131	79	55	50	☆
	5			1536SU05C-2000	20	153	101	77	50	☆
	3		Whistle notch shank	1734SU03C-2000	20	131	79	55	50	☆
	5			1736SU05C-2000	20	153	101	77	50	☆

☆Recommended grade and produce according to order

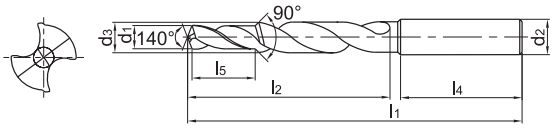
Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

Code key C6 Cutting parameters C64-C66 Technical information C76-C82 Non-standard tailor made C83-C87

SU series General machining(step drill)



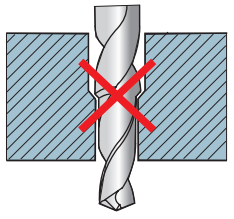
● For thread pre-hole, chamfering.

Drill diameter $d_1(m_8)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)							Recommended grade
					Thread size	d_2 (h_6)	d_3	l_1	l_2	l_4	l_5	KDG303
3.3	3	External coolant	Straight shank	**1557SU03-M4**	M4	6.0	4.5	66	28	36	11.4	☆
4.2	3			**1557SU03-M5**	M5	6.0	6.0	66	28	36	13.6	☆
5.0	3			**1557SU03-M6**	M6	8.0	7.0	79	41	36	16.5	☆
6.75	3			**1557SU03-M8**	M8	10.0	9.5	89	47	40	21.0	☆
8.5	3			**1557SU03-M10**	M10	12.0	12.0	102	55	45	25.5	☆
10.25	3			**1557SU03-M12**	M12	14.0	14.0	107	60	45	30.0	☆
12.0	3			**1557SU03-M14**	M14	16.0	16.0	115	65	48	34.5	☆
14.0	3			**1557SU03-M16**	M16	18.0	18.0	123	73	48	38.5	☆
7.0	3			**1557SU03-M8×1.0**	M8×1.0	10.0	9.8	89	47	40	21.0	☆
9.0	3			**1557SU03-M10×1.0**	M10×1.0	12.0	12.0	102	55	45	25.5	☆
10.5	3			**1557SU03-M12×1.5**	M12×1.5	14.0	14.0	107	60	45	30.0	☆
12.5	3			**1557SU03-M14×1.5**	M14×1.5	16.0	16.0	115	65	48	34.5	☆
14.5	3			**1557SU03-M16×1.5**	M16×1.5	18.0	18.0	123	73	48	38.5	☆

☆Recommended grade and produce according to order

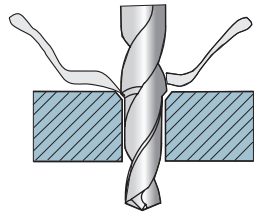
Attentions when using step drill

A



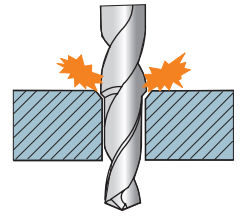
Because of no chamfer on the large diameter, countersink drill as shown above is not possible.

B



Long chips will roll around the drill and obstruct machining when countersink drill. It is recommended to select small feed drilling in order to cut chips.

C



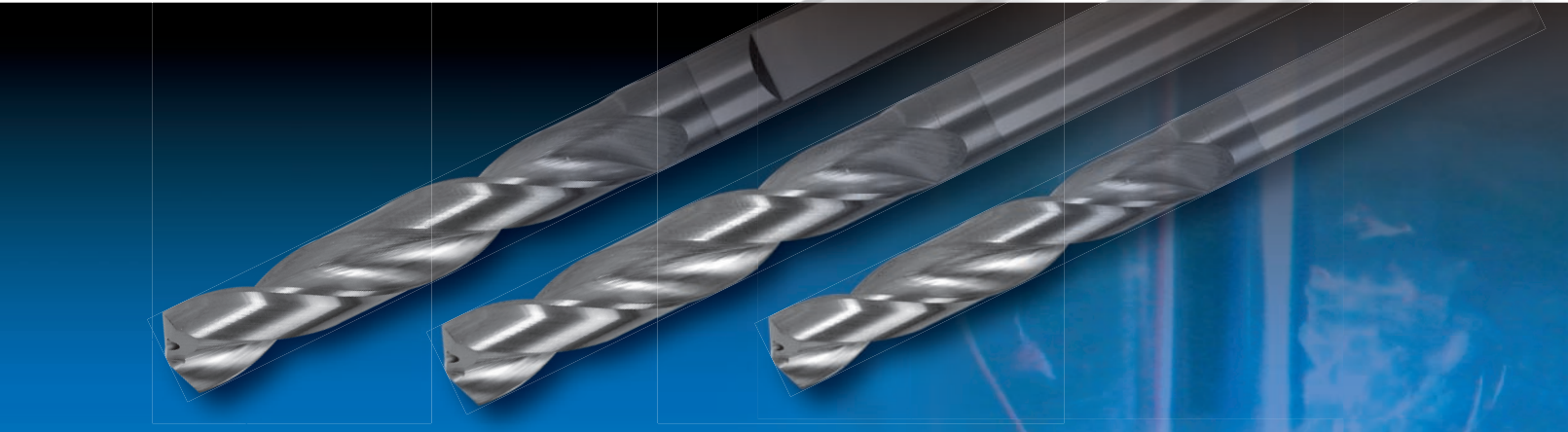
When countersink drill, cutting force increases at initial. Reduce the feed please.

Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	○	◎	◎			○	◎	◎	○		○

Code key C6 Cutting parameters C67 Technical information C76-C82 Non-standard tailor made C83-C87

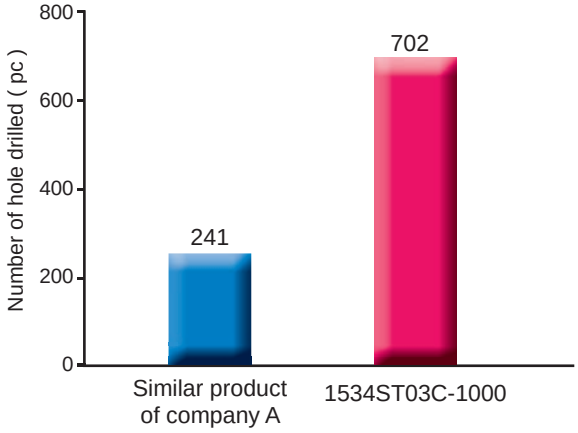


ST series twist drill

For soft steel, stainless steel

1. Specially designed flute and large chip pocket，make it possible to effectively control the chip flow, curl and fracture.
2. Waveform cutting edge and large cutting angle improve the sharpness of drill.
3. Very optimal for cutting materials with high extensibility and materials with long chips such as Austenitic stainless steel etc .

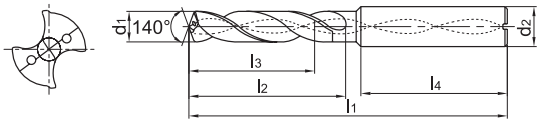
Tool type：1534ST03C-1000
Size：Ø10mm
Workpiece material：1Cr18Ni9Ti
Cutting speed：70m/min
Rotating speed：2200r/min
Feed rate per revolution：0.15mm/r
Feed speed：330mm/min
Drilling depth：30mm(L/D=3)
Cooling system: water-soluble liquid (internal coolant)
Machine：Mikron UCP 1000



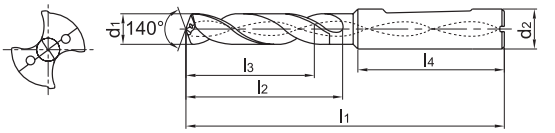
Company A's chips　　1534ST03C-1000 chips

ST series for soft steel, stainless steel


Internal coolant Straight shank




Internal coolant Whistle notch shank



- First choice for drilling soft & stainless steel
- Sharp cutting edge can avoid build--up edge, suitable for drilling hole with high performance.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.0	3	Internal coolant	Straight shank	1534ST03C-0300	6	62	20	14	36	☆
	5			1536ST05C-0300	6	66	28	23	36	☆
	5		Whistle notch shank	1736ST05C-0300	6	66	28	23	36	☆
3.1	3		Straight shank	1534ST03C-0310	6	62	20	14	36	☆
	5			1536ST05C-0310	6	66	28	23	36	☆
	5		Whistle notch shank	1736ST05C-0310	6	66	28	23	36	☆
3.2	3		Straight shank	1534ST03C-0320	6	62	20	14	36	☆
	5			1536ST05C-0320	6	66	28	23	36	☆
	5		Whistle notch shank	1736ST05C-0320	6	66	28	23	36	☆
3.25	3		Straight shank	1534ST03C-0325	6	62	20	14	36	☆
	5			1536ST05C-0325	6	66	28	23	36	☆
	5		Whistle notch shank	1736ST05C-0325	6	66	28	23	36	☆
3.3	3		Straight shank	1534ST03C-0330	6	62	20	14	36	☆
	5			1536ST05C-0330	6	66	28	23	36	☆
	5		Whistle notch shank	1736ST05C-0330	6	66	28	23	36	☆
3.4	3		Straight shank	1534ST03C-0340	6	62	20	14	36	☆
	5			1536ST05C-0340	6	66	28	23	36	☆
	5		Whistle notch shank	1736ST05C-0340	6	66	28	23	36	☆
3.5	3		Straight shank	1534ST03C-0350	6	62	20	14	36	☆
	5			1536ST05C-0350	6	66	28	23	36	☆
	5		Whistle notch shank	1736ST05C-0350	6	66	28	23	36	☆
3.6	3		Straight shank	1534ST03C-0360	6	62	20	14	36	☆
	5			1536ST05C-0360	6	66	28	23	36	☆
	5		Whistle notch shank	1736ST05C-0360	6	66	28	23	36	☆
3.7	3		Straight shank	1534ST03C-0370	6	62	20	14	36	☆
	5			1536ST05C-0370	6	66	28	23	36	☆
	5		Whistle notch shank	1736ST05C-0370	6	66	28	23	36	☆
3.8	3		Straight shank	1534ST03C-0380	6	66	24	17	36	☆
	5			1536ST05C-0380	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0380	6	74	36	29	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.9	3	Internal coolant	Straight shank	1534ST03C-0390	6	66	24	17	36	☆
	5			1536ST05C-0390	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0390	6	74	36	29	36	☆
4.0	3		Straight shank	1534ST03C-0400	6	66	24	17	36	☆
	5			1536ST05C-0400	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0400	6	74	36	29	36	☆
4.1	3		Straight shank	1534ST03C-0410	6	66	24	17	36	☆
	5			1536ST05C-0410	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0410	6	74	36	29	36	☆
4.2	3		Straight shank	1534ST03C-0420	6	66	24	17	36	☆
	5			1536ST05C-0420	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0420	6	74	36	29	36	☆
4.3	3		Straight shank	1534ST03C-0430	6	66	24	17	36	☆
	5			1536ST05C-0430	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0430	6	74	36	29	36	☆
4.4	3		Straight shank	1534ST03C-0440	6	66	24	17	36	☆
	5			1536ST05C-0440	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0440	6	74	36	29	36	☆
4.5	3		Straight shank	1534ST03C-0450	6	66	24	17	36	☆
	5			1536ST05C-0450	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0450	6	74	36	29	36	☆
4.6	3		Straight shank	1534ST03C-0460	6	66	24	17	36	☆
	5			1536ST05C-0460	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0460	6	74	36	29	36	☆
4.65	3		Straight shank	1534ST03C-0465	6	66	24	17	36	☆
	5			1536ST05C-0465	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0465	6	74	36	29	36	☆
4.7	3		Straight shank	1534ST03C-0470	6	66	24	17	36	☆
	5			1536ST05C-0470	6	74	36	29	36	☆
	5		Whistle notch shank	1736ST05C-0470	6	74	36	29	36	☆
4.8	3		Straight shank	1534ST03C-0480	6	66	28	20	36	☆
	5			1536ST05C-0480	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0480	6	82	44	35	36	☆

☆Recommended grade and produce according to order

Applicable material table

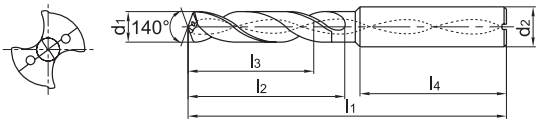
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	◎	○				◎					○

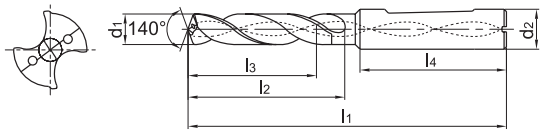
Code key C6 Cutting parameters C68 Technical information C76-C82 Non-standard tailor made C83-C87

ST series for soft steel, stainless steel


Internal coolant Straight shank




Internal coolant Whistle notch shank



- First choice for drilling soft & stainless steel
- Sharp cutting edge can avoid build--up edge, suitable for drilling hole with high performance.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
4.9	3	Internal coolant	Straight shank	1534ST03C-0490	6	66	28	20	36	☆
	5			1536ST05C-0490	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0490	6	82	44	35	36	☆
5.0	3		Straight shank	1534ST03C-0500	6	66	28	20	36	☆
	5			1536ST05C-0500	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0500	6	82	44	35	36	☆
5.1	3		Straight shank	1534ST03C-0510	6	66	28	20	36	☆
	5			1536ST05C-0510	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0510	6	82	44	35	36	☆
5.2	3		Straight shank	1534ST03C-0520	6	66	28	20	36	☆
	5			1536ST05C-0520	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0520	6	82	44	35	36	☆
5.3	3		Straight shank	1534ST03C-0530	6	66	28	20	36	☆
	5			1536ST05C-0530	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0530	6	82	44	35	36	☆
5.4	3		Straight shank	1534ST03C-0540	6	66	28	20	36	☆
	5			1536ST05C-0540	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0540	6	82	44	35	36	☆
5.5	3		Straight shank	1534ST03C-0550	6	66	28	20	36	☆
	5			1536ST05C-0550	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0550	6	82	44	35	36	☆
5.55	3		Straight shank	1534ST03C-0555	6	66	28	20	36	☆
	5			1536ST05C-0555	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0555	6	82	44	35	36	☆
5.6	3		Straight shank	1534ST03C-0560	6	66	28	20	36	☆
	5			1536ST05C-0560	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0560	6	82	44	35	36	☆
5.7	3		Straight shank	1534ST03C-0570	6	66	28	20	36	☆
	5			1536ST05C-0570	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0570	6	82	44	35	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
5.8	3	Internal coolant	Straight shank	1534ST03C-0580	6	66	28	20	36	☆
	5			1536ST05C-0580	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0580	6	82	44	35	36	☆
5.9	3		Straight shank	1534ST03C-0590	6	66	28	20	36	☆
	5			1536ST05C-0590	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0590	6	82	44	35	36	☆
6.0	3		Straight shank	1534ST03C-0600	6	66	28	20	36	☆
	5			1536ST05C-0600	6	82	44	35	36	☆
	5		Whistle notch shank	1736ST05C-0600	6	82	44	35	36	☆
6.1	3		Straight shank	1534ST03C-0610	8	79	34	24	36	☆
	5			1536ST05C-0610	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0610	8	91	53	43	36	☆
6.2	3		Straight shank	1534ST03C-0620	8	79	34	24	36	☆
	5			1536ST05C-0620	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0620	8	91	53	43	36	☆
6.3	3		Straight shank	1534ST03C-0630	8	79	34	24	36	☆
	5			1536ST05C-0630	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0630	8	91	53	43	36	☆
6.4	3		Straight shank	1534ST03C-0640	8	79	34	24	36	☆
	5			1536ST05C-0640	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0640	8	91	53	43	36	☆
6.5	3		Straight shank	1534ST03C-0650	8	79	34	24	36	☆
	5			1536ST05C-0650	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0650	8	91	53	43	36	☆
6.6	3		Straight shank	1534ST03C-0660	8	79	34	24	36	☆
	5			1536ST05C-0660	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0660	8	91	53	43	36	☆
6.7	3		Straight shank	1534ST03C-0670	8	79	34	24	36	☆
	5			1536ST05C-0670	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0670	8	91	53	43	36	☆
6.75	3		Straight shank	1534ST03C-0675	8	79	34	24	36	☆
	5			1536ST05C-0675	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0675	8	91	53	43	36	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

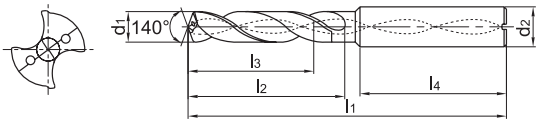
Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	◎	○				◎					○

Code key C6 Cutting parameters C68 Technical information C76-C82 Non-standard tailor made C83-C87

ST series for soft steel, stainless steel

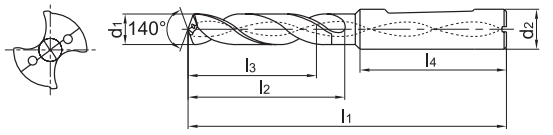

Internal coolant

Straight shank




Internal coolant

Whistle notch shank



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Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
6.9	3	Internal coolant	Straight shank	1534ST03C-0690	8	79	34	24	36	☆
	5			1536ST05C-0690	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0690	8	91	53	43	36	☆
7.0	3		Straight shank	1534ST03C-0700	8	79	34	24	36	☆
	5			1536ST05C-0700	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0700	8	91	53	43	36	☆
7.1	3		Straight shank	1534ST03C-0710	8	79	41	29	36	☆
	5			1536ST05C-0710	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0710	8	91	53	43	36	☆
7.2	3		Straight shank	1534ST03C-0720	8	79	41	29	36	☆
	5			1536ST05C-0720	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0720	8	91	53	43	36	☆
7.3	3		Straight shank	1534ST03C-0730	8	79	41	29	36	☆
	5			1536ST05C-0730	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0730	8	91	53	43	36	☆
7.4	3		Straight shank	1534ST03C-0740	8	79	41	29	36	☆
	5			1536ST05C-0740	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0740	8	91	53	43	36	☆
7.5	3		Straight shank	1534ST03C-0750	8	79	41	29	36	☆
	5			1536ST05C-0750	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0750	8	91	53	43	36	☆
7.6	3		Straight shank	1534ST03C-0760	8	79	41	29	36	☆
	5			1536ST05C-0760	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0760	8	91	53	43	36	☆
7.7	3		Straight shank	1534ST03C-0770	8	79	41	29	36	☆
	5			1536ST05C-0770	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0770	8	91	53	43	36	☆
7.8	3		Straight shank	1534ST03C-0780	8	79	41	29	36	☆
	5			1536ST05C-0780	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0780	8	91	53	43	36	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
7.9	3	Internal coolant	Straight shank	1534ST03C-0790	8	79	41	29	36	☆
	5			1536ST05C-0790	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0790	8	91	53	43	36	☆
8.0	3		Straight shank	1534ST03C-0800	8	79	41	29	36	☆
	5			1536ST05C-0800	8	91	53	43	36	☆
	5		Whistle notch shank	1736ST05C-0800	8	91	53	43	36	☆
8.1	3		Straight shank	1534ST03C-0810	10	89	47	35	40	☆
	5			1536ST05C-0810	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0810	10	103	61	49	40	☆
8.2	3		Straight shank	1534ST03C-0820	10	89	47	35	40	☆
	5			1536ST05C-0820	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0820	10	103	61	49	40	☆
8.3	3		Straight shank	1534ST03C-0830	10	89	47	35	40	☆
	5			1536ST05C-0830	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0830	10	103	61	49	40	☆
8.4	3		Straight shank	1534ST03C-0840	10	89	47	35	40	☆
	5			1536ST05C-0840	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0840	10	103	61	49	40	☆
8.5	3		Straight shank	1534ST03C-0850	10	89	47	35	40	☆
	5			1536ST05C-0850	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0850	10	103	61	49	40	☆
8.6	3		Straight shank	1534ST03C-0860	10	89	47	35	40	☆
	5			1536ST05C-0860	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0860	10	103	61	49	40	☆
8.7	3		Straight shank	1534ST03C-0870	10	89	47	35	40	☆
	5			1536ST05C-0870	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0870	10	103	61	49	40	☆
8.8	3		Straight shank	1534ST03C-0880	10	89	47	35	40	☆
	5			1536ST05C-0880	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0880	10	103	61	49	40	☆
8.9	3		Straight shank	1534ST03C-0890	10	89	47	35	40	☆
	5			1536ST05C-0890	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0890	10	103	61	49	40	☆
9.0	3		Straight shank	1534ST03C-0900	10	89	47	35	40	☆
	5			1536ST05C-0900	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0900	10	103	61	49	40	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

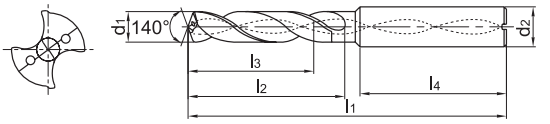
Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	◎	○				◎					○

Code key C6 Cutting parameters C68 Technical information C76-C82 Non-standard tailor made C83-C87

ST series for soft steel, stainless steel

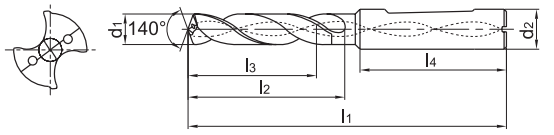

Internal coolant

Straight shank




Internal coolant

Whistle notch shank



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Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
9.1	3	Internal coolant	Straight shank	1534ST03C-0910	10	89	47	35	40	☆
	5			1536ST05C-0910	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0910	10	103	61	49	40	☆
9.3	3		Straight shank	1534ST03C-0930	10	89	47	35	40	☆
	5			1536ST05C-0930	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0930	10	103	61	49	40	☆
9.4	3		Straight shank	1534ST03C-0940	10	89	47	35	40	☆
	5			1536ST05C-0940	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0940	10	103	61	49	40	☆
9.5	3		Straight shank	1534ST03C-0950	10	89	47	35	40	☆
	5			1536ST05C-0950	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0950	10	103	61	49	40	☆
9.6	3		Straight shank	1534ST03C-0960	10	89	47	35	40	☆
	5			1536ST05C-0960	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0960	10	103	61	49	40	☆
9.7	3		Straight shank	1534ST03C-0970	10	89	47	35	40	☆
	5			1536ST05C-0970	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0970	10	103	61	49	40	☆
9.8	3		Straight shank	1534ST03C-0980	10	89	47	35	40	☆
	5			1536ST05C-0980	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0980	10	103	61	49	40	☆
9.9	3		Straight shank	1534ST03C-0990	10	89	47	35	40	☆
	5			1536ST05C-0990	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-0990	10	103	61	49	40	☆
10.0	3		Straight shank	1534ST03C-1000	10	89	47	35	40	☆
	5			1536ST05C-1000	10	103	61	49	40	☆
	5		Whistle notch shank	1736ST05C-1000	10	103	61	49	40	☆
10.1	3		Straight shank	1534ST03C-1010	12	102	55	40	45	☆
	5			1536ST05C-1010	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1010	12	118	71	56	45	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
10.25	3	Internal coolant	Straight shank	1534ST03C-1025	12	102	55	40	45	☆
	5			1536ST05C-1025	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1025	12	118	71	56	45	☆
10.3	3		Straight shank	1534ST03C-1030	12	102	55	40	45	☆
	5			1536ST05C-1030	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1030	12	118	71	56	45	☆
10.4	3		Straight shank	1534ST03C-1040	12	102	55	40	45	☆
	5			1536ST05C-1040	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1040	12	118	71	56	45	☆
10.5	3		Straight shank	1534ST03C-1050	12	102	55	40	45	☆
	5			1536ST05C-1050	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1050	12	118	71	56	45	☆
10.6	3		Straight shank	1534ST03C-1060	12	102	55	40	45	☆
	5			1536ST05C-1060	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1060	12	118	71	56	45	☆
10.7	3		Straight shank	1534ST03C-1070	12	102	55	40	45	☆
	5			1536ST05C-1070	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1070	12	118	71	56	45	☆
10.8	3		Straight shank	1534ST03C-1080	12	102	55	40	45	☆
	5			1536ST05C-1080	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1080	12	118	71	56	45	☆
10.9	3		Straight shank	1534ST03C-1090	12	102	55	40	45	☆
	5			1536ST05C-1090	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1090	12	118	71	56	45	☆
11.0	3		Straight shank	1534ST03C-1100	12	102	55	40	45	☆
	5			1536ST05C-1100	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1100	12	118	71	56	45	☆
11.1	3		Straight shank	1534ST03C-1110	12	102	55	40	45	☆
	5			1536ST05C-1110	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1110	12	118	71	56	45	☆
11.2	3		Straight shank	1534ST03C-1120	12	102	55	40	45	☆
	5			1536ST05C-1120	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1120	12	118	71	56	45	☆
11.3	3		Straight shank	1534ST03C-1130	12	102	55	40	45	☆
	5			1536ST05C-1130	12	118	71	56	45	☆
	5		Whistle notch shank	1736ST05C-1130	12	118	71	56	45	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

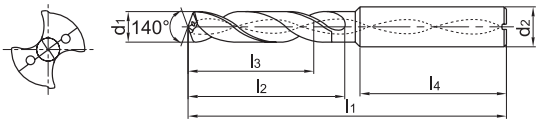
Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	◎	○				◎					○

Code key C6 Cutting parameters C68 Technical information C76-C82 Non-standard tailor made C83-C87

ST series for soft steel, stainless steel

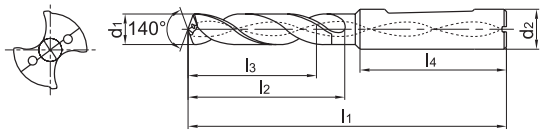
Internal coolant

Straight shank



Internal coolant

Whistle notch shank



- First choice for drilling soft & stainless steel
- Sharp cutting edge can avoid build--up edge, suitable for drilling hole with high performance.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
11.4	3	Internal coolant	Straight shank	**1534ST03C-1140**	12	102	55	40	45	☆
	5			**1536ST05C-1140**	12	118	71	56	45	☆
	5		Whistle notch shank	**1736ST05C-1140**	12	118	71	56	45	☆
11.5	3		Straight shank	**1534ST03C-1150**	12	102	55	40	45	☆
	5			**1536ST05C-1150**	12	118	71	56	45	☆
	5		Whistle notch shank	**1736ST05C-1150**	12	118	71	56	45	☆
11.6	3		Straight shank	**1534ST03C-1160**	12	102	55	40	45	☆
	5			**1536ST05C-1160**	12	118	71	56	45	☆
	5		Whistle notch shank	**1736ST05C-1160**	12	118	71	56	45	☆
11.7	3		Straight shank	**1534ST03C-1170**	12	102	55	40	45	☆
	5			**1536ST05C-1170**	12	118	71	56	45	☆
	5		Whistle notch shank	**1736ST05C-1170**	12	118	71	56	45	☆
11.8	3		Straight shank	**1534ST03C-1180**	12	102	55	40	45	☆
	5			**1536ST05C-1180**	12	118	71	56	45	☆
	5		Whistle notch shank	**1736ST05C-1180**	12	118	71	56	45	☆
11.9	3		Straight shank	**1534ST03C-1190**	12	102	55	40	45	☆
	5			**1536ST05C-1190**	12	118	71	56	45	☆
	5		Whistle notch shank	**1736ST05C-1190**	12	118	71	56	45	☆
12.0	3		Straight shank	**1534ST03C-1200**	12	102	55	40	45	☆
	5			**1536ST05C-1200**	12	118	71	56	45	☆
	5		Whistle notch shank	**1736ST05C-1200**	12	118	71	56	45	☆
12.25	3		Straight shank	**1534ST03C-1225**	14	107	60	43	45	☆
	5			**1536ST05C-1225**	14	124	77	60	45	☆
	5		Whistle notch shank	**1736ST05C-1225**	14	124	77	60	45	☆
12.3	3		Straight shank	**1534ST03C-1230**	14	107	60	43	45	☆
	5			**1536ST05C-1230**	14	124	77	60	45	☆
	5		Whistle notch shank	**1736ST05C-1230**	14	124	77	60	45	☆
12.5	3		Straight shank	**1534ST03C-1250**	14	107	60	43	45	☆
	5			**1536ST05C-1250**	14	124	77	60	45	☆
	5		Whistle notch shank	**1736ST05C-1250**	14	124	77	60	45	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
12.7	3	Internal coolant	Straight shank	1534ST03C-1270	14	107	60	43	45	☆
	5			1536ST05C-1270	14	124	77	60	45	☆
	5		Whistle notch shank	1736ST05C-1270	14	124	77	60	45	☆
12.75	3		Straight shank	1534ST03C-1275	14	107	60	43	45	☆
	5			1536ST05C-1275	14	124	77	60	45	☆
	5		Whistle notch shank	1736ST05C-1275	14	124	77	60	45	☆
12.8	3		Straight shank	1534ST03C-1280	14	107	60	43	45	☆
	5			1536ST05C-1280	14	124	77	60	45	☆
	5		Whistle notch shank	1736ST05C-1280	14	124	77	60	45	☆
13.0	3		Straight shank	1534ST03C-1300	14	107	60	43	45	☆
	5			1536ST05C-1300	14	124	77	60	45	☆
	5		Whistle notch shank	1736ST05C-1300	14	124	77	60	45	☆
13.1	3		Straight shank	1534ST03C-1310	14	107	60	43	45	☆
	5			1536ST05C-1310	14	124	77	60	45	☆
	5		Whistle notch shank	1736ST05C-1310	14	124	77	60	45	☆
13.5	3		Straight shank	1534ST03C-1350	14	107	60	43	45	☆
	5			1536ST05C-1350	14	124	77	60	45	☆
	5		Whistle notch shank	1736ST05C-1350	14	124	77	60	45	☆
13.8	3		Straight shank	1534ST03C-1380	14	107	60	43	45	☆
	5			1536ST05C-1380	14	124	77	60	45	☆
	5		Whistle notch shank	1736ST05C-1380	14	124	77	60	45	☆
14.0	3		Straight shank	1534ST03C-1400	14	107	60	43	45	☆
	5			1536ST05C-1400	14	124	77	60	45	☆
	5		Whistle notch shank	1736ST05C-1400	14	124	77	60	45	☆
14.25	3		Straight shank	1534ST03C-1425	16	115	65	45	48	☆
	5			1536ST05C-1425	16	133	83	63	48	☆
	5		Whistle notch shank	1736ST05C-1425	16	133	83	63	48	☆
14.3	3		Straight shank	1534ST03C-1430	16	115	65	45	48	☆
	5			1536ST05C-1430	16	133	83	63	48	☆
	5		Whistle notch shank	1736ST05C-1430	16	133	83	63	48	☆
14.5	3		Straight shank	1534ST03C-1450	16	115	65	45	48	☆
	5			1536ST05C-1450	16	133	83	63	48	☆
	5		Whistle notch shank	1736ST05C-1450	16	133	83	63	48	☆
14.75	3		Straight shank	1534ST03C-1475	16	115	65	45	48	☆
	5			1536ST05C-1475	16	133	83	63	48	☆
	5		Whistle notch shank	1736ST05C-1475	16	133	83	63	48	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

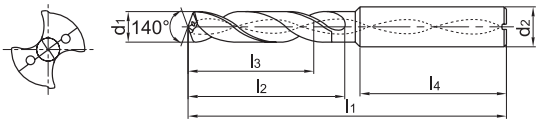
Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	◎	○				◎					○

Code key C6 Cutting parameters C68 Technical information C76-C82 Non-standard tailor made C83-C87

ST series for soft steel, stainless steel

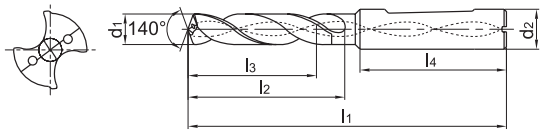

Internal coolant

Straight shank




Internal coolant

Whistle notch shank



- First choice for drilling soft & stainless steel
- Sharp cutting edge can avoid build--up edge, suitable for drilling hole with high performance.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
14.8	3	Internal coolant	Straight shank	**1534ST03C-1480**	16	115	65	45	48	☆
	5			**1536ST05C-1480**	16	133	83	63	48	☆
	5		Whistle notch shank	**1736ST05C-1480**	16	133	83	63	48	☆
15.0	3		Straight shank	**1534ST03C-1500**	16	115	65	45	48	☆
	5			**1536ST05C-1500**	16	133	83	63	48	☆
	5		Whistle notch shank	**1736ST05C-1500**	16	133	83	63	48	☆
15.1	3		Straight shank	**1534ST03C-1510**	16	115	65	45	48	☆
	5			**1536ST05C-1510**	16	133	83	63	48	☆
	5		Whistle notch shank	**1736ST05C-1510**	16	133	83	63	48	☆
15.5	3		Straight shank	**1534ST03C-1550**	16	115	65	45	48	☆
	5			**1536ST05C-1550**	16	133	83	63	48	☆
	5		Whistle notch shank	**1736ST05C-1550**	16	133	83	63	48	☆
15.8	3		Straight shank	**1534ST03C-1580**	16	115	65	45	48	☆
	5			**1536ST05C-1580**	16	133	83	63	48	☆
	5		Whistle notch shank	**1736ST05C-1580**	16	133	83	63	48	☆
16.0	3		Straight shank	**1534ST03C-1600**	16	115	65	45	48	☆
	5			**1536ST05C-1600**	16	133	83	63	48	☆
	5		Whistle notch shank	**1736ST05C-1600**	16	133	83	63	48	☆
16.5	3		Straight shank	**1534ST03C-1650**	18	123	73	51	48	☆
	5			**1536ST05C-1650**	18	143	93	71	48	☆
	5		Whistle notch shank	**1736ST05C-1650**	18	143	93	71	48	☆
16.75	3		Straight shank	**1534ST03C-1675**	18	123	73	51	48	☆
	5			**1536ST05C-1675**	18	143	93	71	48	☆
	5		Whistle notch shank	**1736ST05C-1675**	18	143	93	71	48	☆
16.8	3		Straight shank	**1534ST03C-1680**	18	123	73	51	48	☆
	5			**1536ST05C-1680**	18	143	93	71	48	☆
	5		Whistle notch shank	**1736ST05C-1680**	18	143	93	71	48	☆
17.0	3		Straight shank	**1534ST03C-1700**	18	123	73	51	48	☆
	5			**1536ST05C-1700**	18	143	93	71	48	☆
	5		Whistle notch shank	**1736ST05C-1700**	18	143	93	71	48	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
17.5	3	Internal coolant	Straight shank	1534ST03C-1750	18	123	73	51	48	☆
	5			1536ST05C-1750	18	143	93	71	48	☆
	5		Whistle notch shank	1736ST05C-1750	18	143	93	71	48	☆
17.8	3		Straight shank	1534ST03C-1780	18	123	73	51	48	☆
	5			1536ST05C-1780	18	143	93	71	48	☆
	5		Whistle notch shank	1736ST05C-1780	18	143	93	71	48	☆
18.0	3		Straight shank	1534ST03C-1800	18	123	73	51	48	☆
	5			1536ST05C-1800	18	143	93	71	48	☆
	5		Whistle notch shank	1736ST05C-1800	18	143	93	71	48	☆
18.5	3		Straight shank	1534ST03C-1850	20	131	79	55	50	☆
	5			1536ST05C-1850	20	153	101	77	50	☆
	5		Whistle notch shank	1736ST05C-1850	20	153	101	77	50	☆
18.8	3		Straight shank	1534ST03C-1880	20	131	79	55	50	☆
	5			1536ST05C-1880	20	153	101	77	50	☆
	5		Whistle notch shank	1736ST05C-1880	20	153	101	77	50	☆
19.0	3		Straight shank	1534ST03C-1900	20	131	79	55	50	☆
	5			1536ST05C-1900	20	153	101	77	50	☆
	5		Whistle notch shank	1736ST05C-1900	20	153	101	77	50	☆
19.5	3		Straight shank	1534ST03C-1950	20	131	79	55	50	☆
	5			1536ST05C-1950	20	153	101	77	50	☆
	5		Whistle notch shank	1736ST05C-1950	20	153	101	77	50	☆
19.8	3		Straight shank	1534ST03C-1980	20	131	79	55	50	☆
	5			1536ST05C-1980	20	153	101	77	50	☆
	5		Whistle notch shank	1736ST05C-1980	20	153	101	77	50	☆
20.0	3		Straight shank	1534ST03C-2000	20	131	79	55	50	☆
	5			1536ST05C-2000	20	153	101	77	50	☆
	5		Whistle notch shank	1736ST05C-2000	20	153	101	77	50	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303	◎	○				◎					○

Code key C6 Cutting parameters C68 Technical information C76-C82 Non-standard tailor made C83-C87

SH series twist drill

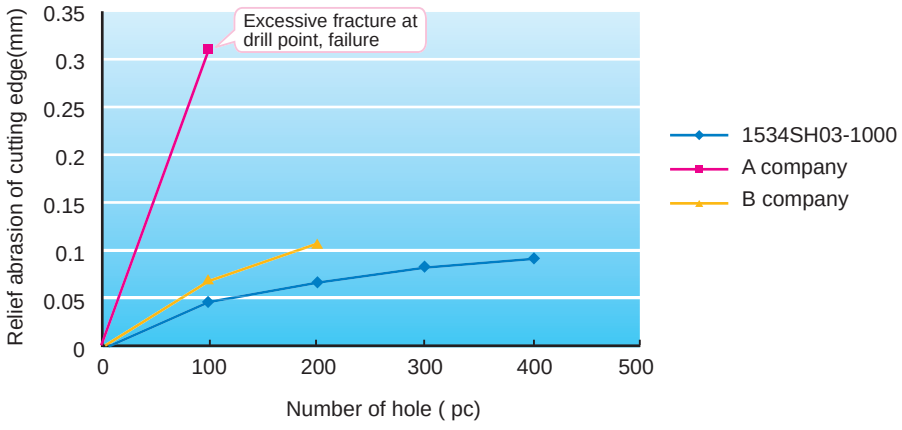
For high hardness steel

- **Small helical angle and large core designed, greatly improve tool rigidity.**
- **Linear cutting edge, outstanding strength.**
- **TiAlN coating with oxidation resistance and high hardness, extend greatly tool life.**

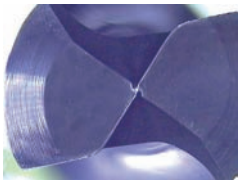
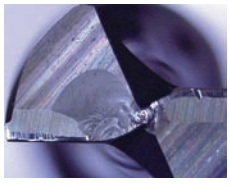
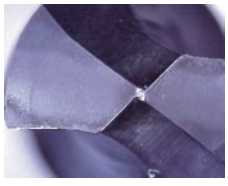
Tool type：1534SH03-1000
Workpiece material：S136（53HRC）
Rotating speed：800r/min
Feed speed：64mm/r
Cooling system: water-soluble liquid

Size：Ø10.0mm
Cutting speed：25m/min
Feed rate per revolution：0.08mm/r
Drilling depth：20mm（blind hole）
Machine：MIKRON UCP 1000

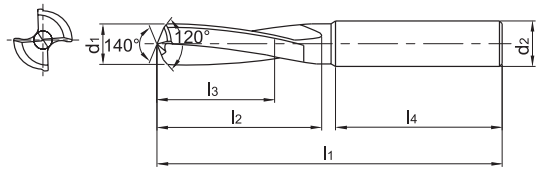
Application of SH series drills in high hardness materials



Drill abrasion status in machining process

Drill	1534SH03-1000	Similar product of company A	Similar product of company B
Number of hole (pc)	400	100	200
Abrasion value	0.08mm	Abrasion 0.31mm，fracture 2.59mm	0.108mm
Abrasion condition			

SH series for high hardness steel



- For drilling high hardness steel (HRC 40~60)
- Small helical angle and large core designed, greatly improve tool rigidity.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.0	3	External coolant	Straight shank	**1534SH03-0300**	6	62	20	14	36	☆
3.3	3			**1534SH03-0330**	6	62	20	14	36	☆
4.0	3			**1534SH03-0400**	6	66	24	17	36	☆
4.2	3			**1534SH03-0420**	6	66	24	17	36	☆
5.0	3			**1534SH03-0500**	6	66	28	20	36	☆
6.0	3			**1534SH03-0600**	6	66	28	20	36	☆
6.75	3			**1534SH03-0675**	8	79	34	24	36	☆
7.0	3			**1534SH03-0700**	8	79	34	24	36	☆
8.0	3			**1534SH03-0800**	8	79	41	29	36	☆
8.5	3			**1534SH03-0850**	10	89	47	35	40	☆
9.0	3			**1534SH03-0900**	10	89	47	35	40	☆
10.0	3			**1534SH03-1000**	10	89	47	35	40	☆
10.25	3			**1534SH03-1025**	12	102	55	40	45	☆
10.5	3			**1534SH03-1050**	12	102	55	40	45	☆
12.0	3			**1534SH03-1200**	12	102	55	40	45	☆
12.5	3			**1534SH03-1250**	14	107	60	43	45	☆
14.0	3			**1534SH03-1400**	14	107	60	43	45	☆
14.5	3			**1534SH03-1450**	16	115	65	45	48	☆
16.0	3			**1534SH03-1600**	16	115	65	45	48	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

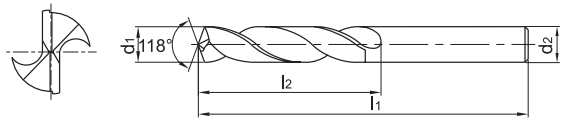
Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303				◎	◎						

Code key C6 Cutting parameters C69 Technical information C76-C82 Non-standard tailor made C83-C87

SC series(twist drill) for cast iron, Al alloy

External coolant

Straight shank



- For materials with short chips such as cast iron, silicon-aluminum alloy etc.
- Cutting edge and shank with same diameter

Drill diameter $d_1(h_8)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)			Recommended grade
					Shank diameter	Overall length	Flute length	
					$d_2(h_7)$	l_1	l_2	YK20F
2.00	3	External coolant	Straight shank	**1105SC03-0200**	2.0	38	12	☆
	5			**1101SC05-0200**	2.0	49	24	☆
2.5	3			**1105SC03-0250**	2.5	43	14	☆
	5			**1101SC05-0250**	2.5	57	30	☆
2.8	3			**1105SC03-0280**	2.8	46	16	☆
	5			**1101SC05-0280**	2.8	61	33	☆
3.0	3			**1105SC03-0300**	3.0	46	16	☆
	5			**1101SC05-0300**	3.0	61	33	☆
3.1	3			**1105SC03-0310**	3.1	49	18	☆
3.2	3			**1105SC03-0320**	3.2	49	18	☆
3.3	3			**1105SC03-0330**	3.3	49	18	☆
3.4	3			**1105SC03-0340**	3.4	52	20	☆
3.5	3			**1105SC03-0350**	3.5	52	20	☆
	5			**1101SC05-0350**	3.5	70	39	☆
3.6	3			**1105SC03-0360**	3.6	52	20	☆
3.7	3			**1105SC03-0370**	3.7	52	20	☆
3.8	3			**1105SC03-0380**	3.8	55	22	☆
	5			**1101SC05-0380**	3.8	75	43	☆
3.9	3			**1105SC03-0390**	3.9	55	22	☆
4.0	3			**1105SC03-0400**	4.0	55	22	☆
	5			**1101SC05-0400**	4.0	75	43	☆
4.1	3			**1105SC03-0410**	4.1	55	22	☆
4.2	3			**1105SC03-0420**	4.2	55	22	☆
	5			**1101SC05-0420**	4.2	75	43	☆
4.3	3			**1105SC03-0430**	4.3	58	24	☆
4.4	3			**1105SC03-0440**	4.4	58	24	☆
4.5	3			**1105SC03-0450**	4.5	58	24	☆
	5			**1101SC05-0450**	4.5	80	47	☆
4.6	3			**1105SC03-0460**	4.6	58	24	☆
4.7	3			**1105SC03-0470**	4.7	58	24	☆
4.8	3			**1105SC03-0480**	4.8	62	26	☆
	5			**1101SC05-0480**	4.8	86	52	☆
4.9	3			**1105SC03-0490**	4.9	62	26	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(h_8)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)			Recommended grade
					Shank diameter	Overall length	Flute length	
					$d_2(h_7)$	l_1	l_2	YK20F
5.0	3	External coolant	Straight shank	**1105SC03-0500**	5.0	62	26	☆
	5			**1101SC05-0500**	5.0	86	52	☆
5.1	3			**1105SC03-0510**	5.1	62	26	☆
5.2	3			**1105SC03-0520**	5.2	62	26	☆
5.3	3			**1105SC03-0530**	5.3	62	26	☆
5.4	3			**1105SC03-0540**	5.4	66	28	☆
5.5	3			**1105SC03-0550**	5.5	66	28	☆
	5			**1101SC05-0550**	5.5	93	57	☆
5.6	3			**1105SC03-0560**	5.6	66	28	☆
5.7	3			**1105SC03-0570**	5.7	66	28	☆
5.8	3			**1105SC03-0580**	5.8	66	28	☆
	5			**1101SC05-0580**	5.8	93	57	☆
5.9	3			**1105SC03-0590**	5.9	66	28	☆
6.0	3			**1105SC03-0600**	6.0	66	28	☆
	5			**1101SC05-0600**	6.0	93	57	☆
6.1	3			**1105SC03-0610**	6.1	70	31	☆
6.2	3			**1105SC03-0620**	6.2	70	31	☆
6.3	3			**1105SC03-0630**	6.3	70	31	☆
6.4	3			**1105SC03-0640**	6.4	70	31	☆
6.5	3			**1105SC03-0650**	6.5	70	31	☆
	5			**1101SC05-0650**	6.5	101	63	☆
6.6	3			**1105SC03-0660**	6.6	70	31	☆
6.7	3			**1105SC03-0670**	6.7	70	31	☆
6.8	3			**1105SC03-0680**	6.8	74	34	☆
	5			**1101SC05-0680**	6.8	109	69	☆
6.9	3			**1105SC03-0690**	6.9	74	34	☆
7.0	3			**1105SC03-0700**	7.0	74	34	☆
	5			**1101SC05-0700**	7.0	109	69	☆
7.1	3			**1105SC03-0710**	7.1	74	34	☆
7.2	3			**1105SC03-0720**	7.2	74	34	☆
7.3	3			**1105SC03-0730**	7.3	74	34	☆
7.4	3			**1105SC03-0740**	7.4	74	34	☆

☆Recommended grade and produce according to order

Applicable material table

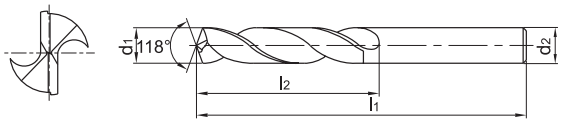
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
YK20F							◎	○	◎		

Code key C6 Cutting parameters C70 Technical information C76-C82 Non-standard tailor made C83-C87

SC series(twist drill) for cast iron, Al alloy


External coolant Straight shank



- For materials with short chips such as cast iron, silicon-aluminum alloy etc.
- Cutting edge and shank with same diameter

Drill diameter $d_1(h_8)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)			Recommended grade
					Shank diameter	Overall length	Flute length	
					$d_2(h_7)$	l_1	l_2	YK20F
7.5	3	External coolant	Straight shank	**1105SC03-0750**	7.5	74	34	☆
	5			**1101SC05-0750**	7.5	109	69	☆
7.6	3			**1105SC03-0760**	7.6	79	37	☆
7.7	3			**1105SC03-0770**	7.7	79	37	☆
7.8	3			**1105SC03-0780**	7.8	79	37	☆
	5			**1101SC05-0780**	7.8	117	75	☆
7.9	3			**1105SC03-0790**	7.9	79	37	☆
8.0	3			**1105SC03-0800**	8.0	79	37	☆
	5			**1101SC05-0800**	8.0	117	75	☆
8.1	3			**1105SC03-0810**	8.1	79	37	☆
8.2	3			**1105SC03-0820**	8.2	79	37	☆
8.3	3			**1105SC03-0830**	8.3	79	37	☆
8.4	3			**1105SC03-0840**	8.4	79	37	☆
8.5	3			**1105SC03-0850**	8.5	79	37	☆
	5			**1101SC05-0850**	8.5	117	75	☆
8.6	3			**1105SC03-0860**	8.6	84	40	☆
8.7	3			**1105SC03-0870**	8.7	84	40	☆
8.8	3			**1105SC03-0880**	8.8	84	40	☆
	5			**1101SC05-0880**	8.8	125	81	☆
8.9	3			**1105SC03-0890**	8.9	84	40	☆
9.0	3			**1105SC03-0900**	9.0	84	40	☆
	5			**1101SC05-0900**	9.0	125	81	☆
9.1	3			**1105SC03-0910**	9.1	84	40	☆
9.2	3			**1105SC03-0920**	9.2	84	40	☆
9.3	3			**1105SC03-0930**	9.3	84	40	☆
9.4	3			**1105SC03-0940**	9.4	84	40	☆
9.5	3			**1105SC03-0950**	9.5	84	40	☆
	5			**1101SC05-0950**	9.5	125	81	☆
9.6	3			**1105SC03-0960**	9.6	89	43	☆
9.7	3			**1105SC03-0970**	9.7	89	43	☆
9.8	3			**1105SC03-0980**	9.8	89	43	☆
	5			**1101SC05-0980**	9.8	133	87	☆
9.9	3			**1105SC03-0990**	9.9	89	43	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(h_8)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)			Recommended grade
					Shank diameter	Overall length	Flute length	
					$d_2(h_7)$	l_1	l_2	YK20F
10.0	3	External coolant	Straight shank	**1105SC03-1000**	10.0	89	43	☆
	5			**1101SC05-1000**	10.0	133	87	☆
10.1	3			**1105SC03-1010**	10.1	89	43	☆
10.2	3			**1105SC03-1020**	10.2	89	43	☆
10.4	3			**1105SC03-1040**	10.4	89	43	☆
10.5	3			**1105SC03-1050**	10.5	89	43	☆
	5			**1101SC05-1050**	10.5	133	87	☆
10.7	3			**1105SC03-1070**	10.7	95	47	☆
10.8	3			**1105SC03-1080**	10.8	95	47	☆
	5			**1101SC05-1080**	10.8	142	94	☆
11.0	3			**1105SC03-1100**	11.0	95	47	☆
	5			**1101SC05-1100**	11.0	142	94	☆
11.5	3			**1105SC03-1150**	11.5	95	47	☆
	5			**1101SC05-1150**	11.5	142	94	☆
12.0	3			**1105SC03-1200**	12.0	102	51	☆
	5			**1101SC05-1200**	12.0	151	101	☆
12.5	3			**1105SC03-1250**	12.5	102	51	☆
	5			**1101SC05-1250**	12.5	151	101	☆
12.8	3			**1105SC03-1280**	12.8	102	51	☆
13.0	3			**1105SC03-1300**	13.0	102	51	☆
	5			**1101SC05-1300**	13.0	151	101	☆
13.1	3			**1105SC03-1310**	13.1	102	51	☆
13.5	3			**1105SC03-1350**	13.5	107	54	☆
	5			**1101SC05-1350**	13.5	160	108	☆
14.0	3			**1105SC03-1400**	14.0	107	54	☆
	5			**1101SC05-1400**	14.0	160	108	☆
14.3	3			**1105SC03-1430**	14.3	111	56	☆
14.5	3			**1105SC03-1450**	14.5	111	56	☆
	5			**1101SC05-1450**	14.5	169	114	☆
15.0	3			**1105SC03-1500**	15.0	111	56	☆
	5			**1101SC05-1500**	15.0	169	114	☆
15.5	5			**1101SC05-1550**	15.5	178	120	☆
16.0	3			**1105SC03-1600**	16.0	115	58	☆
	5			**1101SC05-1600**	16.0	178	120	☆

☆Recommended grade and produce according to order

Applicable material table

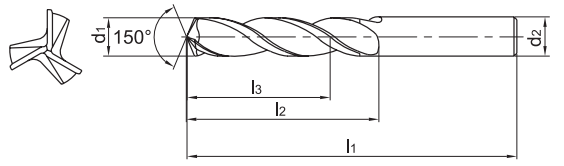
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
YK20F							◎	○	◎		

Code key C6 Cutting parameters C70 Technical information C76-C82 Non-standard tailor made C83-C87

PA series(three-lips drill) for cast iron, Al alloy

External coolant　　Straight shank



- For drilling solid workpiece composed of cast iron or Al alloy etc
- Three-lips structure can achieve high feed rate and prominent centering capability.
- High machining reliability, suitable for poor conditions such as interrupted cutting.

Drill diameter $d_1(h_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)				Recommended grade	
					Shank diameter	Overall length	Flute length	Recommended drilling depth	KDG303	YK30F
					$d_2(h_7)$	l_1	l_2	l_3		
3.0	3	External coolant	Straight shank	**1165PA03-0300**	3.0	46	16	12	☆	☆
3.1	3			**1165PA03-0310**	3.1	49	18	14	☆	☆
3.2	3			**1165PA03-0320**	3.2	49	18	14	☆	☆
3.3	3			**1165PA03-0330**	3.3	49	18	14	☆	☆
3.4	3			**1165PA03-0340**	3.4	52	20	15	☆	☆
3.5	3			**1165PA03-0350**	3.5	52	20	15	☆	☆
3.6	3			**1165PA03-0360**	3.6	52	20	15	☆	☆
3.7	3			**1165PA03-0370**	3.7	52	20	15	☆	☆
3.8	3			**1165PA03-0380**	3.8	55	22	17	☆	☆
3.9	3			**1165PA03-0390**	3.9	55	22	17	☆	☆
4.0	3			**1165PA03-0400**	4.0	55	22	17	☆	☆
4.1	3			**1165PA03-0410**	4.1	55	22	17	☆	☆
4.2	3			**1165PA03-0420**	4.2	55	22	17	☆	☆
4.3	3			**1165PA03-0430**	4.3	58	24	18	☆	☆
4.4	3			**1165PA03-0440**	4.4	58	24	18	☆	☆
4.5	3			**1165PA03-0450**	4.5	58	24	18	☆	☆
4.6	3			**1165PA03-0460**	4.6	58	24	18	☆	☆
4.7	3			**1165PA03-0470**	4.7	58	24	18	☆	☆
4.8	3			**1165PA03-0480**	4.8	62	26	20	☆	☆
4.9	3			**1165PA03-0490**	4.9	62	26	20	☆	☆
5.0	3			**1165PA03-0500**	5.0	62	26	20	☆	☆
5.1	3			**1165PA03-0510**	5.1	62	26	20	☆	☆
5.2	3			**1165PA03-0520**	5.2	62	26	20	☆	☆
5.3	3			**1165PA03-0530**	5.3	62	26	20	☆	☆
5.4	3			**1165PA03-0540**	5.4	66	28	21	☆	☆
5.5	3			**1165PA03-0550**	5.5	66	28	21	☆	☆
5.6	3			**1165PA03-0560**	5.6	66	28	21	☆	☆
5.7	3			**1165PA03-0570**	5.7	66	28	21	☆	☆
5.8	3			**1165PA03-0580**	5.8	66	28	21	☆	☆
5.9	3			**1165PA03-0590**	5.9	66	28	21	☆	☆
6.0	3			**1165PA03-0600**	6.0	66	28	21	☆	☆
6.1	3			**1165PA03-0610**	6.1	70	31	23	☆	☆
6.2	3			**1165PA03-0620**	6.2	70	31	23	☆	☆

☆Recommended grade and produce according to order

Drill diameter $d_1(h_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)				Recommended grade	
					Shank diameter	Overall length	Flute length	Recommended drilling depth	KDG303	YK30F
					$d_2(h_7)$	l_1	l_2	l_3		
6.3	3	External coolant	Straight shank	**1165PA03-0630**	6.3	70	31	23	☆	☆
6.4	3			**1165PA03-0640**	6.4	70	31	23	☆	☆
6.5	3			**1165PA03-0650**	6.5	70	31	23	☆	☆
6.6	3			**1165PA03-0660**	6.6	70	31	23	☆	☆
6.7	3			**1165PA03-0670**	6.7	70	31	23	☆	☆
6.8	3			**1165PA03-0680**	6.8	74	34	25	☆	☆
6.9	3			**1165PA03-0690**	6.9	74	34	25	☆	☆
7.0	3			**1165PA03-0700**	7.0	74	34	25	☆	☆
7.1	3			**1165PA03-0710**	7.1	74	34	25	☆	☆
7.2	3			**1165PA03-0720**	7.2	74	34	25	☆	☆
7.3	3			**1165PA03-0730**	7.3	74	34	25	☆	☆
7.4	3			**1165PA03-0740**	7.4	74	34	25	☆	☆
7.5	3			**1165PA03-0750**	7.5	74	34	25	☆	☆
7.6	3			**1165PA03-0760**	7.6	79	37	27	☆	☆
7.7	3			**1165PA03-0770**	7.7	79	37	27	☆	☆
7.8	3			**1165PA03-0780**	7.8	79	37	27	☆	☆
7.9	3			**1165PA03-0790**	7.9	79	37	27	☆	☆
8.0	3			**1165PA03-0800**	8.0	79	37	27	☆	☆
8.1	3			**1165PA03-0810**	8.1	79	37	27	☆	☆
8.2	3			**1165PA03-0820**	8.2	79	37	27	☆	☆
8.3	3			**1165PA03-0830**	8.3	79	37	27	☆	☆
8.4	3			**1165PA03-0840**	8.4	79	37	27	☆	☆
8.5	3			**1165PA03-0850**	8.5	79	37	27	☆	☆
8.6	3			**1165PA03-0860**	8.6	84	40	29	☆	☆
8.7	3			**1165PA03-0870**	8.7	84	40	29	☆	☆
8.8	3			**1165PA03-0880**	8.8	84	40	29	☆	☆
8.9	3			**1165PA03-0890**	8.9	84	40	29	☆	☆
9.0	3			**1165PA03-0900**	9.0	84	40	29	☆	☆
9.1	3			**1165PA03-0910**	9.1	84	40	29	☆	☆
9.2	3			**1165PA03-0920**	9.2	84	40	29	☆	☆
9.3	3			**1165PA03-0930**	9.3	84	40	29	☆	☆
9.4	3			**1165PA03-0940**	9.4	84	40	29	☆	☆
9.5	3			**1165PA03-0950**	9.5	84	40	29	☆	☆
9.6	3			**1165PA03-0960**	9.6	89	43	31	☆	☆
9.7	3			**1165PA03-0970**	9.7	89	43	31	☆	☆
9.8	3			**1165PA03-0980**	9.8	89	43	31	☆	☆

☆Recommended grade and produce according to order

Applicable material table

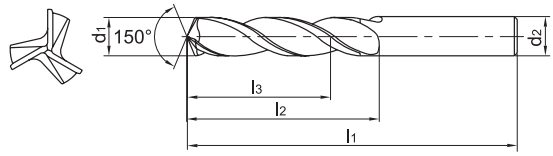
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303						○	◎	○	◎		○
YK30F						○	◎	○	◎		○

Code key C6 Cutting parameters C71-C72 Technical information C76-C82 Non-standard tailor made C83-C87

PA series(three-lips drill) for cast iron, Al alloy

External coolant　　Straight shank



- For drilling solid workpiece composed of cast iron or Al alloy etc
- Three-lips structure can achieve high feed rate and prominent centering capability.
- High machining reliability, suitable for poor conditions such as interrupted cutting.

Drill diameter $d_1(h_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)				Recommended grade	
					Shank diameter	Overall length	Flute length	Recommended drilling depth	KDG303	YK30F
					$d_2(h_7)$	l_1	l_2	l_3		
9.9	3	External coolant	Straight shank	**1165PA03-0990**	9.9	89	43	31	☆	☆
10.0	3			**1165PA03-1000**	10.0	89	43	31	☆	☆
10.1	3			**1165PA03-1010**	10.1	89	43	31	☆	☆
10.2	3			**1165PA03-1020**	10.2	89	43	31	☆	☆
10.3	3			**1165PA03-1030**	10.3	89	43	31	☆	☆
10.5	3			**1165PA03-1050**	10.5	89	43	31	☆	☆
11.0	3			**1165PA03-1100**	11.0	95	47	33	☆	☆
11.2	3			**1165PA03-1120**	11.2	95	47	33	☆	☆
11.5	3			**1165PA03-1150**	11.5	95	47	33	☆	☆
11.8	3			**1165PA03-1180**	11.8	95	47	33	☆	☆
12.0	3			**1165PA03-1200**	12.0	102	51	35	☆	☆
12.1	3			**1165PA03-1210**	12.1	102	51	35	☆	☆
12.5	3			**1165PA03-1250**	12.5	102	51	35	☆	☆
13.0	3			**1165PA03-1300**	13.0	102	51	35	☆	☆
13.5	3			**1165PA03-1350**	13.5	107	54	37	☆	☆
14.0	3			**1165PA03-1400**	14.0	107	54	37	☆	☆
14.5	3			**1165PA03-1450**	14.5	111	56	38	☆	☆
15.0	3			**1165PA03-1500**	15.0	111	56	38	☆	☆
15.5	3			**1165PA03-1550**	15.5	115	58	38	☆	☆
16.0	3			**1165PA03-1600**	16.0	115	58	38	☆	☆
16.5	3			**1165PA03-1650**	16.5	119	60	39	☆	☆
17.0	3			**1165PA03-1700**	17.0	119	60	39	☆	☆
17.5	3			**1165PA03-1750**	17.5	123	62	40	☆	☆
18.0	3			**1165PA03-1800**	18.0	123	62	40	☆	☆
18.5	3			**1165PA03-1850**	18.5	127	64	41	☆	☆
19.0	3			**1165PA03-1900**	19.0	127	64	41	☆	☆
19.5	3			**1165PA03-1950**	19.5	131	66	42	☆	☆
20.0	3			**1165PA03-2000**	20.0	131	66	42	☆	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

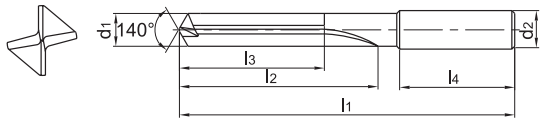
Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG303						○	◎	○	◎		○
YK30F						○	◎	○	◎		○

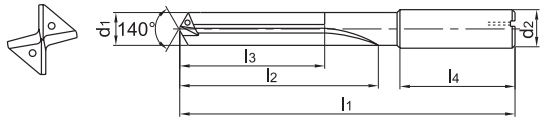
Code key C6　Cutting parameters C71-C72　Technical information C76-C82　Non-standard tailor made C83-C87

PC series(straight flute drill) for cast iron, Al alloy

External coolant Straight shank

Internal coolant Straight shank





- For materials with short chips such as cast iron, silicon-aluminum alloy etc.
- Excellent self centering capability can machine high efficiently, and the hole precision can reach H7.
- High positional accuracy, high linearity and good surface finish can be obtained in the hole drilled.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	YK20F
4.0	5	External coolant	Straight shank	**1576PC05-0400**	6.0	74	36	29	36	☆
4.2	5	External coolant		**1576PC05-0420**	6.0	74	36	29	36	☆
5.0	5	External coolant		**1576PC05-0500**	6.0	82	44	35	36	☆
	15	Internal coolant		**1579PC15C-0500**	6.0	145	105	96	36	☆
6.0	5	External coolant		**1576PC05-0600**	6.0	82	44	35	36	☆
	15	Internal coolant		**1579PC15C-0600**	6.0	145	105	96	36	☆
6.75	5	External coolant		**1576PC05-0675**	8.0	91	53	43	36	☆
7.0	5	External coolant		**1576PC05-0700**	8.0	91	53	43	36	☆
8.0	5	External coolant		**1576PC05-0800**	8.0	91	53	43	36	☆
	15	Internal coolant		**1579PC15C-0800**	8.0	180	137	127	36	☆
8.5	5	External coolant		**1576PC05-0850**	10.0	103	61	49	40	☆
9.0	5	External coolant		**1576PC05-0900**	10.0	103	61	49	40	☆
	15	Internal coolant		**1579PC15C-0900**	10.0	217	170	158	40	☆
10.0	5	External coolant		**1576PC05-1000**	10.0	103	61	49	40	☆
	15	Internal coolant		**1579PC15C-1000**	10.0	217	170	158	40	☆
10.25	5	External coolant		**1576PC05-1025**	12.0	118	71	56	45	☆
11.0	5	External coolant		**1576PC05-1100**	12.0	118	71	56	45	☆
	15	Internal coolant		**1579PC15C-1100**	12.0	258	205	190	45	☆
12.0	5	External coolant		**1576PC05-1200**	12.0	118	71	56	45	☆
	15	Internal coolant		**1579PC15C-1200**	12.0	258	205	190	45	☆
13.0	5	External coolant		**1576PC05-1300**	14.0	124	77	60	45	☆
14.0	5	External coolant		**1576PC05-1400**	14.0	124	77	60	45	☆
	15	Internal coolant		**1579PC15C-1400**	14.0	290	236	219	45	☆
15.0	5	External coolant		**1576PC05-1500**	16.0	133	83	63	48	☆
15.5	5	External coolant		**1576PC05-1550**	16.0	133	83	63	48	☆

☆Recommended grade and produce according to order

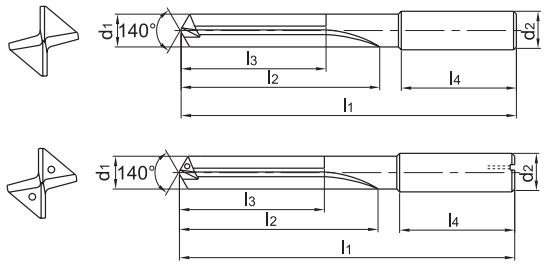
Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
YK20F							◎	○	◎		

Code key C6 Cutting parameters C73-C74 Technical information C76-C82 Non-standard tailor made C83-C87

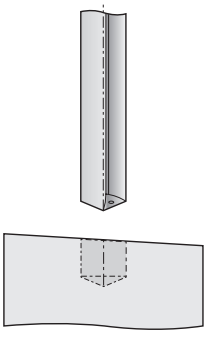
PC series(straight flute drill) for cast iron, Al alloy

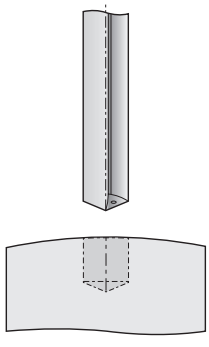


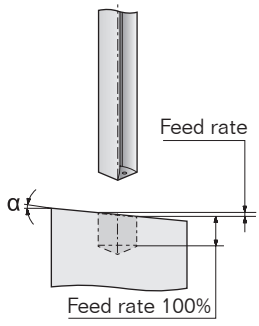
- For materials with short chips such as cast iron, silicon-aluminum alloy etc.
- Excellent self centering capability can machine high efficiently, and the hole precision can reach H7.
- High positional accuracy, high linearity and good surface finish can be obtained in the hole drilled.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Recommended grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	YK20F
16.0	5	External coolant	Straight shank	**1576PC05-1600**	16.0	133	83	63	48	☆
17.0	5			**1576PC05-1700**	18.0	143	93	71	48	☆
17.5	5			**1576PC05-1750**	18.0	143	93	71	48	☆
18.0	5			**1576PC05-1800**	18.0	143	93	71	48	☆
19.5	5			**1576PC05-1950**	20.0	153	101	77	50	☆
20.0	5			**1576PC05-2000**	20.0	153	101	77	50	☆

☆Recommended grade and produce according to order

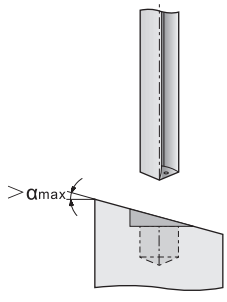

Drill inclined face


Drill curved face



Please reduce the feed rate correspondingly on the basis of recommended parameters when drilling inclined or curved face.

Inclined angle α	Max. feed rate
1°	80%
2°	50%
3°	30%



Pretreatment should be carried out when the face possess a large inclined angle, drill hole at the flat face which milled firstly.

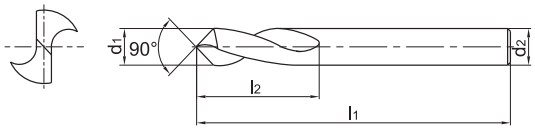
Applicable material table

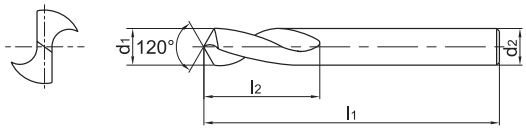
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
YK20F							◎	○	◎		

Code key C6 Cutting parameters C73-C74 Technical information C76-C82 Non-standard tailor made C83-C87

SC series(centering drill) for cast iron, Al alloy

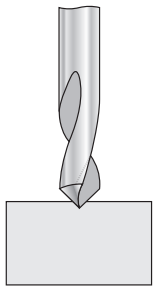


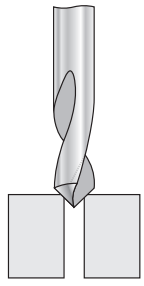


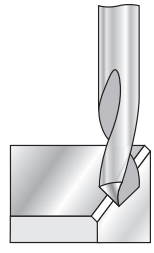
- Suitable for drilling center hole and chamfer.
- Comparing with common centering drills, it possesses more stable centering capability. Even at the slant face, it is also easy to carry out center drilling.

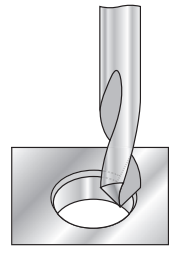
Drill diameter $d_1(h_6)$	Point angle	Cooling mode	Shank type	Type	Basic dimension(mm)			Recommended grade
					Shank diameter	Overall length	Flute length	
					$d_2(h_6)$	l_1	l_2	YK20F
5	90°	External coolant	Straight shank	**1143SC90-0500**	5.00	62	10	☆
	120°			**1143SC120-0500**	5.00	62	10	☆
6	90°			**1143SC90-0600**	6.00	66	15	☆
	120°			**1143SC120-0600**	6.00	66	15	☆
8	90°			**1143SC90-0800**	8.00	79	17	☆
	120°			**1143SC120-0800**	8.00	79	17	☆
10	90°			**1143SC90-1000**	10.00	89	20	☆
	120°			**1143SC120-1000**	10.00	89	20	☆
12	90°			**1143SC90-1200**	12.00	102	25	☆
	120°			**1143SC120-1200**	12.00	102	25	☆
14	90°			**1143SC90-1400**	14.00	107	30	☆
	120°			**1143SC120-1400**	14.00	107	30	☆
16	90°			**1143SC90-1600**	16.00	115	35	☆
	120°			**1143SC120-1600**	16.00	115	35	☆
20	90°			**1143SC90-2000**	20.00	131	40	☆
	120°			**1143SC120-2000**	20.00	131	40	☆

☆Recommended grade and produce according to order


Centering


Hole chamfering


Chamfering


Hole chamfering

Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
YK20F							◎	○	◎		

Code key C6 Cutting parameters C75 Technical information C76-C82 Non-standard tailor made C83-C87

SU series twist drills(external coolant)

3D 5D

workpiece material	Mild steel HB≤180		Carbon steel, alloy steel ~30HRC		Pre-hardened steel ~40HRC		Stainless steel		Cast iron		Nodular cast iron		Aluminum alloy		Heat resistant alloy	
Cutting speed	60~120m/min		60~120m/min		40~70m/min		25~40m/min		60~120m/min		50~100m/min		60~140m/min		15~25m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
2	14000	0.06~0.08	14000	0.06~0.08	9500	0.06~0.08	5500	0.02~0.05	14000	0.06~0.08	11000	0.06~0.08	16000	0.06~0.08	3200	0.02~0.04
3	9500	0.09~0.12	9500	0.09~0.12	6300	0.09~0.12	3700	0.03~0.07	9500	0.09~0.12	7400	0.09~0.12	10600	0.09~0.12	2100	0.03~0.06
4	7000	0.10~0.15	7000	0.10~0.15	4700	0.10~0.15	2700	0.04~0.08	7000	0.10~0.15	5600	0.10~0.15	8000	0.10~0.15	1600	0.04~0.07
5	5700	0.12~0.18	5700	0.12~0.18	3800	0.12~0.18	2200	0.05~0.10	5700	0.12~0.18	4500	0.12~0.18	6400	0.12~0.18	1250	0.05~0.09
6	4700	0.14~0.20	4700	0.14~0.20	3100	0.14~0.20	1850	0.06~0.12	4700	0.14~0.20	3700	0.14~0.20	5300	0.14~0.20	1050	0.06~0.11
8	3600	0.16~0.24	3600	0.16~0.24	2400	0.16~0.24	1400	0.08~0.16	3600	0.16~0.24	2800	0.16~0.24	4000	0.16~0.24	800	0.08~0.14
10	2800	0.18~0.27	2800	0.18~0.27	1900	0.18~0.27	1100	0.10~0.18	2800	0.18~0.27	2200	0.18~0.27	3200	0.18~0.27	600	0.10~0.16
12	2400	0.20~0.30	2400	0.20~0.30	1600	0.20~0.30	930	0.12~0.20	2400	0.20~0.30	1900	0.20~0.30	2700	0.20~0.30	500	0.12~0.18
14	2100	0.22~0.35	2100	0.22~0.35	1400	0.22~0.35	800	0.13~0.22	2100	0.22~0.35	1600	0.22~0.35	2300	0.22~0.35	450	0.13~0.20
16	1800	0.25~0.36	1800	0.25~0.36	1200	0.25~0.36	700	0.14~0.25	1800	0.25~0.36	1400	0.25~0.36	2000	0.25~0.36	400	0.14~0.23
18	1600	0.28~0.38	1600	0.28~0.38	1100	0.28~0.38	620	0.15~0.28	1600	0.28~0.38	1200	0.28~0.38	1800	0.28~0.38	350	0.15~0.25
20	1400	0.30~0.40	1400	0.30~0.40	950	0.30~0.40	550	0.16~0.30	1400	0.30~0.40	1100	0.30~0.40	1600	0.30~0.40	320	0.16~0.28

1.When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.

2.The cutting conditions above are for drilling with emulsion.

3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.

4.These conditions above are for cutting depth under 5D.

SU series twist drills(internal coolant)

3D 5D

workpiece material	Mild steel HB≤180		Carbon steel, alloy steel ~30HRC		Pre-hardened steel ~40HRC		Stainless steel		Cast iron		Nodular cast iron		Aluminum alloy		Heat resistant alloy	
Cutting speed	80~150m/min		80~150m/min		50~80m/min		50~80m/min		80~150m/min		60~120m/min		100~180m/min		15~25m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
3	12700	0.09~0.12	12700	0.09~0.12	7400	0.09~0.12	6300	0.03~0.07	12700	0.09~0.12	9500	0.09~0.12	15000	0.09~0.12	2100	0.03~0.06
4	9600	0.10~0.15	9600	0.10~0.15	5600	0.10~0.15	4700	0.04~0.08	9600	0.10~0.15	7000	0.10~0.15	11100	0.10~0.15	1600	0.04~0.07
5	7600	0.12~0.18	7600	0.12~0.18	4500	0.12~0.18	3800	0.05~0.10	7600	0.12~0.18	5700	0.12~0.18	9000	0.12~0.18	1250	0.05~0.09
6	6400	0.14~0.20	6400	0.14~0.20	3700	0.14~0.20	3200	0.06~0.12	6400	0.14~0.20	4700	0.14~0.20	7400	0.14~0.20	1050	0.06~0.11
8	4800	0.16~0.24	4800	0.16~0.24	2800	0.16~0.24	2400	0.08~0.16	4800	0.16~0.24	3600	0.16~0.24	5600	0.16~0.24	800	0.08~0.14
10	3800	0.18~0.27	3800	0.18~0.27	2200	0.18~0.27	1900	0.10~0.18	3800	0.18~0.27	2800	0.18~0.27	4500	0.18~0.27	600	0.10~0.16
12	3200	0.20~0.30	3200	0.20~0.30	1900	0.20~0.30	1600	0.12~0.20	3200	0.20~0.30	2400	0.20~0.30	3700	0.20~0.30	500	0.12~0.18
14	2700	0.22~0.35	2700	0.22~0.35	1600	0.22~0.35	1350	0.13~0.22	2700	0.22~0.35	2100	0.22~0.35	3200	0.22~0.35	450	0.13~0.20
16	2400	0.25~0.36	2400	0.25~0.36	1400	0.25~0.36	1200	0.14~0.25	2400	0.25~0.36	1800	0.25~0.36	2800	0.25~0.36	400	0.14~0.23
18	2100	0.28~0.38	2100	0.28~0.38	1200	0.28~0.38	1050	0.15~0.28	2100	0.28~0.38	1600	0.28~0.38	2500	0.28~0.38	350	0.15~0.25
20	1900	0.30~0.40	1900	0.30~0.40	1100	0.30~0.40	950	0.16~0.30	1900	0.30~0.40	1400	0.30~0.40	2300	0.30~0.40	320	0.16~0.28

1.When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.

2.The cutting conditions above are for drilling with emulsion.

3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.

4.These conditions above are for cutting depth under 5D.

SU series twist drills(internal coolant)

8D

Workpiece material	Mild steel HB≤180		Carbon steel, alloy steel ~30HRC		Pre-hardened steel ~40HRC		Stainless steel		Cast iron		Nodular cast iron		Aluminum alloy		Heat resistant alloy	
Cutting speed	80~150m/min		80~150m/min		50~80m/min		40~60m/min		80~150m/min		60~120m/min		100~180m/min		15~25m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
3	12700	0.06~0.10	12700	0.06~0.10	7400	0.06~0.10	5300	0.03~0.07	12700	0.06~0.10	9500	0.06~0.10	15000	0.09~0.12	2100	0.03~0.06
4	9600	0.08~0.12	9600	0.08~0.12	5600	0.08~0.12	4000	0.04~0.08	9600	0.08~0.12	7000	0.08~0.12	11100	0.10~0.15	1600	0.04~0.07
5	7600	0.10~0.14	7600	0.10~0.14	4500	0.10~0.14	3200	0.05~0.10	7600	0.10~0.14	5700	0.10~0.14	9000	0.10~0.14	1250	0.05~0.09
6	6400	0.11~0.16	6400	0.11~0.16	3700	0.11~0.16	2700	0.06~0.12	6400	0.11~0.16	4700	0.11~0.16	7400	0.11~0.16	1050	0.06~0.11
8	4800	0.13~0.19	4800	0.13~0.19	2800	0.13~0.19	2000	0.08~0.16	4800	0.13~0.19	3600	0.13~0.19	5600	0.13~0.19	800	0.08~0.14
10	3800	0.14~0.22	3800	0.14~0.22	2200	0.14~0.22	1600	0.10~0.18	3800	0.14~0.22	2800	0.14~0.22	4500	0.14~0.22	600	0.10~0.16
12	3200	0.16~0.24	3200	0.16~0.24	1900	0.16~0.24	1300	0.12~0.20	3200	0.16~0.24	2400	0.16~0.24	3700	0.16~0.24	500	0.12~0.18
14	2700	0.18~0.28	2700	0.18~0.28	1600	0.18~0.28	1100	0.13~0.22	2700	0.18~0.28	2100	0.18~0.28	3200	0.18~0.28	450	0.13~0.20
16	2400	0.20~0.29	2400	0.20~0.29	1400	0.20~0.29	1000	0.14~0.25	2400	0.20~0.29	1800	0.20~0.29	2800	0.20~0.29	400	0.14~0.23
18	2100	0.24~0.32	2100	0.24~0.32	1200	0.24~0.32	880	0.15~0.28	2100	0.24~0.32	1600	0.24~0.32	2500	0.24~0.32	350	0.15~0.25

1.When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.

2.The cutting conditions above are for drilling with emulsion.

3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.

4.These conditions above are for cutting depth under 8D.

SU series step drill(external coolant)

workpiece material	Mild steel HB≤180		Carbon steel, alloy steel ~30HRC		Pre-hardened steel ~40HRC		Stainless steel		Cast iron		Nodular cast iron		Aluminum alloy		Heat resistant alloy	
Cutting speed	50~100m/min		50~100m/min		30~50m/min		25~40m/min		50~100m/min		40~80m/min		60~120m/min		15~25m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
3.3	5800	0.09~0.12	5800	0.09~0.12	3850	0.09~0.12	2900	0.03~0.07	5800	0.09~0.12	5000	0.09~0.12	10000	0.09~0.12	1600	0.03~0.06
4.2	4550	0.10~0.15	4550	0.10~0.15	3000	0.10~0.15	2300	0.04~0.08	4550	0.10~0.15	3800	0.10~0.15	7600	0.10~0.15	1250	0.04~0.07
5	3800	0.12~0.18	3800	0.12~0.18	2550	0.12~0.18	1900	0.05~0.10	3800	0.12~0.18	3200	0.12~0.18	6400	0.12~0.18	1050	0.05~0.10
6.75	2850	0.14~0.20	2850	0.14~0.20	1900	0.14~0.20	1400	0.06~0.12	2850	0.14~0.20	2400	0.14~0.20	4800	0.14~0.20	800	0.06~0.11
7	2750	0.15~0.22	2750	0.15~0.22	1800	0.15~0.22	1350	0.07~0.14	2750	0.15~0.22	2300	0.15~0.22	4550	0.15~0.22	730	0.07~0.12
8.5	2250	0.16~0.24	2250	0.16~0.24	1500	0.16~0.24	1100	0.08~0.16	2250	0.16~0.24	1800	0.16~0.24	3600	0.16~0.24	600	0.08~0.14
9	2100	0.17~0.25	2100	0.17~0.25	1400	0.17~0.25	1050	0.09~0.17	2100	0.17~0.25	1750	0.17~0.25	3500	0.17~0.25	560	0.09~0.15
10.25	1850	0.18~0.27	1850	0.18~0.27	1250	0.18~0.27	930	0.10~0.18	1850	0.18~0.27	1550	0.18~0.27	3100	0.18~0.27	500	0.10~0.16
10.5	1800	0.19~0.28	1800	0.19~0.28	1200	0.19~0.28	900	0.11~0.19	1800	0.19~0.28	1500	0.19~0.28	3000	0.19~0.28	480	0.11~0.17
12	1600	0.20~0.30	1600	0.20~0.30	1050	0.20~0.30	800	0.12~0.20	1600	0.20~0.30	1300	0.20~0.30	2600	0.20~0.30	450	0.12~0.18
12.5	1550	0.20~0.30	1550	0.20~0.30	1000	0.20~0.30	760	0.12~0.20	1550	0.20~0.30	1250	0.20~0.30	2550	0.20~0.30	410	0.12~0.18
14	1350	0.22~0.35	1350	0.22~0.35	900	0.22~0.35	700	0.14~0.24	1350	0.22~0.35	1150	0.22~0.35	2300	0.22~0.35	370	0.13~0.20
14.5	1300	0.22~0.35	1300	0.22~0.35	880	0.22~0.35	650	0.14~0.24	1300	0.22~0.35	1050	0.22~0.35	2200	0.22~0.35	350	0.13~0.20

1.When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.

2.The cutting conditions above are for drilling with emulsion.

3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.

ST series twist drills(internal coolant)

3D 5D

Workpiece material	Mild steel HB≤180		Carbon steel, alloy steel ~30HRC		Stainless steel					
					Austenite		Martensite		Ferrite	
Cutting speed	80~150m/min		80~150m/min		40~80 m/min		50~100 m/min		60~120 m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
3	12700	0.09~0.12	12700	0.09~0.12	6300	0.03~0.07	7400	0.03~0.07	9000	0.03~0.07
4	9600	0.10~0.15	9600	0.10~0.15	4700	0.04~0.08	5600	0.04~0.08	6700	0.04~0.08
5	7600	0.12~0.18	7600	0.12~0.18	3800	0.05~0.10	4500	0.05~0.10	5400	0.05~0.10
6	6400	0.14~0.20	6400	0.14~0.20	3200	0.06~0.12	3700	0.06~0.12	4500	0.06~0.12
8	4800	0.16~0.24	4800	0.16~0.24	2400	0.08~0.16	2800	0.08~0.16	3400	0.08~0.16
10	3800	0.18~0.27	3800	0.18~0.27	1900	0.10~0.18	2200	0.10~0.18	2700	0.10~0.18
12	3200	0.20~0.30	3200	0.20~0.30	1600	0.12~0.20	1900	0.12~0.20	2300	0.12~0.20
14	2700	0.22~0.35	2700	0.22~0.35	1350	0.13~0.22	1600	0.13~0.22	1900	0.13~0.22
16	2400	0.25~0.36	2400	0.25~0.36	1200	0.14~0.25	1400	0.14~0.25	1700	0.14~0.25
18	2100	0.28~0.38	2100	0.28~0.38	1050	0.15~0.28	1200	0.15~0.28	1500	0.15~0.28
20	1900	0.30~0.40	1900	0.30~0.40	950	0.16~0.30	1100	0.16~0.30	1350	0.16~0.30

1.When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.

2.The cutting conditions above are for drilling with emulsion.

3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.

4.These conditions above are for cutting depth under 5D.

SH series twist drills(external coolant)

3D

Workpiece material	Hardened steel					
	40~50HRC		50~55HRC		55~60HRC	
Cutting speed	20~40m/min		15~30m/min		10~20m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
3	3200	0.02~0.03	2100	0.02~0.03	1060	0.015~0.02
4	2400	0.03~0.04	1600	0.03~0.04	800	0.02~0.025
5	1900	0.04~0.05	1250	0.04~0.05	640	0.025~0.03
6	1600	0.05~0.06	1050	0.05~0.06	530	0.03~0.04
8	1200	0.06~0.08	800	0.06~0.07	400	0.04~0.05
10	950	0.08~0.10	640	0.07~0.08	320	0.05~0.06
12	800	0.10~0.12	530	0.08~0.09	270	0.06~0.07
14	680	0.12~0.14	450	0.09~0.10	230	0.07~0.08
16	600	0.14~0.16	400	0.10~0.12	200	0.08~0.10

1.When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.

2.The cutting conditions above are for drilling with emulsion.

3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.

4. These conditions above are for cutting depth under 3D.

SC series twist drills(external coolant)

3D 5D

Workpiece material	Cast iron		Nodular cast iron		Silicon aluminium alloy				Aluminum alloy	
					Si≤10%		Si＞10%			
Cutting speed	50~80m/min		40~70m/min		100~180m/min		80~140m/min		120~200m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
2	9550	0.06~ 0.08	8000	0.06~ 0.08	20000	0.07~0.16	18000	0.07~0.16	24000	0.07~0.16
3	6400	0.09~ 0.12	5300	0.09~ 0.12	15000	0.09~0.18	12700	0.09~0.18	16000	0.09~0.18
4	4800	0.10~ 0.15	4000	0.10~ 0.15	11000	0.10~0.22	9600	0.10~0.22	12000	0.10~0.22
5	3800	0.12~ 0.18	3200	0.12~ 0.18	9000	0.12~0.25	7600	0.12~0.25	10000	0.12~0.25
6	3100	0.14~ 0.20	2700	0.14~ 0.20	7400	0.14~0.28	6400	0.14~0.28	8500	0.14~0.28
8	2400	0.16~ 0.24	2000	0.16~ 0.24	5600	0.18~0.32	4800	0.18~0.32	6400	0.18~0.32
10	1900	0.18~ 0.27	1600	0.18~ 0.27	4500	0.22~0.36	3800	0.22~0.36	5000	0.22~0.36
12	1600	0.20~ 0.30	1300	0.20~ 0.30	3700	0.25~0.40	3200	0.25~0.40	4200	0.25~0.40
14	1350	0.22~ 0.35	1150	0.22~ 0.35	3200	0.27~0.44	2700	0.27~0.44	3600	0.27~0.44
16	1200	0.25~ 0.36	1000	0.25~ 0.36	2800	0.32~0.48	2400	0.32~0.48	3200	0.32~0.48

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2 .The cutting conditions above are for drilling with emulsion.
3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.
4.These conditions above are for cutting depth under 5D.

PA series coated three-lips drill(external coolant)

3D

Workpiece material	Cast iron		Nodular cast iron		Silicon aluminium alloy				Aluminum alloy		Heat resistant alloy	
					Si≤10%		Si＞10%					
Cutting speed	60~120m/min		50~100m/min		100~180m/min		80~140m/min		120~200m/min		20~40m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
3	9500	0.09~0.12	7400	0.09~0.12	14000	0.07~0.16	12700	0.07~0.16	16000	0.07~0.16	3200	0.03~0.06
4	7000	0.10~0.15	5600	0.10~0.15	10000	0.09~0.18	9600	0.09~0.18	12000	0.09~0.18	2400	0.04~0.07
5	5700	0.12~0.18	4500	0.12~0.18	9000	0.10~0.22	7600	0.10~0.22	10000	0.10~0.22	1900	0.05~0.09
6	4700	0.14~0.20	3700	0.14~0.20	7400	0.12~0.25	6400	0.12~0.25	8500	0.12~0.25	1600	0.06~0.11
8	3600	0.16~0.24	2800	0.16~0.24	5600	0.14~0.28	4800	0.14~0.28	6400	0.14~0.28	1200	0.08~0.14
10	2800	0.18~0.27	2200	0.18~0.27	4500	0.18~0.32	3800	0.18~0.32	5000	0.18~0.32	950	0.10~0.16
12	2400	0.20~0.30	1900	0.20~0.30	3700	0.22~0.36	3200	0.22~0.36	4200	0.22~0.36	800	0.12~0.18
14	2100	0.22~0.35	1600	0.22~0.35	3200	0.25~0.40	2700	0.25~0.40	3600	0.25~0.40	700	0.13~0.20
16	1800	0.25~0.36	1400	0.25~0.36	2800	0.27~0.44	2400	0.27~0.44	3200	0.27~0.44	600	0.14~0.23
18	1600	0.28~0.38	1200	0.28~0.38	2500	0.32~0.48	2100	0.32~0.48	2800	0.32~0.48	530	0.15~0.25
20	1400	0.30~0.40	1100	0.30~0.40	2300	0.36~0.54	1900	0.36~0.54	2550	0.36~0.54	480	0.16~0.28

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2 .The cutting conditions above are for drilling with emulsion.
3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.
4.These conditions above are for cutting depth under 3D.

PA series uncoated three-lips drill(external coolant)

3D

Workpiece material	Cast iron		Nodular cast iron		Silicon aluminium alloy				Aluminum alloy		Heat resistant alloy	
					Si≤10%		Si>10%					
Cutting speed	50~100m/min		40~70m/min		80~160m/min		60~120m/min		100~180m/min		15~25m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
3	7400	0.09~0.12	5300	0.09~0.12	12700	0.07~0.16	10000	0.07~0.16	15000	0.07~0.16	2100	0.03~0.06
4	5600	0.10~0.15	4000	0.10~0.15	9600	0.09~0.18	8000	0.09~0.18	11000	0.09~0.18	1600	0.04~0.07
5	4500	0.12~0.18	3200	0.12~0.18	7600	0.10~0.22	6300	0.10~0.22	9000	0.10~0.22	1250	0.05~0.09
6	3700	0.14~0.20	2700	0.14~0.20	6400	0.12~0.25	5300	0.12~0.25	7400	0.12~0.25	1050	0.06~0.11
8	2800	0.16~0.24	2000	0.16~0.24	4800	0.14~0.28	4000	0.14~0.28	5600	0.14~0.28	800	0.08~0.14
10	2200	0.18~0.27	1600	0.18~0.27	3800	0.18~0.32	3200	0.18~0.32	4500	0.18~0.32	600	0.10~0.16
12	1900	0.20~0.30	1300	0.20~0.30	3200	0.22~0.36	2700	0.22~0.36	3700	0.22~0.36	500	0.12~0.18
14	1600	0.22~0.35	1100	0.22~0.35	2700	0.25~0.40	2300	0.25~0.40	3200	0.25~0.40	450	0.13~0.20
16	1400	0.25~0.36	1000	0.25~0.36	2400	0.27~0.44	2000	0.27~0.44	2800	0.27~0.44	400	0.14~0.23
18	1200	0.28~0.38	880	0.28~0.38	2100	0.32~0.48	1800	0.32~0.48	2500	0.32~0.48	350	0.15~0.25
20	1100	0.30~0.40	800	0.30~0.40	1900	0.36~0.54	1600	0.36~0.54	2300	0.36~0.54	320	0.16~0.28

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2 .The cutting conditions above are for drilling with emulsion.
3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.
4.These conditions above are for cutting depth under 3D.

PC series straight flute drill(external coolant)

5D

Workpiece material	Cast iron		Nodular cast iron		Silicon aluminium alloy				Aluminum alloy	
					Si≤10%		Si＞10%			
Cutting speed	60~120m/min		50~100m/min		100~200m/min		80~160m/min		120~220m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
4	7000	0.10~ 0.15	5600	0.10~ 0.15	11000	0.12~ 0.20	9600	0.12~ 0.20	12000	0.12~ 0.20
5	5700	0.12~ 0.18	4500	0.12~ 0.18	9000	0.14~ 0.26	7600	0.14~ 0.26	10000	0.14~ 0.26
6	4700	0.14~ 0.20	3700	0.14~ 0.20	7400	0.16~ 0.28	6400	0.16~ 0.28	8500	0.16~ 0.28
8	3600	0.16~ 0.24	2800	0.16~ 0.24	5500	0.18~ 0.30	4800	0.18~ 0.30	6400	0.18~ 0.30
10	2800	0.18~ 0.27	2200	0.18~ 0.27	4500	0.20~ 0.32	3800	0.20~ 0.32	5000	0.20~ 0.32
12	2400	0.20~ 0.30	1900	0.20~ 0.30	3700	0.24~ 0.36	3200	0.24~ 0.36	4200	0.24~ 0.36
14	2100	0.22~ 0.35	1600	0.22~ 0.35	3200	0.28~ 0.44	2700	0.28~ 0.44	3600	0.28~ 0.44
16	1800	0.25~ 0.36	1400	0.25~ 0.36	2800	0.30~ 0.48	2400	0.30~ 0.48	3200	0.30~ 0.48
18	1600	0.28~0.38	1200	0.28~ 0.38	2500	0.34~ 0.52	2100	0.34~ 0.52	3000	0.34~ 0.52
20	1400	0.30~0.40	1100	0.30~ 0.40	2300	0.40~ 0.63	1900	0.40~ 0.63	2500	0.40~ 0.63

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.

2 .The cutting conditions above are for drilling with emulsion.

3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.

4.These conditions above are for cutting depth under 5D.

PC series straight flute drill(internal coolant)

15D

Workpiece material	Cast iron		Nodular cast iron		Silicon aluminium alloy				Aluminum alloy	
					Si≤10%		Si＞10%			
Cutting speed	60~120m/min		50~100m/min		100~200m/min		80~160m/min		120~220m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
5	5700	0.08~ 0.14	4500	0.08~ 0.14	9000	0.09~ 0.18	7600	0.09~ 0.18	10000	0.09~ 0.18
6	4700	0.10~ 0.16	3700	0.10~ 0.16	7400	0.12~ 0.20	6400	0.12~ 0.20	8500	0.12~ 0.20
8	3600	0.12~ 0.20	2800	0.12~ 0.20	5500	0.12~ 0.24	4800	0.12~ 0.24	6400	0.12~ 0.24
10	2800	0.14~ 0.23	2200	0.14~ 0.23	4500	0.16~ 0.28	3800	0.16~ 0.28	5000	0.16~ 0.28
12	2400	0.16~ 0.26	1900	0.16~ 0.26	3700	0.18~ 0.32	3200	0.18~ 0.32	4200	0.18~ 0.32
14	2100	0.18~ 0.32	1600	0.18~ 0.32	3200	0.20~ 0.36	2700	0.20~ 0.36	3600	0.20~ 0.36

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2 .The cutting conditions above are for drilling with emulsion.
3.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.
4.These conditions above are for cutting depth under 15D.

SC series centering drill(external coolant)

Center locating

Workpiece material	Cast iron		Nodular cast iron		Silicon aluminium alloy				Aluminum alloy	
					Si≤10%		Si＞10%			
Cutting speed	60~120m/min		50~100m/min		100~180m/min		80~140m/min		120~200m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
5	6400	0.09~0.14	5100	0.09~0.14	9000	0.12~0.25	7600	0.12~0.25	10000	0.12~0.25
6	5300	0.12~0.16	4200	0.12~0.16	7400	0.14~0.28	6400	0.14~0.28	8500	0.14~0.28
8	4000	0.13~0.20	3200	0.13~0.20	5600	0.18~0.32	4800	0.18~0.32	6400	0.18~0.32
10	3200	0.17~0.25	2500	0.17~0.25	4500	0.22~0.36	3800	0.22~0.36	5000	0.22~0.36
12	2700	0.20~0.30	2100	0.20~0.30	3700	0.25~0.40	3200	0.25~0.40	4200	0.25~0.40
14	2400	0.22~0.32	1800	0.22~0.32	3200	0.27~0.44	2700	0.27~0.44	3600	0.27~0.44
16	2000	0.24~0.34	1600	0.24~0.34	2800	0.32~0.48	2400	0.32~0.48	3200	0.32~0.48
20	1600	0.28~0. 40	1300	0.28~0. 40	2300	0.40~0.60	1900	0.40~0.60	2550	0.40~0.60

1.The cutting conditions above are applicable for center drilling.
2.When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
3.The cutting conditions above are for drilling with emulsion.
4.Please reduce the feed speed when center drilling at inclined and curved face.
5.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.

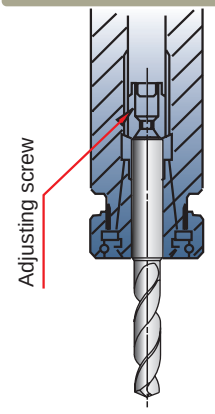
Chamfering

Workpiece material	Cast iron		Nodular cast iron		Silicon aluminium alloy				Aluminum alloy	
					Si≤10%		Si＞10%			
Cutting speed	90~180m/min		70~150m/min		150~270m/min		120~210m/min		180~300m/min	
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)	Rotating speed (min^{-1})	Feed rate (mm/r)
5	9600	0.09~0.20	7600	0.09~0.20	13500	0.12~0.30	11500	0.12~0.30	15000	0.12~0.30
6	8000	0.12~0.22	6400	0.12~0.22	11100	0.14~0.34	9600	0.14~0.34	12700	0.14~0.34
8	6000	0.13~0.28	4800	0.13~0.28	8400	0.18~0.40	7200	0.18~0.40	9600	0.18~0.40
10	4800	0.17~0.32	3800	0.17~0.32	6800	0.22~0.44	5700	0.22~0.44	7600	0.22~0.44
12	4000	0.20~0.38	3200	0.20~0.38	5600	0.25~0.50	4800	0.25~0.50	6400	0.25~0.50
14	3600	0.22~0.42	2700	0.22~0.42	4800	0.27~0.56	4000	0.27~0.56	5400	0.27~0.56
16	3000	0.24~0.46	2400	0.24~0.46	4200	0.32~0.60	3600	0.32~0.60	4800	0.32~0.60
20	2400	0.28~0.58	1900	0.28~0.58	3500	0.40~0.76	2850	0.40~0.76	3800	0.40~0.76

1.When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2.The cutting conditions above are applicable for chamfer drilling.
3.The cutting conditions above are for drilling with emulsion.
4.When clamping drill, please use a collet without any defect or dust, then control the radial run-out of drill under 0.02mm.

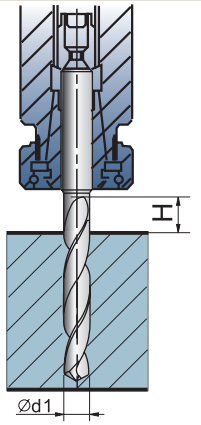
Application guide of drills

Drill clampling



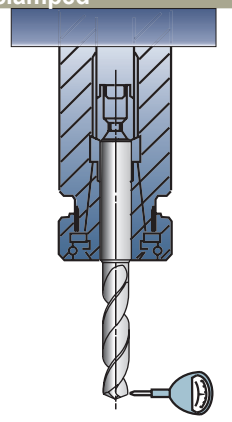
Guarantee tight clamping by useing thrust bearing type collet chuck.

How to define the clamping length of drill



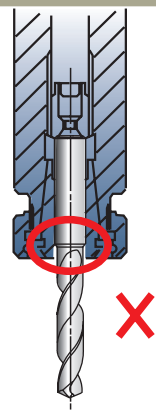
Ensure the size of H is over 1.5d1

Radial Run-out of drill clamped



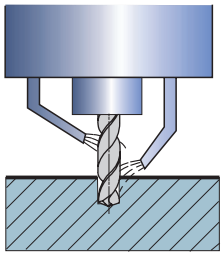
The Radial Run-out should be under 0.02mm.

Wrong drill clamping



Don't clamp on the drill flutes.

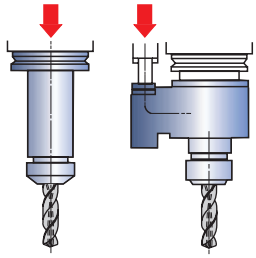
Correct coolant method



The coolant liquid should shoot to the end and the center of drill as shown in the figure.

Internal coolant; coolant supply method.

Coolant through spindle　　Coolant not through spindle



Coolant pressure is about 0.5~1mpa
(coolant pressure is 2~3mpa when the diameter is less than Ø5 mm)
Coolant volume is 1.5~4L/min

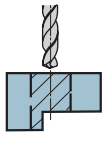
Cautions to use coolant

When using internal coolant

①The little chip particles and dust will generate jamming in the oil hole. A fine mesh filter should be used to prevent jamming in the oil hole , especially for the small diameter drills.

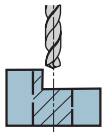
②Dirt and dust particles will adhere to the oil hole and lead to unsmooth coolant flow. Coolant change as early as possible is recommended.

Cautions to interrupted cutting



Can be drilled

Reduce the feed rate when drilling interrupted part.

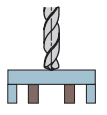


Pre-machining prior drilling

Machining a countersink with end mill prior to drilling.

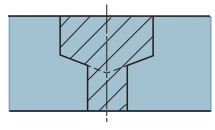
Correct method for thin workpiece

Bending occurs



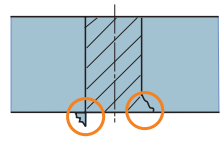
Add a supporter

Drilling method of stepped holes



①Divided to two drilling processes.
②Drill the larger diameter hole firstly.
※Multiple step and chamfer drill can be produced by us.

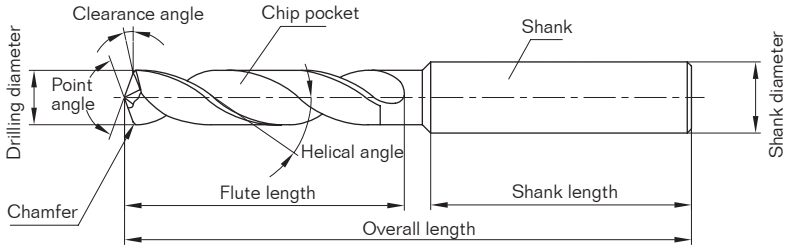
burrs and workpiece chippings on Exit

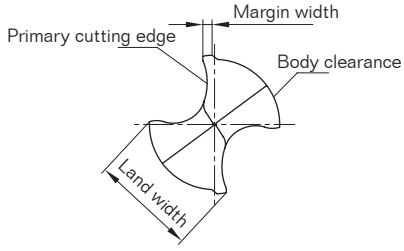


①Reduce the feed rate at the end time of drilling through
②Chamfer machined at the exit position.
③Change the point angle.

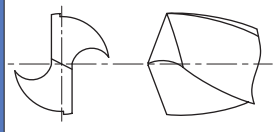
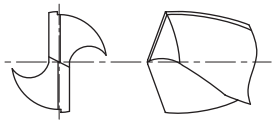
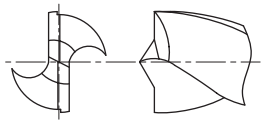
Parts terminology of drill

Terminology of drill





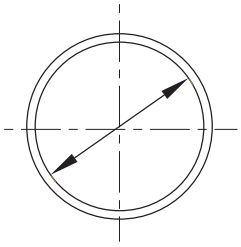
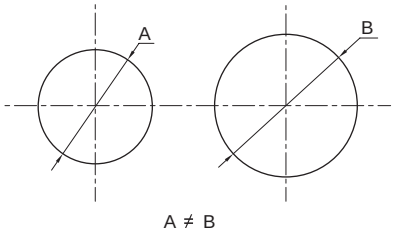
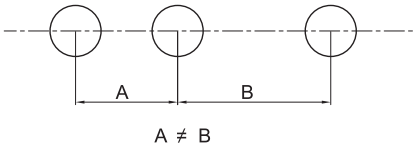
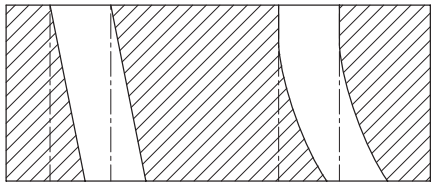
Representative cutting edge shapes

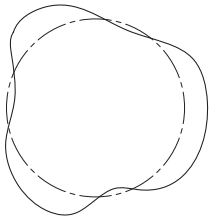
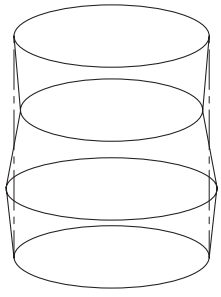
Shape	 (Conical)	 (Dual flats)	 (Candler)
Features	● The flank face is conical and the clearance angel increases toward the center of drill. ● Wide applications, commonly used both for soft and hard materials.	● The flank face is dual flats, to facilitate cutting and initial entering. ● often used for small diameter dirlls	● This shape has two-stage point angle and perfect centering capability, less burs generate when drilling hole. ● It is the first choice for drilling thin plate.

Structure specification and cutting characteristics

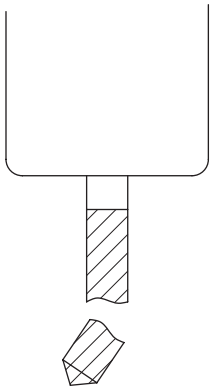
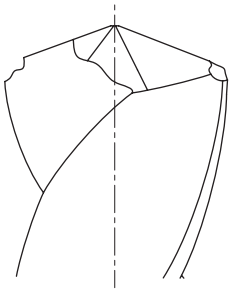
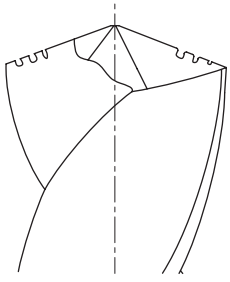
Chip pocket	The function of chip pocket is remove the chips out of the hole. The larger the cross-sectional area is, the chips is easier to remove out.
Helical angle	The helical angle is the inclined angle of flute at the axial direction of a drill. It varies according to the different position of cutting edge. It decreases greatly as the periphery toward the center. High hardness material Small ⟵ Helical angle ⟶ Large Soft material
Flute length	It is determined by depth of hole, guide bush length and regrinding allowance. The longer the flute is, the worse the drill rigidity is. Since it greatly influences on the tool life, to minimize it as much as possible when other requirements are met. The minimal flute length generally is hole depth plus the 1.5 times of hole diameter.
Point angle	Generally the angle is 118°, it is set differently as per various applications. Soft material easy to cut Small ⟵ Point angle ⟶ Large for hard materials and high-efficiency machining
Core	It is an important factor that influence the rigidity and chip control of a drill. It is set according to applications. Low axial cutting force Low rigidity Materials easy to cut thin ⟵ core ⟶ Thick Large axial cutting force High rigidity High hardness materials, cross hole drilling etc.
Margin	As a drill guide during drilling process. The margin width need to take the hole friction into consideration. Low friction with hole wall, poor guiding performance small ⟵ margin width ⟶ large Good guiding performance, high friction with hole wall
Back taper	To decrease the friction with inside wall of the drilled hole, there is a back taper slightly from tool nose to shank. The degree is usually represented by the quantity decreasing in the diameter per 100 mm flute length.
Body clearance	It is the part formed on the clearance face after margin, mainly to reduce the friction between inside wall of hole and drill periphery

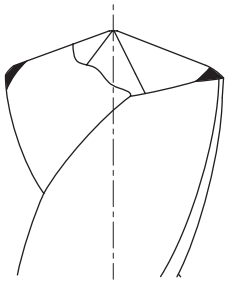
Common problems and solutions for drilling

	Problem	Cause	Solution
Hole	Oversize holes 	Poor clamping Large run-out around spindle	Select the holder and chuck with high precision Calibrating spindle Check and adjust after clamping drill
		Non-symmetric point angle Large run-out Chisel edge is off center	Regrind drill Check the precision after regrinding
	Irregular hole size 	Non-symmetric point angle Large run-out Chisel edge is off center Excessive margin abrasion	Select the holder and chuck with high precision Calibrating the spindle Check and adjust after clamping drill
		Poor clamping Large spindle run-out Workpiece is unfirmly hold.	Select the holder and chuck with high precision Calibrating spindle Check and adjust after clamping drill
		Feed rate is too high	Reduce the feed speed
		Coolant is not enough	Change the coolant supply method, or increase coolant volume.
	Low position accuracy 	Poor re-positioning precision of spindle Poor clamping Large run-out with spindle	Improve the re-positioning precision of machine Select the holder and chuck with high precision Calibrating the spindle Check and adjust after clamping drill
		The feed direction is not vertical to the workpiece surface	Adjust the feed direction vertical to the workpiece.
		Top center not align with the spindle center (lathe)	Check and adjust alignment carefully before drilling
	Bad linearity Bad perpendicularity 	Excessive tool abrasion	Regrind
		Poor center hole accuracy	Increase the position accuracy of hole
		Non-symmetric point angle Large run-out Chisel edge is off center	Regrind drill Check the precision after regrinding
		Insufficient drill rigidity	Increase drill rigidity
		Uneven workpiece surface Top center does not align with the spindle center (lathe)	The workpiece must be horizontal or pre-machined to horizontal before drilling Pre-drill a center hole

	Problem	Cause	Solution
Hole	Poor roundness 	Non-symmetric point angle Large drill run-out Chisel edge is off center	Regrind drill Check the precision after regrinding
		Poor clamping Large spindle run-out Workpiece is unfirmly hold	Select the holder and chuck with high precision Calibrating the spindle Check run-out and adjust after clamping drill
		Clearance angle is too large	Regrind drill
		Insufficient drill rigidity	Increase drill rigidity
	Poor workpiece surface quality	Incorrect regrinding	Regrind calibration
		Insufficient coolant or unsuitable coolant type	Change coolant supply method, increase coolant volume Select the cutting oil with good lubricating property
		Poor clamping Large spindle run-out	Select the holder and chuck with high precision Calibrating the spindle
		Feed rate is too high	Decrease the feed rate
		Excessive abrasion on cutting edge Excessive build-up on margin	Regrind drill Select a coated drill
		Chip jamming	Select a suitable drill (considering flute geometry , helical angle etc) Change the cutting method (adjust feed rate, use step feed etc)
	Poor cylindricity 	Non-symmetric point angle Large drill run-out Chisel edge is off center Excessive margin abrasion	Regrind drill Check the precision after regrinding
		Feed speed is too low	Increase the feed speed

Common problems and solutions for drilling

	Problem	Cause	Solution
Drill	Drill breakage 	Bend ,distortion and slippage of machine and workpiece	Increase the rigidity of drill, machine, workpiece and clamp
		Clearance angle is too small	Regrind calibration
		Feed rate is too high	Decrease the feed rate
		Excessive drill abrasion	Regrind drill
		Chip jamming	Select a suitable drill (considering flute geometry , helical angle etc) Change the cutting method (adjust feed rate, use step feed etc)
		Difficult entering the workpiece	Increase the rigidity of drill and machine Increase rigidity of workpiece and clamping. Select the drill with a sharp point for easy entry Pre-drill a centre hole Adjust the level of workpiece or pre-machined to horizontal before drilling Use guide bush or bush plate
	Chipping on the cutting corner 	Unsuitable drill material	Select the suitable drill material
		Hard lump on the workpiece	Analyse the workpiece or select a suitable workpiece Change the cutting parameters(cutting speed , feed rate or machining method)
		Feed rate is too high	Reduce feed rate
		Insufficient coolant	Change coolant supply method, increase coolant volume
	Chipping on cutting edge 	Poor clamping Large spindle run-out	Select the holder and chuck with high precision Calibrating the spindle
		Cutting speed and feed speed are too high	Reduce the cutting speed and feed speed.
		Clearance angle is too large	Regrind calibration
		Unsuitable drill material	Select the suitable drill material

	Problem	Cause	Solution
Drill	Abnormal abrasion on cutting corner 	Delay to regrind	Regrind in time
		Drill point does not align with the spindle center (lathe)	Check and adjust alignment carefully before drilling
		Cutting speed is too high	Reduce cutting speed
		Cutting edge shape is inappropriate	Select correct cutting edge shape
		Unsuitable drill material	Select the suitable drill material
		Incorrect coolant type	Change coolant
	Abrasion and chipping on chisel edge	Feed speed is too high	Reduce feed speed.
		Cutting edge shape is inappropriate	Select correct cutting edge shape
		Unsuitable drill material	Select the suitable drill material
		Clearance angle is too small	Regrind drill
	Breakage on margin	The size of guide bush or drill bush is too large	Select another bush with correct size
	Margin build-up	Excessive abrasion on cutting edge generates high heat	Regrind drill
		Insufficient coolant	Change coolant supply method, increase coolant volume
		Incorrect coolant type	Change coolant
		Workpiece material is too soft	Change drill or machining method
	High vibration	Clearance angle is too large	Regrind drill
		Drill rigidity is not enough	Increase drill rigidity
	Chips roll around the drill	Long chips Chip removal is not fluent	Change the drill and adjust machining method and cutting parameters
	One-side abrasion	Drill point does not align with the spindle center (lathe)	Check and adjust the alignment carefully before drilling
		Poor clamping	Fix drill carefully, control the radial run-out

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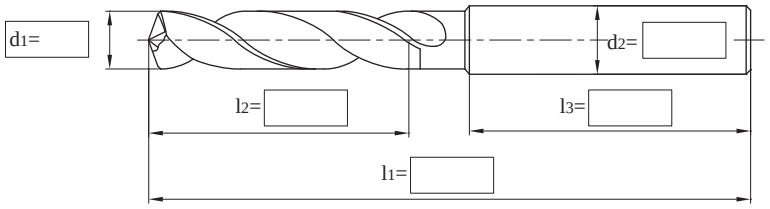
If the dimensions on the catalogue can't meet your requirements, we will supply special and accurate non-standard order, you just need to easily select the product you want.

Diameter range	External coolant Ø2.0～Ø20.0mm
	Internal coolant Ø3.0～Ø20.0mm

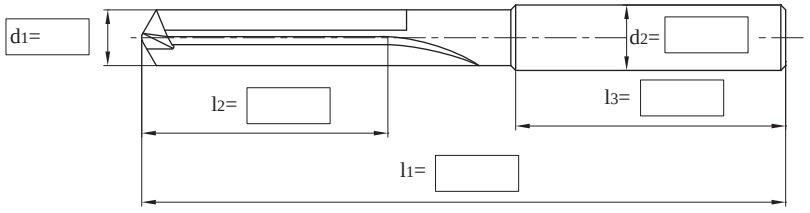
Coolant
☐ External coolant
☐ Internal coolant

1.Twist drill



Select the category of twist drill	
☐ SU series	☐ ST series
☐ SH series	☐ SC series

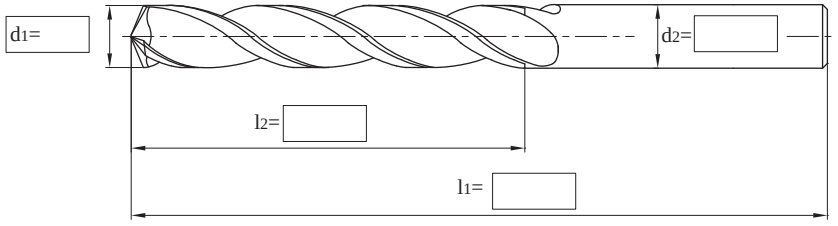
2.Straight flute drill



Select the category of straight flute drill

☐ PC series

3.Three-lips drill



Select the category of three-lips drill

☐ PA series

Note:

Order quantity:	pc	Delivery date(Y/M/D):
Quotation by ZCCCT		Confirmed by customer:
		Date:(Y/M/D):

Customer name: Fax： Tel： E-MAIL:	ZCC-CT Huanghe Southern Road, Tianyuan Zone, Zhuzhou, Hunan province, China. Fax：0733-2882721 2885420 2887878 Postcode：412007 E-mail:zccct@zccct.com

Hole data and workpiece

Hole diameter= ____ mm

hole tolerance= ____

Hole depth= ____ mm

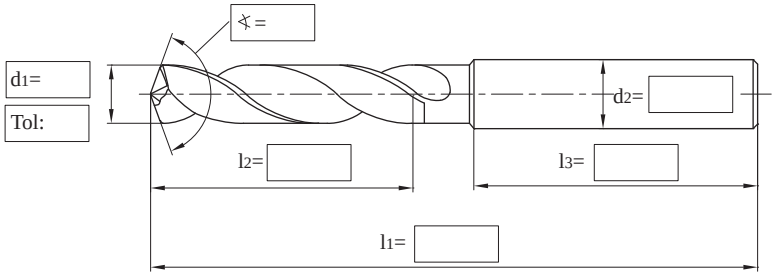
☐ Carbon steel
☐ Alloy steel
☐ Pre-hardened Steel
☐ Hardened steel
☐ Stainless steel
☐ Grey cast iron
☐ Nodular cast iron
☐ Copper alloy
☐ Aluminum alloy
☐ Titanium alloy
☐ Heat resistant alloy

Grade of workpiece material ____

Tensile strength= ____ N/mm^2

Hardness= ____ unit（HRC,HB etc）

Tool information



Coolant	
☐	External coolant
☐	Internal coolant

Coated	
Yes	☐
No	☐

DIN6535

Shank type

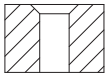
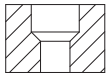
☐ Form HA
☐ Form HB
☐ Form HE
☐ Common straight shank
☐ Shank with tang DIN 1809
☐ Morse taper shank MT ☐
Special shape

Note:

Order quantity:	pc	Delivery date(Y/M/D):
Quotation by ZCCCT		Confirmed by customer:
		Date:(Y/M/D):

Customer name: Fax： Tel： E-MAIL:	ZCC·CT Huanghe Southern Road, Tianyuan Zone, Zhuzhou, Hunan province, China. Fax：0733-2882721 2885420 2887878 Postcode：412007 E-mail:zccct@zccct.com

Hole data and workpiece

Hole shape: ☐  ☐ 

Diameter of small hole= mm

Tolerance of small hole=

Diameter of large hole= mm

Tolerance of large hole=

Hole depth= mm

☐ Carbon steel ☐ Grey cast iron

☐ Alloy steel ☐ Nodular cast iron

☐ Pre-hardened Steel ☐ Copper alloy

☐ Hardened steel ☐ Aluminum alloy

☐ Stainless steel ☐ Titanium alloy

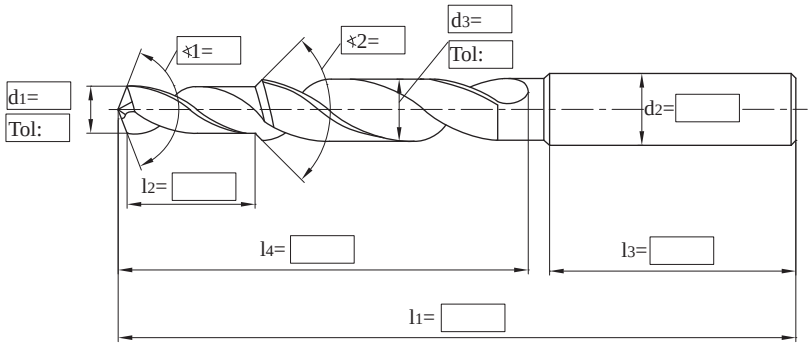
☐ Heat resistant alloy

Grade of workpiece material

Tensile strength= N/mm^2

Hardness= unit（HRC,HB etc）

Tool information



Coolant
☐ External coolant
☐ Internal coolant

Coated	
Yes	☐
No	☐

DIN6535	Shank type
	☐ Form HA
	☐ Form HB
	☐ Form HE
	☐ Common straight shank
	☐ Shank with tang DIN 1809
	☐ Morse taper shank MT ☐
	Special shape

Note:

Order quantity:	pc	Delivery date(Y/M/D):
Quotation by ZCCCT		Confirmed by customer:
		Date:(Y/M/D):

Customer name: Fax： Tel： E-MAIL:	ZCC·CT Huanghe Southern Road, Tianyuan Zone, Zhuzhou, Hunan province, China. Fax：0733-2882721 2885420 2887878 Postcode：412007 E-mail:zccct@zccct.com

Hole data and workpiece

Hole diameter= mm

hole tolerance=

Hole depth= mm

Straight flute drills are widely used for machining short chip materials, from cast iron, common aluminum alloys to high-silicon aluminium alloy.

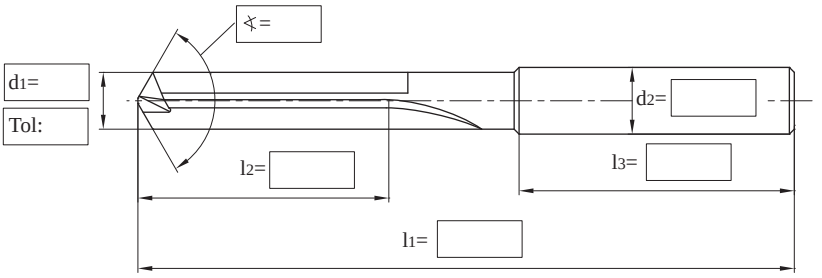
- ☐ Grey cast iron
- ☐ Nodular cast iron
- ☐ Aluminum alloy
- ☐ silicon aluminium alloy Si＜10%
- ☐ silicon aluminium alloy Si≥10%

Grade of workpiece material

Tensile strength= N/mm^2

Hardness= unit（HRC,HB etc）

Tool information



Coolant	
☐	External coolant
☐	Internal coolant

Coated	
Yes	☐
No	☐

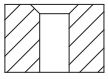
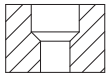
Shank type	
DIN6535	☐ Form HA
	☐ Form HB
	☐ Form HE
☐ Common straight shank	
☐ Shank with tang DIN 1809	
☐ Morse taper shank MT ☐	
Special shape	

Note:

Order quantity:	pc	Delivery date(Y/M/D):
Quotation by ZCCCT		Confirmed by customer:
		Date:(Y/M/D):

Customer name: Fax： Tel： E-MAIL:	ZCC·CT Huanghe Southern Road, Tianyuan Zone, Zhuzhou, Hunan province, China. Fax：0733-2882721 2885420 2887878 Postcode：412007 E-mail:zccct@zccct.com

Hole data and workpiece

Hole shape: ☐  ☐ 

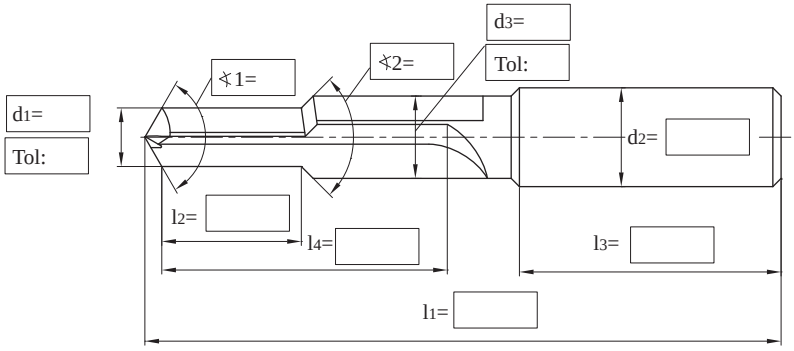
Diameter of small hole= ____ mm
Tolerance of small hole= ____
Diameter of large hole= ____ mm
Tolerance of large hole= ____
Hole depth= ____ mm

Straight flute drills are widely used for machining short chip materials, from cast iron, common aluminum alloys to high-silicon aluminium alloy.

☐ Grey cast iron
☐ Nodular cast iron
☐ Aluminum alloy
☐ silicon aluminium alloy Si＜10%
☐ silicon aluminium alloy Si≥10%

Grade of workpiece material ____
Tensile strength= ____ N/mm^2
Hardness= ____ unit（HRC,HB etc）

Tool information



Coolant	
☐	External coolant
☐	Internal coolant

Coated	
Yes	☐
No	☐

DIN6535	Shank type
	☐ Form HA
	☐ Form HB
	☐ Form HE
	☐ Common straight shank
	☐ Shank with tang DIN 1809
	☐ Morse taper shank MT ☐
	Special shape

Note:

Order quantity:	pc	Delivery date(Y/M/D):
Quotation by ZCCCT		Confirmed by customer:
		Date:(Y/M/D):

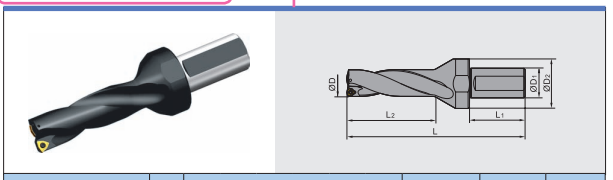
孔加工刀具

How to choose the right indexable shallow drills

Product category

Shape

Indexable shallow drill



Type	Stock	Basic dimension(mm)						Recommended inserts	Screw	Wrench
		D	D1	D2	L1	L2	L			
ZD03-400-XP40-WC06-02	▲	40	40	60	70	125	231	WCMX06T308	I60M3×7	WT09IP
ZD03-410-XP40-WC06-02	▲	41	40	60	70	128	234	WCMX06T308	I60M3×7	WT09IP
ZD03-420-XP40-WC08-02	▲	42	40	60	70	131	239	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-430-XP40-WC08-02	▲	43	40	60	70	134	242	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-440-XP40-WC08-02	▲	44	40	60	70	137	245	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-450-XP40-WC08-02	▲	45	40	60	70	140	248	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-460-XP40-WC08-02	▲	46	40	60	70	143	251	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-470-XP40-WC08-02	▲	47	40	60	70	146	253	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-480-XP40-WC08-02	▲	48	40	70	70	149	255	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-490-XP40-WC08-02	▲	49	40	70	70	152	257	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-500-XP40-WC08-02	▲	50	40	70	70	155	259	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-510-XP40-WC08-02	▲	51	40	70	70	158	261	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-520-XP40-WC08-02	▲	52	40	70	70	161	263	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-530-XP40-WC08-02	▲	53	40	70	70	164	265	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-540-XP40-WC08-02	▲	54	40	70	70	167	267	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-550-XP40-WC08-02	▲	55	40	70	70	170	269	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-560-XP40-WC08-02	▲	56	40	70	70	173	271	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-570-XP40-WC08-02	▲	57	40	70	70	176	273	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-580-XP40-WC08-02	▲	58	40	70	70	179	275	WCMX080412	I60M3.5×10.4	WT15IP

▲Stock available △Produce according to order

Indexable inserts for shallow drilling

Type	Basic dimension(mm)					Grade
	L	I.C	s	d	r	YBG202
WCMX030208R-53	3.8	5.56	2.38	2.8	0.8	★
WCMX040208R-53	4.3	6.35	2.38	3.1	0.8	★
WCMX050308R-53	5.4	7.94	3.18	3.2	0.8	★
WCMX06T308R-53	6.5	9.525	3.97	3.7	0.8	★
WCMX080412R-53	8.7	12.7	4.76	4.3	1.2	★
WCMX030208R-PG	3.8	5.56	2.38	2.8	0.8	★
WCMX040208R-PG	4.3	6.35	2.38	3.1	0.8	★
WCMX050308R-PG	5.4	7.94	3.18	3.2	0.8	★
WCMX06T308R-PG	6.5	9.525	3.97	3.7	0.8	★
WCMX080412R-PG	8.7	12.7	4.76	4.3	1.2	★

★Recommended Grade and Always stock available ☆Recommended grade and produce according to order
●Available Grade and Always stock available ○Available Grade and Produce according to order

Inserts specification
Including type, dimension, grade and stock.

Tool specification
Including type, dimension, applicable inserts and spare parts

Indexable shallow drill code key

02，03，04，05
The ratio of length and diameter

Range	160-580
	16mm-58mm
Diameter	

W	
S	
Insert shape	

C	7°
P	11°
Insert clearance angle	

Code	Length	
	W	S
03	3.8	
04	4.3	
05	5.4	
06	6.5	6.35
08	8.7	8.0
09		9.525
12		12.7
Cutting edge length(mm)		

ZD 03 - 300 - XP 32 - W C 05 - 02

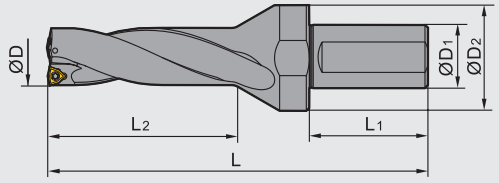
Tool type	
Code	Description
ZD	Shallow drill

Coupling structure and type	
Code	Description
XP	Weldon shank

Coupling size(mm)
25，32，40

Number of tooth

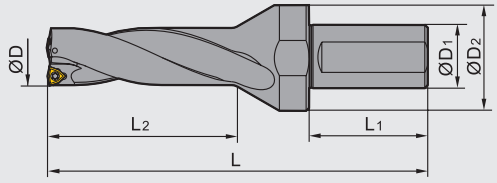
Indexable shallow drill



Type	Stock	Basic dimension(mm)						Recommended inserts	Screw	Wrench
		D	D1	D2	L1	L2	L			
ZD03-160-XP25-WC03-02	▲	16	25	32	56	52	129	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-170-XP25-WC03-02	▲	17	25	32	56	55	133	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-180-XP25-WC03-02	▲	18	25	32	56	58	137	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-190-XP25-WC03-02	▲	19	25	32	56	61	140	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-200-XP25-WC03-02	▲	20	25	32	56	64	143	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-210-XP25-WC04-02	▲	21	25	45	56	67	153	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-220-XP25-WC04-02	▲	22	25	45	56	70	156	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-230-XP25-WC04-02	▲	23	25	45	56	73	159	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-240-XP25-WC04-02	▲	24	25	45	56	76	162	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-250-XP25-WC04-02	▲	25	25	45	56	79	165	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-260-XP32-WC05-02	▲	26	32	55	60	83	176	WCMX050308	I60M3×7	WT09IP
ZD03-270-XP32-WC05-02	▲	27	32	55	60	86	180	WCMX050308	I60M3×7	WT09IP
ZD03-280-XP32-WC05-02	▲	28	32	55	60	89	184	WCMX050308	I60M3×7	WT09IP
ZD03-290-XP32-WC05-02	▲	29	32	55	60	92	188	WCMX050308	I60M3×7	WT09IP
ZD03-300-XP32-WC05-02	▲	30	32	55	60	95	192	WCMX050308	I60M3×7	WT09IP
ZD03-310-XP40-WC06-02	▲	31	40	60	70	98	203	WCMX06T308	I60M3×7	WT09IP
ZD03-320-XP40-WC06-02	▲	32	40	60	70	101	206	WCMX06T308	I60M3×7	WT09IP
ZD03-330-XP40-WC06-02	▲	33	40	60	70	104	209	WCMX06T308	I60M3×7	WT09IP
ZD03-340-XP40-WC06-02	▲	34	40	60	70	107	212	WCMX06T308	I60M3×7	WT09IP
ZD03-350-XP40-WC06-02	▲	35	40	60	70	110	215	WCMX06T308	I60M3×7	WT09IP
ZD03-360-XP40-WC06-02	▲	36	40	60	70	113	218	WCMX06T308	I60M3×7	WT09IP
ZD03-370-XP40-WC06-02	▲	37	40	60	70	116	221	WCMX06T308	I60M3×7	WT09IP
ZD03-380-XP40-WC06-02	▲	38	40	60	70	119	225	WCMX06T308	I60M3×7	WT09IP
ZD03-390-XP40-WC06-02	▲	39	40	60	70	122	228	WCMX06T308	I60M3×7	WT09IP

▲Stock available △Produce according to order

Indexable shallow drill



Type	Stock	Basic dimension(mm)						Recommended inserts	Screw	Wrench
		D	D1	D2	L1	L2	L			
ZD03-400-XP40-WC06-02	▲	40	40	60	70	125	231	WCMX06T308	I60M3×7	WT09IP
ZD03-410-XP40-WC06-02	▲	41	40	60	70	128	234	WCMX06T308	I60M3×7	WT09IP
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ZD03-450-XP40-WC08-02	▲	45	40	60	70	140	248	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-460-XP40-WC08-02	▲	46	40	60	70	143	251	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-470-XP40-WC08-02	▲	47	40	60	70	146	253	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-480-XP40-WC08-02	▲	48	40	70	70	149	255	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-490-XP40-WC08-02	▲	49	40	70	70	152	257	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-500-XP40-WC08-02	▲	50	40	70	70	155	259	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-510-XP40-WC08-02	▲	51	40	70	70	158	261	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-520-XP40-WC08-02	▲	52	40	70	70	161	263	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-530-XP40-WC08-02	▲	53	40	70	70	164	265	WCMX080412	I60M3.5×10.4	WT15IP
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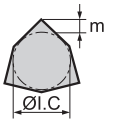
ZD03-550-XP40-WC08-02	▲	55	40	70	70	170	269	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-560-XP40-WC08-02	▲	56	40	70	70	173	271	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-570-XP40-WC08-02	▲	57	40	70	70	176	273	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-580-XP40-WC08-02	▲	58	40	70	70	179	275	WCMX080412	I60M3.5×10.4	WT15IP

▲Stock available △Produce according to order

Shallow drills code key

Code	Insert shap
S	
W	

Insert shape / code

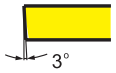
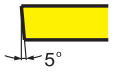
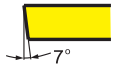
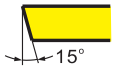
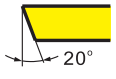
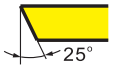
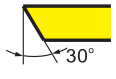
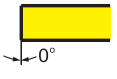
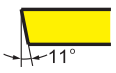


Code	Nose Height m Tolerance(mm)	Inscribed Circle ØI.C Tolerance(mm)	Thickness S Tolerance(mm)	Code	Nose Height m Tolerance(mm)	Inscribed Circle ØI.C Tolerance(mm)	Thickness S Tolerance(mm)
A	±0.005	±0.025	±0.025	J	±0.005	±0.05-±0.13	±0.025
F	±0.005	±0.013	±0.025	K	±0.013	±0.05-±0.13	±0.025
C	±0.013	±0.025	±0.025	L	±0.025	±0.05-±0.13	±0.025
H	±0.013	±0.013	±0.025	M	±0.08-±0.18	±0.05-±0.13	±0.13
E	±0.025	±0.025	±0.025	N	±0.08-±0.18	±0.05-±0.13	±0.025
G	±0.025	±0.025	±0.13	U	±0.13-±0.38	±0.08-±0.25	±0.13

Tolerance

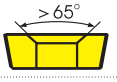
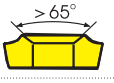
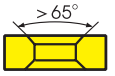
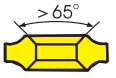
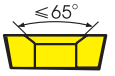
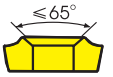
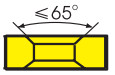
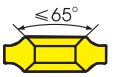
W C M X

Clearance angle of main cutting edge

Code	Clearance angle	Code	Clearance angle
A		B	
C		D	
E		F	
G		N	
P		O	Other clearance angle

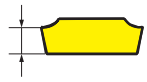
Chipbreaker and clamping system

Metric

Code	With/Without hole	With/Without chipbreaker	Section plane of Insert	Code	With/Without hole	With/Without chipbreaker	Section plane of Insert
B	With	Without		N	Without	Without	
H	With	Single-side		R	Without	Single-side	
C	With	Without		F	Without	Double-side	
J	With	Double-side		A	With	Without	
W	With	Without		M	With	Single-side	
T	With	Single-side		G	With	Double-side	
Q	With	Without		X	---	---	Special
U	With	Double-side					

Code	Length	
	W	S
03	3.8	
04	4.3	
05	5.4	
06	6.5	6.35
08	8.7	8.0
09		9.525
12		12.7

Length of cutting edge

Thickness is defined as height from bottom of insert to the highest part of cutting edge.

Code	Insert thickness (mm)	Code	Insert thickness (mm)
00	0.79	**05**	5.96
T0	0.99	**T5**	5.95
01	1.59	**06**	6.35
T1	1.98	**T6**	6.75
02	2.38	**07**	7.94
T2	2.58	**09**	9.52
03	3.18	**T9**	9.72
T3	3.97	**11**	11.11
04	4.76	**12**	12.70
T4	4.96		

Insert thickness

08 04 12 R - PG

Nose radius	
Code	Description
04	0.4mm
08	0.8mm
12	1.2mm

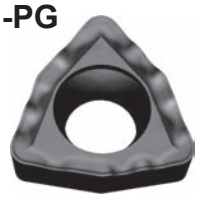
Cutting direction	
Code	Description
R	Right hand
L	Left hand
N	Neutral

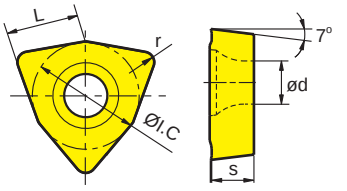
Chipbreaker code

Indexable inserts for shallow drilling

-53

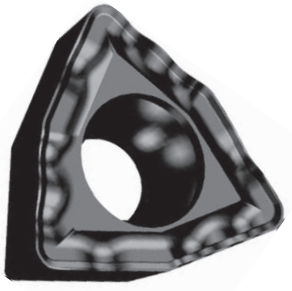
-PG





Type	Basic dimension(mm)					Grade
	L	I.C	s	d	r	YBG202
WCMX030208R-53	3.8	5.56	2.38	2.8	0.8	★
WCMX040208R-53	4.3	6.35	2.38	3.1	0.8	★
WCMX050308R-53	5.4	7.94	3.18	3.2	0.8	★
WCMX06T308R-53	6.5	9.525	3.97	3.7	0.8	★
WCMX080412R-53	8.7	12.7	4.76	4.3	1.2	★
WCMX030208R-PG	3.8	5.56	2.38	2.8	0.8	★
WCMX040208R-PG	4.3	6.35	2.38	3.1	0.8	★
WCMX050308R-PG	5.4	7.94	3.18	3.2	0.8	★
WCMX06T308R-PG	6.5	9.525	3.97	3.7	0.8	★
WCMX080412R-PG	8.7	12.7	4.76	4.3	1.2	★

★Recommended grade and always stock available ☆Recommended grade and produce according to order
●Available grade and always stock available ○Available grade and produce according to order



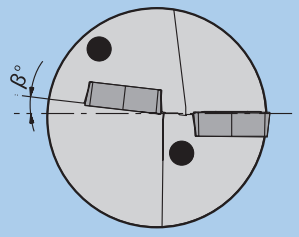
-PG chipbreaker characteristics

Unique design of waveform edge ensure high edge strength and good chip breaking performance for machining carbon steel and alloy steel.

-53 chipbreaker characteristics

Sharp cutting edge benefits to achieve low roughness surface, mainly applicable for low load cutting of aluminum alloy, mild steel and cast iron.

Features of shallow drill

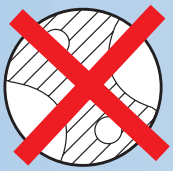


★Perfect insert assembling angle makes balanced cutting force, low vibration in machining process, thus achieve excellent surface quality.

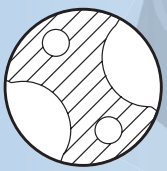
★Advanced flute design possesses large chip pocket for chip removal.

★Complete diameter range, from 16 mm to 58 mm.

Small chip pocket
Easy to generate chips jamming



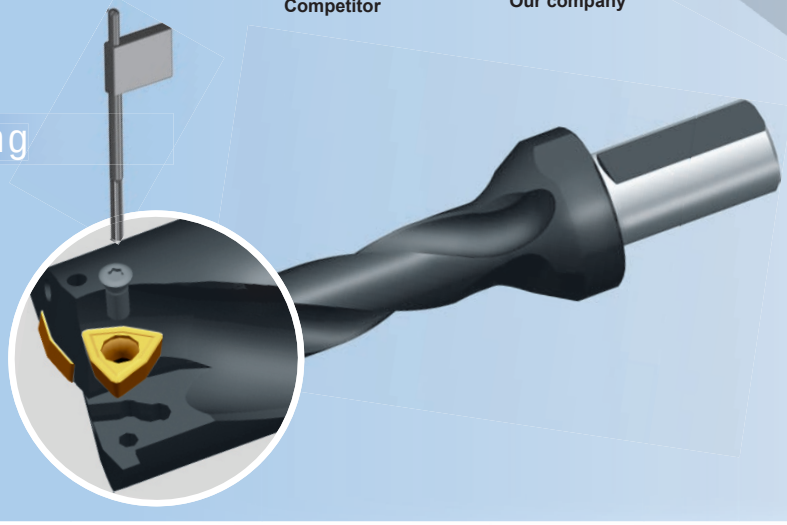
Competitor



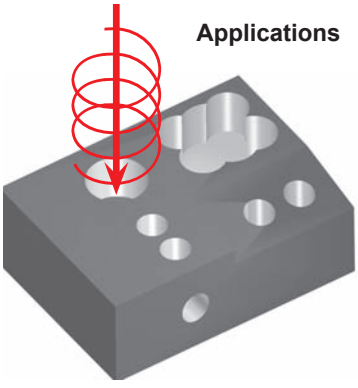
Our company

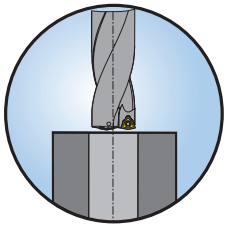
Large chip pocket
Chip jamming free

Insert assembling

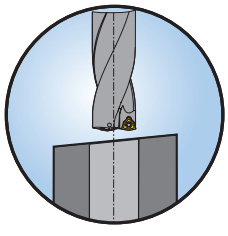


Applications

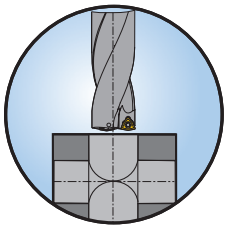




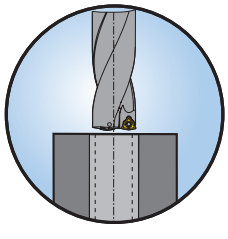
1. Common drilling



2. Slant face drilling

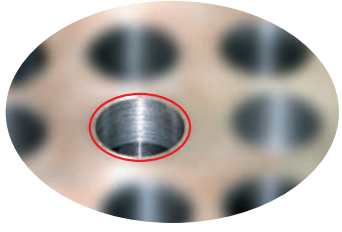


3. Cross-hole drilling



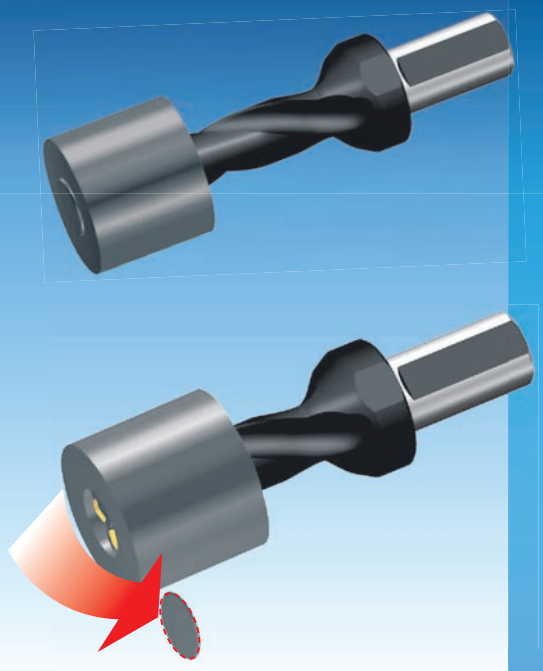
4. Counterboring

Higher surface quality



Better chip breaking performance

Safety information



Breakage

Chipping on cutting edges can be caused by various conditions:

- off-center drill.
- Tool overhang or feed rate are too large.
- Instability of inserts caused by incorrect insert seating or damaged tip-seat.
- poor machine and workpiece stability.
- insufficient coolant supply.
- incorrect insert chipbreaker or grade.

Insert abrasion

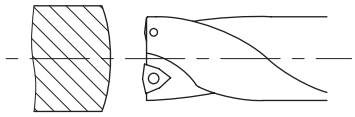
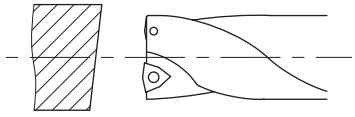
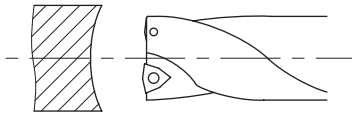
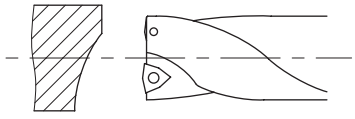
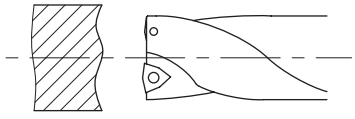
The two most common types of insert abrasion are flank and crater abrasion. The flank abrasion is generally the natural abrasion pattern, especially on the periphery insert which is applied for higher cutting speed. However, this abrasion will finally result that the insert cutting edge can not achieve the tolerance and/or surface quality required for the machining.

For drilling operations, if flank and crater abrasion go beyond certain values, the inserts should be changed without delay for production security

If stationary drilling method is used, the small ejected discs may result dangerous accident when workpiece is drilled through, it is therefore ensured that the machine has adequate safeguard.

initial drill penetration

Initial drill penetration is an important factor for successful drilling. One way of ensuring good hole quality is to make sure the penetration surface of the workpiece is vertical to the drill centre axis. In addition, an indexable drill can carry out initial penetration of convex, concave, inclined and irregular surfaces when accompanied with an adjustment of feed rates.

Workpiece surface	Countermeasures
	For a convex surface, the conditions are relatively good and the centre of the drill ideally makes contact with the workpiece first, thus can adopt normal feed.
	When penetrating an inclined surface, the cutting edges will be unevenly loaded which may result in the premature drill abrasion. If the angle of the inclined surface is larger than two degrees, the feed should be reduced to 1/3 of that recommended for the drill.
	When drilling into concave surface, drill center axis normally tends to off-center, the feed should be reduced to 1/3 of that recommended for the drill.
	When drilling into non-symmetric curved surfaces, the drill tends to deviate from the centre because of penetrating against an inclined surface. The feed should be reduced to lower than that recommended for the initial penetration of concave surfaces.
	When drilling into irregular surface, there is a risk of the inserts chipping and this may also occur when drilling through the workpiece. Therefore the feed rate should be reduced.

Calculations for shallow drilling

Cutting speed(Vc)

$$Vc = \frac{Dc \times \pi \times n}{1000}$$

Vc (m/min): cutting speed Dc(mm): drill diameter
n (rev/min): rotating speed

◆ Example

Spindle speed is1600 rev/min，drill diameter is20mm，thus cutting speed is：

$$Vc = \frac{Dc \times \pi \times n}{1000} = \frac{20 \times 3.14 \times 1600}{1000} = 100\ (m/min)$$

Feed speed

$$Vf = fr \times n\ (mm/min)$$

Vf (mm/min): feed speed fr (mm/rev): feed rate per revolution
n (rev/min): spindle speed

◆ Example

Spindle speed is1500 rev/min，feed rate per revolution is 0.1mm/rev，thus feed speed is：

$$Vf = fr \times n = 0.1 \times 1500 = 150\ (mm/min)$$

Machining time

$$Tc = \frac{Id \times i}{n \times f}$$

Tc (min): machining time fr (mm/rev): feed rate per revolution
i: number of holes Id (mm): drilling depth n (rev/min): spindle speed

◆ Example

Drilling a hole with diameter 20mm and depth 40mm, cutting speed is 100m/min and feed rate per revolution is 0.1mm/rev, calculate the drilling time .

$$n = \frac{Vc \times 1000}{Dc \times \pi} = \frac{100 \times 1000}{20 \times 3.14} = 1600\ (rev/min)$$

$$Tc = \frac{Id \times i}{n \times fr} = \frac{40 \times 1}{1600 \times 0.1} = 0.25\ (min)$$

Metal removal rate

$$Q = \frac{Vf \times \pi \times Dc^2}{4 \times 1000}$$

Q (cm3/min): metal removal rate Dc(mm): drill diameter
Vf (mm/min): feed speed

◆ Example

Drill diameter is 20mm, feed speed is 160mm/rev, thus metal removal rate is:

$$Q = \frac{Vf \times \pi \times Dc^2}{4 \times 1000} = \frac{160 \times 3.14 \times 20^2}{4 \times 1000} = 50.24\ (cm^3/min)$$

Recommended cutting parameters for shallow drills

ISO	Materials	Hardness HB	Diameter Dc mm	Feed rate fn mm/r	Cutting speed Vc m/min
P	Carbon steel	80-200	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.09 0.06-0.10 0.07-0.11 0.08-0.12	200(170-240)
	Low alloy steel	150-260	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.14 0.08-0.16 0.10-0.20	170(140-220)
	Hign alloy steel	150-320	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.16 0.08-0.18 0.10-0.22	150(120-180)
	Cast steel	180-250	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.08 0.05-0.08 0.06-0.10 0.07-0.11 0.07-0.12	140(120-170)
M	Stainless steel Ferrite Martensite	150-270	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.16 0.08-0.18 0.10-0.22	160(110-230)
	Austenite	150-275	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.11 0.06-0.13 0.08-0.14 0.10-0.16	140(110-220)
K	Malleable cast iron	150-230	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.10 0.05-0.14 0.08-0.16 0.10-0.20 0.12-0.24	160(120-220)
	Gray cast iron	150-220	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.10 0.05-0.14 0.08-0.16 0.10-0.20 0.12-0.24	200(170-240)
	Nodular cast iron	160-250	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.14 0.08-0.16 0.10-0.20	160(130-200)
N	Al alloy	60-110	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.10 0.05-0.14 0.08-0.16 0.10-0.20 0.12-0.24	300(250-350)

BORE MACHINING TOOLS

How to choose the right solid carbide reamers

Shape

Product type

Product name

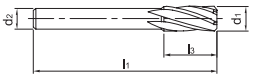
Product category

Reamers

Shape size

Solid carbide reamer with straight shank and right helical flute

3101H7



H7

Type	Basic dimension(mm)				Number of tooth	Recommended grade
	d_1	$d_{2(h7)}$	l_1	l_3		YK10F
3101H7-0400	4.0	3.55	56	20	4	☆
3101H7-0450	4.5	4.00	63	22	6	☆
3101H7-0500	5.0	4.00	63	22	6	☆
3101H7-0550	5.5	5.00	63	22	6	☆
3101H7-0600	6.0	5.00	63	22	6	☆
3101H7-0650	6.5	5.00	63	22	6	☆
3101H7-0700	7.0	6.30	71	25	6	☆
3101H7-0750	7.5	6.30	71	25	6	☆
3101H7-0800	8.0	6.30	71	25	6	☆
3101H7-0850	8.5	8.00	71	25	6	☆
3101H7-0900	9.0	8.00	71	25	6	☆
3101H7-0950	9.5	8.00	71	25	6	☆
3101H7-1000	10.0	8.00	71	25	6	☆
3101H7-1050	10.5	8.00	71	25	6	☆
3101H7-1100	11.0	10.00	80	28	6	☆
3101H7-1150	11.5	10.00	80	28	6	☆
3101H7-1200	12.0	10.00	80	28	6	☆
3101H7-1250	12.5	10.00	80	28	6	☆
3101H7-1300	13.0	10.00	80	28	6	☆
3101H7-1350	13.5	12.5	90	32	6	☆
3101H7-1400	14.0	12.5	90	32	6	☆
3101H7-1450	14.5	12.5	90	32	6	☆
3101H7-1500	15.0	12.5	90	32	6	☆
3101H7-1550	15.5	12.5	90	32	6	☆
3101H7-1600	16.0	12.5	90	32	6	☆
3101H7-1700	17.0	12.5	90	32	6	☆
3101H7-1800	18.0	16.00	100	36	6	☆
3101H7-1900	19.0	16.00	100	36	6	☆
3101H7-2000	20.0	16.00	100	36	6	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
YK10F							◎	◎	◎	◎	

Code key C103 Cutting parameters C107 Technical information C108-C110 Non-standard tailor made C111

Applicable workpiece material range

Hole precision class and shank type

Specification

Type, basic dimensions ,number of tooth and grade.

Code key, cutting parameter, technical information, non-standard tailor-made

BORE MACHINING TOOLS

Reamers

Solid carbide reamers overview

Name	Type	Shape	Diameter range	Workpiece material								Page	
				P		M	K	N		S	H	Specification	Cutting parameters
				Mild steel	Common steel	Stainless steel	Cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy	High hardness steel		
Right helical flute reamer	**3101H7**		Ø4-Ø20				◎	◎	◎			C104	C107
Straight flute reamer	**3102H7**		Ø4-Ø20				◎	◎	◎			C105	C107
Left helical flute reamer	**3103H7**		Ø4-Ø20				◎	◎	◎			C106	C107

◎Very suitable ○Suitable

Solid carbide reamers icons information

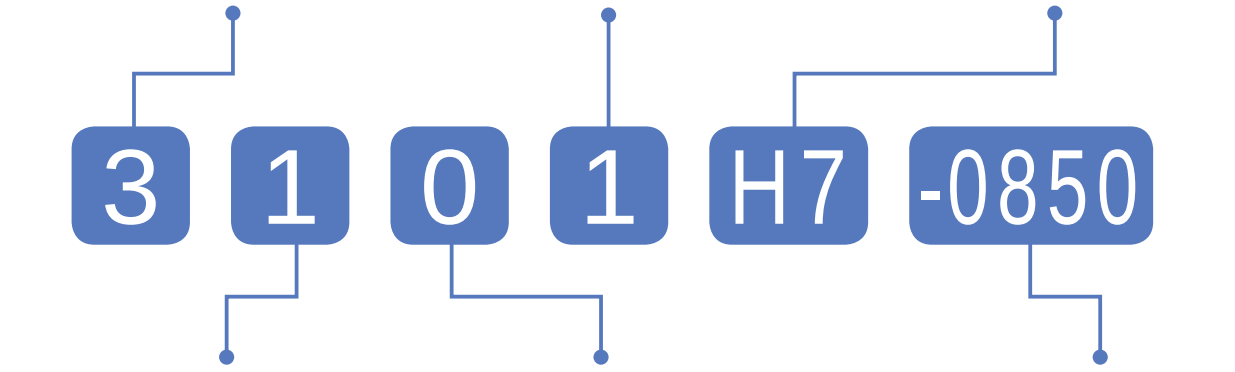
Precision class of reamed hole

H7 — The precision class of reamed hole reaches H7 specified in GB/T1800-1804

Shank type

Straight shank

Solid carbide reamer code key



Code	Description
3	Reamer

Tool type

Code	Description
1	Right chip flute
2	Straight flute
3	Left chip flute

Chip flute

Code	Description
H7	The precision class of reamed hole reaches H7 specified in GB/T1800-1804

Precision class of reamed hole

Shank type

Code	Description
1	Straight shank
2	Square straight shank as per din10
5	Straight shank as per din6535ha
9	Tapered shank

Mode of cooling

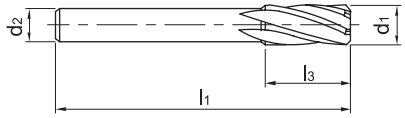
Code	Description
0	External coolant
1	Internal coolant

Specification

Code	Description
0850	Diameter is 8.5mm

Solid carbide reamer with straight shank and right helical flute

3101H7



H7

Type	Basic dimension(mm)				Number of tooth	Recommended grade
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3101H7-0650	6.5	5.00	63	22	6	☆
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3101H7-2000	20.0	16.00	100	36	6	☆

☆Recommended grade and produce according to order

Applicable material table

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Grade	Workpiece material										
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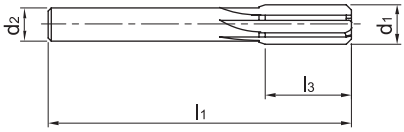
			~40HRC	~50HRC	~60HRC						
YK10F							◎	◎	◎	◎	

Code key C103 Cutting parameters C107 Technical information C108-C110 Non-standard tailor made C111

Solid carbide reamer with straight shank and flute

3102H7



H7

Type	Basic dimension(mm)				Number of tooth	Recommended grade
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3102H7-1200	12.0	10.00	80	28	6	☆
3102H7-1250	12.5	10.00	80	28	6	☆
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3102H7-1400	14.0	12.5	90	32	6	☆
3102H7-1450	14.5	12.5	90	32	6	☆
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3102H7-1550	15.5	12.5	90	32	6	☆
3102H7-1600	16.0	12.5	90	32	6	☆
3102H7-1700	17.0	12.5	90	32	6	☆
3102H7-1800	18.0	16.00	100	36	6	☆
3102H7-1900	19.0	16.00	100	36	6	☆
3102H7-2000	20.0	16.00	100	36	6	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
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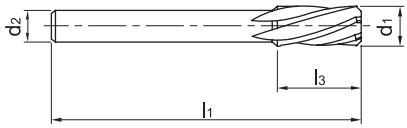
			~40HRC	~50HRC	~60HRC						
YK10F							◎	◎	◎	◎	

Code key C103 Cutting parameters C107 Technical information C108-C110 Non-standard tailor made C111

Solid carbide reamer with straight shank and left helical flute

3103H7



H7

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☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
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			~40HRC	~50HRC	~60HRC						
YK10F							◎	◎	◎	◎	

Code key C103 Cutting parameters C107 Technical information C108-C110 Non-standard tailor made C111

3101H7★3102H7★3103H7

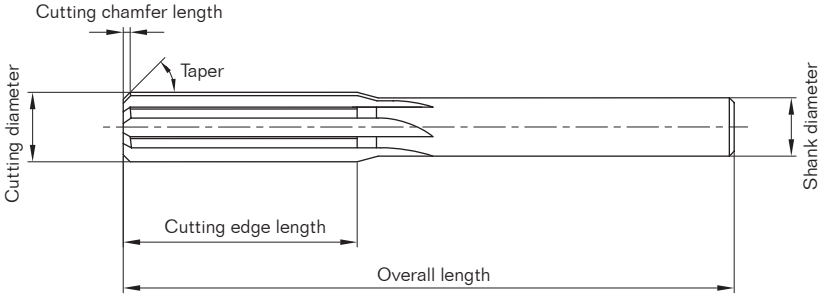
Workpiece material	Cast iron Nodular cast iron			Copper alloy			Casting aluminium alloy		
Cutting speed	8~16m/min			10~25m/min			15~30 m/min		
Diameter (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Allowance (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Allowance (mm)	Rotating speed (min^{-1})	Feed rate (mm/r)	Allowance (mm)
4	950	0.04~0.06	0.1~0.2	1600	0.04~0.06	0.1~0.2	2000	0.04~0.06	0.1~0.2
5	760	0.05~0.09	0.1~0.2	1300	0.05~0.09	0.1~0.2	1600	0.05~0.09	0.1~0.2
6	640	0.06~0.12	0.1~0.2	1050	0.06~0.12	0.1~0.2	1300	0.06~0.12	0.1~0.2
7	550	0.07~0.14	0.1~0.2	910	0.07~0.14	0.1~0.2	1150	0.07~0.14	0.1~0.2
8	480	0.08~0.16	0.1~0.2	800	0.08~0.16	0.1~0.2	1000	0.08~0.16	0.1~0.2
9	430	0.09~0.18	0.1~0.2	710	0.09~0.18	0.1~0.2	890	0.09~0.18	0.1~0.2
10	380	0.10~0.20	0.1~0.2	640	0.10~0.20	0.1~0.2	800	0.10~0.20	0.1~0.2
11	350	0.11~0.22	0.1~0.2	580	0.11~0.22	0.1~0.2	720	0.11~0.22	0.1~0.2
12	320	0.12~0.24	0.1~0.2	530	0.12~0.24	0.1~0.2	660	0.12~0.24	0.1~0.2
13	290	0.13~0.26	0.1~0.2	490	0.13~0.26	0.1~0.2	610	0.13~0.26	0.1~0.2
14	270	0.14~0.28	0.1~0.2	460	0.14~0.28	0.1~0.2	570	0.14~0.28	0.1~0.2
15	250	0.15~0.30	0.1~0.2	430	0.15~0.30	0.1~0.2	530	0.15~0.30	0.1~0.2
16	240	0.16~0.32	0.1~0.2	400	0.16~0.32	0.1~0.2	500	0.16~0.32	0.1~0.2
17	225	0.18~0.34	0.1~0.2	380	0.18~0.34	0.1~0.2	470	0.18~0.34	0.1~0.2
18	210	0.20~0.36	0.1~0.2	350	0.20~0.36	0.1~0.2	440	0.20~0.36	0.1~0.2
19	200	0.22~0.38	0.1~0.2	340	0.22~0.38	0.1~0.2	420	0.22~0.38	0.1~0.2
20	190	0.24~0.40	0.1~0.2	320	0.24~0.40	0.1~0.2	400	0.24~0.40	0.1~0.2

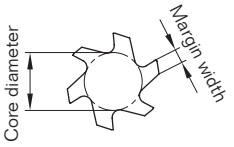
1.Please select the holder with high rigidity and precision.

2.Make sure supply sufficient coolant.

3.Please adjust cutting parameters according workpiece and machine rigidity.

Terminology of reamer

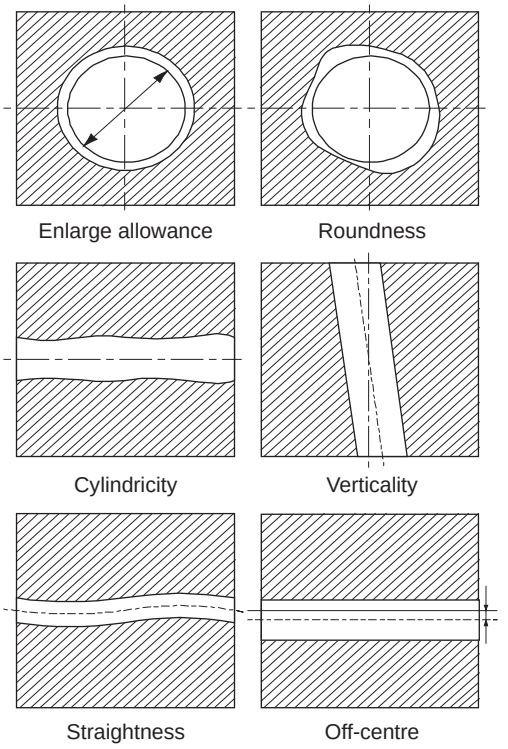




Reaming is the semi-finishing and finishing of an existing hole to achieve precise size, high surface quality, perfect roundness and cylindricity etc.

In order to achieve precise hole in reaming process, it must to determine the reamer diameter correctly. Therefore, it is need to consider allowance determined by workpiece material and machining conditions. In addition, it is also need to select the cutting conditions correctly except using high precision reamer to achieve good surface quality.

The reaming precision is mainly decided by diameter and radial run-out. With respect to cutting condition, it is better to select low speed cutting considering to improve machining precision, but it also must take upper limit of machining efficiency into consideration.



Common problems and solutions for reaming

Common problems	Solutions
Oversize holes	1.Reduce diameter of reamer. 2.The center of reamer is not in alignment with hole center, adjust the concentricity of hole and reamer. 3.Large radial run-out of reamer, good radial run-out is a key to successful reaming 4.Scratches on reamer shank. 5.When using bush and bush, ensure shank is clean. 6.Select a suitable coolant. 7.Adjust cutting parameters.
Smaller holes	1.Increase diameter of reamer. 2.Reduce rotating speed. 3.Reduce the margin width. 4.Excessive tool abrasion, please conduct cutting after regrinding. 5.Thermal expansion coefficient of workpiece is too large, please keep it cooled enough.
Poor hole roundness and straightness	1.Ensure better roundness of reamer chamfer. 2.Low rigidity make the overhang as short as possible if no inference. 3.Check radial run-out after clamping reamer. 4.Adjust the concentricity of hole and reamer. 5.Ensure reaming allowance equality.
Poor hole surface quality	1.The hole surface roughness of entering part is bad. 2.Reduce rotating speed. 3.Ensure correct reaming allowance, too large or too small both will result bad surface roughness. 4.Select the reamer with large chip pocket, avoid chip jamming. 5.Increase clearance angle of reamer entering part . 6.Check whether there are built-up on chamfer and margin land. 7.Increase the rigidity of machine, holder and reamer . 8.Ensure whether the type of reamer head is suitable for the workpiece. 9.Increase the margin width and land width appropriately .
Hole precision is worse	1.In return pass, the reamer should be pulled out of hole when rotating as the same direction before. Opposite rotation must be prohibited. 2.Reduce rotating speed. 3.Select the reamer with more lips. 4.Increase the margin width appropriately, enhance its guiding performance and extrusion effect. 5.Improve reamer lubricating property by surface treatment. 6.Select a suitable coolant.

Common problems and solutions for reaming

Common problems	Solutions
Reamer breakage, thermal damage	1.The guiding hole is defective before reaming, such as linearity in not good. 2.Adjust machining allowance to avoid tool breakage caused by too large allowance. 3.If the chip removal is not fluent, select a reamer with larger chip pocket. 4.Ensure supply insufficient coolant. 5.Adjust rotating speed and feed speed appropriately. 6.Increase the rigidity of machine, holder and reamer . 7.Improve the sharpness of reamer, make cutting light and fast. 8.Excessive abrasion on cutting edge, reach or surpass tool life, recommend to change tool or regrind.
Damage on reamer shank	1.Check whether the shank hardness is enough, too low hardness will cause deformation, too high hardness may cause breakage. 2.Check the conjunction of holder and bush, don't use the defective holder.
Shorter durability	1.Enhance reamer's cutting edge hardness . 2.Select the reamer produced by advanced material. 3.Check the coolant. 4.Adopt surface treatment for reamer such as nitride process. 5.Change the straight flute to helical flute. 6.Check all factors affecting machining precision.
Scratches on hole surface	1.Check no built-up on reamer surface. 2.Improve workpiece holding.
Trumpet-shaped entry hole	1.Improve workpiece holding. 2.Check radial run-out after clamping reamer. 3.The center of reamer is not in alignment with hole center, adjust the concentricity of hole and reamer.
Oversize hole	1.The center of reamer is not in alignment with hole center, adjust the concentricity of hole and reamer. 2.Improve workpiece holding.

Customer name:

Fax：

Tel：

E-MAIL:

ZCC·CT
Huanghe Southern Road, Tianyuan Zone,
Zhuzhou, Hunan province, China.
Fax：0733-2882721 2885420 2887878
Postcode：412007 E-mail:zccct@zccct.com

Hole data and workpiece

Hole shape: ☐ ☐

Through hole Blind hole

Hole diameter= mm

hole tolerance=

Hole depth= mm

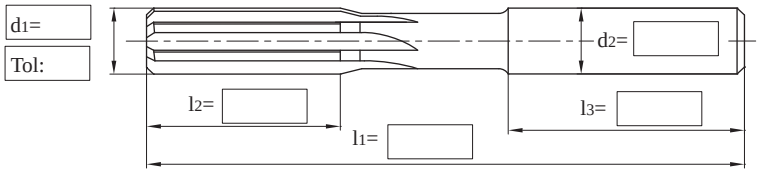
☐ Grey cast iron
☐ Nodular cast iron
☐ Aluminum alloy
☐ Silicon aluminium alloy Si＜10%
☐ Silicon aluminium alloy Si≥10%

Grade of workpiece material

Tensile strength= N/mm^2

Hardness= unit（HRC,HB etc）

Tool information

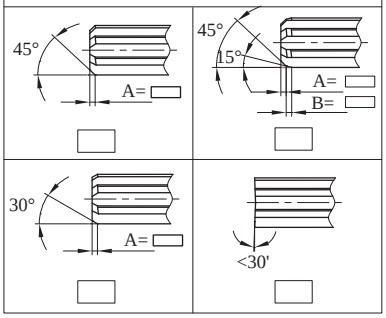


Tool rotating direction	
Right-hand	☐
Straight flute	☐
Left-hand	☐

Coolant	
☐	External coolant
☐	Internal coolant

Coated	
Yes	☐
No	☐

Type of approach angle



DIN6535

Shank type

☐ Form HA
☐ Form HB
☐ Form HE
☐ Common straight shank
☐ Shank with tang DIN 1809
☐ Morse taper shank MT ☐
Special shape

Note:

Order quantity: pc

Delivery date(Y/M/D):

Quotation by ZCCCT

Confirmed by customer:

Date:(Y/M/D):

BORE MACHINING TOOLS

How to choose the right solid carbide threading cutter

Shape

Product type

Product name

Product category

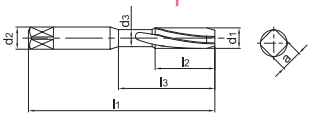
Threading cutter

Application

Shape size

Right helical-flute taps with square head and straight shank

4201C For cast iron



ISO 2 (6H)

Type	Basic dimension(mm)									Number of tooth	Recommended grade	
	d_1	P	d_2	d_3	l_1	l_2	l_3	a×a	Thread profile		KTG202	YK20F
4201C -M4	M4	0.7	4.5	3.1	63	13	21	3.4	60°	3	☆	☆
4201C –M5	M5	0.8	6.0	4.0	70	16	25	4.9	60°	3	☆	☆
4201C –M6	M6	1.0	6.0	4.7	80	19	30	4.9	60°	3	☆	☆
4201C –M8	M8	1.25	8.0	6.4	90	22	35	6.2	60°	3	☆	☆
4201C –M10	M10	1.5	10.0	8.1	100	24	39	8.0	60°	3	☆	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material									
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KTG202							◎	◎			
YK20F							◎	◎			

Code key C115 Cutting parameters C121 Technical information C123 Non-standard tailor made C124

Specification

Type, basic dimensions ,number of tooth and grade.

Applicable workpiece material range

Thread profile angle, shank type, precision class

Code key, cutting parameter, technical information, non-standard tailor-made

BORE MACHINING TOOLS

Threading cutter

Threading cutter overview

name	type	shape	Diameter range	Workpiece material							Page	
				P		M	K	N	S	H	Specification	Cutting parameters
				Mild steel	Common steel	Stainless steel	Cast iron	Aluminum alloy	Heat resistant alloy	High hardness steel		
Helical-flute tap	**4201C**		M4-M10				◎				C116	C121
Helical-flute tap	**4201A**		M4-M10					◎			C117	C121
Straight-flute tap	**4202C**		M4-M10				◎				C118	C121
Straight-flute tap	**4202A**		M4-M10					◎			C119	C121
Threading end mills	**4111**		M5-M20	○	◎		◎	◎			C120	C121

◎Very suitable ○Suitable

Icons information

Shank type

Straight shank

Square straight shank as per DIN10

Thread profile angle of tap

Indicate 60°

Precision class of screw thread

Precision class of screw thread

Threading cutter code key

Code	Description
4	Threading cutter

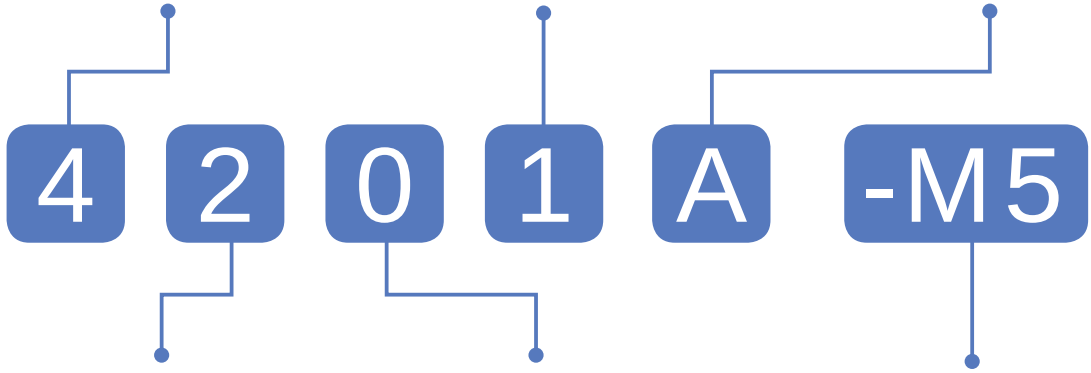
Tool type

Code	Description
1	Right chip flute
2	Straight flute
3	Left chip flute

Chip flute

Code	Description
A	Aluminum alloy
C	Cast iron

Workpiece material



Shank type

Code	Description
1	Straight shank
2	Square straight shank as per din10
5	Straight shank as per din6535ha
9	Tapered shank

Type of function

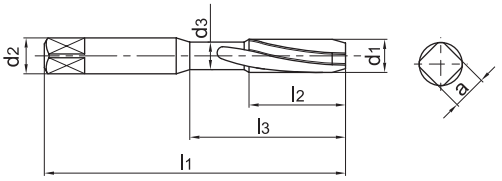
Code	Description
0	Tap
1	Thread milling cutter

Specification

Code	Description
M5	Nominal diameter of standard threading cutters is M5

Right helical-flute taps with square head and straight shank

4201C For cast iron



60° ISO 2 (6H)

Type	Basic dimension(mm)									Number of teeth	Recommended grade	
	d_1	P	d_2	d_3	l_1	l_2	l_3	a×a	Thread profile		KTG202	YK20F
4201C -M4	M4	0.7	4.5	3.1	63	13	21	3.4	60°	3	☆	☆
4201C –M5	M5	0.8	6.0	4.0	70	16	25	4.9	60°	3	☆	☆
4201C –M6	M6	1.0	6.0	4.7	80	19	30	4.9	60°	3	☆	☆
4201C –M8	M8	1.25	8.0	6.4	90	22	35	6.2	60°	3	☆	☆
4201C –M10	M10	1.5	10.0	8.1	100	24	39	8.0	60°	3	☆	☆

☆Recommended grade and produce according to order

Applicable material table

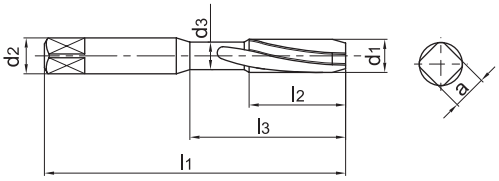
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KTG202							◎	◎			
YK20F							◎	◎			

Code key C115 Cutting parameters C121 Technical information C122 Non-standard tailor made C123

Right helical-flute taps with square head and straight shank

4201A For aluminum



60° ISO 2 (6H)

Type	Basic dimension(mm)									Number of teeth	Recommended grade
	d_1	P	d_2	d_3	l_1	l_2	l_3	a×a	Thread profile		YK20F
4201A -M4	M4	0.7	4.5	3.1	63	13	21	3.4	60°	3	☆
4201A –M5	M5	0.8	6.0	4.0	70	16	25	4.9	60°	3	☆
4201A –M6	M6	1.0	6.0	4.7	80	19	30	4.9	60°	3	☆
4201A –M8	M8	1.25	8.0	6.4	90	22	35	6.2	60°	3	☆
4201A –M10	M10	1.5	10.0	8.1	100	24	39	8.0	60°	3	☆

☆Recommended grade and produce according to order

Applicable material table

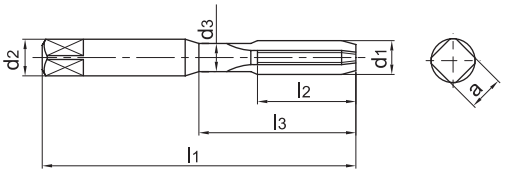
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
YK20F									◎		

Code key C115 Cutting parameters C121 Technical information C122 Non-standard tailor made C123

Straight-flute taps with square head and straight shank

4202C For cast iron



60° ISO 2 (6H)

Type	Basic dimension(mm)									Number of teeth	Recommended grade	
	d_1	P	d_2	d_3	l_1	l_2	l_3	a×a	Thread profile		KTG202	YK20F
4202C -M4	M4	0.7	4.5	3.1	63	13	21	3.4	60°	3	☆	☆
4202C –M5	M5	0.8	6.0	4.0	70	16	25	4.9	60°	3	☆	☆
4202C –M6	M6	1.0	6.0	4.7	80	19	30	4.9	60°	3	☆	☆
4202C –M8	M8	1.25	8.0	6.4	90	22	35	6.2	60°	3	☆	☆
4202C –M10	M10	1.5	10.0	8.1	100	24	39	8.0	60°	3	☆	☆

☆Recommended grade and produce according to order

Applicable material table

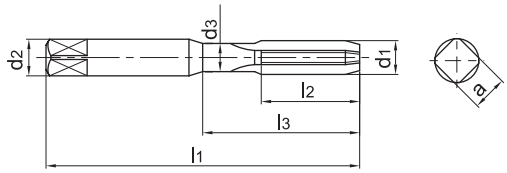
◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KTG202							◎	◎			
YK20F							◎	◎			

Code key C115 Cutting parameters C121 Technical information C122 Non-standard tailor made C123

Straight-flute taps with square head and straight shank

4202A For aluminum



Type	Basic dimension(mm)									Number of teeth	Recommended grade
	d_1	P	d_2	d_3	l_1	l_2	l_3	a×a	Thread profile		YK20F
4202A -M4	M4	0.7	4.5	3.1	63	13	21	3.4	60°	3	☆
4202A –M5	M5	0.8	6.0	4	70	16	25	4.9	60°	3	☆
4202A –M6	M6	1.0	6.0	4.7	80	19	30	4.9	60°	3	☆
4202A –M8	M8	1.25	8.0	6.4	90	22	35	6.2	60°	3	☆
4202A –M10	M10	1.5	10.0	8.1	100	24	39	8.0	60°	3	☆

☆Recommended grade and produce according to order

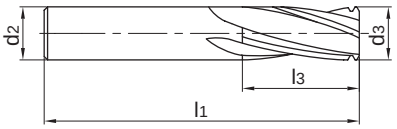
Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
YK20F									◎		

Code key C115 Cutting parameters C121 Technical information C122 Non-standard tailor made C123

Thread milling cutter
4111



Type	Basic dimension(mm)						Number of teeth	Recommended grade	
	d_1	P	d_2	l_1	l_3	d_3		KTG303	YK30F
4111-M5	M5	0.8	6	42	8.0	3.6	3	☆	☆
4111-M6	M6	1.0	6	57	9.0	4.0	3	☆	☆
4111-M8	M8	1.25	6	57	12.5	5.0	3	☆	☆
4111-M10	M10	1.5	6	57	15.0	5.9	4	☆	☆
4111-M12	M12	1.75	8	63	19.25	7.9	4	☆	☆
4111-M16	M16	2.0	10	72	24.0	9.9	4	☆	☆
4111-M20	M20	2.5	12	83	30.0	11.9	4	☆	☆

☆Recommended grade and produce according to order

Applicable material table

◎Very suitable ○Suitable

Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KTG303	○	◎	○				◎	◎	◎		
YK30F							◎		◎		

Code key C115 Cutting parameters C121 Technical information C122 Non-standard tailor made C123

Tap

Workpiece material	Cutting speed (m/min)		
	4201C，4202C		4201A，4202A
	YK20F	KTG202	YK20F
Cast iron	10~15	20~40	---
Nodular cast iron	7~12	15~30	---
Aluminum alloy	---	---	10~25
Casting aluminium alloy＜Si10%	---	---	10~20
Casting aluminium alloy≥Si10%	---	---	10~15

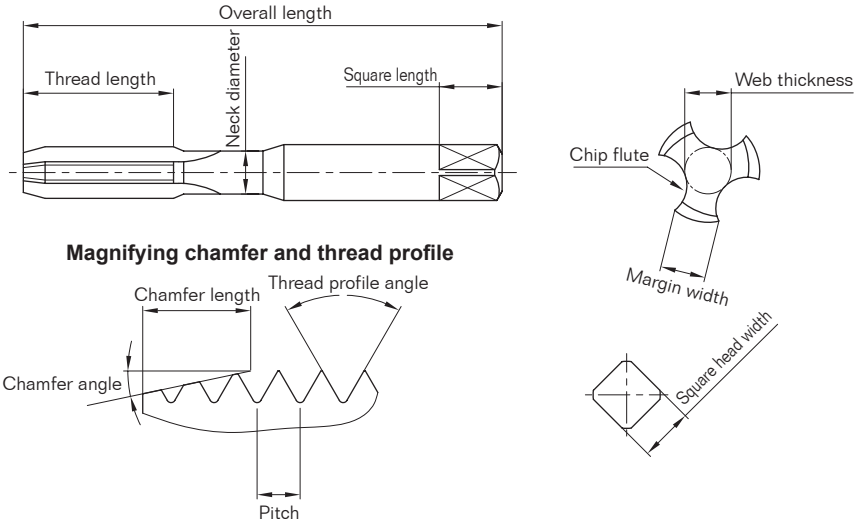
1.Threading is a complex machining, suitable coolant must be used. Using oil coolant is recommended for the cutting conditions above.
2.The table above is a general selecting standard, change it according to various cutting conditions.
3.Please adjust the cutting parameter appropriately according to system rigidity.

4111-Thread milling cutter

Workpiece material	carbon steel ~750N/mm²		alloy steel ~30HRC		Cast iron Nodular cast iron		Aluminum alloy		casting aluminium alloy			
									＜Si 10%		≥Si 10%	
Cutting speed	40~80m/min		20~40m/min		40~70m/min		40~80m/min		60~140m/min		60~130m/min	
Diameter (mm)	Rotating speed (min-1)	Feed rate per tooth (mm/z)	Rotating speed (min-1)	Feed rate per tooth (mm/z)	Rotating speed (min-1)	Feed rate per tooth (mm/z)	Rotating speed (min-1)	Feed rate per tooth (mm/z)	Rotating speed (min-1)	Feed rate per tooth (mm/z)	Rotating speed (min-1)	Feed rate per tooth (mm/z)
M5	5300	0.01~0.11	2800	0.01~0.03	5300	0.03~0.10	5300	0.03~0.10	8400	0.03~0.13	7500	0.03~0.10
M6	4800	0.01~0.11	2400	0.01~0.03	4800	0.03~0.10	4800	0.03~0.10	8000	0.03~0.13	7200	0.03~0.10
M8	3850	0.01~0.11	1900	0.01~0.03	3850	0.03~0.10	3850	0.03~0.10	6400	0.03~0.13	5700	0.03~0.10
M10	3200	0.01~0.11	1600	0.01~0.03	3200	0.03~0.10	3200	0.03~0.10	5300	0.03~0.13	4800	0.03~0.10
M12	2400	0.01~0.11	1200	0.01~0.03	2400	0.03~0.10	2400	0.03~0.10	4000	0.03~0.13	3600	0.03~0.10
M16	1900	0.01~0.11	960	0.01~0.03	1900	0.03~0.10	1900	0.03~0.10	3200	0.03~0.13	2900	0.03~0.10
M20	1600	0.01~0.11	800	0.01~0.03	1600	0.03~0.10	1600	0.03~0.10	2650	0.03~0.13	2400	0.03~0.10

1.Water-soluble coolant is recommended for the cutting conditions above.
2.Please adjust the cutting parameter appropriately according to system rigidity.
3.The cutting conditions above is set on the basis of coated grade KTG303. When use uncoated grade YK30F, please reduce the cutting speed and feed rate to the 50%～70% of speed stated above.

Terminology of tap

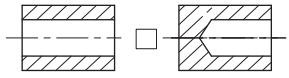


Different tap's chip flute and features

Type of chip flute	Feature	Application
Helical flute tap 	● Helical flute ● Tap blind hole to its flat bottom ● No chips remain ● Good entering performance ● Penetrate to pre-hole easily	● Material generating long curled chips ● Blind hole ● The hole with axial slot on inner wall
Straight flute tap 	● Straight flute ● High cutting edge strength ● Easy to regrind ● Easy selection of chamfer length	● For machining high hardness material ● Material generating powdered form chips ● Tap short through and blind hole ● Material easy to generate abrasion

Customer name: Fax： Tel： E-MAIL:	ZCC·CT Huanghe Southern Road, Tianyuan Zone, Zhuzhou, Hunan province, China. Fax：0733-2882721 2885420 2887878 Postcode：412007 E-mail:zccct@zccct.com

Hole data and workpiece

Hole shape: ☐  ☐
Through hole Blind hole

Thread precision class: ☐

Tapping length= ☐ mm

Status of hole: ☐ Pre-drilled hole ☐ Casting-mold hole

☐ Grey cast iron
☐ Nodular cast iron
☐ Aluminum alloy
☐ Silicon aluminium alloy Si＜10%
☐ Silicon aluminium alloy Si≥10%

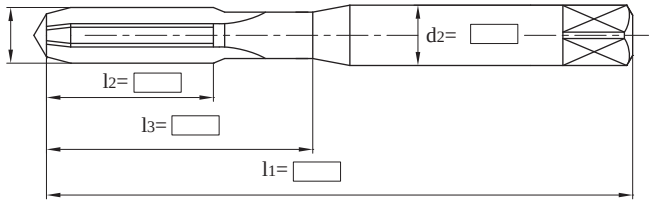
Grade of workpiece material ☐

Tensile strength= ☐ N/mm^2

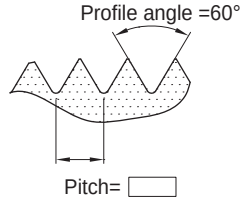
Hardness= ☐ unit（HRC,HB etc）

Tool information

Nominal diameter= ☐



Magnified thread profile



Tool rotating direction
☐ 
☐ 

Coolant
☐ External coolant
☐ Internal coolant

Coated	
Yes	☐
No	☐

Note:

Order quantity:	pc	Delivery date(Y/M/D):
Quotation by ZCCCT		Confirmed by customer:
		Date:(Y/M/D):