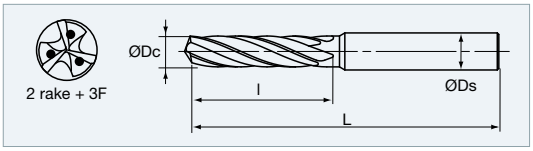
AQDEXOH3F3D

AQUA Drill EX Oil-Hole 3Flutes 3D



LIST9826			Unit: mm
Dc	l	L	Ds
3.0	17	68	3
3.1	20	72	4
3.2	20	72	4
3.3	20	72	4
3.4	20	72	4
3.5	20	72	4
3.6	22	72	4
3.7	22	72	4
3.8	22	72	4
3.9	22	72	4
4.0	22	72	4
4.1	25	80	5
4.2	25	80	5
4.3	25	80	5
4.4	25	80	5
4.5	25	80	5
4.6	27	80	5
4.7	27	80	5
4.8	27	80	5
4.9	27	80	5
5.0	27	80	5
5.1	27	82	6
5.2	27	82	6
5.3	27	82	6
5.4	27	82	6
5.5	27	82	6

LIST9826			Unit: mm
Dc	l	L	Ds
5.6	30	82	6
5.7	30	82	6
5.8	30	82	6
5.9	30	82	6
6.0	30	82	6
6.1	32	88	7
6.2	32	88	7
6.3	32	88	7
6.4	32	88	7
6.5	32	88	7
6.6	35	88	7
6.7	35	88	7
6.8	35	88	7
6.9	35	88	7
7.0	35	88	7
7.1	37	94	8
7.2	37	94	8
7.3	37	94	8
7.4	37	94	8
7.5	37	94	8
7.6	40	94	8
7.7	40	94	8
7.8	40	94	8
7.9	40	94	8
8.0	40	94	8
8.1	42	100	9

LIST9826			Unit: mm
Dc	l	L	Ds
8.2	42	100	9
8.3	42	100	9
8.4	42	100	9
8.5	42	100	9
8.6	45	100	9
8.7	45	100	9
8.8	45	100	9
8.9	45	100	9
9.0	45	100	9
9.1	47	106	10
9.2	47	106	10
9.3	47	106	10
9.4	47	106	10
9.5	47	106	10
9.6	50	106	10
9.7	50	106	10
9.8	50	106	10
9.9	50	106	10
10.0	50	106	10
10.1	52	116	11
10.2	52	116	11
10.3	52	116	11
10.4	52	116	11
10.5	52	116	11
10.6	55	116	11
10.7	55	116	11

LIST9826			Unit: mm
Dc	l	L	Ds
10.8	55	116	11
10.9	55	116	11
11.0	55	116	11
11.1	57	122	12
11.2	57	122	12
11.3	57	122	12
11.4	57	122	12
11.5	57	122	12
11.6	60	122	12
11.7	60	122	12
11.8	60	122	12
11.9	60	122	12
12.0	60	122	12
12.1	62	128	13
12.5	62	128	13
13.0	65	128	13
13.5	67	134	14
14.0	70	134	14
14.1	72	140	15
14.5	72	140	15
15.0	75	140	15
15.5	77	146	16
15.6	80	146	16
16.0	80	146	16

Standard Drilling Conditions AQDEXOH3F3D/5D

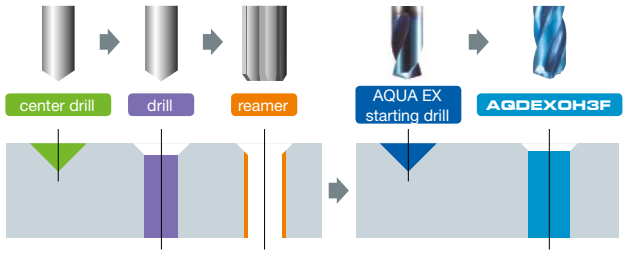
Work material	Structural Steels Carbon Steels Grey cast iron ST-37-2, C50, GG		Alloy Steels Pre-Hardened Steels		Mold Steels Hardened Steels		Hardened Steels		Stainless Steels 1.4301, 1.4401		Cast Irons GGG	
	–200HB		20–30HRC		30–40HRC		40–50HRC					
mm	min^{-1}	mm/min	min^{-1}	mm/min	min^{-1}	mm/min	min^{-1}	mm/min	min^{-1}	mm/min	min^{-1}	mm/min
3.0	10700	1280	8500	1020	7450	780	5600	540	5300	560	8500	1020
4.0	8000	1280	6400	1020	5600	780	4200	540	4000	560	6400	1020
6.0	5300	1280	4250	1020	3750	780	2800	540	2650	560	4250	1020
8.0	4000	1280	3200	1020	2800	780	2100	540	2000	560	3200	1020
10.0	3200	1280	2550	1020	2250	780	1700	540	1600	560	2550	1020
12.0	2650	1280	2100	1020	1850	780	1400	540	1350	560	2100	1020
14.0	2250	1120	1800	900	1600	670	1200	450	1150	480	1800	890
16.0	2000	1120	1600	900	1400	670	1050	450	1000	480	1600	890

Attention on using the drilling condition tables

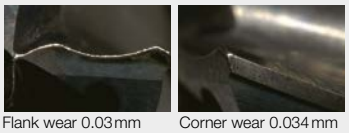
1. Adjust cutting conditions according to the situation, such as rigidity of machine, work clamp, and shape of workpiece.
2. Cutting conditions listed here use water-soluble cutting fluid.
3. Reduce RPM and feed speeds by 20% for non-water-soluble cutting fluids.
4. Use internal coolant.
5. These drilling conditions are for the AQDEXOH3F3D up to 3D and for the AQDEXOH3F5D up to 5D. However a work material and drilling condition to chip removal may be worse. In that case, add step feed even if drilling depth 3xD, 5xD it as follows.
6. In step feed, return to the entrance hole.
7. Step feed intarval is about 0.2~1xD.
8. Set up the chuck for the drill bit so there is less than 0.01mm of runout.

Other examples

Machine part Stainless steel 1.4301 (SUS304)



AQDEXOH3D after 2260 holes



Flank wear 0.03mm Corner wear 0.034mm

Hole tolerance

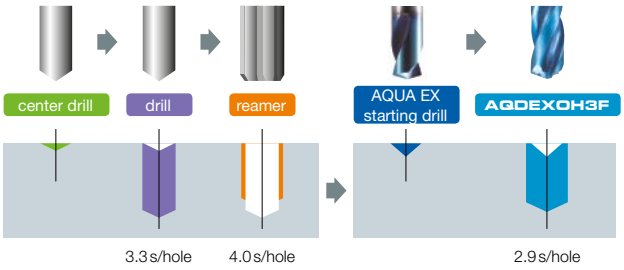
Hole enlargment under 0.01 mm
Roundness under 0.01 mm
Cylindricity under 0.02 mm

Possible to continue

Cutting Condition

Tool:	L9826 AQDEXOH3F3D 4.4mm
Cutting speed:	40m/min
Feed:	300mm/min
Hole depth:	7 mm through hole
Machine:	Vertical Machining Centre (BT40)
Cutting fluid:	Water soluble

Construction equipment parts C45 (200 HB)



Succeed Ø14.0 H7
Succeed reducing process
Reduced 60% of cycle time

Cutting Condition

Tool:	L9826 AQDEXOH3F3D 14.0mm
Cutting speed:	65m/min
Feed:	430mm/min
Hole depth:	21 mm through hole
Machine:	Vertical Machining Centre (BT40)
Cutting fluid:	Water soluble

Internal oil hole and three flutes provide high precision and great performance

AQUA Drill EX Series

Oil Hole 3 Flutes

AQDEXOH3F

3D 5D

High Precision and High Efficient Oil Hole 3 Flute Drill

AQUA Drill EX

Oil Hole 3 Flutes

AQDEXOH3F 3D 5D

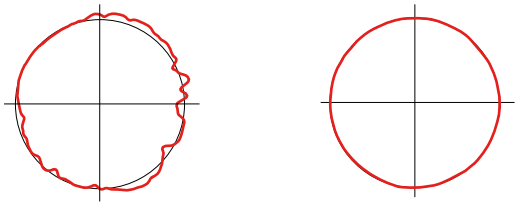
- High precision drilling until 5D depth possible
- Well balanced 3flute and optimized point geometry together with the oil hole will realize the high efficient drilling

High precision drilling

Roundness comparison

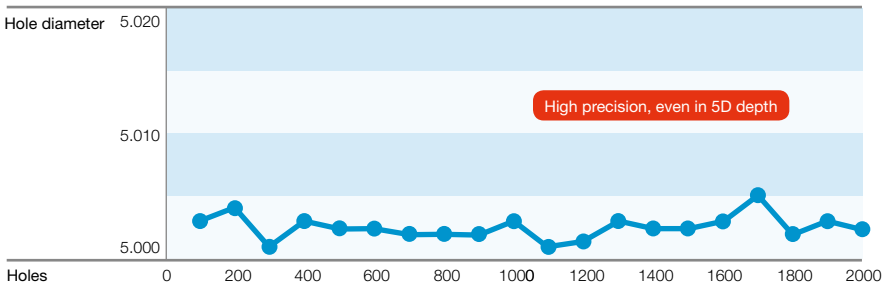
Conventional drill	
Cutting speed:	45 m/min
Feed:	300 mm/rev. (0.25 mm/rev)
Roundness:	14.5 µm

AQDEXOH3D	
Cutting speed:	50 m/min
Feed:	570 mm/rev. (0.43 mm/rev)
Roundness:	1.7 µm



Cutting Condition	
Tool:	L9826 AQDEXOH3F3D 12.0 mm
Cutting depth:	36 mm blind hole
Material:	Stainless steel 1.4301 (SUS304)
Cutting fluid:	Water soluble

Transition of hole enlargement with AQDEXOH3F5D

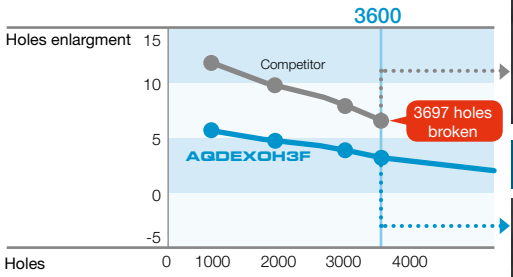


Cutting Condition	
Tool:	L9820 AQDEXOH3F3D 5.0 mm
Cutting speed:	100 m/min
Feed:	1280 mm/min (conventional drill was 950 mm/min)
Cutting depth:	25 mm blind hole
Material:	C50 (180 HB)
Cutting fluid:	Water soluble

High Efficient and Long Tool Life

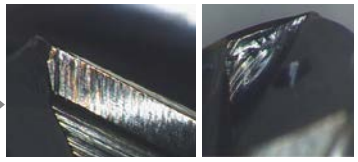
High feed non-step drilling

Feed 1500 mm/min, 5D depth



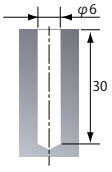
Cycle time 1.2 sec/hole
Total cutting length over 150 m

Competitor

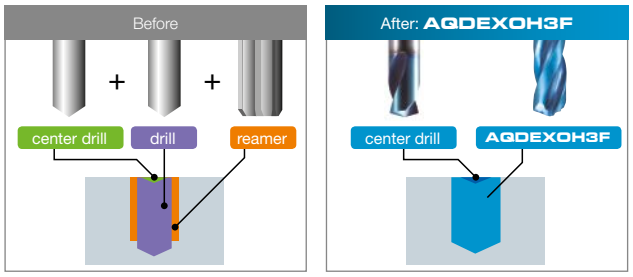


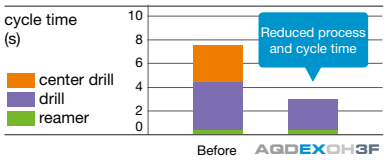
AQDEXOH3F5D 6.0

Cutting Condition	
Tool:	L9820 AQDEXOH3F5D 6.0 mm
Cutting speed:	120 m/min
Feed:	1500 mm/min
Cutting depth:	30 mm
Material:	C50 (180 HB)
Cutting fluid:	Water soluble



Process reduction



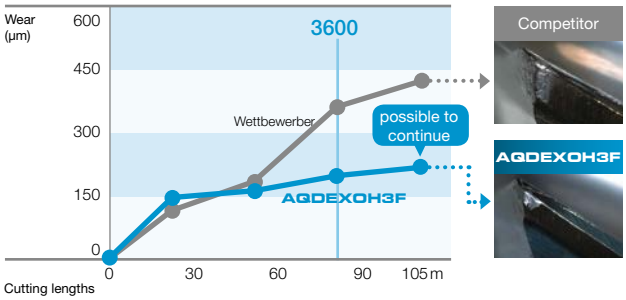


Cutting Condition

Hole requirement:	12.0 mm
Material:	C50 (200 HB)
Cutting depth:	20 mm

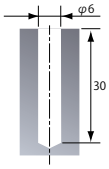
Stable drilling on Structural Steels (ST37-2)

Wear comparison after 150 m driling!



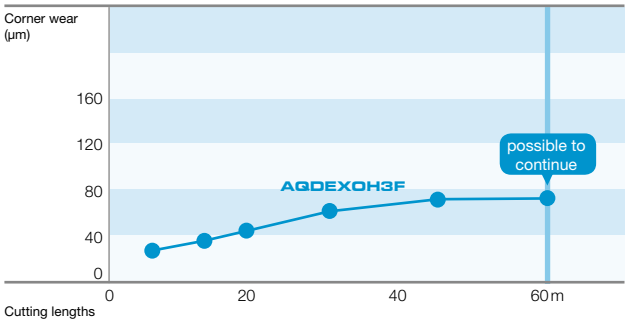
Cutting Condition

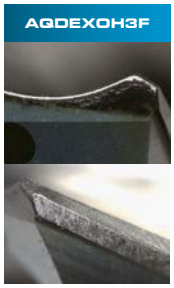
Tool:	L9820 AQDEXOH3F5D 6.0 mm
Cutting speed:	100 m/min
Feed:	1280 mm/min (0.24 mm/rev)
Cutting depth:	30 mm blind hole
Material:	Structural steel ST37-2 (SS400)
Cutting fluid:	Water soluble



Long tool life even on Stainless Steel 1.4301 (SUS304)

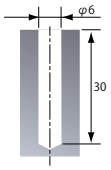
Wear comparison after 60 m driling





Cutting Condition

Tool:	L9820 AQDEXOH3F5D 6.0 mm
Cutting speed:	50 m/min
Feed:	480 mm/min (0.18 mm/rev)
Cutting depth:	30 mm blind hole
Material:	Structural steel 1.4301 (SUS304)
Cutting fluid:	Water soluble



Applicable work materials

Structural Steels	Carbon Steels	Pre-Hard-ened Steels Alloy Steels	Hardened Steels Mold Steels	Hardened Steels		Stainless Steels		Ti Alloys Ni Alloys	Cast Iron	Alumnium Alloys	Copper Alloys
ST37-2	C45/C50	42CrMo4 SCR/NAK	30~40 HRC	40~50 HRC	50~65 HRC	Austentic 1.4301/1.4401 SUS304/SUS316	Martenstic 1.4021/1.4028 SUS420		GG/GGG	Al/ADC	Cu
■	■	■	■	■		❍	❍		❍		