

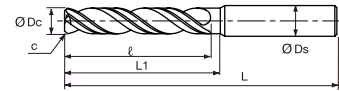
L9814

NEW

AQUA Drill EX FLAT Oil-Hole 5D



double margin



Dc	ℓ	L	L1	Ds
3.0	20	74	21	3
3.1	22	80	25	4
3.2	22	80	25	4
3.3	22	80	25	4
3.4	24	80	25	4
3.5	24	80	26	4
3.6	24	80	27	4
3.7	24	80	27	4
3.8	26	80	27	4
3.9	26	80	27	4
4.0	26	80	27	4
4.1	28	90	30	5
4.2	28	90	30	5
4.3	28	90	30	5
4.4	29	90	30	5
4.5	29	90	31	5
4.6	29	90	34	5
4.7	32	90	34	5
4.8	32	90	34	5
4.9	32	90	34	5
5.0	33	90	34	5
5.1	35	94	38	6
5.2	35	94	38	6
5.3	35	94	38	6
5.4	37	94	38	6
5.5	37	94	39	6
5.6	37	94	40	6
5.7	39	94	40	6
5.8	39	94	40	6
5.9	39	94	40	6
6.0	39	94	40	6
6.1	41	101	44	7
6.2	41	101	44	7
6.3	41	101	44	7
6.4	43	101	44	7
6.5	43	101	45	7
6.6	43	101	46	7
6.7	45	101	46	7
6.8	45	101	46	7
6.9	45	101	46	7
7.0	46	101	46	7
7.1	48	110	51	8
7.2	48	110	51	8
7.3	48	110	51	8
7.4	50	110	51	8
7.5	50	110	52	8
7.6	50	110	53	8
7.7	52	110	53	8
7.8	52	110	53	8
7.9	52	110	53	8

Dc	ℓ	L	L1	Ds
8.0	52	110	53	8
8.1	54	117	57	9
8.2	54	117	57	9
8.3	54	117	57	9
8.4	56	117	57	9
8.5	56	117	58	9
8.6	56	117	59	9
8.7	58	117	59	9
8.8	58	117	59	9
8.9	58	117	59	9
9.0	59	117	59	9
9.1	61	126	64	10
9.2	61	126	64	10
9.3	61	126	64	10
9.4	63	126	64	10
9.5	63	126	65	10
9.6	63	126	66	10
9.7	65	126	66	10
9.8	65	126	66	10
9.9	65	126	66	10
10.0	65	126	66	10
10.1	67	138	70	11
10.2	67	138	70	11
10.3	67	138	70	11
10.4	69	138	70	11
10.5	69	138	71	11
10.6	69	138	71	11
10.7	72	138	73	11
10.8	72	138	73	11
10.9	72	138	73	11
11.0	73	138	73	11
11.1	74	146	77	12
11.2	74	146	77	12
11.3	74	146	77	12
11.4	76	146	77	12
11.5	76	146	78	12
11.6	76	146	79	12
11.7	78	146	79	12
11.8	78	146	79	12
11.9	78	146	79	12
12.0	78	146	79	12
12.5	82	153	84	13
13.0	86	153	86	13
13.5	89	162	91	14
14.0	91	162	92	14
14.5	95	169	97	15
15.0	98	169	98	15
15.5	102	178	104	16
16.0	104	178	105	16

All sizes stocked in Japan

Standard Drilling Conditions

Work material	Structural Steel, Carbon Steel, Grey Cast Iron SS400 S55C FC250		Alloy Steel, Pre-Hardened SCM SKT SKS SKD		Mold Steel SKT SKD NAK55 HPM1		Hardened Steel		Ductile Cast Iron FCD400		Stainless Steel SUS304		Aluminum Alloy A7075	
	~200HB		20-30HRC		30-40HRC		40-50HRC				38-45HRC			
mm	min ⁻¹	mm/min	min ⁻¹	mm/min	min ⁻¹	mm/min	min ⁻¹	mm/min	min ⁻¹	mm/min	min ⁻¹	mm/min	min ⁻¹	mm/min
3	14800	1340	10600	635	7400	330	6370	285	10500	480	10500	635	17000	1530
4	11100	1340	7900	635	5550	330	4780	285	7900	480	7900	635	13700	1530
5	8900	1340	6300	635	4450	330	3820	285	6300	480	6300	635	10200	1530
6	7400	1340	5300	635	3700	330	3180	285	5300	480	5300	635	9500	1530
8	5570	1340	3950	635	2790	330	2390	285	3950	480	3950	635	6370	1530
10	4460	1340	3150	635	2230	330	1900	285	3150	480	3150	635	5100	1530
12	3700	1340	2650	635	1860	330	1590	285	2650	480	2650	635	4240	1530
16	2790	1340	1990	635	1390	330	1190	285	1990	480	1990	635	3180	1530

Warnings on using the drilling condition tables

- Adjust drilling condition according to the rigidity of machine or work clamp state.
- This table values are for drilling with water soluble cutting fluid. When using non-water soluble cutting fluid, reduce the RPM and feed speeds by 20 %.
- Use the table values for drilling depths under 5xD.

- Drilling requires, 1:a centering hole larger than the diameter or 2:a guide hole of the same diameter. (1:AG Starting Drill is recommended for centering holes, and 2:Aqua Drill EX Flat is recommended for guide holes. For drilling stainless steel, Aqua Drill EX Flat EXOH3D is recommended.)
- Side milling is not possible.

Features and Specifications

Tool	Depth	Feature				Drill Feature		
		deep position	efficiency	slope	hole accuracy	Guide hole	Double margin	Internal coolant
AQUA FLAT 2D	2D		⊙	⊙		no		
AQUA FLAT Oil Hole 3D	3D		⊙	⊙	⊙	no	○	○
AQUA FLAT Oil Hole 5D	5D	⊙	○		○	need	○	○

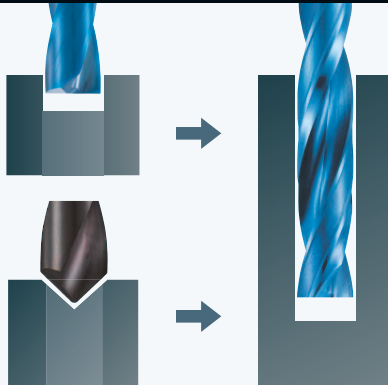
Applicable work materials

Tool	Structural Steels	Carbon Steels	Pre-Hardened Steels Alloy Steels	Hardened Steels Mold Steels	Hardened Steels		Stainless Steels		Titanium Alloys Nickel Alloys	Cast Irons	Aluminum Alloys	Copper Alloys
	SS400	S45C	SCM/NAK	30~40HRC	40~50HRC	50~60HRC	SUS304/SUS316	SUS420		FC/FCD	AC/ADC	CU
AQUA FLAT 2D	⊙	⊙	⊙	⊙	○			⊙		⊙	○	○
AQUA FLAT Oil Hole 3D	⊙	⊙	⊙	⊙	○		○	⊙	○	⊙	⊙	○
AQUA FLAT Oil Hole 5D	⊙	⊙	⊙	⊙	○		○	⊙	○	⊙	⊙	⊙

User Guide

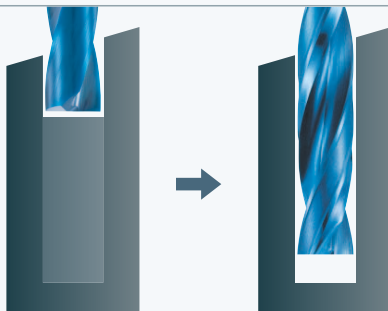
AQUA EX Flat Oil Hole 5D drilling

Please make a guide hole with AQUA EX Flat 2D (Incase of stainless steel, please use AQUA EX Flat Oil Hole 3D)



Chamfering with AG Starting drill

Please make a guide hole with AQUA EX Flat 2D (Incase of stainless steel, please use AQUA EX Flat Oil Hole 3D)

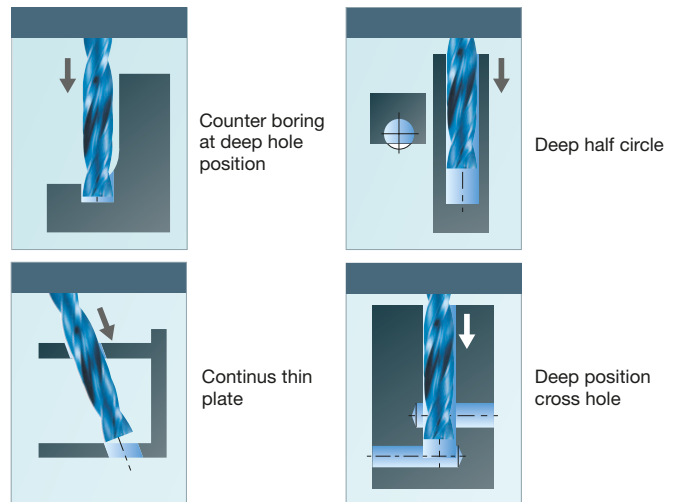


Reduction of hole enlargement

Double margin and 2step cutting edge point geometry reduce the hole enlargement. With Oil hole, excellent chip evacuation



New capable application



Cutting condition comparison on slope drilling

Position	No.	angle	Cutting Speed			Feed		
			m/min	min ⁻¹	ratio	mm/min	mm/rev	ratio
①	0	75	2400	100%	420	0.18	100%	
②	19°	52	1650	70%	210	0.09	50%	
③	35°	52	1650	70%	120	0.07	40%	
④	51°	52	1650	70%	120	0.07	40%	
⑤	64°	52	1650	70%	90	0.06	33%	
⑥	half circle				60	0.04	20%	

