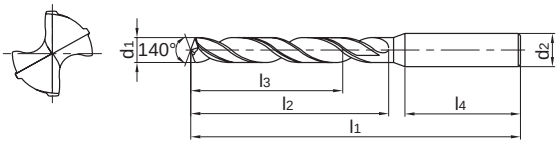
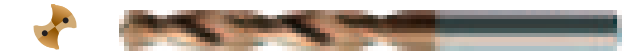
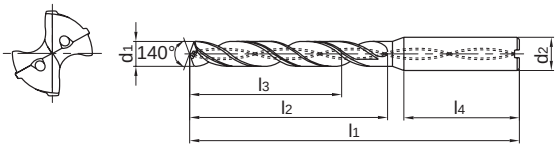
GD series General machining


External coolant Straight shank




Internal coolant Straight shank



● Suitable for high efficiency drilling in a variety of materials e.g steel, stainless steel, cast iron.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Suitable for thread		Grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	cutting taps / tread milling cutters	forming taps	KDG3013
					$d_2(h_6)$	l_1	l_2	l_3	l_4			
18.3	3	External coolant	Straight shank	GD03-1830	20	131	79	55	50		3/4-16UNF	●
	5			GD05-1830	20	153	101	77	50			●
	3	Internal coolant		GD03C-1830	20	131	79	55	50			●
	5			GD05C-1830	20	153	101	77	50			●
18.5	3	External coolant		GD03-1850	20	131	79	55	50			●
	5			GD05-1850	20	153	101	77	50			●
	3	Internal coolant		GD03C-1850	20	131	79	55	50			●
	5			GD05C-1850	20	153	101	77	50			●
18.8	3	External coolant		GD03-1880	20	131	79	55	50			●
	5			GD05-1880	20	153	101	77	50		M20×2.5	●
	3	Internal coolant		GD03C-1880	20	131	79	55	50			●
	5			GD05C-1880	20	153	101	77	50			●
19.0	3	External coolant		GD03-1900	20	131	79	55	50			●
	5			GD05-1900	20	153	101	77	50			●
	3	Internal coolant		GD03C-1900	20	131	79	55	50			●
	5			GD05C-1900	20	153	101	77	50			●
19.5	3	External coolant		GD03-1950	20	131	79	55	50			●
	5			GD05-1950	20	153	101	77	50	M22×2.5		●
	3	Internal coolant		GD03C-1950	20	131	79	55	50	7/8-9UNC		●
	5			GD05C-1950	20	153	101	77	50			●
19.8	3	External coolant		GD03-1980	20	131	79	55	50			●
	5			GD05-1980	20	153	101	77	50			●
	3	Internal coolant		GD03C-1980	20	131	79	55	50			●
	5			GD05C-1980	20	153	101	77	50			●
20.0	3	External coolant		GD03-2000	20	131	79	55	50			●
	5			GD05-2000	20	153	101	77	50	M22×2		●
	3	Internal coolant		GD03C-2000	20	131	79	55	50			●
	5			GD05C-2000	20	153	101	77	50			●

● Stock available ○ Make-to-order

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Suitable for thread		Grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	cutting taps / tread milling cutters	forming taps	KDG3013
					$d_2(h_6)$	l_1	l_2	l_3	l_4			
20.4	3	External coolant	Straight shank	GD03-2040	20	141	86	60	50	7/8-14UNF		○
	5			GD05-2040	20	167	112	85	50			○
	3	Internal coolant		GD03C-2040	20	141	86	60	50			○
	5			GD05C-2040	20	167	112	85	50			○
20.5	3	External coolant		GD03-2050	20	141	86	60	50			○
	5			GD05-2050	20	167	112	85	50			○
	3	Internal coolant		GD03C-2050	20	141	86	60	50			○
	5			GD05C-2050	20	167	112	85	50			○
21.0	3	External coolant		GD03-2100	20	141	86	60	50	M24×3	7/8-9UNC	○
	5			GD05-2100	20	167	112	85	50			○
	3	Internal coolant		GD03C-2100	20	141	86	60	50			○
	5			GD05C-2100	20	167	112	85	50			○
21.4	3	External coolant		GD03-2140	20	141	86	60	50		7/8-14UNF	○
	5			GD05-2140	20	167	112	85	50			○
	3	Internal coolant		GD03C-2140	20	141	86	60	50			○
	5			GD05C-2140	20	167	112	85	50			○
21.5	3	External coolant		GD03-2150	20	141	86	60	50			○
	5			GD05-2150	20	167	112	85	50			○
	3	Internal coolant		GD03C-2150	20	141	86	60	50			○
	5			GD05C-2150	20	167	112	85	50			○
22.0	3	External coolant		GD03-2200	20	141	86	60	50	M24×2		○
	5			GD05-2200	20	167	112	85	50			○
	3	Internal coolant		GD03C-2200	20	141	86	60	50			○
	5			GD05C-2200	20	167	112	85	50			○
22.25	3	External coolant		GD03-2225	25	153	95	65	56	1-8UNC		○
	5			GD05-2225	25	184	126	98	56			○
	3	Internal coolant		GD03C-2225	25	153	95	65	56			○
	5			GD05C-2225	25	184	126	98	56			○
22.5	3	External coolant		GD03-2250	25	153	95	65	56			○
	5			GD05-2250	25	184	126	98	56			○
	3	Internal coolant		GD03C-2250	25	153	95	65	56			○
	5			GD05C-2250	25	184	126	98	56			○
23.0	3	External coolant		GD03-2300	25	153	95	65	56	M25×2		○
	5			GD05-2300	25	184	126	98	56			○
	3	Internal coolant		GD03C-2300	25	153	95	65	56			○
	5			GD05C-2300	25	184	126	98	56			○

Note: For drilling depth (l/d) of 8 ,namely GD08C series, tolerance of shank diameter is h_5.

● Stock available ○ Make-to-order

Applicable material table

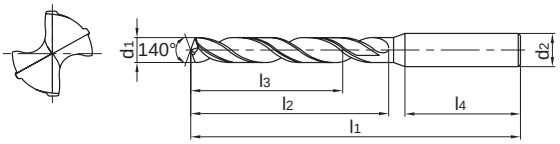
◎Very suitable ○Suitable

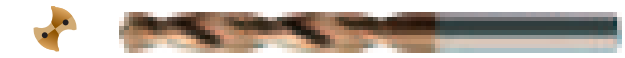
Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
KDG3013	○	◎	◎			○	◎	◎			○

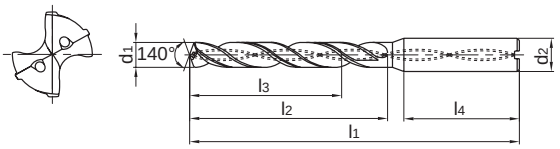
Code key C6
Cutting parameters C74–C76
Technical information C80–C86

GD series General machining


External coolant Straight shank




Internal coolant Straight shank



● Suitable for high efficiency drilling in a variety of materials e.g steel, stainless steel, cast iron.

Drill diameter $d_1(m_7)$	Drilling depth (l/d)	Cooling mode	Shank type	Type	Basic dimension(mm)					Suitable for thread		Grade
					Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length	cutting taps / tread milling cutters	forming taps	KDG3013
					$d_2(h_6)$	l_1	l_2	l_3	l_4			
23.25	3	External coolant	Straight shank	GD03-2325	25	153	95	65	56	1-12UNF		○
	5			GD05-2325	25	184	126	98	56			○
	3	Internal coolant		GD03C-2325	25	153	95	65	56			○
	5			GD05C-2325	25	184	126	98	56			○
23.5	3	External coolant		GD03-2350	25	153	95	65	56			○
	5			GD05-2350	25	184	126	98	56			○
	3	Internal coolant		GD03C-2350	25	153	95	65	56			○
	5			GD05C-2350	25	184	126	98	56			○
24.0	3	External coolant		GD03-2400	25	153	95	65	56	M27×3	1-8UNC	○
	5			GD05-2400	25	184	126	98	56			○
	3	Internal coolant		GD03C-2400	25	153	95	65	56			○
	5			GD05C-2400	25	184	126	98	56			○
24.5	3	External coolant		GD03-2450	25	153	95	65	56		1-12UNF	○
	5			GD05-2450	25	184	126	98	56			○
	3	Internal coolant		GD03C-2450	25	153	95	65	56			○
	5			GD05C-2450	25	184	126	98	56			○
25.0	3	External coolant		GD03-2500	25	153	95	65	56	M27×2 11/8-7UNC		○
	5			GD05-2500	25	184	126	98	56			○
	3	Internal coolant		GD03C-2500	25	153	95	65	56			○
	5			GD05C-2500	25	184	126	98	56			○

Note: For drilling depth (l/d) of 8 ,namely GD08C series, tolerance of shank diameter is h_5.

● Stock available ○ Make-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						
KDG3013	○	◎	◎			○	◎	◎			○

Code key C6
Cutting parameters C74–C76
Technical information C80–C86

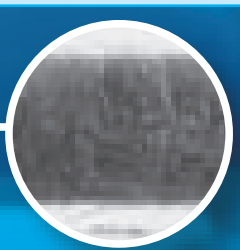
Achieving the optimization of tool structure through analysis of simulated cutting.

Design with change parameter helical flute, good rigidity and chip removal capability.

Double special guiding margin, more credible guiding and more stable machining.

Unique cutting edge design, good chip breaking capability even for sticky, softer materials, high versatility.

Special nano structure coating with better self lubricating capability and superb wear resistance.

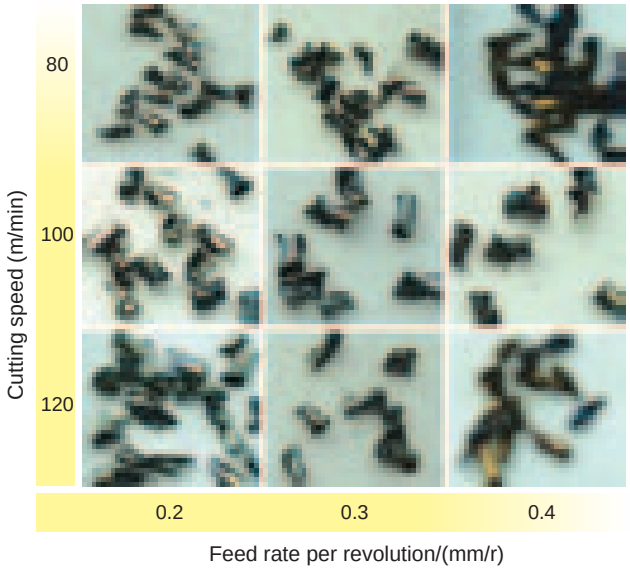


1588SL series deep hole twist drills

1588SL seriesdeep hole twist drills

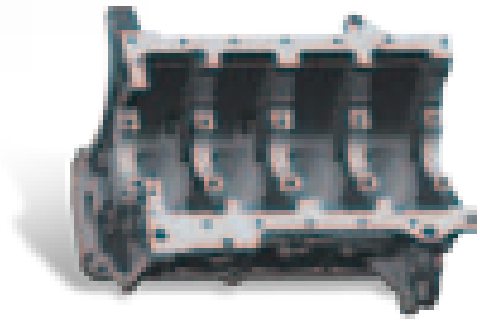
Outstandingly chip breaking capability

Work piece: crank shaft
Work piece material: 40Cr
Machining area: inclined oil hole
Tool type: 1588SL20C-0690/KDG303
Cutting parameters: V_c =80~120m/min
f_r=0.2~0.4mm/r
Cooling system: Water soluble liquid
Drilling depth: 105mm



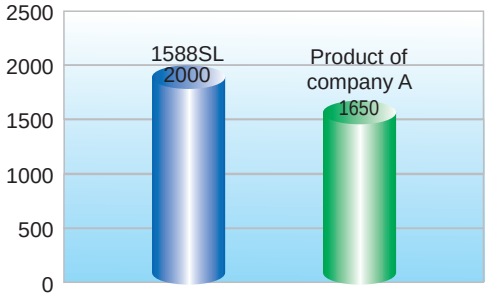
Good chip breaking capability and stable machining with different cutting speed and feed rate.

Extremely high efficiency and long tool life



Work piece: cylinder
Work material: HT300
Machined area: crank shaft joint surface drilling
Drilling depth: 30mm
Tool type: 1588SL12C-0850/KDG303
Recommend parameters: Vc=80m/min f_r=0.2mm/r
Cooling system: water-soluble liquid

Comparison of tool life(number of machined holes)



Comparison of tool life(tool wear)

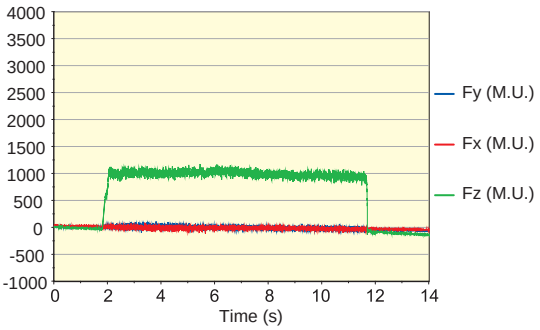
1588SL(regular wear)

Product of
company A(falling)

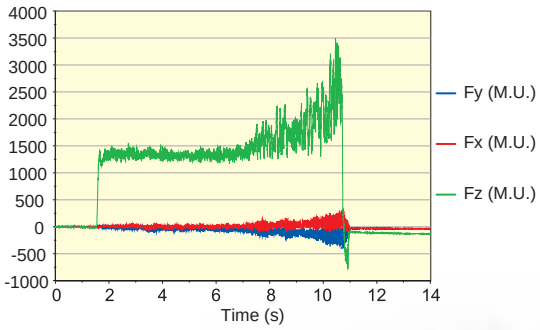
Good cutting performance

Tool type: 1588SL12C-0850/KDG303
Feed rate: 0.2mm/r Drilling depth: 72mm
Work material: 42CrMo(HB250)
Cooling system: Emulsified liquid
Cutting speed: 80m/min
Machine equipment: Vertical machining center

Cutting force of Product of company A



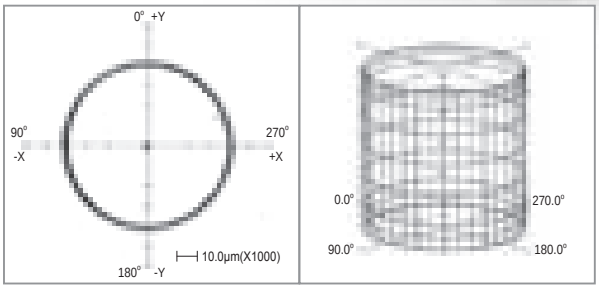
Cutting force of 1588SL



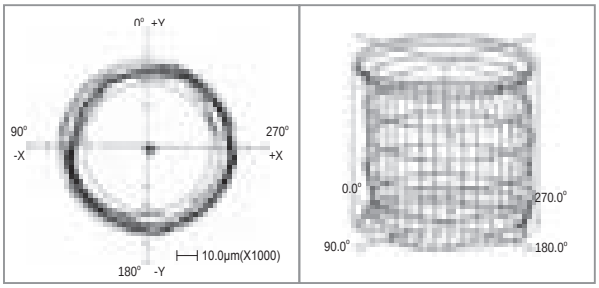
Stable machining precision

Workpiece: Die
Machined materials: 738H
Machined area: Hole of sidewall
Drilling depth: 70mm
Tool type: 1588SL12C-0600/KDG303
Recommended parameters: Vc=85m/min, f_r=0.2mm/r
Cooling system: Water-soluble liquid

Comparison of Machined Hole's Accuracy



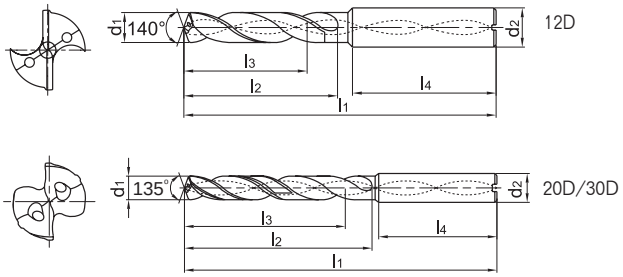
1588SL



Product of company A

SL series Deep-hole machining

Internal coolant　　Straight shank



● Suitable for deep-hole drilling of steel，cast iron etc.

Drill diameter d1 12D(m7) 20D/30D(h7)	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			d2(h5)	l1	l2	l3	l4
3.0	12	1588SL12C-0300	6	90	50	40	36
	20	1588SL20C-0300	6	110	70	62	36
	30	1588SL30C-0300	6	140	100	92	36
3.1	12	1588SL12C-0310	6	90	50	40	36
	20	1588SL20C-0310	6	123	83	72	36
	30	1588SL30C-0310	6	160	120	108	36
3.2	12	1588SL12C-0320	6	90	50	40	36
	20	1588SL20C-0320	6	123	83	72	36
	30	1588SL30C-0320	6	160	120	108	36
3.3	12	1588SL12C-0330	6	90	50	40	36
	20	1588SL20C-0330	6	123	83	72	36
	30	1588SL30C-0330	6	160	120	108	36
3.4	12	1588SL12C-0340	6	90	50	40	36
	20	1588SL20C-0340	6	123	83	72	36
	30	1588SL30C-0340	6	160	120	108	36
3.5	12	1588SL12C-0350	6	90	50	40	36
	20	1588SL20C-0350	6	123	83	72	36
	30	1588SL30C-0350	6	160	120	108	36
3.6	12	1588SL12C-0360	6	90	50	40	36
	20	1588SL20C-0360	6	136	96	84	36
	30	1588SL30C-0360	6	176	136	124	36
3.7	12	1588SL12C-0370	6	90	50	46	36
	20	1588SL20C-0370	6	136	96	84	36
	30	1588SL30C-0370	6	176	136	124	36
3.8	12	1588SL12C-0380	6	90	50	46	36
	20	1588SL20C-0380	6	136	96	84	36
	30	1588SL30C-0380	6	176	136	124	36
3.9	12	1588SL12C-0390	6	90	50	46	36
	20	1588SL20C-0390	6	136	96	84	36
	30	1588SL30C-0390	6	176	136	124	36
4.0	12	1588SL12C-0400	6	102	64	56	36
	20	1588SL20C-0400	6	136	96	84	36
	30	1588SL30C-0400	6	176	136	124	36
4.1	12	1588SL12C-0410	6	102	64	56	36
	20	1588SL20C-0410	6	148	108	96	36
	30	1588SL30C-0410	6	192	152	140	36

Drill diameter d1 12D(m7) 20D/30D(h7)	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			d2(h5)	l1	l2	l3	l4
4.2	12	1588SL12C-0420	6	102	64	56	36
	20	1588SL20C-0420	6	148	108	96	36
	30	1588SL30C-0420	6	192	152	140	36
4.3	12	1588SL12C-0430	6	102	64	56	36
	20	1588SL20C-0430	6	148	108	96	36
	30	1588SL30C-0430	6	192	152	140	36
4.4	12	1588SL12C-0440	6	102	64	56	36
	20	1588SL20C-0440	6	148	108	96	36
	30	1588SL30C-0440	6	192	152	140	36
4.5	12	1588SL12C-0450	6	102	64	56	36
	20	1588SL20C-0450	6	148	108	96	36
	30	1588SL30C-0450	6	192	152	140	36
4.6	12	1588SL12C-0460	6	102	64	56	36
	20	1588SL20C-0460	6	158	118	106	36
	30	1588SL30C-0460	6	208	168	156	36
4.7	12	1588SL12C-0470	6	102	64	56	36
	20	1588SL20C-0470	6	158	118	106	36
	30	1588SL30C-0470	6	208	168	156	36
4.8	12	1588SL12C-0480	6	102	64	56	36
	20	1588SL20C-0480	6	158	118	106	36
	30	1588SL30C-0480	6	208	168	156	36
4.9	12	1588SL12C-0490	6	102	64	56	36
	20	1588SL20C-0490	6	158	118	106	36
	30	1588SL30C-0490	6	208	168	156	36
5.0	12	1588SL12C-0500	6	116	78	72	36
	20	1588SL20C-0500	6	158	118	106	36
	30	1588SL30C-0500	6	208	168	156	36
5.1	12	1588SL12C-0510	6	116	78	72	36
	20	1588SL20C-0510	6	168	128	116	36
	30	1588SL30C-0510	6	228	188	170	36
5.2	12	1588SL12C-0520	6	116	78	72	36
	20	1588SL20C-0520	6	168	128	116	36
	30	1588SL30C-0520	6	228	188	170	36
5.3	12	1588SL12C-0530	6	116	78	72	36
	20	1588SL20C-0530	6	168	128	116	36
	30	1588SL30C-0530	6	228	188	170	36

Drill diameter d_1 12D(m_7) 20D/30D(h_7)	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
5.4	12	**1588SL12C-0540**	6	116	78	72	36
	20	**1588SL20C-0540**	6	168	128	116	36
	30	**1588SL30C-0540**	6	228	188	170	36
5.5	12	**1588SL12C-0550**	6	116	78	72	36
	20	**1588SL20C-0550**	6	168	128	116	36
	30	**1588SL30C-0550**	6	228	188	170	36
5.6	12	**1588SL12C-0560**	6	116	78	72	36
	20	**1588SL20C-0560**	6	180	140	126	36
	30	**1588SL30C-0560**	6	240	200	182	36
5.7	12	**1588SL12C-0570**	6	116	78	72	36
	20	**1588SL20C-0570**	6	180	140	126	36
	30	**1588SL30C-0570**	6	240	200	182	36
5.8	12	**1588SL12C-0580**	6	116	78	72	36
	20	**1588SL20C-0580**	6	180	140	126	36
	30	**1588SL30C-0580**	6	240	200	182	36
5.9	12	**1588SL12C-0590**	6	116	78	72	36
	20	**1588SL20C-0590**	6	180	140	126	36
	30	**1588SL30C-0590**	6	240	200	182	36
6.0	12	**1588SL12C-0600**	6	116	78	72	36
	20	**1588SL20C-0600**	6	180	140	126	36
	30	**1588SL30C-0600**	6	240	200	182	36
6.1	12	**1588SL12C-0610**	8	131	93	84	36
	20	**1588SL20C-0610**	8	192	150	132	36
	30	**1588SL30C-0610**	8	260	220	202	36
6.2	12	**1588SL12C-0620**	8	131	93	84	36
	20	**1588SL20C-0620**	8	192	150	132	36
	30	**1588SL30C-0620**	8	260	220	202	36
6.3	12	**1588SL12C-0630**	8	131	93	84	36
	20	**1588SL20C-0630**	8	192	150	132	36
	30	**1588SL30C-0630**	8	260	220	202	36
6.4	12	**1588SL12C-0640**	8	131	93	84	36
	20	**1588SL20C-0640**	8	192	150	132	36
	30	**1588SL30C-0640**	8	260	220	202	36
6.5	12	**1588SL12C-0650**	8	131	93	84	36
	20	**1588SL20C-0650**	8	192	150	132	36
	30	**1588SL30C-0650**	8	260	220	202	36

Drill diameter d_1 12D(m_7) 20D/30D(h_7)	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
6.6	12	**1588SL12C-0660**	8	131	93	84	36
	20	**1588SL20C-0660**	8	202	162	144	36
	30	**1588SL30C-0660**	8	272	232	214	36
6.7	12	**1588SL12C-0670**	8	131	93	84	36
	20	**1588SL20C-0670**	8	202	162	144	36
	30	**1588SL30C-0670**	8	272	232	214	36
6.8	12	**1588SL12C-0680**	8	131	93	84	36
	20	**1588SL20C-0680**	8	202	162	144	36
	30	**1588SL30C-0680**	8	272	232	214	36
6.9	12	**1588SL12C-0690**	8	131	93	84	36
	20	**1588SL20C-0690**	8	202	162	144	36
	30	**1588SL30C-0690**	8	272	232	214	36
7.0	12	**1588SL12C-0700**	8	131	93	84	36
	20	**1588SL20C-0700**	8	202	162	144	36
	30	**1588SL30C-0700**	8	272	232	214	36
7.1	12	**1588SL12C-0710**	8	146	108	96	36
	20	**1588SL20C-0710**	8	213	173	155	36
	30	**1588SL30C-0710**	8	290	250	232	36
7.2	12	**1588SL12C-0720**	8	146	108	96	36
	20	**1588SL20C-0720**	8	213	173	155	36
	30	**1588SL30C-0720**	8	290	250	232	36
7.3	12	**1588SL12C-0730**	8	146	108	96	36
	20	**1588SL20C-0730**	8	213	173	155	36
	30	**1588SL30C-0730**	8	290	250	232	36
7.4	12	**1588SL12C-0740**	8	146	108	96	36
	20	**1588SL20C-0740**	8	213	173	155	36
	30	**1588SL30C-0740**	8	290	250	232	36
7.5	12	**1588SL12C-0750**	8	146	108	96	36
	20	**1588SL20C-0750**	8	213	173	155	36
	30	**1588SL30C-0750**	8	290	250	232	36
7.6	12	**1588SL12C-0760**	8	146	108	96	36
	20	**1588SL20C-0760**	8	223	183	165	36
	30	**1588SL30C-0760**	8	305	265	246	36
7.7	12	**1588SL12C-0770**	8	146	108	96	36
	20	**1588SL20C-0770**	8	223	183	165	36
	30	**1588SL30C-0770**	8	305	265	246	36

Applicable material table

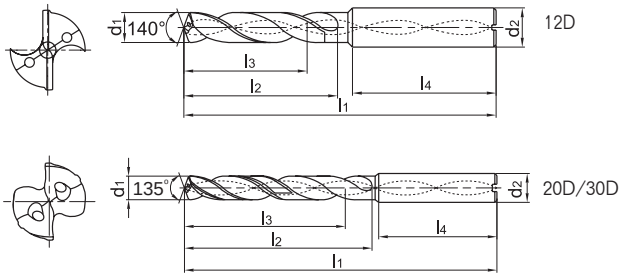
◎Very suitable ○Suitable

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 C77
Cutting parameters C80–C86

SL series Deep-hole machining

Internal coolant　　Straight shank



● Suitable for deep-hole drilling of steel，cast iron etc.

Drill diameter d_1 12D(m_7) 20D/30D(h_7)	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
7.8	12	**1588SL12C-0780**	8	146	108	96	36
	20	**1588SL20C-0780**	8	223	183	165	36
	30	**1588SL30C-0780**	8	305	265	246	36
7.9	12	**1588SL12C-0790**	8	146	108	96	36
	20	**1588SL20C-0790**	8	223	183	165	36
	30	**1588SL30C-0790**	8	305	265	246	36
8.0	12	**1588SL12C-0800**	8	146	108	96	36
	20	**1588SL20C-0800**	8	223	183	165	36
	30	**1588SL30C-0800**	8	305	265	246	36
8.1	12	**1588SL12C-0810**	10	162	120	108	40
	20	**1588SL20C-0810**	10	239	195	176	40
	30	**1588SL30C-0810**	10	330	285	265	40
8.2	12	**1588SL12C-0820**	10	162	120	108	40
	20	**1588SL20C-0820**	10	239	195	176	40
	30	**1588SL30C-0820**	10	330	285	265	40
8.3	12	**1588SL12C-0830**	10	162	120	108	40
	20	**1588SL20C-0830**	10	239	195	176	40
	30	**1588SL30C-0830**	10	330	285	265	40
8.4	12	**1588SL12C-0840**	10	162	120	108	40
	20	**1588SL20C-0840**	10	239	195	176	40
	30	**1588SL30C-0840**	10	330	285	265	40
8.5	12	**1588SL12C-0850**	10	162	120	108	40
	20	**1588SL20C-0850**	10	239	195	176	40
	30	**1588SL30C-0850**	10	330	285	265	40
8.6	12	**1588SL12C-0860**	10	162	120	108	40
	20	**1588SL20C-0860**	10	249	205	186	40
	30	**1588SL30C-0860**	10	340	295	275	40
8.7	12	**1588SL12C-0870**	10	162	120	108	40
	20	**1588SL20C-0870**	10	249	205	186	40
	30	**1588SL30C-0870**	10	340	295	275	40
8.8	12	**1588SL12C-0880**	10	162	120	108	40
	20	**1588SL20C-0880**	10	249	205	186	40
	30	**1588SL30C-0880**	10	340	295	275	40
8.9	12	**1588SL12C-0890**	10	162	120	108	40
	20	**1588SL20C-0890**	10	249	205	186	40
	30	**1588SL30C-0890**	10	340	295	275	40

Drill diameter d_1 12D(m_7) 20D/30D(h_7)	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
9.0	12	**1588SL12C-0900**	10	162	120	108	40
	20	**1588SL20C-0900**	10	249	205	186	40
	30	**1588SL30C-0900**	10	340	295	275	40
9.1	12	**1588SL12C-0910**	10	174	132	120	40
	20	**1588SL20C-0910**	10	262	218	196	40
	30	**1588SL30C-0910**	10	360	315	292	40
9.2	12	**1588SL12C-0920**	10	174	132	120	40
	20	**1588SL20C-0920**	10	262	218	196	40
	30	**1588SL30C-0920**	10	360	315	292	40
9.3	12	**1588SL12C-0930**	10	174	132	120	40
	20	**1588SL20C-0930**	10	262	218	196	40
	30	**1588SL30C-0930**	10	360	315	292	40
9.4	12	**1588SL12C-0940**	10	174	132	120	40
	20	**1588SL20C-0940**	10	262	218	196	40
	30	**1588SL30C-0940**	10	360	315	292	40
9.5	12	**1588SL12C-0950**	10	174	132	120	40
	20	**1588SL20C-0950**	10	262	218	196	40
	30	**1588SL30C-0950**	10	360	315	292	40
9.6	12	**1588SL12C-0960**	10	174	132	120	40
	20	**1588SL20C-0960**	10	272	228	206	40
	30	**1588SL30C-0960**	10	372	328	305	40
9.7	12	**1588SL12C-0970**	10	174	132	120	40
	20	**1588SL20C-0970**	10	272	228	206	40
	30	**1588SL30C-0970**	10	372	328	305	40
9.8	12	**1588SL12C-0980**	10	174	132	120	40
	20	**1588SL20C-0980**	10	272	228	206	40
	30	**1588SL30C-0980**	10	372	328	305	40
9.9	12	**1588SL12C-0990**	10	174	132	120	40
	20	**1588SL20C-0990**	10	272	228	206	40
	30	**1588SL30C-0990**	10	372	328	305	40
10.0	12	**1588SL12C-1000**	10	174	132	120	40
	20	**1588SL20C-1000**	10	272	228	206	40
	30	**1588SL30C-1000**	10	372	328	305	40
10.1	12	**1588SL12C-1010**	12	204	156	144	45
	20	**1588SL20C-1010**	12	292	242	220	45

Drill diameter d_1 12D(m_7) 20D/30D(h_7)	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
10.2	12	**1588SL12C-1020**	12	204	156	144	45
	20	**1588SL20C-1020**	12	292	242	220	45
10.3	12	**1588SL12C-1030**	12	204	156	144	45
	20	**1588SL20C-1030**	12	292	242	220	45
10.4	12	**1588SL12C-1040**	12	204	156	144	45
	20	**1588SL20C-1040**	12	292	242	220	45
10.5	12	**1588SL12C-1050**	12	204	156	144	45
	20	**1588SL20C-1050**	12	292	242	220	45
10.6	12	**1588SL12C-1060**	12	204	156	144	45
	20	**1588SL20C-1060**	12	300	250	228	45
10.7	12	**1588SL12C-1070**	12	204	156	144	45
	20	**1588SL20C-1070**	12	300	250	228	45
10.8	12	**1588SL12C-1080**	12	204	156	144	45
	20	**1588SL20C-1080**	12	300	250	228	45
10.9	12	**1588SL12C-1090**	12	204	156	144	45
	20	**1588SL20C-1090**	12	300	250	228	45
11.0	12	**1588SL12C-1100**	12	204	156	144	45
	20	**1588SL20C-1100**	12	300	250	228	45
11.1	12	**1588SL12C-1110**	12	204	156	144	45
	20	**1588SL20C-1110**	12	315	265	240	45
11.2	12	**1588SL12C-1120**	12	204	156	144	45
	20	**1588SL20C-1120**	12	315	265	240	45
11.3	12	**1588SL12C-1130**	12	204	156	144	45
	20	**1588SL20C-1130**	12	315	265	240	45
11.4	12	**1588SL12C-1140**	12	204	156	144	45
	20	**1588SL20C-1140**	12	315	265	240	45
11.5	12	**1588SL12C-1150**	12	204	156	144	45
	20	**1588SL20C-1150**	12	315	265	240	45
11.6	12	**1588SL12C-1160**	12	204	156	144	45
	20	**1588SL20C-1160**	12	325	275	250	45

Drill diameter d_1 12D(m_7) 20D/30D(h_7)	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
11.7	12	**1588SL12C-1170**	12	204	156	144	45
	20	**1588SL20C-1170**	12	325	275	250	45
11.8	12	**1588SL12C-1180**	12	204	156	144	45
	20	**1588SL20C-1180**	12	325	275	250	45
11.9	12	**1588SL12C-1190**	12	204	156	144	45
	20	**1588SL20C-1190**	12	325	275	250	45
12.0	12	**1588SL12C-1200**	12	204	156	144	45
	20	**1588SL20C-1200**	12	325	275	250	45
12.5	12	**1588SL12C-1250**	14	230	182	168	45
	20	**1588SL20C-1250**	14	323	275	250	45
12.7	12	**1588SL12C-1270**	14	230	182	168	45
12.8	12	**1588SL12C-1280**	14	230	182	168	45
13.0	12	**1588SL12C-1300**	14	230	182	168	45
	20	**1588SL20C-1300**	14	338	290	265	45
13.5	12	**1588SL12C-1350**	14	230	182	168	45
	20	**1588SL20C-1350**	14	338	290	265	45
14.0	12	**1588SL12C-1400**	14	230	182	168	45
	20	**1588SL20C-1400**	14	367	318	290	45
14.5	12	**1588SL12C-1450**	16	260	208	194	48
15.0	12	**1588SL12C-1500**	16	260	208	194	48
15.5	12	**1588SL12C-1550**	16	260	208	194	48
16.0	12	**1588SL12C-1600**	16	260	208	194	48
16.5	12	**1588SL12C-1650**	18	286	234	218	48
17.0	12	**1588SL12C-1700**	18	286	234	218	48
17.5	12	**1588SL12C-1750**	18	286	234	218	48
18.0	12	**1588SL12C-1800**	18	286	234	218	48
18.5	12	**1588SL12C-1850**	20	310	258	240	48
19.0	12	**1588SL12C-1900**	20	310	258	240	48
19.5	12	**1588SL12C-1950**	20	310	258	240	48
20.0	12	**1588SL12C-2000**	20	310	258	240	48

Applicable material table

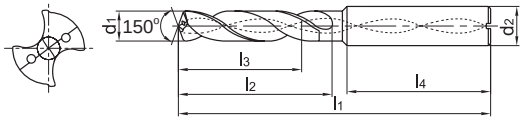
◎Very suitable ○Suitable

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 C77
Cutting parameters C80–C86

1534SP series Guide-hole machining

Internal coolant Straight shank



Drill diameter $d_1(h_7)$	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
3.03	3	**1534SP03C-0303**	6	62	20	14	36
3.13	3	**1534SP03C-0313**	6	62	20	14	36
3.23	3	**1534SP03C-0323**	6	62	20	14	36
3.33	3	**1534SP03C-0333**	6	62	20	14	36
3.43	3	**1534SP03C-0343**	6	62	20	14	36
3.53	3	**1534SP03C-0353**	6	62	20	14	36
3.63	3	**1534SP03C-0363**	6	62	20	14	36
3.73	3	**1534SP03C-0373**	6	62	20	14	36
3.83	3	**1534SP03C-0383**	6	66	24	17	36
3.93	3	**1534SP03C-0393**	6	66	24	17	36
4.03	3	**1534SP03C-0403**	6	66	24	17	36
4.13	3	**1534SP03C-0413**	6	66	24	17	36
4.23	3	**1534SP03C-0423**	6	66	24	17	36
4.33	3	**1534SP03C-0433**	6	66	24	17	36
4.43	3	**1534SP03C-0443**	6	66	24	17	36
4.53	3	**1534SP03C-0453**	6	66	24	17	36
4.63	3	**1534SP03C-0463**	6	66	24	17	36
4.73	3	**1534SP03C-0473**	6	66	24	17	36
4.83	3	**1534SP03C-0483**	6	66	28	20	36
4.93	3	**1534SP03C-0493**	6	66	28	20	36
5.03	3	**1534SP03C-0503**	6	66	28	20	36
5.13	3	**1534SP03C-0513**	6	66	28	20	36
5.23	3	**1534SP03C-0523**	6	66	28	20	36
5.33	3	**1534SP03C-0533**	6	66	28	20	36
5.43	3	**1534SP03C-0543**	6	66	28	20	36
5.53	3	**1534SP03C-0553**	6	66	28	20	36
5.63	3	**1534SP03C-0563**	6	66	28	20	36
5.73	3	**1534SP03C-0573**	6	66	28	20	36
5.83	3	**1534SP03C-0583**	6	66	28	20	36
5.93	3	**1534SP03C-0593**	6	66	28	20	36
6.03	3	**1534SP03C-0603**	6	66	28	20	36
6.13	3	**1534SP03C-0613**	8	79	34	24	36
6.23	3	**1534SP03C-0623**	8	79	34	24	36
6.33	3	**1534SP03C-0633**	8	79	34	24	36
6.43	3	**1534SP03C-0643**	8	79	34	24	36
6.53	3	**1534SP03C-0653**	8	79	34	24	36

Drill diameter $d_1(h_7)$	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
6.63	3	**1534SP03C-0663**	8	79	34	24	36
6.73	3	**1534SP03C-0673**	8	79	34	24	36
6.83	3	**1534SP03C-0683**	8	79	34	24	36
6.93	3	**1534SP03C-0693**	8	79	34	24	36
7.03	3	**1534SP03C-0703**	8	79	34	24	36
7.13	3	**1534SP03C-0713**	8	79	41	29	36
7.23	3	**1534SP03C-0723**	8	79	41	29	36
7.33	3	**1534SP03C-0733**	8	79	41	29	36
7.43	3	**1534SP03C-0743**	8	79	41	29	36
7.53	3	**1534SP03C-0753**	8	79	41	29	36
7.63	3	**1534SP03C-0763**	8	79	41	29	36
7.73	3	**1534SP03C-0773**	8	79	41	29	36
7.83	3	**1534SP03C-0783**	8	79	41	29	36
7.93	3	**1534SP03C-0793**	8	79	41	29	36
8.03	3	**1534SP03C-0803**	8	79	41	29	36
8.13	3	**1534SP03C-0813**	10	89	47	35	40
8.23	3	**1534SP03C-0823**	10	89	47	35	40
8.33	3	**1534SP03C-0833**	10	89	47	35	40
8.43	3	**1534SP03C-0843**	10	89	47	35	40
8.53	3	**1534SP03C-0853**	10	89	47	35	40
8.63	3	**1534SP03C-0863**	10	89	47	35	40
8.73	3	**1534SP03C-0873**	10	89	47	35	40
8.83	3	**1534SP03C-0883**	10	89	47	35	40
8.93	3	**1534SP03C-0893**	10	89	47	35	40
9.03	3	**1534SP03C-0903**	10	89	47	35	40
9.13	3	**1534SP03C-0913**	10	89	47	35	40
9.23	3	**1534SP03C-0923**	10	89	47	35	40
9.33	3	**1534SP03C-0933**	10	89	47	35	40
9.43	3	**1534SP03C-0943**	10	89	47	35	40
9.53	3	**1534SP03C-0953**	10	89	47	35	40
9.63	3	**1534SP03C-0963**	10	89	47	35	40
9.73	3	**1534SP03C-0973**	10	89	47	35	40
9.83	3	**1534SP03C-0983**	10	89	47	35	40
9.93	3	**1534SP03C-0993**	10	89	47	35	40
10.03	3	**1534SP03C-1003**	10	89	47	35	40
10.13	3	**1534SP03C-1013**	12	102	55	40	45

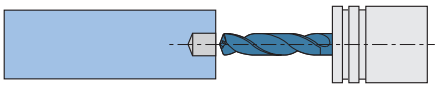
Drill diameter $d_1(h_7)$	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
10.23	3	**1534SP03C-1023**	12	102	55	40	45
10.33	3	**1534SP03C-1033**	12	102	55	40	45
10.43	3	**1534SP03C-1043**	12	102	55	40	45
10.53	3	**1534SP03C-1053**	12	102	55	40	45
10.63	3	**1534SP03C-1063**	12	102	55	40	45
10.73	3	**1534SP03C-1073**	12	102	55	40	45
10.83	3	**1534SP03C-1083**	12	102	55	40	45
10.93	3	**1534SP03C-1093**	12	102	55	40	45
11.03	3	**1534SP03C-1103**	12	102	55	40	45
11.13	3	**1534SP03C-1113**	12	102	55	40	45
11.23	3	**1534SP03C-1123**	12	102	55	40	45
11.33	3	**1534SP03C-1133**	12	102	55	40	45
11.43	3	**1534SP03C-1143**	12	102	55	40	45

Drill diameter $d_1(h_7)$	Drilling depth (l/d)	Type	Basic dimension(mm)				
			Shank diameter	Overall length	Flute length	Recommended drilling depth	Shank length
			$d_2(h_5)$	l_1	l_2	l_3	l_4
11.53	3	**1534SP03C-1153**	12	102	55	40	45
11.63	3	**1534SP03C-1163**	12	102	55	40	45
11.73	3	**1534SP03C-1173**	12	102	55	40	45
11.83	3	**1534SP03C-1183**	12	102	55	40	45
11.93	3	**1534SP03C-1193**	12	102	55	40	45
12.03	3	**1534SP03C-1203**	12	102	55	40	45
12.53	3	**1534SP03C-1253**	14	107	60	43	45
12.73	3	**1534SP03C-1273**	14	107	60	43	45
12.83	3	**1534SP03C-1283**	14	107	60	43	45
13.03	3	**1534SP03C-1303**	14	107	60	43	45
13.53	3	**1534SP03C-1353**	14	107	60	43	45
14.03	3	**1534SP03C-1403**	14	107	60	43	45

◆Cutting condition of SP series hole-guide drill please reference 1534SU03C Series.

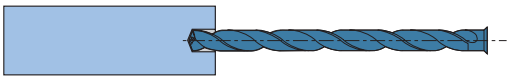
Recommended Machining Method of SL series Deep-hole Drills

1.Hole-guided Machining



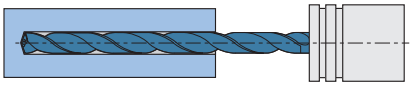
◆Apex angle of drills used for hole-guided machining has to be greater than the apex angle of deep-hole drills.
◆Diameter of drills used for hole-guided machining has to be respectively greater than the diameter of deep-hole drills. Generally the diameter range of deep-hole drills is between 0 and positive 0.1.
◆Generally the depth of pre-drilling hole is 1-3D (D is the diameter of pre-drilling holes). Also, it basically needs to ensure the accuracy of pre-drilling holes at the same time.

2.Deep-hole Machining (Inserting into the Pre-drilling Holes)



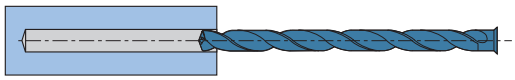
◆lower speed should be applied in the process of inserting deep-hole drills into the pre-drilling holes.
◆Insert deep hole drill to the location 1-3mm away from the bottom of pre-drilling holes (Please make sure that the parts of drilling point are entirely inserted).

3.Deep-hole Machining (Beginning machining, to the end)



◆Non-stopped machining with fixed speed and feed rates. (Completed at one time, not a “Step-by-Step” machining).

4.Deep-hole Machining (Retract from hole)



◆Reduce speed located 1-2mm away from hole bottom at the end of machining.
◆Quickly secedes the deep-hole drills back to the location where it begins to machine.
◆Retract under the same conditions of inserting pre-drilling holes.

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	○	◎	◎			○	◎	◎	○		○

ST machining of soft steel and stainless steel series twist drill

ST series drills with superior performance will solve the difficulties in machining of high-elongation materials such as soft steel, stainless steel, etc.

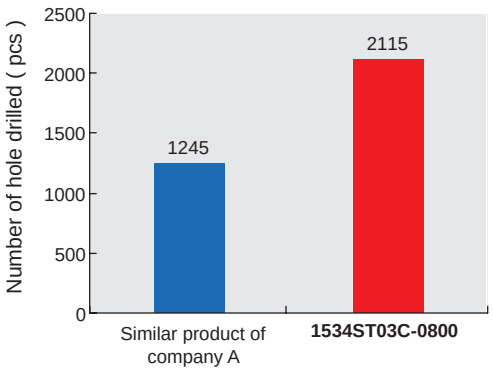
Optimized drill point design with strengthened chisel edge and ensures easy and fast cutting and excellent chip breaking.

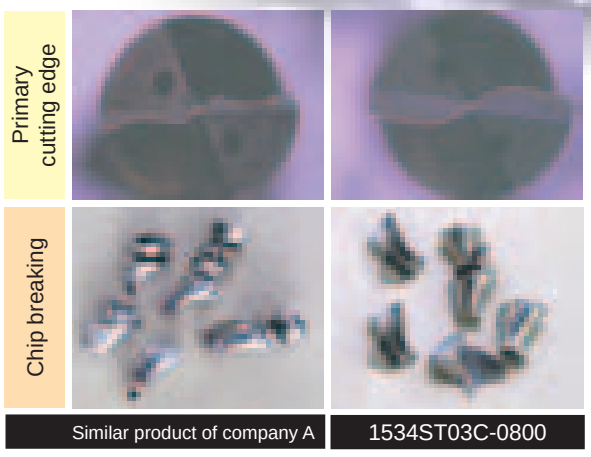
Nano-structured TiAlN coating, outstanding wear resistance and heat resistance.

Special chipbreaker with large chip pocket ensures good chip evacuation and smooth drilling.

Application of st series twist drills

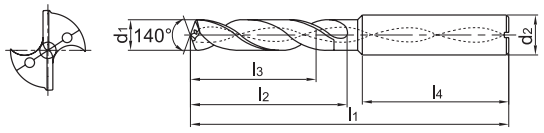
Tool type: 1534ST03C-0800
Workpiece material: 1Cr18Ni9Ti
Cooling system: oil water emulsion(internal cooling)
Cutting speed: V_c=85m/min
Feed rate: f_r=0.16mm/r
Drilling depth: 24mm(blind hole)



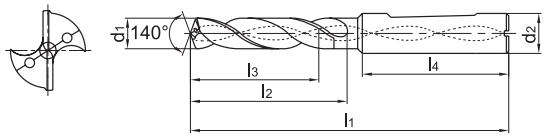


ST series for machining of soft steel, stainless steel


Internal coolant Straight shank




Internal coolant Whistle notch shank



- First choice for drilling soft steel and 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	☆

☆Recommended grade (produce according to order)

Applicable material table

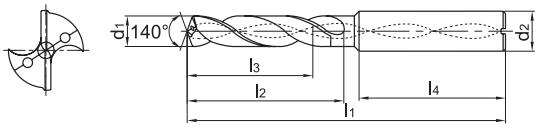
◎Very suitable ○Suitable

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	◎	○				◎					○

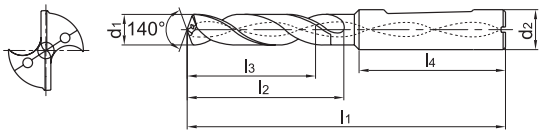
Code key C6
Cutting parameters C78
Cutting parameters C80–C86

ST series for machining of soft steel, stainless steel


Internal coolant Straight shank




Internal coolant Whistle notch shank



- First choice for drilling soft steel and 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
3.6	3	Internal coolant	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	☆
3.9	3		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	☆

☆Recommended grade (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
4.6	3	Internal coolant	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	☆
4.9	3		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	☆

☆Recommended grade (produce according to order)

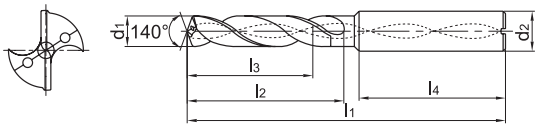
Applicable material table

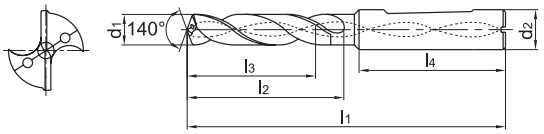
◎Very suitable ○Suitable

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 C78
Cutting parameters C80–C86

ST series for machining of soft steel, stainless steel





- First choice for drilling soft steel and 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
5.55	3	Internal coolant	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	☆
5.8	3		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	☆

☆Recommended grade (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
6.5	3	Internal coolant	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	☆
6.9	3		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	☆

☆Recommended grade (produce according to order)

Applicable material table

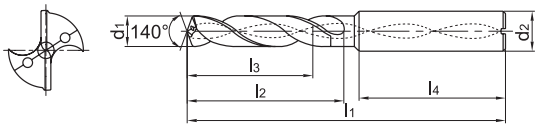
◎Very suitable ○Suitable

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	◎	○				◎					○

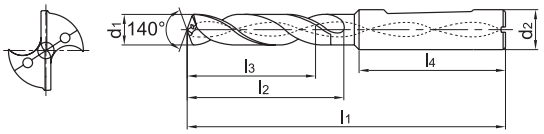
Code key C6
Cutting parameters C78
Cutting parameters C80–C86

ST series for machining of soft steel, stainless steel


Internal coolant Straight shank




Internal coolant Whistle notch shank



- First choice for drilling soft steel and 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
7.6	3	Internal coolant	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	☆
7.9	3		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	☆

☆Recommended grade (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
8.6	3	Internal coolant	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	☆
9.1	3		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	☆

☆Recommended grade (produce according to order)

Applicable material table

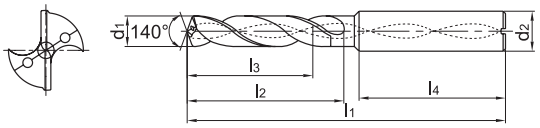
◎Very suitable ○Suitable

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	◎	○				◎					○

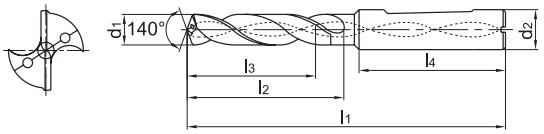
Code key C6
Cutting parameters C78
Cutting parameters C80–C86

ST series for machining of soft steel, stainless steel


Internal coolant Straight shank




Internal coolant Whistle notch shank



- First choice for drilling soft steel and 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
9.8	3	Internal coolant	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	☆
10.25	3		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	☆

☆Recommended grade (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
10.8	3	Internal coolant	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	☆
11.4	3		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	☆

☆Recommended grade (produce according to order)

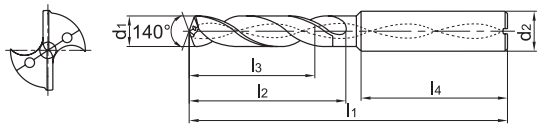
Applicable material table

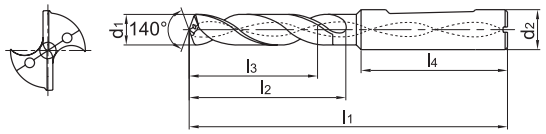
◎Very suitable ○Suitable

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 C78
Cutting parameters C80–C86

ST series for machining of soft steel, stainless steel





- First choice for drilling soft steel and 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
11.9	3	Internal coolant	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	☆
12.7	3		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	☆

☆Recommended grade (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
13.5	3	Internal coolant	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	☆
14.8	3		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	☆

☆Recommended grade (produce according to order)

Applicable material table

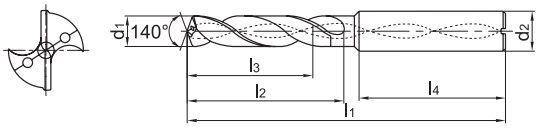
◎Very suitable ○Suitable

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	◎	○				◎					○

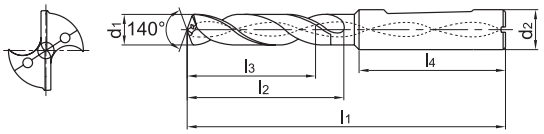
Code key C6
Cutting parameters C78
Cutting parameters C80–C86

ST series for machining of soft steel, stainless steel


Internal coolant Straight shank




Internal coolant Whistle notch shank



- First choice for drilling soft steel and 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
15.8	3	Internal coolant	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	☆
17.5	3		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	☆

☆Recommended grade (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
18.8	3	Internal coolant	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 (produce according to order)

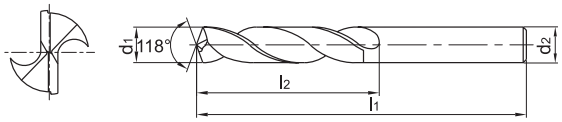
Applicable material table

◎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 C78
Cutting parameters C80–C86

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



- 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
2.0	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	☆

☆Recommended grade (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
4.9	3	External coolant	Straight shank	**1105SC03-0490**	4.9	62	26	☆
5.0	3			**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 (produce according to order)

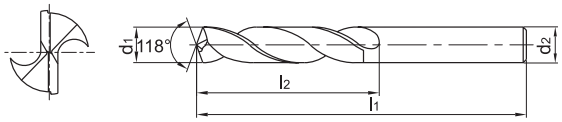
Applicable material table

◎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 C78
Cutting parameters C80–C86

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



- 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 (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 (produce according to order)

Applicable material table

◎Very suitable ○Suitable

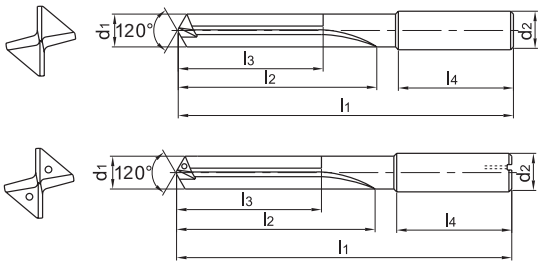
Grade	Workpiece material										
	Mild steel HB≤180	Carbon steel, Alloy steel	Pre-hardened steel, Hardened steel			Stainless steel	Cast iron	Nodular cast iron	Aluminum alloy	Copper alloy	Heat resistant alloy
			~40HRC	~50HRC	~60HRC						
YK20F							◎	○	◎		

Code key C6
Cutting parameters C78
Cutting parameters C80–C86

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


External coolant Straight shank


Internal coolant Straight shank



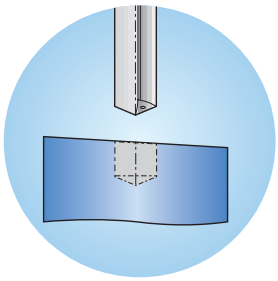
- For materials with short chips such as cast iron, silicon-aluminum alloy, etc.
- Excellent self centering capability, able to machine with high efficiency, the hole precision up to H7.
- High positional accuracy, high linearity and good surface finish can be obtained in the hole drilled.

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			**1576PC05-0420**	6.0	74	36	29	36	☆
5.0	5			**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			**1576PC05-0700**	8.0	91	53	43	36	☆
8.0	5			**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			**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			**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			**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			**1576PC05-1550**	16.0	133	83	63	48	☆

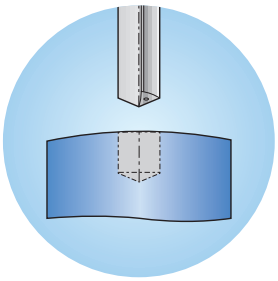
☆Recommended grade (produce according to order)

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	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	☆

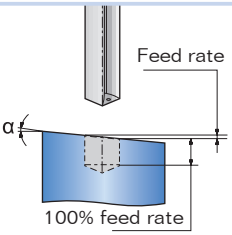
☆Recommended grade (produce according to order)



Inclined face drilling

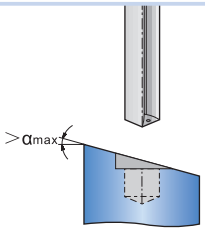


Curved face drilling



When drilling inclined face or curved face, feed rate should be reduced as recommended.

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



Surface with a large inclined angle should be pre-treated. Face milling should be conducted before drilling.

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 C79
Cutting parameters C80–C86

Recommended cutting parameters

GD 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 do a test cutting with 90% of the cutting speed or 85% of the feed rate stated above. As cutting conditions become stable, gradually increase the cutting speed and feed rate.

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

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

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

GD 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 do a test cutting with 90% of the cutting speed or 85% of the feed rate stated above. As cutting conditions become stable, gradually increase the cutting speed and feed rate.

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

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

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

Recommended cutting parameters

GD 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 do a test cutting with 90% of the cutting speed or 85% of the feed rate stated above. As cutting conditions become stable, gradually increase the cutting speed and feed rate.

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

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

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

SL series deep twist drills(internal coolant) 12D

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		50~80m/min		40~60m/min		80~150m/min		60~120m/min		100~180m/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)	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	10600	0.06~0.1	10600	0.06~0.1	7400	0.06~0.1	5300	0.03~0.07	12700	0.06~0.1	9500	0.06~0.1	15000	0.09~0.12	2100	0.03~0.06
4	8000	0.08~0.12	8000	0.08~0.12	5600	0.08~0.12	4000	0.04~0.08	96000	0.08~0.12	7000	0.08~0.12	11000	0.10~0.15	1600	0.04~0.07
5	6400	0.10~0.14	6400	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	0.10~0.15	1250	0.05~0.9
6	5300	0.11~0.16	5300	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	4000	0.13~0.19	4000	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	3200	0.14~0.22	3200	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	2700	0.16~0.24	2700	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	2300	0.18~0.28	2300	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

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

SL series deep twist drills(internal coolant) 20D 30D

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	70~90m/min		50~80m/min		40~60m/min		40~60m/min		50~80m/min		60~80m/min		100~180m/min		8~15m/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	8250	0.06~0.1	7650	0.06~0.1	5200	0.06~0.1	4750	0.03~0.07	7100	0.06~0.1	7600	0.06~0.1	12750	0.09~0.12	1350	0.03~0.06
4	6250	0.08~0.12	5750	0.08~0.12	3900	0.08~0.12	3600	0.04~0.08	5400	0.08~0.12	5600	0.08~0.12	9350	0.10~0.15	1050	0.04~0.07
5	5000	0.10~0.14	4600	0.10~0.14	3150	0.10~0.14	2900	0.05~0.10	4250	0.10~0.14	4550	0.10~0.14	7650	0.10~0.15	800	0.05~0.9
6	4150	0.11~0.16	3800	0.11~0.16	2600	0.11~0.16	2450	0.06~0.12	3600	0.11~0.16	3750	0.11~0.16	6300	0.11~0.16	700	0.06~0.11
8	3100	0.13~0.19	2900	0.13~0.19	1950	0.13~0.19	1800	0.08~0.16	2700	0.13~0.19	2900	0.13~0.19	4750	0.13~0.19	500	0.08~0.14
10	2500	0.14~0.22	2300	0.14~0.22	1550	0.14~0.22	1450	0.10~0.18	2150	0.14~0.22	2250	0.14~0.22	3850	0.14~0.22	400	0.10~0.16
12	2100	0.16~0.24	1950	0.16~0.24	1350	0.16~0.24	1150	0.12~0.20	1800	0.16~0.24	1900	0.16~0.24	3150	0.16~0.24	350	0.12~0.18
14	1800	0.18~0.28	1650	0.18~0.28	1100	0.18~0.28	1000	0.13~0.22	1500	0.18~0.28	1700	0.18~0.28	2700	0.18~0.28	300	0.13~0.20

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

Recommended cutting parameters

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 do a test cutting with 90% of the cutting speed or 85% of the feed rate stated above. As cutting conditions become stable, gradually increase the cutting speed and feed rate.
2.The cutting conditions above are applicable for drilling with emulsion.
3.When clamping drill, please use a collet without any defect or dust, and keep the radial run-out of drill under 0.02mm.
4.These conditions above are applicable for cutting depth under 5D.

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 do a test cutting with 90% of the cutting speed or 85% of the feed rate stated above. As cutting conditions become stable, gradually increase the cutting speed and feed rate.
2 .The cutting conditions above are applicable for drilling with emulsion.
3.When clamping drill, please use a collet without any defect or dust, and keep the radial run-out of drill under 0.02mm.
4.These conditions above are applicable for cutting depth under 5D.

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 do a test cutting with 90% of the cutting speed or 85% of the feed rate stated above. As cutting conditions become stable, gradually increase the cutting speed and feed rate.
2 .The cutting conditions above are applicable for drilling with emulsion.
3.When clamping drill, please use a collet without any defect or dust, and keep the radial run-out of drill under 0.02mm.
4.These conditions above are applicable for cutting depth under 5D.

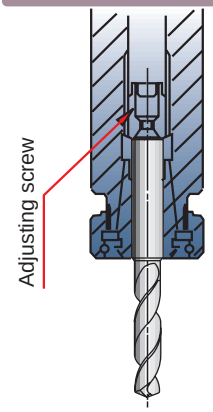
PC series straight flute drill(internal coolant) 15D

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 do a test cutting with 90% of the cutting speed or 85% of the feed rate stated above. As cutting conditions become stable, gradually increase the cutting speed and feed rate.
2 .The cutting conditions above are applicable for drilling with emulsion.
3.When clamping drill, please use a collet without any defect or dust, and keep the radial run-out of drill under 0.02mm.
4.These conditions above are applicable for cutting depth under 15D.

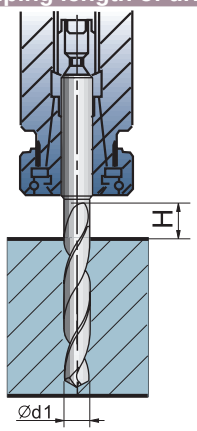
Application guide of drills

Drill clampling



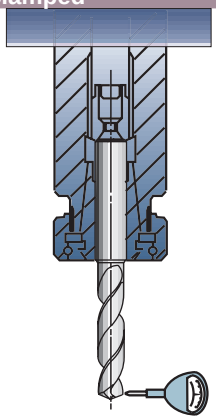
Guarantee tight clamping by using thrust bearing type collet chuck.

How to define the clamping length of drill



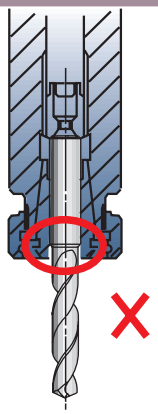
Ensure the size of H is over 1.5d1

Radial run-out of drill clamped



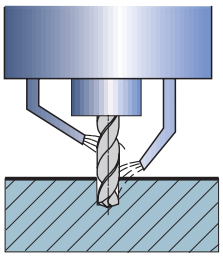
The Radial Run-out should be under 0.02mm.

Wrong drill clamping



Do not clamp on the drill flutes.

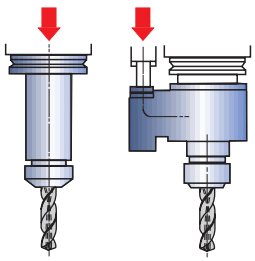
Correct coolant method



The coolant liquid should be injected to the end and the middle of drill as shown in the figure.

Internal cooling: 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.

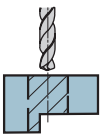
Cautions on coolant use

When using internal coolant

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

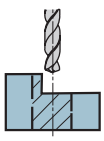
②Dirt and dust particles will adhere to the oil hole and lead to unsmooth coolant flow. Coolant change as early as possible is recommended.

Cautions on interrupted cutting



Can be drilled

Reduce the feed rate when drilling interrupted part.

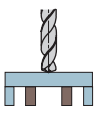


Pre-machining prior to drilling

Countersink with end mill prior to drilling.

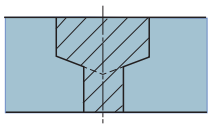
Correct method for thin workpiece

Bending occurs



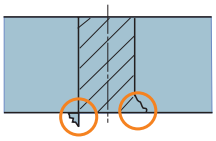
Add a supporter

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.

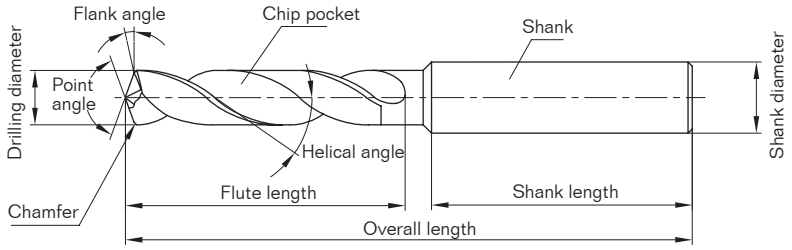
Burrs and workpiece chippings on exit

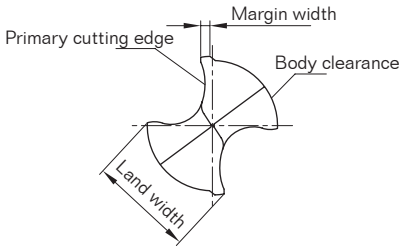


①Reduce the feed rate when approaching the exit.
②Machine chamfers at the point of exit.
③Change the point angle.

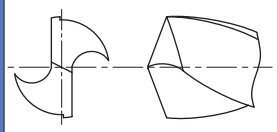
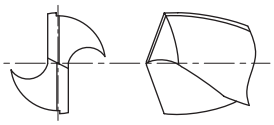
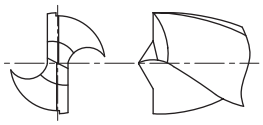
Parts terminology of drill

Terminology of drill





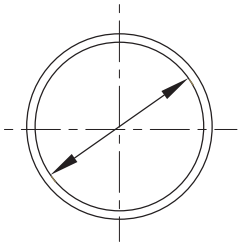
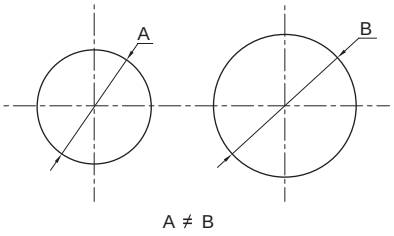
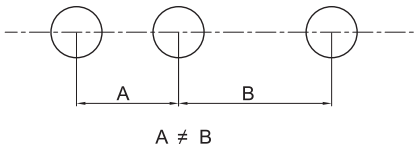
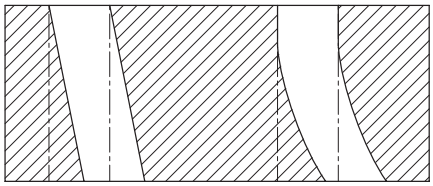
Representative cutting edge shapes

Shape	 (Conical)	 (Dual face)	 (Candler)
Features	● The flank face is conical and the clearance angel increases toward the center of drill. ● Wide applications, commonly used for both soft and hard materials	● Flank face with dual flats to facilitate cutting and initial entering. ● often used for small-diameter drills.	● Two-stage point angle with perfect centering capability, less burr generated when drilling hole. ● First choice for drilling thin plate.

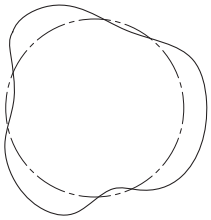
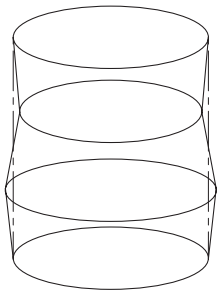
Structure specification and cutting characteristics

Chip pocket	The function of chip pocket is to remove the chips out of the hole. The larger the cross-sectional area is, the easier for chips to be evacuated.
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 from the peripheral toward the center. High hardness material Small ← Helical angle → Large Soft material
Flute length	It is determined by depth of hole, guide bushing length and regrinding allowance. The longer the flute is, the lower the drill rigidity is, which greatly affects tool life. So it is recommended to minimize the flute length as much as possible when other requirements are met. The minimal flute length generally is depth of hole plus 1.5 times of the hole diameter.
Point angle	Generally 118°, set differently as per various applications. Soft easy-to-cut material Small ← Point angle → Large for hard materials or 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 Easy-to-cut materials thin ← core → Thick Large axial cutting force High rigidity For machining of 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	In order to decrease the friction with inside wall of the drilled hole, there is a slight back taper 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 peripheral.

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 not firmly held	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 provide 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

Technical information for solid carbide drills

	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 not firmly held	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