MITSUBISHI MITSUBISHI MATERIALS TOOLS NEWS B204G

Long shank straight drill

SD-LS

Long shank type prevents troubles for overhang application.

Long shank straight drill

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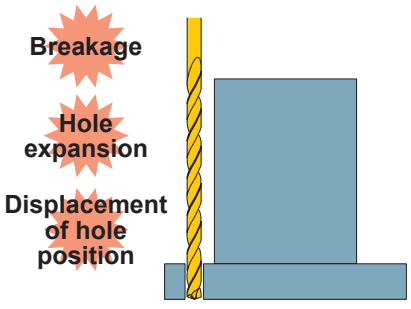
Do you have any troubles drilling a deep hole?

Have you had any troubles using a long straight drill when long overall length is demanded for preventing collision with workpiece?

Conventional drill for deep hole drilling



Various problems occurs

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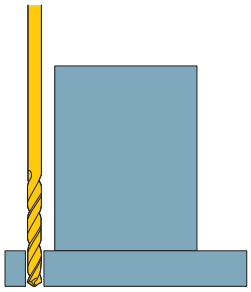
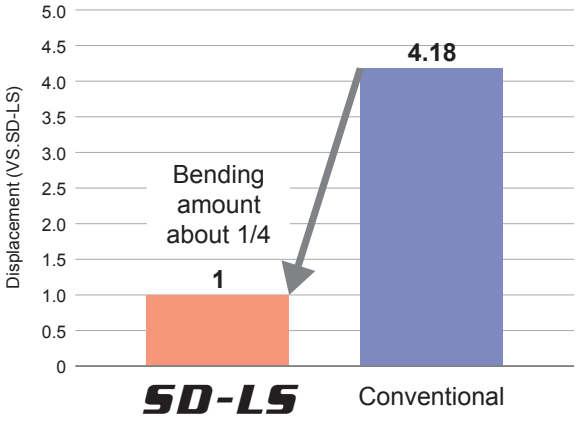


Cause less breakage
Longer tool life
Stable tool life
Prevent hole expansion
Small displacement of hole position

High rigidity

Shorter flute length in comparison with conventional long straight drill is used to maintain high rigidity, thereby preventing various troubles.

Deflection analysis



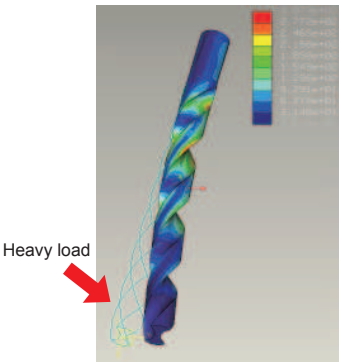


Image of applying
(Overhang length 110mm)

<Analyzed model>

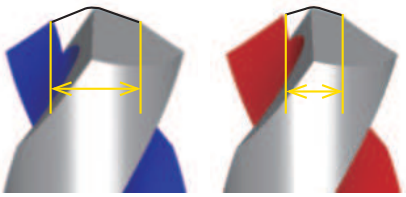
SD-LS Drill diameter 4.0mm, overall length 200mm, flute length 42mm

Conventional Drill diameter 4.0mm, overall length 200mm, flute length 100mm

Stable machining due to optimum design

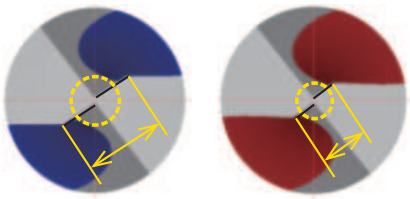
Better engaging stability

Better engaging stability since the thinning part whose point angle is obtuse becomes smaller.



Lower cutting force

Lower cutting force since length of cutting edges formed by thinning becomes shorter.



Conventional

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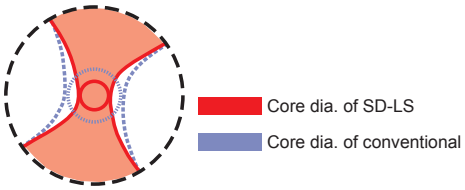
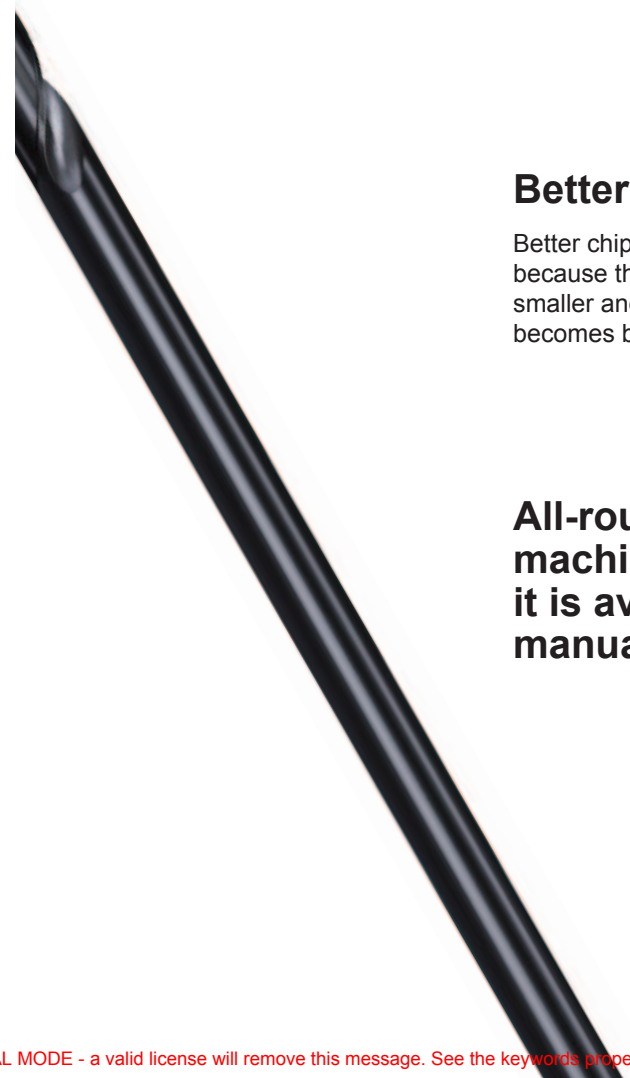
Better chip disposability

Better chip disposability because the core dia. can be smaller and the chip pocket becomes bigger.



All-rounder flute geometry which enables to machine wide range of work materials and it is available for both machining center and manually operated machines.



Long shank straight drill

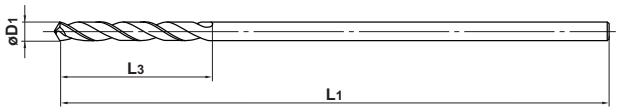
SD-LS NEW

LONG SHANK STRAIGHT DRILL

HSS | 118° | X Thinning D1≥2

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	

1≤D1≤3	3<D1≤6	6<D1≤10
0 −0.014	0 −0.018	0 −0.022



- It is recommended to use when long overall length is demanded for preventing collision with workpiece with high rigidity.
- For both machining center and manually operated machines.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDLSD0100A100	1.0	12	100	●
D0110A100	1.1	14	100	●
D0120A100	1.2	16	100	●
D0130A100	1.3	16	100	●
D0140A100	1.4	18	100	●
D0150A100	1.5	18	100	●
D0160A100	1.6	20	100	●
D0170A100	1.7	20	100	●
D0180A100	1.8	22	100	●
D0190A100	1.9	22	100	●
D0200A100	2.0	23	100	●
D0210A150	2.1	23	150	●
D0220A150	2.2	26	150	●
D0230A150	2.3	26	150	●
D0240A150	2.4	29	150	●
D0250A150	2.5	29	150	●
D0260A150	2.6	29	150	●
D0270A150	2.7	32	150	●
D0280A150	2.8	32	150	●
D0290A150	2.9	32	150	●
D0300A150	3.0	32	150	●
D0310A150	3.1	35	150	●
D0320A150	3.2	35	150	●
D0330A150	3.3	35	150	●
D0340A150	3.4	38	150	●
D0350A150	3.5	38	150	●
D0360A200	3.6	38	200	●
D0370A200	3.7	38	200	●
D0380A200	3.8	42	200	●
D0390A200	3.9	42	200	●
D0400A200	4.0	42	200	●
D0410A200	4.1	42	200	●
D0420A200	4.2	42	200	●
D0430A200	4.3	46	200	●
D0440A200	4.4	46	200	●
D0450A200	4.5	46	200	●
D0460A200	4.6	46	200	●
D0470A200	4.7	46	200	●
D0480A200	4.8	51	200	●
D0490A200	4.9	51	200	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDLSD0500A200	5.0	51	200	●
D0510A200	5.1	51	200	●
D0520A200	5.2	51	200	●
D0530A200	5.3	51	200	●
D0540A200	5.4	56	200	●
D0550A200	5.5	56	200	●
D0560A200	5.6	56	200	●
D0570A200	5.7	56	200	●
D0580A200	5.8	56	200	●
D0590A200	5.9	56	200	●
D0600A200	6.0	56	200	●
D0610A250	6.1	62	250	●
D0620A250	6.2	62	250	●
D0630A250	6.3	62	250	●
D0640A250	6.4	62	250	●
D0650A250	6.5	62	250	●
D0660A250	6.6	62	250	●
D0670A250	6.7	62	250	●
D0680A250	6.8	67	250	●
D0690A250	6.9	67	250	●
D0700A250	7.0	67	250	●
D0710A250	7.1	67	250	●
D0720A250	7.2	67	250	●
D0730A250	7.3	67	250	●
D0740A250	7.4	67	250	●
D0750A250	7.5	67	250	●
D0760A250	7.6	73	250	●
D0770A250	7.7	73	250	●
D0780A250	7.8	73	250	●
D0790A250	7.9	73	250	●
D0800A250	8.0	73	250	●
D0810A250	8.1	73	250	●
D0820A250	8.2	73	250	●
D0830A250	8.3	73	250	●
D0840A250	8.4	73	250	●
D0850A250	8.5	73	250	●
D0860A250	8.6	79	250	●
D0870A250	8.7	79	250	●
D0880A250	8.8	79	250	●
D0890A250	8.9	79	250	●

● : Inventory maintained.

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Stock
SDLSD0900A250	9.0	79	250	●
D0910A250	9.1	79	250	●
D0920A250	9.2	79	250	●
D0930A250	9.3	79	250	●
D0940A250	9.4	79	250	●
D0950A250	9.5	79	250	●
D0960A250	9.6	85	250	●
D0970A250	9.7	85	250	●
D0980A250	9.8	85	250	●
D0990A250	9.9	85	250	●
D1000A250	10.0	85	250	●

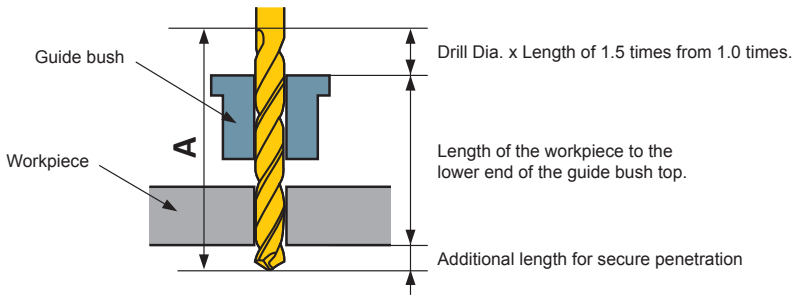
RECOMMENDED CUTTING CONDITIONS

Work material	Mild Steel (≤180HB), Carbon Steel, Alloy Steel(180−250HB) SS400, S10C, S45C, SCM440 etc.				Alloy Steel, Tool Steel (≤30HRC) SKD61, SKT4 etc.				Alloy Steel, Tool Steel (<40HRC) SKD61, SKT4 etc.				Gray Cast Iron (≤350MPa) FC300 etc.			
Drill Dia. (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (mm/rev)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (mm/rev)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (mm/rev)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (mm/rev)	Feed rate (mm/min)
1.0	16	5000	0.02	100	13	4000	0.01	40	9	2800	0.007	15	16	5000	0.02	100
1.5	20	4200	0.03	125	15	3200	0.02	60	10	2100	0.01	20	20	4200	0.03	125
2.0	20	3200	0.05	160	16	2500	0.03	75	11	1800	0.02	35	20	3200	0.05	160
3.0	20	2100	0.1	210	17	1800	0.06	105	11	1200	0.04	45	22	2300	0.1	230
4.0	20	1600	0.12	190	17	1350	0.08	105	11	900	0.06	50	22	1750	0.12	210
5.0	20	1300	0.14	180	17	1100	0.1	110	11	700	0.08	55	22	1400	0.14	195
6.0	20	1050	0.17	175	17	900	0.12	105	11	600	0.1	60	22	1150	0.18	205
7.0	20	900	0.19	170	17	780	0.14	105	11	500	0.11	55	22	1000	0.19	190
8.0	20	800	0.2	160	17	670	0.15	100	11	450	0.12	50	22	890	0.2	175
9.0	20	700	0.21	145	17	600	0.16	95	11	400	0.13	50	22	780	0.21	160
10.0	20	650	0.22	140	17	540	0.17	90	11	350	0.14	45	22	700	0.22	150

Work material	Ferritic and Martensitic Stainless Steel (≤200HB) SUS410, SUS430 etc.				Austenitic Stainless Steel (≤200HB) SUS304, SUS316 etc.				Copper, Copper Alloys				Aluminium Alloy (Si<5%) A6061, A7075 etc.			
Drill Dia. (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (mm/rev)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (mm/rev)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (mm/rev)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (mm/rev)	Feed rate (mm/min)
1.0	13	4000	0.02	80	9	3000	0.02	60	16	5000	0.02	100	22	7000	0.04	280
1.5	14	3000	0.03	90	9	2000	0.03	60	20	4200	0.03	125	28	6000	0.06	360
2.0	14	2200	0.05	110	9	1500	0.04	60	20	3200	0.05	160	30	4800	0.08	380
3.0	15	1600	0.07	110	9	1000	0.06	60	20	2100	0.1	210	40	4200	0.13	545
4.0	15	1200	0.11	130	9	700	0.08	55	20	1600	0.12	190	40	3200	0.16	510
5.0	15	950	0.13	120	9	600	0.09	50	20	1300	0.14	180	40	2550	0.2	510
6.0	15	800	0.14	110	10	530	0.1	50	20	1050	0.18	185	40	2100	0.23	480
7.0	15	700	0.15	105	10	450	0.11	45	20	900	0.19	170	40	1800	0.25	450
8.0	15	600	0.16	95	10	400	0.13	50	20	800	0.2	160	40	1600	0.28	445
9.0	15	520	0.17	85	10	360	0.14	50	20	700	0.21	145	40	1400	0.3	420
10.0	15	480	0.18	85	10	310	0.15	45	20	650	0.22	140	40	1280	0.33	420

(Note) For the spindle revolution of diameters not shown in the table, please adjust to the conditions of larger and closest diameter, or calculate from the cutting speed of the closest diameter. For the feed rate per revolution, please set up within the recommended feed rate of the closest diameter appropriately.

1) Please reduce the revolution and feed rate depending on the drilling situation when the installation of workpiece or machine lacks rigidity.
2) When drilling holes greater than 3 x drill diameter hole depths, please use a peck feed.
3) The above-mentioned cutting condition is standard when adjusting a tool overhang to twice longer than flute length.
   Please modulate the cutting conditions when overhang length is long.
4) Use of water-soluble cutting fluid is recommended. Please reduce the revolution when using water-insoluble cutting fluid.
5) Use sufficient cutting fluid. Please reduce the revolution when not supplied sufficient cutting fluid.
6) When using a guide bush, please confirm if it is flute length>A. In case of short flute length, please conduct machining without the bush.
   And, when not being able to dismount the bush, please use LSD or G-WSL.

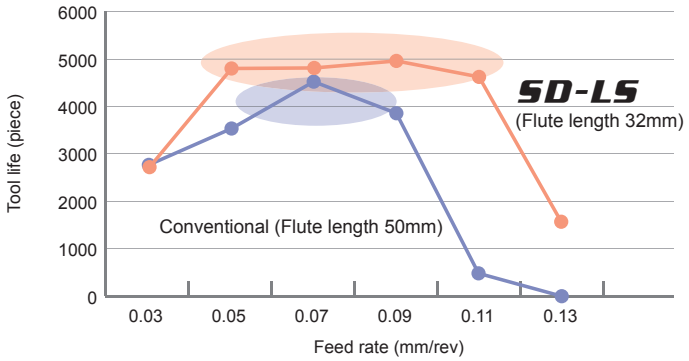


Technical Data

The advantage of long shank drill

UP Tool life and Machining efficiency

Tool life vs. feed rate



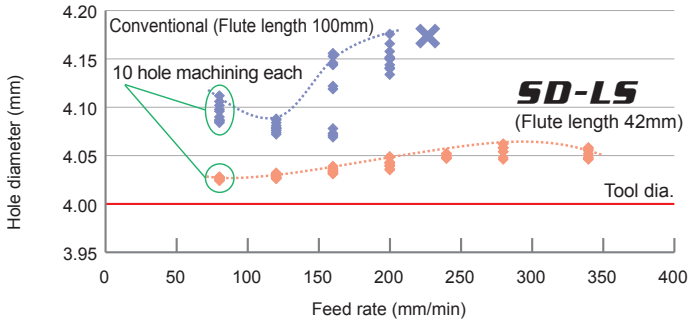
POINT

Easy to set up cutting condition.
Possible to be used at higher feed.

<Cutting Conditions>
Work material : S50C (DIN-C50)
Drill Dia. : ø3mm
Cutting speed : 25m/min
Feed rate : 398mm/min
Hole depth : 9mm (Blind hole)
Overhang length : 110mm

UP Hole diameter accuracy and Stable cutting area

Hole expansion amount vs. feed rate



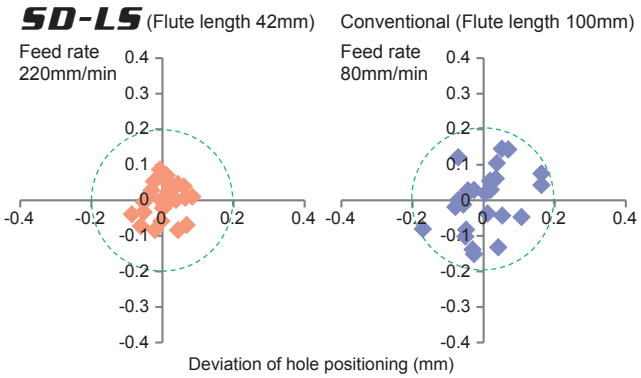
POINT

Small deviation and prevented expansion of hole diameter without any effect of feed rate.

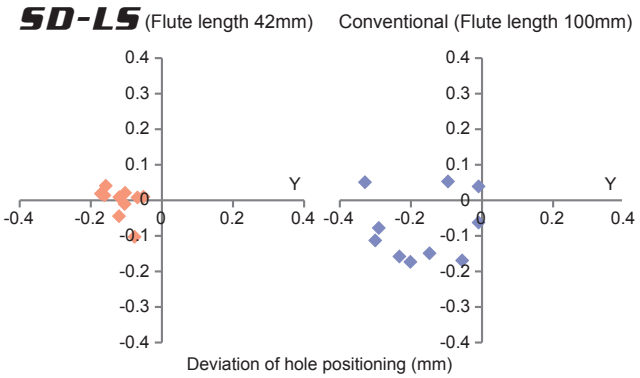
<Cutting Conditions>
Work material : S50C
Drill Dia. : ø4mm
Cutting speed : 25m/min
Hole depth : 7mm (Blind hole)
Overhang length : 110mm

UP Hole positioning accuracy

Deviation of hole positioning in surface machining



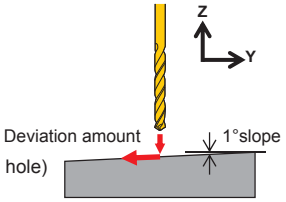
Deviation amount of hole positioning in 1°slope machining.



POINT

Better engaging stability.
High rigidity.

<Cutting Conditions>
Work material : S50C
Drill Dia. : ø4mm
Cutting speed : 25m/min
Hole depth : 13mm (Through hole)
Overhang length : 110mm



Long shank straight drill

SD-LS

For Your Safety
●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc. ●Grinding or heating of cutting tools produces dust and mist. Inhaling large amount of dust or contacting with eyes and skins may harm your body.

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(Tools specifications subject to change without notice.)

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