

**New USA Stock Items**

**NACHI**

# **AQUA DRILL EX CARBIDE DRILL SERIES**

**Aqua EX 2D, 4D**

**Aqua EX Oil Hole 3D, 5D, 8D**

**Aqua EX Deep Hole 10D, 15D, 20D, 25D, 30D, 40D**

**Aqua EX Oil Hole Pilot**

**Aqua EX Oil Hole Three Flute 3D, 5D**

**Aqua Micro**

**Metric, Fractional, Wire & Letter Sizes Now Available**



Designed for consistent high performance drilling  
in stainless steels to high temperature alloys.

# AQUA EX SERIES

## AQUA DRILL EX CARBIDE DRILL SERIES

AQDEXS | AQDEXR | AQDEXOH3D | AQDEXOH5D | AQDEXOH8D  
AQDEXOH10D, 15D, 20D, 25D, 30D, 40D, PLT | AQMD



### Features of Aqua EX Drill Series Fluting

- Unique J-shape flute design helps to generate easy chip break up.
- Smooth flute polishing facilitates fluid chip evacuation.
- Deep pockets ensure minimal chip packing.



Smooth Flute

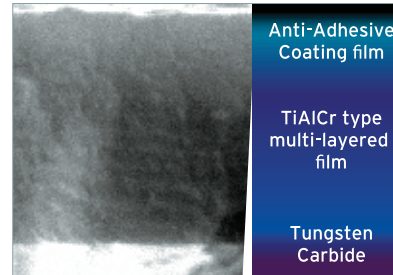
Deep Pocket

### Features of Aqua EX Drill Series Coating

- Aqua EX coating is designed for superior performance in both dry and wet conditions.
- EX = Exotic materials, extreme conditions.
- Engineering to withstand heavy wear and maintain consistent performance.

AQUA EX coating

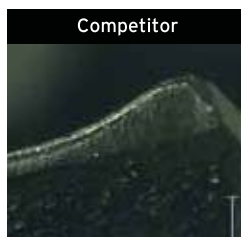
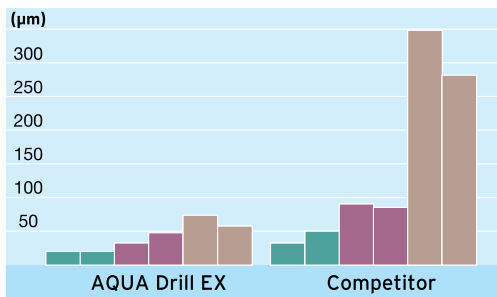
True Blue



## Long Tool Life

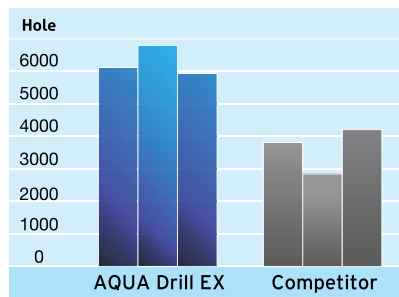
### Cutting resistance is low

#### Durability comparison



#### Flowing curve

#### Durability comparison (Service Life)



Cutting Conditions	
Tool	: AQDEXR6.0 (L9602)
Speed	: 100m/min (RPM=5300)
Feed	: 0.18mm/rev (960mm/min)
Feed	: 0.007 IPR / 21.0 IPM
Work Material	: C50 (Carbon Steel)
Cutting Fluid	: Water Soluble

### Fine Chips with AQUA DRILL EX

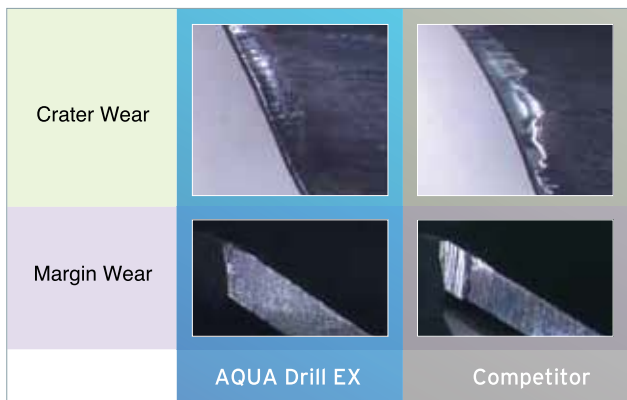


*Delicate Cut*

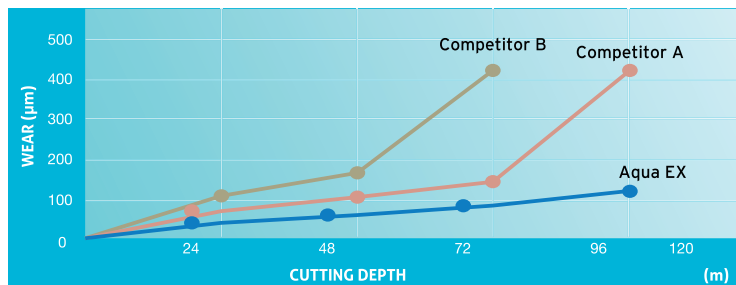
*Tough Heart*



## Comparison of wear after 625 Holes in 304 SS



## Comparison of wear on 304 SS

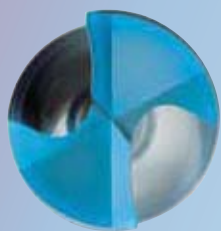


### Cutting Conditions

Tool : Ø9.0 5D	Feed : 640mm/min (IPR = 0.008 / IPM = 25)	Work Material : 304 Stainless
Speed : 90m/min (RPM = 3,200)	Depth : 40mm (1.57")	Cutting Fluid : Water Soluble

## NEW AQUA DRILL EX DESIGN V/S AQUA DRILL

### AQUA Drill EX (New Design)



- Engineered to handle the full range of applications.
- Aqua EX coating stands up to the highest temperatures.
- Optimal design for hard materials like Nickel / Titanium alloys.
- From start to finish designed with optimum chip evacuation in mind.

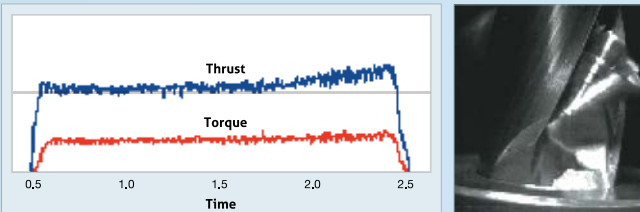
### AQUA Drill (Old Design)



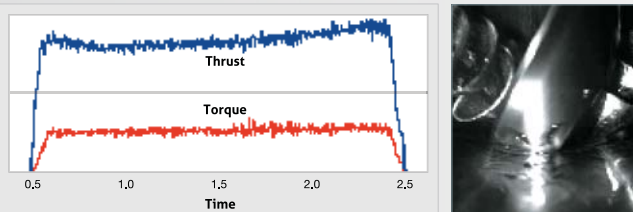
- Special cutting edge shape has superior wear resistance.
- High web thickness to increase tool rigidity
- Innovative AQUA coating was the first of it's kind.
- Not suitable for Stainless Steel

## TORQUE / THRUST COMPARISON

### AQUA Drill EX



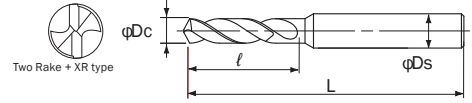
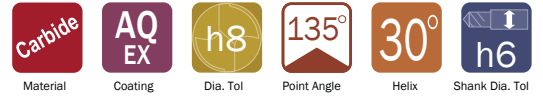
### Competitor



**Consistent Thrust & Torque with Aqua Drill EX**

# AQDEXS

AQUA Drill EX Stub



## L9600 Metric Sizes

## L9601 Fractional, Wire & Letter Sizes

Non-coolant Thru

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length $\ell$	Overall Length L	Shank Dia. Ds	Stock			
0700710	2.00		0.0787	8	45	3	•			
0700727	2.10		0.0827	10			•			
0700733	2.20		0.0866				•			
0700740	2.30		0.0906	•						
0700756	2.40		0.0945	•						
0700762	2.50		0.0984	•						
0700779	2.60		0.1024	•						
0700785	2.70		0.1063	13			•			
0700791	2.80		0.1102				•			
0700807	2.90		0.1142	•						
0700813	3.00		0.1181	19	4	•				
0700820	3.10		0.1220			•				
1481500	3.18	1/8	0.1250			•				
0700836	3.20		0.1260			•				
0700842	3.30		0.1299			•				
0700859	3.40		0.1339			•				
0700865	3.50		0.1378			•				
1481517	3.57	9/64	0.1406			21	54	4	•	
0700871	3.60		0.1417						•	
0700888	3.70		0.1457			•				
0700894	3.80		0.1496	23	61	5	•			
0700900	3.90		0.1535				•			
1481523	3.97	5/32	0.1563				•			
0700916	4.00		0.1575				•			
1482267	4.04	#21	0.1590				25	65	6	•
1482273	4.09	#20	0.1610							•
0700922	4.10		0.1614				•			
0700939	4.20		0.1654				•			
0700945	4.30		0.1693				•			
1481530	4.37	11/64	0.1719				27	73	7	•
0700951	4.40		0.1732	•						
0700968	4.50		0.1772	•						
0700974	4.60		0.1811	•						
0700980	4.70		0.1850	•						
1481546	4.76	3/16	0.1875	•						
0700997	4.80		0.1890	•						
0701001	4.90		0.1929	•						
0701018	5.00		0.1969	•						
0701024	5.10		0.2008	•						
1482280	5.11	#7	0.2010	31	73	7	•			
1481552	5.16	13/64	0.2031				•			
0701030	5.20		0.2047				•			
0701047	5.30		0.2087				•			
0701053	5.40		0.2126				•			
1482296	5.41	#3	0.2130				•			
0701060	5.50		0.2165				•			
1481569	5.56	7/32	0.2188				•			
0701076	5.60		0.2205				•			
1482301	5.61	#2	0.2210				•			
0701082	5.70		0.2244	•						
0701099	5.80		0.2283	•						
0701104	5.90		0.2323	•						
1481575	5.95	15/64	0.2344	•						
0701110	6.00		0.2362	•						
0701127	6.10		0.2402	•						
0701133	6.20		0.2441	•						

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length $\ell$	Overall Length L	Shank Dia. Ds	Stock
0701140	6.30		0.2480	31	73	7	•
1481581	6.35	1/4	0.2500				•
0701156	6.40		0.2520				•
0701162	6.50		0.2559				•
1482318	6.53	F	0.2570				•
0701179	6.60		0.2598				•
0701185	6.70		0.2638				•
1481598	6.75	17/64	0.2656				•
0701191	6.80		0.2677				•
0701207	6.90		0.2717				•
1482324	6.91	I	0.2720	33	78	8	•
0701213	7.00		0.2756				•
1482330	7.04	J	0.2770				•
0701220	7.10		0.2795				•
1481603	7.14	9/32	0.2813				•
0701236	7.20		0.2835				•
0701242	7.30		0.2874				•
0701259	7.40		0.2913				•
0701265	7.50		0.2953				•
1481610	7.54	19/64	0.2969				36
0701271	7.60		0.2992	•			
0701288	7.70		0.3031	•			
0701294	7.80		0.3071	•			
0701300	7.90		0.3110	•			
1481626	7.94	5/16	0.3125	•			
0701316	8.00		0.3150	•			
0701322	8.10		0.3189	•			
0701339	8.20		0.3228	•			
1482347	8.20	P	0.3230	38	87	10	
0701345	8.30		0.3268				•
1481632	8.33	21/64	0.3281				•
0701351	8.40		0.3307				•
1482353	8.43	Q	0.3320				•
0701368	8.50		0.3346				•
0701374	8.60		0.3386				•
0701380	8.70		0.3425				•
1481649	8.73	11/32	0.3438				•
0701397	8.80		0.3465				•
0701402	8.90		0.3504	41	93	11	•
0701419	9.00		0.3543				•
0701425	9.10		0.3583				•
1481655	9.13	23/64	0.3594				•
0701431	9.20		0.3622				•
0701448	9.30		0.3661				•
1482360	9.35	U	0.3680				•
0701454	9.40		0.3701				•
0701460	9.50		0.3740				•
1481661	9.53	3/8	0.3750				•
0701477	9.60		0.3780	•			
0701483	9.70		0.3819	•			
0701490	9.80		0.3858	•			
0701505	9.90		0.3898	•			
1481678	9.92	25/64	0.3906	•			
0701511	10.00		0.3937	•			
0701528	10.10		0.3976	•			
0701534	10.20		0.4016	•			

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
0701534	10.20		0.4016	41	93	11	•
0701540	10.30		0.4055				•
1481684	10.32	13/32	0.4063				•
0701557	10.40		0.4094				•
0701563	10.50		0.4134	45	100	12	•
0701570	10.60		0.4173				•
0701586	10.70		0.4213				•
1481690	10.72	27/64	0.4219				•
0701592	10.80		0.4252	47	100	12	•
0701608	10.90		0.4291				•
0701614	11.00		0.4331				•
0701620	11.10		0.4370				•
1481706	11.11	7/16	0.4375	49	100	12	•
0701637	11.20		0.4409				•
0701643	11.30		0.4449				•
0701650	11.40		0.4488				•
0701666	11.50		0.4528	49	100	12	•
1481712	11.51	29/64	0.4531				•
0701672	11.60		0.4567				•
0701689	11.70		0.4606				•
0701695	11.80		0.4646	49	100	12	•
0701700	11.90		0.4685				•
1481729	11.91	15/32	0.4688				•
0701717	12.00		0.4724				•
0701723	12.10		0.4764	50	100	12	•
0701730	12.20		0.4803				•
0701746	12.30		0.4843				•
1481735	12.30	31/64	0.4844				•
0701752	12.40		0.4882	50	100	12	•
0701769	12.50		0.4921				•
0701775	12.60		0.4961				•
0701781	12.70		0.5000				•
1481741	12.70	1/2	0.5000	50	100	12	•
0701798	12.80		0.5039				•
0701803	12.90		0.5079				•
0701810	13.00		0.5118				•
1481758	13.10	33/64	0.5156	50		14	•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
0701826	13.10		0.5157	50	105	14	•
0701832	13.20		0.5197				•
0701849	13.30		0.5236				•
0701855	13.40		0.5276				•
1481764	13.49	17/32	0.5313	52	108	15	•
0701861	13.50		0.5315				•
0701878	13.60		0.5354				•
0701884	13.70		0.5394				•
0701890	13.80		0.5433	53	112	16	•
1481770	13.89	35/64	0.5469				•
0701906	13.90		0.5472				•
0701912	14.00		0.5512				•
0701929	14.10		0.5551	55	112	16	•
0701935	14.20		0.5591				•
1481787	14.29	9/16	0.5625				•
0701941	14.30		0.5630				•
0701958	14.40		0.5669	55	112	16	•
0701964	14.50		0.5709				•
0701970	14.60		0.5748				•
1481793	14.68	37/64	0.5781				•
0701987	14.70		0.5787	55	112	16	•
0701993	14.80		0.5827				•
0702008	14.90		0.5866				•
0702014	15.00		0.5906				•
1481809	15.08	19/32	0.5938	55	112	16	•
0702020	15.10		0.5945				•
0702037	15.20		0.5984				•
0702043	15.30		0.6024				•
0702050	15.40		0.6063	55	112	16	•
1481815	15.48	39/64	0.6094				•
0702066	15.50		0.6102				•
0702072	15.60		0.6142				•
0702089	15.70		0.6181	55	112	16	•
0702095	15.80		0.6220				•
1481821	15.88	5/8	0.6250				•
0702100	15.90		0.6260				•
0702117	16.00		0.6299	55			•

\* Package Quantity: 1 per tube.

## Standard Drilling Conditions L9600, 9601

Drill Dia. (mm/inches)	Work Material		Cast Irons Carbon Steels		Alloy Steels (20-30 HRC)		Mold Steels Hardened Steels (30-40 Hrc)		Hardened Steels (40-50 Hrc)		Ductile Cast Irons		Stainless Steel (300-Series Stainless)		Nickel Alloys, Titanium Alloys, PH Stainless		Aluminum Alloys	
	Speed (SFM)		260-270 SFM		210-220 SFM		110-120 SFM		80-90 SFM		180-190 SFM		100-105 SFM		80-90 SFM		275-300 SFM	
	Metric	Fractional	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM
3		0.1181	8500	0.003	7000	0.003	3700	0.003	2700	0.003	6000	0.003	3200	0.002	2900	0.002	9700	0.004
3.175	1/8	0.1250	8100	0.003	6700	0.003	3500	0.003	2600	0.003	5700	0.003	3100	0.002	2800	0.002	9200	0.004
4		0.1575	6500	0.004	5200	0.004	2800	0.004	2100	0.003	4400	0.004	2400	0.002	2200	0.003	7300	0.005
4.763	3/16	0.1875	5400	0.005	4400	0.005	2400	0.005	1700	0.004	3800	0.005	2000	0.003	1900	0.003	6200	0.006
5		0.1969	5100	0.005	4100	0.005	2200	0.005	1600	0.004	3600	0.005	1900	0.003	1750	0.003	5900	0.006
6		0.2362	4300	0.006	3500	0.006	1800	0.006	1300	0.005	2900	0.006	1600	0.004	1450	0.004	4900	0.007
6.35	1/4	0.2500	4100	0.006	3400	0.006	1800	0.006	1300	0.005	2800	0.006	1600	0.004	1400	0.004	4700	0.007
7.938	5/16	0.3125	3300	0.008	2700	0.008	1500	0.007	1000	0.007	2300	0.008	1300	0.005	1100	0.005	3800	0.009
8		0.3150	3200	0.008	2600	0.008	1400	0.007	900	0.007	2200	0.008	1200	0.005	1090	0.005	3700	0.009
9.525	3/8	0.3750	2800	0.010	2300	0.010	1200	0.009	900	0.008	1900	0.009	1100	0.006	1000	0.006	3100	0.010
10		0.3937	2600	0.010	2100	0.010	1100	0.009	800	0.008	1800	0.009	1000	0.006	870	0.006	2900	0.010
12		0.4724	2100	0.011	1700	0.011	950	0.010	700	0.009	1500	0.010	800	0.006	730	0.007	2200	0.013
12.7	1/2	0.5000	2000	0.012	1700	0.012	900	0.011	700	0.010	1500	0.011	800	0.006	700	0.006	2100	0.014
14		0.5512	1800	0.012	1500	0.012	800	0.011	600	0.011	1300	0.011	700	0.007	620	0.008	1900	0.014
16		0.6299	1600	0.014	1300	0.013	700	0.012	500	0.011	1100	0.013	600	0.008	550	0.009	1700	0.015

Note: 1) Utilize the standard drilling conditions shown in the catalogs just a general guide when starting operation.

2) Adjust drilling conditions if required if any vibration or unusual sound occurs when cutting.

3) When using low speed machines, use the maximum speed and adjust the feed rate.

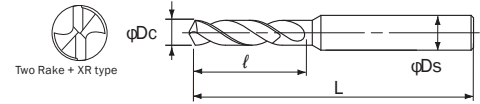
4) Use of water soluble cutting fluid is recommended.

5) In case of drying drilling - use Air blow and reduce feeds/speeds by 30%

Formulas: RPM = SFM x 3.82 Feed rate (in/min) : RPM x IPR  
Drill Dia.

# AQDEXR

AQUA DRILL EX REGULAR LENGTH



L9602 Metric Sizes

L9603 Fractional, Wire & Letter Sizes

Non-coolant Thru

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock			
	Dc			ℓ	L	Ds				
0702123	2.00		0.0787	15	49	3	•			
0702130	2.10		0.0827	17			•			
0702146	2.20		0.0866				•			
0702152	2.30		0.0906				•			
0702169	2.40		0.0945				•			
0702175	2.50		0.0984				•			
0702181	2.60		0.1024				•			
0702198	2.70		0.1063				•			
0702203	2.80		0.1102				•			
0702210	2.90		0.1142				•			
0702226	3.00		0.1181		19	4	•			
0702232	3.10		0.1220	•						
1481838	3.18	1/8	0.1250	24			60	•		
0702249	3.20		0.1260					•		
0702255	3.30		0.1299					•		
0702261	3.40		0.1339					•		
0702278	3.50		0.1378					•		
1481844	3.57	9/64	0.1406					27	76	•
0702284	3.60		0.1417							•
0702290	3.70		0.1457							•
0702306	3.80		0.1496		•					
0702312	3.90		0.1535		•					
1481850	3.97	5/32	0.1563	31	81	•				
0702329	4.00		0.1575			•				
1482376	4.04	#21	0.1590			38	81			•
1482382	4.09	#20	0.1610							•
0702335	4.10		0.1614							•
0702341	4.20		0.1654					•		
0702358	4.30		0.1693					•		
1481867	4.37	11/64	0.1719					39	83	•
0702364	4.40		0.1732							•
0702370	4.50		0.1772							•
0702387	4.60		0.1811	•						
0702393	4.70		0.1850	41	83					•
1481873	4.76	3/16	0.1875			•				
0702409	4.80		0.1890			•				
0702415	4.90		0.1929			•				
0702421	5.00		0.1969			•				
0702438	5.10		0.2008			41	83			•
1482399	5.11	#7	0.2010					•		
1481880	5.16	13/64	0.2031					•		
0702444	5.20		0.2047					•		
0702450	5.30		0.2087					•		
0702467	5.40		0.2126	•						
1482404	5.41	#3	0.2130	41	•					
0702473	5.50		0.2165	39	•					
1481896	5.56	7/32	0.2188	41	83			•		
0702480	5.60		0.2205					•		
1482410	5.61	#2	0.2210			•				
0702496	5.70		0.2244			•				
0702501	5.80		0.2283			•				
0702518	5.90		0.2323			•				
1481901	5.95	15/64	0.2344			•				
0702524	6.00		0.2362			•				
0702530	6.10		0.2402			•				
0702547	6.20		0.2441			42	83	7	•	

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock			
	Dc			ℓ	L	Ds				
0702553	6.30		0.2480	42	83	7	•			
1481918	6.35	1/4	0.2500				•			
0702560	6.40		0.2520				•			
0702576	6.50		0.2559				•			
1482427	6.53	F	0.2570				•			
0702582	6.60		0.2598				43	90	8	•
0702599	6.70		0.2638							•
1481924	6.75	17/64	0.2656							•
0702604	6.80		0.2677							•
0702610	6.90		0.2717							•
1482433	6.91	I	0.2720	45	•					
0702627	7.00		0.2756	43	83	7				•
1482440	7.04	J	0.2770	45	90	8				•
0702633	7.10		0.2795							•
1481930	7.14	9/32	0.2813							•
0702640	7.20		0.2835				•			
0702656	7.30		0.2874				•			
0702662	7.40		0.2913				•			
0702679	7.50		0.2953				48	90	8	•
1481947	7.54	19/64	0.2969							•
0702685	7.60		0.2992							•
0702691	7.70		0.3031							•
0702707	7.80		0.3071	•						
0702713	7.90		0.3110	53	98	9				•
1481953	7.94	5/16	0.3125							•
0702720	8.00		0.3150							•
0702736	8.10		0.3189							•
0702742	8.20		0.3228							•
1482456	8.20	P	0.3230				•			
0702759	8.30		0.3268				•			
1481960	8.33	21/64	0.3281				•			
0702765	8.40		0.3307				•			
1482462	8.43	Q	0.3320				55	•		
0702771	8.50		0.3346	53	98	9	•			
0702788	8.60		0.3386	55	105	10	•			
0702794	8.70		0.3425				•			
1481976	8.73	11/32	0.3438				•			
0702800	8.80		0.3465				•			
0702816	8.90		0.3504				•			
0702822	9.00		0.3543				•			
0702839	9.10		0.3583				58	105	10	•
1481982	9.13	23/64	0.3594							•
0702845	9.20		0.3622							•
0702851	9.30		0.3661							•
1482479	9.35	U	0.3680	60	•					
0702868	9.40		0.3701	58	•					
0702874	9.50		0.3740	•						
1481999	9.53	3/8	0.3750	•						
0702880	9.60		0.3780	•						
0702897	9.70		0.3819	•						
0702902	9.80		0.3858	60	114	11	•			
0702919	9.90		0.3898				•			
1482003	9.92	25/64	0.3906				•			
0702925	10.00		0.3937				•			
0702931	10.10		0.3976				•			
0702948	10.20		0.4016				66	114	11	•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
0702954	Dc		0.4055	ℓ	L	Ds	•
1482010	10.30		0.4063	66	L	Ds	•
0702960	10.40	13/32	0.4094				•
0702977	10.50		0.4134				•
0702983	10.60		0.4173				•
0702990	10.70		0.4213	68	114	11	•
1482026	10.72	27/64	0.4219				•
0703004	10.80		0.4252				•
0703010	10.90		0.4291				•
0703027	11.00		0.4331	71			•
0703033	11.10		0.4370				•
1482032	11.11	7/16	0.4375				•
0703040	11.20		0.4409				•
0703056	11.30		0.4449	73			•
0703062	11.40		0.4488				•
0703079	11.50		0.4528				•
1482049	11.51	29/64	0.4531				•
0703085	11.60		0.4567	76	121	12	•
0703091	11.70		0.4606				•
0703107	11.80		0.4646				•
0703113	11.90		0.4685				•
1482055	11.91	15/32	0.4688	78			•
0703120	12.00		0.4724				•
0703136	12.10		0.4764				•
0703142	12.20		0.4803				•
0703159	12.30		0.4843	76			•
1480780	12.30	31/64	0.4844				•
0703165	12.40		0.4882				•
0703171	12.50		0.4921				•
0703188	12.60		0.4961	78	137	13	•
0703194	12.70		0.5000				•
1480797	12.70	1/2	0.5000				•
0703200	12.80		0.5039				•
0703216	12.90		0.5079	84	147	14	•
0703222	13.00		0.5118				•
1480802	13.10	33/64	0.5156				•
0703239	13.10		0.5157				•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0703245	13.20		0.5197	84	L	Ds	•
0703251	13.30		0.5236				•
0703268	13.40		0.5276				•
1480819	10.30	17/32	0.5313				•
0703274	13.50		0.5315	86	147	14	•
0703280	13.60		0.5354				•
0703297	13.70		0.5394				•
0703302	13.80		0.5433				•
1480825	13.89	35/64	0.5469	89	153		•
0703319	13.90		0.5472	89			•
0703325	14.00		0.5512				•
0703331	14.10		0.5551				•
0703348	14.20		0.5591				•
1480831	14.29	9/16	0.5625	91	153	15	•
0703354	14.30		0.5630				•
0703360	14.40		0.5669				•
0703377	14.50		0.5709				•
0703383	14.60		0.5748	91			•
1480848	14.68	37/64	0.5781	89			•
0703390	14.70		0.5787	91			•
0703405	14.80		0.5827				•
0703411	14.90		0.5866				•
0703428	15.00		0.5906				•
1480854	15.08	19/32	0.5938	94	160	16	•
0703434	15.10		0.5945				•
0703440	15.20		0.5984				•
0703457	15.30		0.6024				•
0703463	15.40		0.6063	96			•
1480860	15.48	39/64	0.6094				•
0703470	15.50		0.6102				•
0703486	15.60		0.6142				•
0703492	15.70		0.6181	96			•
0703508	15.80		0.6220				•
1480877	15.88	5/8	0.6250				•
0703514	15.90		0.6260				•
0703520	16.00		0.6299				•

\* Package Quantity: 1 per tube.

## Standard Drilling Conditions

### L9602, 9603

Work Material			Cast Irons Carbon Steels		Alloy Steels (20-30 HRC)		Mold Steels Hardened Steels (30-40 Hrc)		Hardened Steels (40-50 Hrc)		Ductile Cast Irons		Stainless Steel (300-Series Stainless)		Nickel Alloys, Titanium Alloys, PH Stainless		Aluminum Alloys		
Speed (SFM)			260-270 SFM		210-220 SFM		110-120 SFM		80-90 SFM		180-190 SFM		100-105 SFM		80-90 SFM		275-300 SFM		
Drilling Diameter			260-270 SFM		210-220 SFM		110-120 SFM		80-90 SFM		180-190 SFM		100-105 SFM		80-90 SFM		275-300 SFM		
Drill Dia. (mm/inches)	Metric	Fractional	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
	3		0.1181	8500	0.003	7000	0.003	3700	0.002	2700	0.002	6000	0.003	3200	0.002	2900	0.002	9700	0.004
	3.175	1/8	0.1250	8100	0.003	6700	0.003	3500	0.002	2600	0.002	5700	0.003	3100	0.002	2800	0.002	9200	0.004
	4		0.1575	6500	0.004	5200	0.004	2800	0.003	2100	0.003	4400	0.004	2400	0.002	2200	0.002	7300	0.005
	4.763	3/16	0.1875	5400	0.004	4400	0.004	2400	0.004	1700	0.003	3800	0.005	2000	0.003	1900	0.003	6200	0.006
	5		0.1969	5100	0.005	4100	0.005	2200	0.004	1600	0.003	3600	0.005	1900	0.003	1750	0.003	5900	0.006
	6		0.2362	4300	0.005	3500	0.005	1800	0.005	1300	0.004	2900	0.006	1600	0.003	1450	0.003	4900	0.007
	6.35	1/4	0.2500	4100	0.006	3400	0.006	1800	0.005	1300	0.004	2800	0.006	1600	0.003	1400	0.003	4700	0.008
	7.938	5/16	0.3125	3300	0.007	2700	0.007	1500	0.006	1000	0.006	2300	0.008	1300	0.004	1100	0.004	3800	0.009
	8		0.3150	3200	0.007	2600	0.007	1400	0.006	900	0.006	2200	0.008	1200	0.005	1090	0.005	3700	0.009
9.525	3/8	0.3750	2800	0.008	2300	0.008	1200	0.007	900	0.006	1900	0.009	1100	0.005	1000	0.005	3100	0.009	
10		0.3937	2600	0.008	2100	0.009	1100	0.008	800	0.007	1800	0.009	1000	0.005	870	0.005	2900	0.010	
12		0.4724	2100	0.010	1700	0.010	950	0.008	700	0.007	1500	0.010	800	0.006	730	0.006	2200	0.011	
12.7	1/2	0.5000	2000	0.010	1700	0.010	900	0.009	700	0.007	1500	0.010	800	0.006	700	0.006	2100	0.012	
14		0.5512	1800	0.011	1500	0.011	800	0.009	600	0.008	1300	0.012	700	0.006	620	0.006	1900	0.013	
16		0.6299	1600	0.012	1300	0.012	700	0.010	500	0.009	1100	0.013	600	0.007	550	0.007	1700	0.014	

Note: 1) Utilize the standard drilling conditions shown in the catalogs just a general guide when starting operation.

2) Adjust drilling conditions if required if any vibration or unusual sound occurs when cutting.

3) When using low speed machines, use the maximum speed and adjust the feed rate.

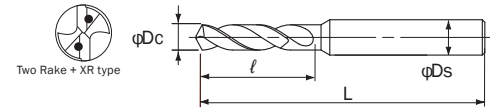
4) Use of water soluble cutting fluid is recommended.

5) In case of drying drilling - use Air blow and reduce feeds/speeds by 30%

Formulas:  $RPM = \frac{SFM \times 3.82}{\text{Drill Dia.}}$  Feed rate (in/min) :  $RPM \times IPR$

# AQDEXOH3D

AQUA DRILL EX OIL HOLE 3XD



L9604 Metric Sizes

L9605 Fractional, Wire & Letter Sizes

Coolant Thru

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia. Ds	Stock
	Dc			ℓ	L		
0704212	3.00		0.1181	17	68	3	•
0704229	3.10		0.1220				•
1480883	3.18	1/8	0.1250				•
0704235	3.20		0.1260	20			•
0704241	3.30		0.1299				•
0704258	3.40		0.1339				•
0704264	3.50		0.1378				•
1480890	3.57	9/64	0.1406		72	4	•
0704270	3.60		0.1417				•
0704287	3.70		0.1457				•
0704293	3.80		0.1496	22			•
0704309	3.90		0.1535				•
1480905	3.97	5/32	0.1563				•
0704315	4.00		0.1575				•
1482485	4.04	#21	0.1590				•
1482491	4.09	#20	0.1610	27			•
0704321	4.10		0.1614				•
0704338	4.20		0.1654	25			•
0704344	4.30		0.1693				•
1480911	4.37	11/64	0.1719	27			•
0704350	4.40		0.1732	25	80	5	•
0704367	4.50		0.1772				•
0704373	4.60		0.1811				•
0704380	4.70		0.1850				•
1480928	4.76	3/16	0.1875				•
0704396	4.80		0.1890				•
0704401	4.90		0.1929				•
0704418	5.00		0.1969	27			•
0704424	5.10		0.2008				•
1482507	5.11	#7	0.2010				•
1480934	5.16	13/64	0.2031				•
0704430	5.20		0.2047				•
0704447	5.30		0.2087				•
0704453	5.40		0.2126				•
1482513	5.41	#3	0.2130	30			•
0704460	5.50		0.2165	27	82	6	•
1480940	5.56	7/32	0.2188				•
0704476	5.60		0.2205				•
1482520	5.61	#2	0.2210				•
0704482	5.70		0.2244	30			•
0704499	5.80		0.2283				•
0704504	5.90		0.2323				•
1480957	5.95	15/64	0.2344				•
0704510	6.00		0.2362				•
0704527	6.10		0.2402				•
0704533	6.20		0.2441				•
0704540	6.30		0.2480	32			•
1480963	6.35	1/4	0.2500				•
0704556	6.40		0.2520				•
0704562	6.50		0.2559				•
1482536	6.53	F	0.2570		88	7	•
0704579	6.60		0.2598				•
0704585	6.70		0.2638				•
1480970	6.75	17/64	0.2656	35			•
0704591	6.80		0.2677				•
0704607	6.90		0.2717				•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia. Ds	Stock
	Dc			ℓ	L		
1482542	6.91	I	0.2720	37	94	8	•
0704613	7.00		0.2756	35	88	7	•
1482559	7.04	J	0.2770				•
0704620	7.10		0.2795				•
1480986	7.14	9/32	0.2813				•
0704636	7.20		0.2835	37			•
0704642	7.30		0.2874				•
0704659	7.40		0.2913				•
0704665	7.50		0.2953		94	8	•
1480992	7.54	19/64	0.2969				•
0704671	7.60		0.2992				•
0704688	7.70		0.3031				•
0704694	7.80		0.3071	40			•
0704700	7.90		0.3110				•
1481007	7.94	5/16	0.3125				•
0704716	8.00		0.3150				•
0704722	8.10		0.3189				•
0704739	8.20		0.3228				•
1482565	8.20	P	0.3230				•
0704745	8.30		0.3268	42			•
1481013	8.33	21/64	0.3281				•
0704751	8.40		0.3307				•
1482571	8.43	Q	0.3320		100	9	•
0704768	8.50		0.3346				•
0704774	8.60		0.3386				•
0704780	8.70		0.3425				•
1481020	8.73	11/32	0.3438				•
0704797	8.80		0.3465	45			•
0704802	8.90		0.3504				•
0704819	9.00		0.3543				•
0704825	9.10		0.3583				•
1481036	9.13	23/64	0.3594	47			•
0704831	9.20		0.3622				•
0704848	9.30		0.3661				•
1482588	9.35	U	0.3680	50			•
0704854	9.40		0.3701	47			•
0704860	9.50		0.3740		106	10	•
1481042	9.53	3/8	0.3750				•
0704877	9.60		0.3780				•
0704883	9.70		0.3819				•
0704890	9.80		0.3858	50			•
0704905	9.90		0.3898				•
1481059	9.92	25/64	0.3906				•
0704911	10.00		0.3937				•
0704928	10.10		0.3976				•
0704934	10.20		0.4016				•
0704940	10.30		0.4055				•
1481065	10.32	13/32	0.4063	52			•
0704957	10.40		0.4094				•
0704963	10.50		0.4134		116	11	•
0704970	10.60		0.4173				•
0704986	10.70		0.4213				•
1481071	10.72	27/64	0.4219	55			•
0704992	10.80		0.4252				•
0705007	10.90		0.4291				•
0705013	11.00		0.4331				•



EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0705020	11.10		0.4370	57	122	12	•
1481088	11.11	7/16	0.4375				•
0705036	11.20		0.4409				•
0705042	11.30		0.4449				•
0705059	11.40		0.4488				•
0705065	11.50		0.4528	•			
1481094	11.51	29/64	0.4531	60	128	13	•
0705071	11.60		0.4567				•
0705088	11.70		0.4606				•
0705094	11.80		0.4646				•
0705100	11.90		0.4685				•
1481100	11.91	15/32	0.4688	62	128	13	•
0705116	12.00		0.4724				•
0705122	12.10		0.4764				•
0705139	12.20		0.4803				•
0705145	12.30		0.4843				•
1481116	12.30	31/64	0.4844	65	128	13	•
0705151	12.40		0.4882				•
0705168	12.50		0.4921				•
0705174	12.60		0.4961				•
0705180	12.70		0.5000				•
1481122	12.70	1/2	0.5000	67	134	14	•
0705197	12.80		0.5039				•
0705202	12.90		0.5079				•
0705219	13.00		0.5118				•
1481139	13.10	33/64	0.5156				•
0705225	13.10		0.5157	67	134	14	•
0705231	13.20		0.5197				•
0705248	13.30		0.5236				•
0705254	13.40		0.5276				•
1481145	13.49	17/32	0.5313				•
0705260	13.50		0.5315	•			

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0705277	13.60		0.5354	70	134	14	•
0705283	13.70		0.5394				•
0705290	13.80		0.5433				•
1481151	13.89	35/64	0.5469				•
0705305	13.90		0.5472				•
0705311	14.00		0.5512	72	140	15	•
0705328	14.10		0.5551				•
0705334	14.20		0.5591				•
1481168	14.29	9/16	0.5625				•
0705340	14.30		0.5630				•
0705357	14.40		0.5669	75	140	15	•
0705363	14.50		0.5709				•
0705370	14.60		0.5748				•
1481174	14.68	37/64	0.5781				•
0705386	14.70		0.5787				•
0705392	14.80		0.5827	77	146	16	•
0705408	14.90		0.5866				•
0705414	15.00		0.5906				•
1481180	15.08	19/32	0.5938				•
0705420	15.10		0.5945				•
0705437	15.20		0.5984	80	146	16	•
0705443	15.30		0.6024				•
0705450	15.40		0.6063				•
1481197	15.48	39/64	0.6094				•
0705466	15.50		0.6102				•
0705472	15.60		0.6142	80	146	16	•
0705489	15.70		0.6181				•
0705495	15.80		0.6220				•
1481202	15.88	5/8	0.6250				•
0705500	15.90		0.6260				•
0705517	16.00		0.6299	•			

\* Package Quantity: 1 per tube.

## Standard Drilling Conditions L9604, 9605

Work Material			Cast Irons Carbon Steels		Alloy Steels (20-30 HRC)		Mold Steels Hardened Steels (30-40 Hrc)		Hardened Steels (40-50 Hrc)		Ductile Cast Irons		Stainless Steel (300-Series Stainless)		Nickel Alloys, Titanium Alloys, PH Stainless		Aluminum Alloys		
Speed (SFM)			390-420 SFM		330-335 SFM		255-265 SFM		160-165 SFM		320-330 SFM		255-265 SFM		100-110 SFM		280-320 SFM		
Drilling Diameter			390-420 SFM		330-335 SFM		255-265 SFM		160-165 SFM		320-330 SFM		255-265 SFM		100-110 SFM		280-320 SFM		
Drill Dia. (mm/Inches)	Metric	Fractional	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
	3		0.1181	12700	0.004	10600	0.004	8500	0.004	5300	0.002	10600	0.004	8500	0.003	3200	0.002	10500	0.004
	3.175	1/8	0.1250	12000	0.004	10100	0.004	8100	0.004	5100	0.003	10100	0.004	8100	0.003	3100	0.002	10000	0.004
	4		0.1575	9600	0.005	8000	0.005	6400	0.005	4000	0.003	8000	0.005	6400	0.004	2400	0.003	7500	0.005
	4.763	3/16	0.1875	8100	0.006	6800	0.006	5400	0.006	3400	0.004	6800	0.006	5400	0.005	2100	0.004	6300	0.006
	5		0.1969	7700	0.006	6400	0.006	5100	0.006	3300	0.004	6400	0.006	5100	0.005	2000	0.004	6000	0.006
	6		0.2362	6400	0.007	5300	0.007	4200	0.007	2700	0.005	5300	0.007	4200	0.006	1600	0.005	5000	0.007
	6.35	1/4	0.2500	6100	0.007	5100	0.007	4000	0.007	2600	0.005	5100	0.007	4000	0.006	1600	0.005	4800	0.008
	7.938	5/16	0.3125	4900	0.009	4100	0.008	3300	0.008	2100	0.006	4100	0.008	3300	0.007	1300	0.005	3800	0.009
	8		0.3150	4800	0.009	4000	0.009	3200	0.009	2000	0.006	4000	0.009	3200	0.008	1200	0.006	3700	0.009
	9.525	3/8	0.3750	4000	0.009	3400	0.009	2700	0.009	1700	0.007	3400	0.009	2700	0.008	1000	0.007	2700	0.012
	10		0.3937	3800	0.010	3200	0.010	2500	0.010	1600	0.007	3200	0.010	2500	0.009	950	0.007	2500	0.012
	12		0.4724	3200	0.010	2700	0.010	2100	0.010	1300	0.009	2700	0.010	2100	0.009	800	0.009	2100	0.013
12.7	1/2	0.5000	3100	0.010	2600	0.010	2000	0.010	1300	0.009	2600	0.010	2000	0.010	800	0.009	2000	0.013	
14		0.5512	2900	0.010	2400	0.011	1900	0.011	1200	0.009	2400	0.010	1900	0.010	800	0.008	1900	0.013	
16		0.6299	2400	0.012	2000	0.012	1600	0.012	1000	0.010	2000	0.012	1600	0.012	600	0.010	1700	0.014	

Note: 1) Utilize the standard drilling conditions shown in the catalogs just a general guide when starting operation.

2) Adjust drilling conditions if required if any vibration or unusual sound occurs when cutting.

3) When using low speed machines, use the maximum speed and adjust the feed rate.

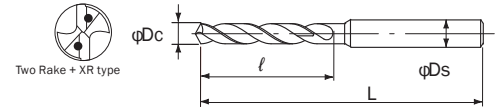
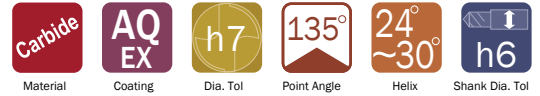
4) Use of water soluble cutting fluid is recommended.

5) In case of drying drilling - use Air blow and reduce feeds/speeds by 30%

Formulas:  $RPM = SFM \times 3.82 \div \text{Drill Dia.}$  Feed rate (in/min) :  $RPM \times IPR$

# AQDEXOH5D

AQUA DRILL EX OIL HOLE 5XD



## L9606 Metric Sizes

## L9607 Fractional, Wire & Letter Sizes

Coolant Thru

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0705523	3.00		0.1181	28	78	3	•
0705530	3.10		0.1220				•
1481219	3.18	1/8	0.1250				•
0705546	3.20		0.1260	32			•
0705552	3.30		0.1299				•
0705569	3.40		0.1339				•
0705575	3.50		0.1378				•
1481225	3.57	9/64	0.1406		86	4	•
0705581	3.60		0.1417				•
0705598	3.70		0.1457				•
0705603	3.80		0.1496	36			•
0705610	3.90		0.1535				•
1481231	3.97	5/32	0.1563				•
0705626	4.00		0.1575				•
1482594	4.04	#21	0.1590				•
1482600	4.09	#20	0.1610				•
0705632	4.10		0.1614				•
0705649	4.20		0.1654	40			•
0705655	4.30		0.1693				•
1481248	4.37	11/64	0.1719				•
0705661	4.40		0.1732		98	5	•
0705678	4.50		0.1772				•
0705684	4.60		0.1811				•
0705690	4.70		0.1850				•
1481254	4.76	3/16	0.1875				•
0705706	4.80		0.1890				•
0705712	4.90		0.1929				•
0705729	5.00		0.1969				•
0705735	5.10		0.2008	44			•
1482616	5.11	#7	0.2010				•
1481260	5.16	13/64	0.2031				•
0705741	5.20		0.2047				•
0705758	5.30		0.2087		100	6	•
0705764	5.40		0.2126				•
1482622	5.41	#3	0.2130	48			•
0705770	5.50		0.2165	44			•
1481277	5.56	7/32	0.2188	48			•
0705787	5.60		0.2205				•
1482639	5.61	#2	0.2210	52	109	7	•
0705793	5.70		0.2244				•
0705809	5.80		0.2283				•
0705815	5.90		0.2323	48	100	6	•
1481283	5.95	15/64	0.2344				•
0705821	6.00		0.2362				•
0705838	6.10		0.2402				•
0705844	6.20		0.2441				•
0705850	6.30		0.2480	52			•
1481290	6.35	1/4	0.2500				•
0705867	6.40		0.2520				•
0705873	6.50		0.2559				•
1482645	6.53	F	0.2570		109	7	•
0705880	6.60		0.2598				•
0705896	6.70		0.2638				•
1481305	6.75	17/64	0.2656	56			•
0705901	6.80		0.2677				•
0705918	6.90		0.2717				•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
1482651	6.91	I	0.2720	60	118	8	•
0705924	7.00		0.2756	56	109	7	•
1482668	7.04	J	0.2770				•
0705930	7.10		0.2795				•
1481311	7.14	9/32	0.2813				•
0705947	7.20		0.2835	60			•
0705953	7.30		0.2874				•
0705960	7.40		0.2913		118	8	•
0705976	7.50		0.2953				•
1481328	7.54	19/64	0.2969				•
0705982	7.60		0.2992				•
0705999	7.70		0.3031				•
0706003	7.80		0.3071	64			•
0706010	7.90		0.3110				•
1481334	7.94	5/16	0.3125				•
0706026	8.00		0.3150				•
0706032	8.10		0.3189				•
0706049	8.20		0.3228				•
1482674	8.20	P	0.3230	68			•
0706055	8.30		0.3268				•
1481340	8.33	21/64	0.3281				•
0706061	8.40		0.3307				•
1482680	8.43	Q	0.3320	72	127	9	•
0706078	8.50		0.3346	68			•
0706084	8.60		0.3386				•
0706090	8.70		0.3425				•
1481357	8.73	11/32	0.3438				•
0706106	8.80		0.3465	72			•
0706112	8.90		0.3504				•
0706129	9.00		0.3543				•
0706135	9.10		0.3583				•
1481363	9.13	23/64	0.3594	76			•
0706141	9.20		0.3622				•
0706158	9.30		0.3661				•
1482697	9.35	U	0.3680	80			•
0706164	9.40		0.3701	76			•
0706170	9.50		0.3740		136	10	•
1481370	9.53	3/8	0.3750				•
0706187	9.60		0.3780				•
0706193	9.70		0.3819				•
0706209	9.80		0.3858	80			•
0706215	9.90		0.3898				•
1481386	9.92	25/64	0.3906				•
0706221	10.00		0.3937				•
0706238	10.10		0.3976				•
0706244	10.20		0.4016				•
0706250	10.30		0.4055	84			•
1481392	10.32	13/32	0.4063				•
0706267	10.40		0.4094				•
0706273	10.50		0.4134		149	11	•
0706280	10.60		0.4173				•
0706296	10.70		0.4213				•
1481408	10.72	27/64	0.4219	88			•
0706301	10.80		0.4252				•
0706318	10.90		0.4291				•
0706324	11.00		0.4331				•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0706330	11.10		0.4370	92	158	12	•
1481414	11.11	7/16	0.4375				•
0706347	11.20		0.4409				•
0706353	11.30		0.4449				•
0706360	11.40		0.4488				•
0706376	11.50		0.4528				•
1481420	11.51	29/64	0.4531	96	167	13	•
0706382	11.60		0.4567				•
0706399	11.70		0.4606				•
0706404	11.80		0.4646				•
0706410	11.90		0.4685				•
1481437	11.91	15/32	0.4688				•
0706427	12.00		0.4724	100	167	13	•
0706433	12.10		0.4764				•
0706440	12.20		0.4803				•
0706456	12.30		0.4843				•
1481443	12.30	31/64	0.4844				•
0706462	12.40		0.4882				•
0706479	12.50		0.4921	104	176	14	•
0706485	12.60		0.4961				•
0706491	12.70		0.5000				•
1481450	12.70	1/2	0.5000				•
0706507	12.80		0.5039				•
0706513	12.90		0.5079				•
0706520	13.00		0.5118	108	176	14	•
1481466	13.10	33/64	0.5156				•
0706536	13.10		0.5157				•
0706542	13.20		0.5197				•
0706559	13.30		0.5236				•
0706565	13.40		0.5276				•
1481472	13.49	17/32	0.5313	108	176	14	•
0706571	13.50		0.5315				•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0706588	13.60		0.5354	112	176	14	•
0706594	13.70		0.5394				•
0706600	13.80		0.5433				•
1481489	13.89	35/64	0.5469				•
0706616	13.90		0.5472				•
0706622	14.00		0.5512				•
0706639	14.10		0.5551	116	185	15	•
0706645	14.20		0.5591				•
1481495	14.29	9/16	0.5625				•
0706651	14.30		0.5630				•
0706668	14.40		0.5669				•
0706674	14.50		0.5709				•
0706680	14.60		0.5748	120	194	16	•
1480418	14.68	37/64	0.5781				•
0706697	14.70		0.5787				•
0706702	14.80		0.5827				•
0706719	14.90		0.5866				•
0706725	15.00		0.5906				•
1480424	15.08	19/32	0.5938	124	194	16	•
0706731	15.10		0.5945				•
0706748	15.20		0.5984				•
0706754	15.30		0.6024				•
0706760	15.40		0.6063				•
1480430	15.48	39/64	0.6094				•
0706777	15.50		0.6102	128	194	16	•
0706783	15.60		0.6142				•
0706790	15.70		0.6181				•
0706805	15.80		0.6220				•
1480447	15.88	5/8	0.6250				•
0706811	15.90		0.6260				•
0706828	16.00		0.6299				•

\* Package Quantity: 1 per tube.

## Standard Drilling Conditions

### L9606, 9607

Work Material			Cast Irons Carbon Steels		Alloy Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 Hrc)		Hardened Steels (40~50 Hrc)		Ductile Cast Irons		Stainless Steel (300-Series Stainless)		Nickel Alloys, Titanium Alloys, PH Stainless		Aluminum Alloys		
Speed (SFM)			390-420 SFM		330-335 SFM		255-265 SFM		160-165 SFM		320-330 SFM		255-265 SFM		100-110 SFM		280-320 SFM		
Drilling Diameter																			
Drill Dia. (mm/inches)	Metric	Fractional	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
	3		0.1181	12700	0.004	10600	0.004	8500	0.004	5300	0.002	10600	0.004	8500	0.003	3200	0.002	10500	0.004
	3.175	1/8	0.1250	12000	0.004	10100	0.004	8100	0.004	5100	0.003	10100	0.004	8100	0.003	3100	0.002	10000	0.004
	4		0.1575	9600	0.005	8000	0.005	6400	0.005	4000	0.003	8000	0.005	6400	0.004	2400	0.003	7500	0.005
	4.763	3/16	0.1875	8100	0.006	6800	0.006	5400	0.006	3400	0.004	6800	0.006	5400	0.005	2100	0.004	6300	0.006
	5		0.1969	7700	0.006	6400	0.006	5100	0.006	3300	0.004	6400	0.006	5100	0.005	2000	0.004	6000	0.006
	6		0.2362	6400	0.007	5300	0.007	4200	0.007	2700	0.005	5300	0.007	4200	0.006	1600	0.005	5000	0.007
	6.35	1/4	0.2500	6100	0.007	5100	0.007	4000	0.007	2600	0.005	5100	0.007	4000	0.006	1600	0.005	4800	0.008
	7.938	5/16	0.3125	4900	0.009	4100	0.008	3300	0.008	2100	0.006	4100	0.008	3300	0.007	1300	0.005	3800	0.009
	8		0.3150	4800	0.009	4000	0.009	3200	0.009	2000	0.006	4000	0.009	3200	0.008	1200	0.006	3700	0.009
	9.525	3/8	0.3750	4000	0.009	3400	0.009	2700	0.009	1700	0.007	3400	0.009	2700	0.008	1000	0.007	2700	0.012
	10		0.3937	3800	0.010	3200	0.010	2500	0.010	1600	0.007	3200	0.010	2500	0.009	950	0.007	2500	0.012
	12		0.4724	3200	0.010	2700	0.010	2100	0.010	1300	0.009	2700	0.010	2100	0.009	800	0.009	2100	0.013
	12.7	1/2	0.5000	3100	0.010	2600	0.010	2000	0.010	1300	0.009	2600	0.010	2000	0.010	800	0.009	2000	0.013
	14		0.5512	2900	0.010	2400	0.011	1900	0.011	1200	0.009	2400	0.010	1900	0.010	800	0.008	1900	0.013
	16		0.6299	2400	0.012	2000	0.012	1600	0.012	1000	0.010	2000	0.012	1600	0.012	600	0.010	1700	0.014

Note: 1) Utilize the standard drilling conditions shown in the catalogs just a general guide when starting operation.

2) Adjust drilling conditions if required if any vibration or unusual sound occurs when cutting.

3) When using low speed machines, use the maximum speed and adjust the feed rate.

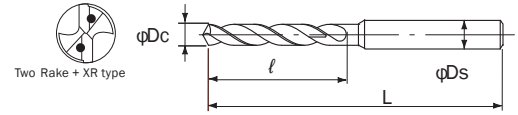
4) Use of water soluble cutting fluid is recommended.

5) In case of drying drilling - use Air blow and reduce feeds/speeds by 30%

Formulas:  $RPM = SFM \times 3.82 \div \text{Drill Dia.}$  Feed rate (in/min) :  $RPM \times IPR$

# AQDEXOH8D

AQUA DRILL EX OIL HOLE 8XD



L9608  
L9609

Metric Sizes

Fractional, Wire & Letter Sizes

Coolant Thru

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0706834	3.00		0.1181	33	81	3	•
0706840	3.10		0.1220				•
1480453	3.18	1/8	0.1250				•
0706857	3.20		0.1260	38			•
0706863	3.30		0.1299				•
0706870	3.40		0.1339				•
0706886	3.50		0.1378				•
1480460	3.57	9/64	0.1406		92	4	•
0706892	3.60		0.1417				•
0706908	3.70		0.1457				•
0706914	3.80		0.1496	44			•
0706920	3.90		0.1535				•
1480476	3.97	5/32	0.1563				•
0706937	4.00		0.1575				•
1482702	4.04	#21	0.1590				•
1482719	4.09	#20	0.1610				•
0706943	4.10		0.1614				•
0706950	4.20		0.1654	49			•
0706966	4.30		0.1693				•
1480482	4.37	11/64	0.1719				•
0706972	4.40		0.1732		105	5	•
0706989	4.50		0.1772				•
0706995	4.60		0.1811				•
0707000	4.70		0.1850				•
1480499	4.76	3/16	0.1875				•
0707016	4.80		0.1890	55			•
0707022	4.90		0.1929				•
0707039	5.00		0.1969				•
0707045	5.10		0.2008				•
1482725	5.11	#7	0.2010				•
1480504	5.16	13/64	0.2031				•
0707051	5.20		0.2047	60			•
0707068	5.30		0.2087				•
0707074	5.40		0.2126				•
1482731	5.41	#3	0.2130	66			•
0707080	5.50		0.2165	60	118	6	•
1480510	5.56	7/32	0.2188				•
0707097	5.60		0.2205				•
1482748	5.61	#2	0.2210				•
0707102	5.70		0.2244				•
0707119	5.80		0.2283	66			•
0707125	5.90		0.2323				•
1480527	5.95	15/64	0.2344				•
0707131	6.00		0.2362				•
0707148	6.10		0.2402				•
0707154	6.20		0.2441				•
0707160	6.30		0.2480				•
1480533	6.35	1/4	0.2500				•
0707177	6.40		0.2520	71			•
0707183	6.50		0.2559				•
1482754	6.53	F	0.2570		130	7	•
0707190	6.60		0.2598				•
0707205	6.70		0.2638				•
1480540	6.75	17/64	0.2656	77			•
0707211	6.80		0.2677				•
0707228	6.90		0.2717				•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
1482760	6.91	I	0.2720	82	142	8	•
0707234	7.00		0.2756	77	130	7	•
1482777	7.04	J	0.2770				•
0707240	7.10		0.2795				•
1480556	7.14	9/32	0.2813				•
0707257	7.20		0.2835	82			•
0707263	7.30		0.2874				•
0707270	7.40		0.2913				•
0707286	7.50		0.2953		142	8	•
1480562	7.54	19/64	0.2969				•
0707292	7.60		0.2992				•
0707308	7.70		0.3031				•
0707314	7.80		0.3071	88			•
0707320	7.90		0.3110				•
1480579	7.94	5/16	0.3125				•
0707337	8.00		0.3150				•
0707343	8.10		0.3189				•
0707350	8.20		0.3228				•
1482783	8.20	P	0.3230				•
0707366	8.30		0.3268	93			•
1480585	8.33	21/64	0.3281				•
0707372	8.40		0.3307				•
1482790	8.43	Q	0.3320		154	9	•
0707389	8.50		0.3346				•
0707395	8.60		0.3386				•
0707400	8.70		0.3425				•
1480591	8.73	11/32	0.3438				•
0707417	8.80		0.3465	99			•
0707423	8.90		0.3504				•
0707430	9.00		0.3543				•
0707446	9.10		0.3583				•
1480607	9.13	23/64	0.3594				•
0707452	9.20		0.3622	104			•
0707469	9.30		0.3661				•
1482805	9.35	U	0.3680	110			•
0707475	9.40		0.3701	104			•
0707481	9.50		0.3740		166	10	•
1480613	9.53	3/8	0.3750				•
0707498	9.60		0.3780				•
0707503	9.70		0.3819				•
0707510	9.80		0.3858	110			•
0707526	9.90		0.3898				•
1480620	9.92	25/64	0.3906				•
0707532	10.00		0.3937				•
0707549	10.10		0.3976				•
0707555	10.20		0.4016				•
0707561	10.30		0.4055				•
1480636	10.32	13/32	0.4063	115			•
0707578	10.40		0.4094				•
0707584	10.50		0.4134				•
0707590	10.60		0.4173		182	11	•
0707606	10.70		0.4213				•
1480642	10.72	27/64	0.4219				•
0707612	10.80		0.4252	121			•
0707629	10.90		0.4291				•
0707635	11.00		0.4331				•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0707641	11.10		0.4370	126	194	12	•
1480659	11.11	7/16	0.4375				•
0707658	11.20		0.4409				•
0707664	11.30		0.4449				•
0707670	11.40		0.4488				•
0707687	11.50		0.4528				•
1480665	11.51	29/64	0.4531	132	206	13	•
0707693	11.60		0.4567				•
0707709	11.70		0.4606				•
0707715	11.80		0.4646				•
0707721	11.90		0.4685				•
1480671	11.91	15/32	0.4688				•
0707738	12.00		0.4724	137	206	13	•
0707744	12.10		0.4764				•
0707750	12.20		0.4803				•
0707767	12.30		0.4843				•
1480688	12.30	31/64	0.4844				•
0707773	12.40		0.4882				•
0707780	12.50		0.4921	143	218	14	•
0707796	12.60		0.4961				•
0707801	12.70		0.5000				•
1480694	12.70	1/2	0.5000				•
0707818	12.80		0.5039				•
0707824	12.90		0.5079				•
0707830	13.00		0.5118	148	218	14	•
1480700	13.10	33/64	0.5156				•
0707847	13.10		0.5157				•
0707853	13.20		0.5197				•
0707860	13.30		0.5236				•
0707876	13.40		0.5276				•
1480716	13.49	17/32	0.5313	148	218	14	•
0707882	13.50		0.5315				•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock	
	Dc			ℓ	L	Ds		
0707899	13.60		0.5354	154	218	14	•	
0707904	13.70		0.5394				•	
0707910	13.80		0.5433				•	
1480722	13.89	35/64	0.5469				•	
0707927	13.90		0.5472				•	
0707933	14.00		0.5512				•	
0707940	14.10		0.5551	159	230	15	•	
0707956	14.20		0.5591				•	
1480739	14.29	9/16	0.5625				•	
0707962	14.30		0.5630				•	
0707979	14.40		0.5669				•	
0707985	14.50		0.5709				•	
0707991	14.60		0.5748	165	242	16	•	
1480745	14.68	37/64	0.5781	159			•	
0708006	14.70		0.5787	165			•	
0708012	14.80		0.5827				•	
0708029	14.90		0.5866				•	
0708035	15.00		0.5906				•	
1480751	15.08	19/32	0.5938		170	242	16	•
0708041	15.10		0.5945					•
0708058	15.20		0.5984	•				
0708064	15.30		0.6024	•				
0708070	15.40		0.6063	•				
1480768	15.48	39/64	0.6094	•				
0708087	15.50		0.6102	176	242	16	•	
0708093	15.60		0.6142				•	
0708109	15.70		0.6181				•	
0708115	15.80		0.6220				•	
1480774	15.88	5/8	0.6250				•	
0708121	15.90		0.6260				•	
0708138	16.00		0.6299	•				

\* Package Quantity: 1 per tube.

## Standard Drilling Conditions

### L9608, 9609

Drill Dia. (mm/inches)	Work Material		Cast Irons Carbon Steels		Alloy Steels (20~30 HRC)		Mold Steels Hardened Steels (30-40 Hrc)		Hardened Steels (40-50 Hrc)		Ductile Cast Irons		Stainless Steel (300-Series Stainless)		Nickel Alloys, Titanium Alloys, PH Stainless		Aluminum Alloys	
	Speed (SFM)		390-420 SFM		330-335 SFM		255-265 SFM		160-165 SFM		320-330 SFM		255-265 SFM		100-110 SFM		280-320 SFM	
	Metric	Fractional	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM
3		0.1181	12700	0.003	10600	0.003	8500	0.003	5300	0.002	10600	0.003	8500	0.003	3200	0.002	10500	0.003
3.175	1/8	0.1250	12000	0.003	10100	0.003	8100	0.003	5100	0.002	10100	0.003	8100	0.003	3100	0.002	10000	0.003
4		0.1575	9600	0.004	8000	0.004	6400	0.004	4000	0.003	8000	0.004	6400	0.004	2400	0.003	7500	0.004
4.763	3/16	0.1875	8100	0.005	6800	0.005	5400	0.004	3400	0.003	6800	0.004	5400	0.004	2100	0.003	6300	0.005
5		0.1969	7700	0.005	6400	0.005	5100	0.005	3300	0.004	6400	0.005	5100	0.005	2000	0.003	6000	0.006
6		0.2362	6400	0.005	5300	0.006	4200	0.006	2700	0.004	5300	0.005	4200	0.006	1600	0.004	5000	0.007
6.35	1/4	0.2500	6100	0.006	5100	0.006	4000	0.006	2600	0.005	5100	0.006	4000	0.006	1600	0.004	4800	0.007
7.938	5/16	0.3125	4900	0.007	4100	0.008	3300	0.007	2100	0.006	4100	0.007	3300	0.007	1300	0.005	3800	0.008
8		0.3150	4800	0.007	4000	0.008	3200	0.007	2000	0.006	4000	0.007	3200	0.007	1200	0.006	3700	0.009
9.525	3/8	0.3750	4000	0.008	3400	0.008	2700	0.008	1700	0.007	3400	0.008	2700	0.007	1000	0.007	2700	0.010
10		0.3937	3800	0.008	3200	0.009	2500	0.008	1600	0.007	3200	0.008	2500	0.008	950	0.007	2500	0.011
12		0.4724	3200	0.009	2700	0.009	2100	0.009	1300	0.008	2700	0.009	2100	0.009	800	0.007	2100	0.012
12.7	1/2	0.5000	3100	0.009	2600	0.010	2000	0.009	1300	0.008	2600	0.009	2000	0.010	800	0.007	2000	0.012
14		0.5512	2900	0.009	2400	0.010	1900	0.009	1200	0.009	2400	0.010	1900	0.010	800	0.007	1900	0.012
16		0.6299	2400	0.011	2000	0.011	1600	0.011	1000	0.010	2000	0.011	1600	0.012	600	0.009	1700	0.013

Note: 1) Utilize the standard drilling conditions shown in the catalogs just a general guide when starting operation.

2) Adjust drilling conditions if required if any vibration or unusual sound occurs when cutting.

3) When using low speed machines, use the maximum speed and adjust the feed rate.

4) Use of water soluble cutting fluid is recommended.

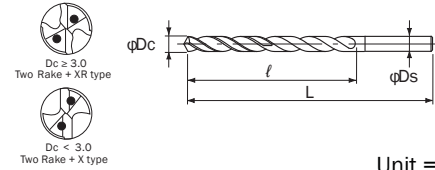
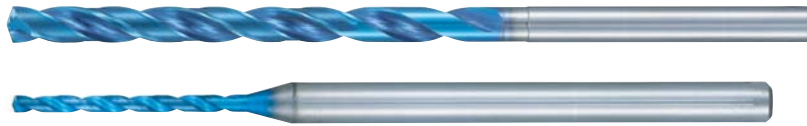
5) In case of drying drilling - use Air blow and reduce feeds/speeds by 30%

Formulas:  $RPM = SFM \times 3.82$  Feed rate (in/min) :  $RPM \times IPR$   
Drill Dia.

# AQDEXOH10D

AQUA DRILL EX OIL HOLE 10XD

Carbide AQ EX h7 140° 26° ~ 30° h6  
 Material Coating Dia. Tol Point Angle Helix Shank Dia. Tol



Unit = mm

## LIST 9612

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0733673	1.00		0.0394	13	61		•
0733680	1.10		0.0433	14			•
0733696	1.20		0.0472	16			•
0733701	1.30		0.0512	17	63		•
0733718	1.40		0.0551	18			•
0733724	1.50		0.0591	20			•
0733730	1.60		0.0630	21			•
0733747	1.70		0.0699	22			•
0733753	1.80		0.0709	23	70		•
0733760	1.90		0.0748	25			•
0733776	2.00		0.0787	26		3	•
0733782	2.10		0.0827	27			•
0733799	2.20		0.0866	29			•
0733804	2.30		0.0906	30	80		•
0733810	2.40		0.0945	31			•
0733827	2.50		0.0984	33			•
0733833	2.60		0.1024	34			•
0733840	2.70		0.1063	35			•
0733856	2.80		0.1102	36	89		•
0733862	2.90		0.1142	38			•
0726519	3.00		0.1181	39			•
0729788	3.10		0.1220				•
0729794	3.20		0.1260				•
0729800	3.30		0.1299	46	96		•
0729816	3.40		0.1339				•
0726525	3.50		0.1378			4	•
0729822	3.60		0.1417				•
0729839	3.70		0.1457				•
0729845	3.80		0.1496	52	102		•
0729851	3.90		0.1535				•
0726531	4.00		0.1575				•
0729868	4.10		0.1614				•
0729874	4.20		0.1654				•
0729880	4.30		0.1693	59	109		•
0729897	4.40		0.1732				•
0726548	4.50		0.1772			5	•
0729902	4.00		0.1811				•
0729919	4.70		0.1850				•
0729925	4.80		0.1890	65	115		•
0729931	4.90		0.1929				•
0726554	5.00		0.1969				•
0729948	5.10		0.2008				•
0729954	5.20		0.2047				•
0729960	5.30		0.2087	72	122		•
0729977	5.40		0.2126				•
0726560	5.50		0.2165			6	•
0729983	5.60		0.2205				•
0729990	5.70		0.2244				•
0730003	5.80		0.2283	78	128		•
0730010	5.90		0.2323				•
0726577	6.00		0.2361				•
0730026	6.10		0.2402				•
0730032	6.20		0.2441				•
0730049	6.30		0.2480	85	135	7	•
0730055	6.40		0.2520				•
0726583	6.50		0.2559				•

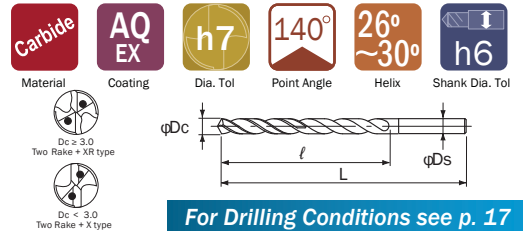
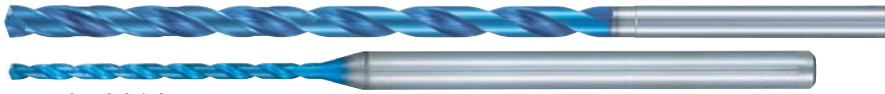
For Drilling Conditions see p. 17

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0730061	6.60		0.2598				•
0730078	6.70		0.2638				•
0730084	6.80		0.2677	91	141	7	•
0730090	6.90		0.2717				•
0726590	7.00		0.2756				•
0730106	7.10		0.2795				•
0730112	7.20		0.2835				•
0730129	7.30		0.2874	98	148		•
0730135	7.40		0.2913				•
0726605	7.50		0.2953			8	•
0730141	7.60		0.2992				•
0730158	7.70		0.3031				•
0730164	7.80		0.3071	104	154		•
0730170	7.90		0.3110				•
0726611	8.00		0.3150				•
0730187	8.10		0.3189				•
0730193	8.20		0.3228				•
0730209	8.30		0.3268	111	161		•
0730215	8.40		0.3307				•
0726628	8.50		0.3346			9	•
0730221	8.60		0.3386				•
0730238	8.70		0.3425				•
0730244	8.80		0.3465	117	167		•
0730250	8.90		0.3504				•
0726634	9.00		0.3543				•
0730267	9.10		0.3583				•
0730273	9.20		0.3622				•
0730280	9.30		0.3661	124	174		•
0730296	9.40		0.3701				•
0726640	9.50		0.3740			10	•
0730301	9.60		0.3780				•
0730318	9.70		0.3819				•
0730324	9.80		0.3858	130	180		•
0730330	9.90		0.3898				•
0726657	10.00		0.3937				•
0730347	10.10		0.3976				•
0730353	10.20		0.4016				•
0730360	10.30		0.4055	137	197		•
0730376	10.40		0.4094				•
0726663	10.50		0.4134			11	•
0730382	10.60		0.4173				•
0730399	10.70		0.4213				•
0730404	10.80		0.4252	143	203		•
0730410	10.90		0.4291				•
0726670	11.00		0.4331				•
0730427	11.10		0.4370				•
0730433	11.20		0.4409				•
0730440	11.30		0.4449	150	210		•
0730456	11.40		0.4488				•
0726686	11.50		0.4528			12	•
0730462	11.60		0.4567				•
0730479	11.70		0.4606				•
0730485	11.80		0.4646	156	216		•
0730491	11.90		0.4685				•
0726692	12.00		0.4724				•

• U.S. stock item

# AQDEXOH15D

## AQUA DRILL EX OIL HOLE 15XD



LIST 9614 Metric sizes  
LIST 9615 Fractional sizes

For Drilling Conditions see p. 17

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length $l$	Overall Length L	Shank Dia. Ds	Stock
0733879	1.00		0.0394	18	66		•
0733885	1.10		0.0433	20			•
0733891	1.20		0.0472	22			•
0733907	1.30		0.0512	23	71		•
0733913	1.40		0.0551	25			•
0733920	1.50		0.0591	27			•
0733936	1.60		0.0630	29			•
0733942	1.70		0.0669	31			•
0733959	1.80		0.0709	32	80		•
0733965	1.90		0.0748	34			•
0733971	2.00		0.0787	36		3	•
0733988	2.10		0.0827	38			•
0733994	2.20		0.0866	40			•
0734009	2.30		0.0906	41	93		•
0734015	2.40		0.0945	43			•
0734021	2.50		0.0984	45			•
0734038	2.60		0.1024	47			•
0734044	2.70		0.1063	49			•
0734050	2.80		0.1102	50	104		•
0734067	2.90		0.1142	52			•
0726708	3.00		0.1181	52			•
0730507	3.10		0.1220				•
1519137	3.18	1/8	0.1250				•
0730513	3.20		0.1260	63	113		•
0730520	3.30		0.1299				•
0720536	3.40		0.1339				•
0726714	3.50		0.1378				•
1519143	3.57	9/64	0.1400				•
0730542	3.60		0.1417				•
0730559	3.70		0.1457				•
0730565	3.80		0.1496	72	122		•
0730571	3.90		0.1535				•
1519150	3.97	5/32	0.1563				•
0726720	4.00		0.1575				•
0730588	4.10		0.1614				•
0730594	4.20		0.1654				•
0730600	4.30		0.1693	81	131		•
1519166	4.37	11/64	0.1718				•
0730616	4.40		0.1732				•
0726737	4.50		0.1772				•
0730622	4.60		0.1811			5	•
0730639	4.70		0.1850				•
1519172	4.76	3/16	0.1875	90	140		•
0730645	4.80		0.1890				•
0730651	4.90		0.1929				•
0726743	5.00		0.1969				•
0730668	5.10		0.2008				•
1519189	5.16	13/64	0.2031				•
0730674	5.20		0.2047				•
0730680	5.30		0.2087	99	149		•
0730697	5.40		0.2126				•
1519195	5.41	#3	0.2129				•
0726750	5.50		0.2165				•
1519200	5.56	7/32	0.2188				•
0730702	5.60		0.2205				•
0730719	5.70		0.2244				•
0730725	5.80		0.2283	108	158		•
0730731	5.90		0.2323				•
1519217	5.95	15/64	0.2343				•
0726766	6.00		0.2361				•
0730748	6.10		0.2402				•
0730754	6.20		0.2441				•
0730760	6.30		0.2480	117	167		•
1519223	6.35	1/4	0.2500				•
0730777	6.40		0.2520				•
0726772	6.50		0.2559				•
0730783	6.60		0.2598				•
0730790	6.70		0.2638	126	176		•

EDP #	Size	Wire/Fractional/Letter Equivalent	Decimal Equivalent	Flute Length $l$	Overall Length L	Shank Dia. Ds	Stock
	6.75	17/64	0.2656				■
0730805	6.80		0.2677				•
0730811	6.90		0.2717	126	176	7	•
0726789	7.00		0.2756				•
0730828	7.10		0.2795				•
1519230	7.14	9/32	0.2813				•
0730834	7.20		0.2835				•
0730840	7.30		0.2874				•
0730857	7.40		0.2913				•
0726795	7.50		0.2953				•
	7.54	19/64	0.2968			8	■
0730863	7.60		0.2992				•
0730870	7.70		0.3031				•
0730886	7.80		0.3071				•
0730892	7.90		0.3110	144	194		•
1519246	7.94	5/16	0.3125				•
0726800	8.00		0.3150				•
0730908	8.10		0.3189				•
0730914	8.20		0.3228				•
0730920	8.30		0.3268				•
	8.33	21/64	0.3281	153	203		■
0730937	8.40		0.3307				•
0726817	8.50		0.3346				•
0730943	8.60		0.3386			9	•
0730950	8.70		0.3425				•
1519252	8.73	11/32	0.3438				•
0730966	8.80		0.3465	162	212		•
0730972	8.90		0.3504				•
0726823	9.00		0.3543				•
0730989	9.10		0.3583				•
1519269	9.13	23/64	0.3593				•
0730995	9.20		0.3622				•
0731000	9.30		0.3661				•
0731016	9.40		0.3701				•
0726830	9.50		0.3740				•
	9.53	3/8	0.3750			10	•
0731022	9.60		0.3780				•
0731039	9.70		0.3819				•
0731045	9.80		0.3858				•
0731051	9.90		0.3898				•
1519281	9.92	25/64	0.3906				•
0726846	10.00		0.3937				•
0731068	10.10		0.3976				•
0731074	10.20		0.4016				•
0731080	10.30		0.4055				•
0731097	10.40		0.4094				•
0726852	10.50		0.4134				•
0731102	10.60		0.4173				•
0731119	10.70		0.4213				•
	10.72	27/64	0.4219				■
0731125	10.80		0.4252	198	258		•
0731131	10.90		0.4291				•
0726869	11.00		0.4331				•
0731148	11.10		0.4370				•
	11.11	7/16	0.4375				■
0731154	11.20		0.4409				•
0731160	11.30		0.4449				•
0731177	11.40		0.4488				•
0726875	11.50		0.4528				•
	11.51	29/64	0.4531				■
0731183	11.60		0.4567				•
0731190	11.70		0.4606				•
0731205	11.80		0.4646				•
0731211	11.90		0.4685				•
0726881	12.00		0.4724				•
1519298	12.70	1/2	0.5000				•
1519303	13.49	17/32	0.5312	234	294	13	•
	14.28	9/16	0.5625	243	303	14	•
				261	321	15	■

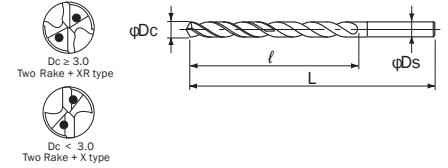
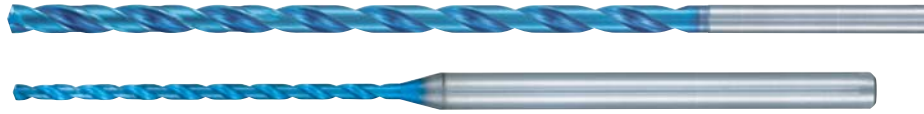
• U.S. stock item

■ Special order

# AQDEXOH20D

AQUA DRILL EX OIL HOLE 20XD

Carbide AQ EX h7 140° 26° ~30° h6  
 Material Coating Dia. Tol Point Angle Helix Shank Dia. Tol



LIST 9616 Metric sizes  
LIST 9617 Fractional sizes

For Drilling Conditions see p. 17

EDP #	Size	Fractional Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock			
	Dc			ℓ	L	Ds				
0734073	1.00		0.0394	23	71	3	•			
0734080	1.10		0.0433	25	78		•			
0734096	1.20		0.0472	28			•			
0734101	1.30		0.0512	30			•			
0734118	1.40		0.0551	32			•			
0734124	1.50		0.0591	35			•			
0734130	1.60		0.0630	37			•			
0734147	1.70		0.0669	39			•			
0734153	1.80		0.0709	41			•			
0734160	1.90		0.0748	44			•			
0734176	2.00		0.0787	46			•			
0734182	2.10		0.0827	48			•			
0734199	2.20		0.0866	51			•			
0734204	2.30		0.0906	53			•			
0734210	2.40		0.0945	55			•			
0734227	2.50		0.0984	58			•			
0734233	2.60		0.1024	60			•			
0734240	2.70		0.1063	62			•			
0734256	2.80		0.1102	64		•				
0734262	2.90		0.1142	67	•					
0726898	3.00		0.1181	69	•					
0731228	3.10		0.1220	81	131	4	•			
1519310	3.18	1/8	0.1250				•			
0731234	3.20		0.1260				•			
0731240	3.30		0.1299				•			
0731257	3.40		0.1339				•			
0726903	3.50		0.1378				•			
1519326	3.57	9/64	0.1400				•			
0731263	3.60		0.1417				•			
0731270	3.70		0.1457				•			
0731286	3.80		0.1496				•			
0731292	3.90		0.1535				•			
1519332	3.97	5/32	0.1563				•			
0726910	4.00		0.1575	104	154	5	•			
0731308	4.10		0.1614				•			
0731314	4.20		0.1654				•			
0731320	4.30		0.1693				•			
1519349	4.37	11/64	0.1718				•			
0731337	4.40		0.1732				•			
0726926	4.50		0.1772				•			
0731343	4.60		0.1811				•			
0731350	4.70		0.1850				•			
1519355	4.76	3/16	0.1875				•			
0731366	4.80		0.1890				•			
0731372	4.90		0.1929				•			
0726932	5.00		0.1969	115	165	6	•			
0731389	5.10		0.2008				•			
	5.15	13/64	0.2031				•			
0731395	5.20		0.2047				•			
0731400	5.30		0.2087				•			
0731417	5.40		0.2126				•			
1519361	5.41	#3	0.2129				•			
0726949	5.50		0.2165				•			
1519378	5.56	7/32	0.2188				•			
0731423	5.60		0.2205				•			
							138	188		•

EDP #	Size	Fractional Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock						
	Dc			ℓ	L	Ds							
0731430	5.70		0.2244	138	188	6	•						
0731446	5.80		0.2283				•						
0731452	5.90		0.2323				•						
	5.95	15/64	0.2343				•						
0726955	6.00		0.2361				•						
0731469	6.10		0.2402				•						
0731475	6.20		0.2441				•						
0731481	6.30		0.2480				150	200	7	•			
1519384	6.35	1/4	0.2500							•			
0731498	6.40		0.2520							•			
0726961	6.50		0.2559							•			
0731503	6.60		0.2598							•			
0731510	6.70		0.2638							•			
1519390	6.75	17/64	0.2656							161	211	8	•
0731526	6.80		0.2677										•
0731532	6.90		0.2717										•
0726978	7.00		0.2756										•
0731549	7.10		0.2795										•
	7.14	9/32	0.2813	•									
0731555	7.20		0.2835	173	223	9	•						
0731561	7.30		0.2874				•						
0731578	7.40		0.2913				•						
0726984	7.50		0.2953				•						
1519406	7.54	19/64	0.2968				•						
0731584	7.60		0.2992				•						
0731590	7.70		0.3031				184	234	10	•			
0731606	7.80		0.3071							•			
0731612	7.90		0.3110							•			
1519412	7.94	5/16	0.3125							•			
0726990	8.00		0.3150							•			
0731629	8.10		0.3189							•			
0731635	8.20		0.3228	196	246	11				•			
0731641	8.30		0.3268							•			
1519429	8.33	21/64	0.3281							•			
0731658	8.40		0.3307							•			
0727005	8.50		0.3346							•			
0731664	8.60		0.3386							•			
0731670	8.70		0.3425				207	257	12	•			
1519435	8.73	11/32	0.3438							•			
0731687	8.80		0.3465							•			
0731693	8.90		0.3504							•			
0727011	9.00		0.3543							•			
0731709	9.10		0.3583							•			
	9.13	23/64	0.3593	219	269	13				•			
0731715	9.20		0.3622							•			
0731721	9.30		0.3661							•			
0731738	9.40		0.3701							•			
0727028	9.50		0.3740							•			
1519441	9.53	3/8	0.3750							230	280	14	•
0731744	9.60		0.3780				•						
0731750	9.70		0.3819				•						
0731767	9.80		0.3858				•						
0731773	9.90		0.3898				•						
1519458	9.92	25/64	0.3906				•						
0727034	10.00		0.3937				•						

• U.S. stock item

■ Special order



## Drilling Conditions - Wet

### L9612, L9614, L9615, L9616, L9617

## Drilling Conditions - MQL

### L9612, L9614, L9615, L9616, L9617

Drill Dia. (mm/inches)	Work Material		Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 Hrc)		Ductile Cast Irons		Stainless Steel	
	Speed (SFM)		145-180 SFM		130-165 SFM		115-150 SFM		115-150 SFM		80-100 SFM	
	Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
1.0	0.0394	14300	0.0009	12700	0.0008	6350	0.0011	11150	0.0008	7950	0.0004	
1.5	0.0591	9550	0.0013	8500	0.0012	4250	0.0016	7400	0.0012	5300	0.0006	
2.0	0.0787	7150	0.0020	6350	0.0020	3200	0.0020	5550	0.0020	4000	0.0008	
2.5	0.0984	7000	0.0030	6350	0.0020	3200	0.0030	5700	0.0020	3800	0.0015	
3.0	0.1181	11500	0.0040	7600	0.0030	6700	0.0030	6700	0.0040	6700	0.0030	
4.0	0.1575	8600	0.0050	5700	0.0040	5000	0.0040	5000	0.0050	5000	0.0030	
5.0	0.1969	7600	0.0070	5100	0.0050	4500	0.0050	4500	0.0060	4500	0.0040	
6.0	0.2362	6400	0.0080	4200	0.0060	3700	0.0060	3700	0.0070	3700	0.0050	
7.0	0.2756	5500	0.0090	3600	0.0070	3200	0.0070	3200	0.0080	3200	0.0060	
8.0	0.3150	4800	0.0100	3200	0.0080	2800	0.0080	2800	0.0090	2800	0.0070	
9.0	0.3543	4200	0.0110	2800	0.0090	2500	0.0090	2500	0.0100	2500	0.0070	
10.0	0.3937	3800	0.0110	2500	0.0090	2200	0.0090	2200	0.0110	2200	0.0080	
11.0	0.4331	3500	0.0120	2300	0.0100	2000	0.0100	2000	0.0120	2000	0.0080	
12.0	0.4724	3200	0.0120	2100	0.0100	1900	0.0100	1900	0.0120	1900	0.0080	

Drill Dia. (mm/inches)	Work Material		Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 Hrc)		Ductile Cast Irons		
	Speed (SFM)		145-180 SFM		130-165 SFM		115-150 SFM		80-100 SFM		
	Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	
3.0	0.1181	7600	0.004	7600	0.003	5700	0.003	5700	0.004	5700	0.004
4.0	0.1575	5700	0.005	5000	0.004	4300	0.004	4300	0.005	4300	0.005
5.0	0.1969	5100	0.006	4450	0.005	3800	0.005	3800	0.006	3800	0.006
6.0	0.2362	4200	0.008	3700	0.006	3200	0.006	3200	0.007	3200	0.007
7.0	0.2756	3600	0.009	3200	0.007	2700	0.007	2700	0.008	2700	0.008
8.0	0.3150	3200	0.010	2800	0.008	2400	0.008	2400	0.009	2400	0.009
9.0	0.3543	2800	0.011	2500	0.009	2100	0.009	2100	0.010	2100	0.010
10.0	0.3937	2550	0.011	2200	0.009	1900	0.009	1900	0.011	1900	0.011
11.0	0.4331	2300	0.012	2000	0.010	1700	0.010	1700	0.012	1700	0.012
12.0	0.4724	2100	0.012	1900	0.010	1600	0.010	1600	0.012	1600	0.012

#### Warnings on using the drilling condition tables

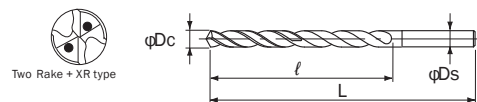
1. Adjust drilling condition according to the rigidity of machine or work clamp state.
2. The table values condition are for drilling with water-soluble cutting fluid or mist.
3. Reduce RPM and feed speeds by 30% for non-water-soluble cutting fluid.
4. Use the internal lubricating oil hole.
5. Non-step drilling is possible. However, a work material and drilling condition to chip removal may be worse. In that case, add step feed or review the drilling condition. For holes deeper than 20D in stainless steels, recommend in step feed.
6. In step feed, return to the entrance hole.
7. Step feed interval is about 0.5 ~ 1xD.
8. Recommend pre-drilling of guide holes. Depth is 2 ~ 3xD.
9. Recommend the AQDEXOHPLT for guide drilling. Recommend the diameter that is 0.03mm larger than the deep hole drill.

#### Warnings on using the drilling condition tables

1. Adjust drilling condition according to the rigidity of machine or work clamp state.
2. The table values condition are for drilling with MQL.
3. Non-step drilling is possible. However, a work material and drilling condition to chip removal may be worse. In that case, add step feed or review the drilling condition.
4. In step feed, return to the entrance hole.
5. Step feed interval is about 0.5 ~ 1xD.
6. Recommend pre-drilling of guide holes. Depth is 2 ~ 3xD.
7. Recommend the AQDEXOHPLT for guide drilling. Recommend the diameter that is 0.03mm larger than the deep hole drill.
8. It is non-application for stainless. Please drill with Wet.

# AQDEXOH25D

## AQUA DRILL EX OIL HOLE 25XD



LIST 9618 Metric sizes  
LIST 9619 Fractional sizes

EDP #	Size	Fractional Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock			
	Dc			ℓ	L	Ds				
0727040	3.00		0.1181	98	148	4	•			
0731780	3.10		0.1220				•			
1519464	3.18	1/8	0.1250				•			
0731796	3.20		0.1260				•			
0731801	3.30		0.1299				•			
0731818	3.40		0.1339				•			
0727057	3.50		0.1378				•			
	3.57	9/64	0.1400				■			
0731824	3.60		0.1417	112	162	7	•			
0731830	3.70		0.1457				•			
0731847	3.80		0.1496				•			
0731853	3.90		0.1535				•			
1519470	3.97	5/32	0.1563				•			
0727063	4.00		0.1575				•			
0731860	4.10		0.1614				•			
0731876	4.20		0.1654				•			
0731882	4.30		0.1693				•			
	4.37	11/64	0.1718				126	176	5	■
0731899	4.40		0.1732							•
0727070	4.50		0.1772							•
0731904	4.60		0.1811	•						
0731910	4.70		0.1850	•						
1519487	4.76	3/16	0.1875	•						
0731927	4.80		0.1890	•						
0731933	4.90		0.1929	•						
0727086	5.00		0.1969	•						
0731940	5.10		0.2008	190	140	6	•			
	5.16	13/64	0.2031				•			
0731956	5.20		0.2047				•			
0731962	5.30		0.2087				•			
0731979	5.40		0.2126				•			
1519493	5.41	#3	0.2129				•			
0727092	5.50		0.2165				•			

EDP #	Size	Fractional Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock			
	Dc			ℓ	L	Ds				
	5.56	7/32	0.2188	168	218	6	■			
0731985	5.60		0.2205				•			
0731991	5.70		0.2244				•			
0732006	5.80		0.2283				•			
0732012	5.90		0.2323				•			
	5.95	15/64	0.2343				182	232	7	■
0727108	6.00		0.2361							•
0732029	6.10		0.2402							•
0732035	6.20		0.2441							•
0732041	6.30		0.2480							•
1519509	6.35	1/4	0.2500	•						
0732058	6.40		0.2520	•						
0727114	6.50		0.2559	•						
0732064	6.60		0.2598	•						
0732070	6.70		0.2638	196	246	8				•
	6.75	17/64	0.2656				■			
0732087	6.80		0.2677				•			
0732093	6.90		0.2717				•			
0727120	7.00		0.2756				•			
0732109	7.10		0.2795				•			
	7.14	9/32	0.2813				210	260	8	■
0732115	7.20		0.2835							•
0732121	7.30		0.2874	•						
0732138	7.40		0.2913	•						
0727137	7.50		0.2953	•						
	7.54	19/64	0.2968	224	274	10				■
0732144	7.60		0.2992							•
0732150	7.70		0.3031							•
0732167	7.80		0.3071							•
0732173	7.90		0.3110							•
1519515	7.94	5/16	0.3125				•			
0727143	8.00		0.3150				•			
1519521	9.53	3/8	0.3750				280	330	10	•

• U.S. stock item

■ Special order

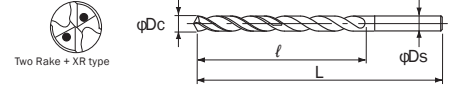
# AQDEXOH30D

## AQUA DRILL EX OIL HOLE 30XD







LIST 9620 Metric sizes  
LIST 9621 Fractional sizes

EDP #	Size	Fractional Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L		
0727150	3.00		0.1181	99	149	4	•
0732180	3.10		0.1220	116	166		•
1519464	3.18	1/8	0.1250				•
0732196	3.20		0.1260				•
0732201	3.30		0.1299				•
0732218	3.40		0.1339				•
0727166	3.50		0.1378				•
	3.57	9/64	0.1400	132	182		■
0732224	3.60		0.1417				•
0732230	3.70		0.1457				•
0732247	3.80		0.1496				•
0732253	3.90		0.1535				•
1519470	3.97	5/32	0.1563				•
0727172	4.00		0.1575	149	199		•
0732260	4.10		0.1614				•
0732276	4.20		0.1654				•
0732282	4.30		0.1693			•	
	4.37	11/64	0.1718			•	
0732299	4.40		0.1732			•	
0727189	4.50		0.1772	165	215	•	
0732304	4.60		0.1811			•	
0732310	4.70		0.1850			•	
1519487	4.76	3/16	0.1875			•	
0732327	4.80		0.1890			•	
0732333	4.90		0.1929			•	
0727195	5.00		0.1969	182	232	•	
0732340	5.10		0.2008			•	
	5.16	13/64	0.2031			•	
0732356	5.20		0.2047			•	
0732362	5.30		0.2087			•	
0732379	5.40		0.2126			•	
	5.41	#3	0.2129	198	248	■	
0727200	5.50		0.2165			•	

EDP #	Size	Fractional Equivalent	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L		
	5.56	7/32	0.2188	198	248	6	■
0732385	5.60		0.2205				•
0732391	5.70		0.2244				•
0732407	5.80		0.2283				•
0732413	5.90		0.2323				•
	5.95	15/64	0.2343				215
0727217	6.00		0.2361	•			
0732420	6.10		0.2402	•			
0732436	6.20		0.2441	•			
0732442	6.30		0.2480	•			
1519509	6.35	1/4	0.2500	•			
0732459	6.40		0.2520	231	281	•	
0727223	6.50		0.2559			•	
0732465	6.60		0.2598			•	
0732471	6.70		0.2638			•	
	6.75	17/64	0.2656			•	
0732488	6.80		0.2677			248	298
0732494	6.90		0.2717	•			
0727230	7.00		0.2756	•			
0732500	7.10		0.2795	•			
	7.14	9/32	0.2813	•			
0732516	7.20		0.2835	264	314		
0732522	7.30		0.2874			•	
0732539	7.40		0.2913			•	
0727246	7.50		0.2953			•	
	7.54	19/64	0.2968			•	
0732545	7.60		0.2992			198	248
0732551	7.70		0.3031	•			
0732568	7.80		0.3071	•			
0732574	7.90		0.3110	•			
	7.94	5/16	0.3125	•			
0727252	8.00		0.3150	•			

• U.S. stock item      ■ Special order

### Drilling Conditions - Wet

#### L9618, L9619, L9620, L9621

Work Material Drilling Diameter	Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 Hrc)		Ductile Cast Irons		Stainless Steel		
	Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	
	Drill Dia. (mm/inches)										
3.0	0.1181	11500	0.004	7600	0.003	6700	0.003	6700	0.004	6700	0.003
4.0	0.1575	8600	0.005	5700	0.004	5000	0.004	5000	0.005	5000	0.004
5.0	0.1969	7600	0.006	5100	0.005	4500	0.004	4500	0.006	4500	0.005
6.0	0.2362	6400	0.007	4200	0.006	3700	0.005	3700	0.007	3700	0.007
7.0	0.2756	5500	0.008	3600	0.006	3200	0.006	3200	0.008	3200	0.008
8.0	0.3150	4800	0.009	3200	0.007	2800	0.007	2800	0.009	2800	0.009

#### Warnings on using the drilling condition tables

- Adjust drilling condition according to the rigidity of machine or work clamp state.
- The table values condition are for drilling with water-soluble cutting fluid or mist.
- Reduce RPM and feed speeds by 30% for non-water-soluble cutting fluid.
- Use the internal lubricating oil hole.
- Non-step drilling is possible. However, a work material and drilling condition to chip removal may be worse. In that case, add step feed or review the drilling condition. For holes deeper than 20D in stainless steels, recommend in step feed.
- In step feed, return to the entrance hole.
- Step feed interval is about 0.5~1xD.
- Recommend pre-drilling of guide holes. Depth is 2~3xD.
- Recommend the AQDEXOHPLT for guide drilling. Recommend the diameter that is 0.03mm larger than the deep hole drill.

### Drilling Conditions - MQL

#### L9618, L9619, L9620, L9621

Work Material Drilling Diameter	Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 Hrc)		Ductile Cast Irons		
	Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	
	Drill Dia. (mm/inches)								
3.0	0.1181	7700	0.004	6700	0.003	5700	0.003	5700	0.003
4.0	0.1575	5700	0.005	5000	0.004	4300	0.004	4300	0.004
5.0	0.1969	5100	0.006	4450	0.005	3800	0.005	3800	0.006
6.0	0.2362	4200	0.007	3700	0.005	3200	0.005	3200	0.007
7.0	0.2756	3600	0.008	3200	0.006	2700	0.006	2700	0.008
8.0	0.3150	3200	0.009	2800	0.007	2400	0.007	2400	0.009

#### Warnings on using the drilling condition tables

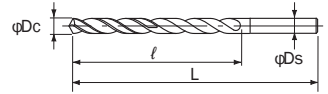
- Adjust drilling condition according to the rigidity of machine or work clamp state.
- The table values condition are for drilling with MQL.
- Non-step drilling is possible. However, a work material and drilling condition to chip removal may be worse. In that case, add step feed or review the drilling condition.
- In step feed, return to the entrance hole.
- Step feed interval is about 0.5~1xD.
- Recommend pre-drilling of guide holes. Depth is 2~3xD.
- Recommend the AQDEXOHPLT for guide drilling. Recommend the diameter that is 0.03mm larger than the deep hole drill.
- It is non-application for stainless. Please drill with Wet.

# AQDEXOH40D

AQUA DRILL EX OIL HOLE 40XD

LIST 9626 Metric sizes

LIST 9627 Fractional sizes



EDP #	Size	Fractional Equivalent	Decimal Equivalent	Flute Length ℓ	Overall Length L	Shank Dia. Ds	Stock
1519573	3.00		0.1181	129	179	4	•
	3.10		0.1220				■
1519618	3.18	1/8	0.1250	151	201		•
	3.20		0.1260				■
	3.30		0.1299				■
	3.40		0.1339				■
	3.50		0.1378				■
1519580	3.57	9/64	0.1563	172	222		•
	3.60		0.1417				■
	3.70		0.1457				■
	3.80		0.1496			■	
	3.90		0.1535			■	
1519624	3.97	5/32	0.1563	194	244	•	
1519596	4.00		0.1575			•	
	4.10		0.1614			■	
	4.20		0.1654			■	
	4.30		0.1693			■	
	4.40		0.1732			■	
	4.50		0.1772			■	
	4.60		0.1811			■	
1519630	4.70		0.1850	215	265	5	■
	4.76	3/16	0.1875				•

EDP #	Size	Fractional Equivalent	Decimal Equivalent	Flute Length ℓ	Overall Length L	Shank Dia. Ds	Stock			
	Dc									
	4.80		0.1890	215	265	5	■			
	4.90		0.1929				■			
	5.00		0.1969				■			
1519601	5.50		0.2165				258	308	6	•
	5.60		0.2205							■
	5.70		0.2244	■						
	5.80		0.2283	■						
	5.90		0.2323	■						
	6.00		0.2361	280	330	7	■			
	6.10		0.2402				■			
	6.20		0.2441				■			
1519647	6.30		0.2480				301	351	7	■
	6.35	1/4	0.2500							•
	6.40		0.2520							■
	6.50		0.2559							■
	6.60		0.2598							■
	6.70		0.2638	344	394	8	■			
	6.80		0.2677				■			
	6.90		0.2717				■			
1519653	7.00		0.2756	344	394	8	■			
	7.94	5/16	0.3125				•			

■ Special order

## Drilling Conditions - Wet L9626, L9627

Work Material Drilling Diameter	Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 Hrc)		Ductile Cast Irons		Stainless Steel			
	Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)		
Drill Dia. (mm/inches)	3.0	0.1181	9600	0.003	6400	0.002	5500	0.002	5500	0.003	5500	0.002
	4.0	0.1575	7200	0.004	4800	0.003	4200	0.003	4200	0.003	4200	0.003
	5.0	0.1969	6400	0.005	4300	0.004	3700	0.004	3700	0.004	3700	0.003
	6.0	0.2362	5300	0.006	3600	0.004	3100	0.004	3100	0.005	3100	0.004
	7.0	0.2756	4600	0.007	3000	0.005	2600	0.005	2600	0.006	2600	0.005
	7.5	0.2953	4200	0.007	2900	0.005	2500	0.005	2500	0.006	2500	0.005

### Warnings on using the drilling condition tables

- Adjust drilling condition according to the rigidity of machine or work clamp state.
- The table values condition are for drilling with water-soluble cutting fluid or mist.
- Reduce RPM and feed speeds by 30% for non-water-soluble cutting fluid.
- Use the internal lubricating oil hole.
- Non-step drilling is possible. However, a work material and drilling condition to chip removal may be worse. In that case, add step feed or review the drilling condition. For holes deeper than 20D in stainless steels, recommend in step feed.
- In step feed, return to the entrance hole.
- Step feed interval is about 0.5~1xD.
- Recommend pre-drilling of guide holes. Depth is 2~3xD.
- Recommend the AQDEXOHPLT for guide drilling. Recommend the diameter that is 0.03mm larger than the deep hole drill.

## Drilling Conditions - MQL L9626, L9627

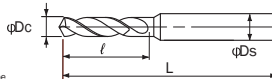
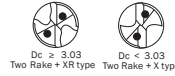
Work Material Drilling Diameter	Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 Hrc)		Ductile Cast Irons			
	Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)		
Drill Dia. (mm/inches)	3.0	0.1181	6400	0.003	5600	0.002	4800	0.002	4800	0.003
	4.0	0.1575	4800	0.004	4200	0.003	3600	0.003	3600	0.003
	5.0	0.1969	4200	0.005	3700	0.004	3200	0.004	3200	0.004
	6.0	0.2362	3500	0.006	3100	0.004	2600	0.005	2600	0.005
	7.0	0.2756	3000	0.007	2600	0.005	2300	0.005	2300	0.006
	7.5	0.2953	2800	0.007	2500	0.006	2100	0.006	2100	0.007

### Warnings on using the drilling condition tables

- Adjust drilling condition according to the rigidity of machine or work clamp state.
- The table values condition are for drilling with MQL.
- Non-step drilling is possible. However, a work material and drilling condition to chip removal may be worse. In that case, add step feed or review the drilling condition.
- In step feed, return to the entrance hole.
- Step feed interval is about 0.5~1xD.
- Recommend pre-drilling of guide holes. Depth is 2~3xD.
- Recommend the AQDEXOHPLT for guide drilling. Recommend the diameter that is 0.03mm larger than the deep hole drill.
- It is non-application for stainless. Please drill with Wet.

**AQDEXOHPLT**  
PRECISION GUIDE HOLE PILOT DRILLS

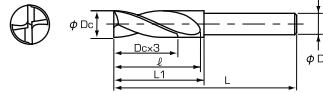
LIST 9622



Material: Carbide | Coating: AQ EX | Dia. Tol: h7 | Point Angle: 150° | Helix: 26°~30° | Shank Dia. Tol: h6

**AQDEXZ**  
FLAT BOTTOM DRILL FOR PILOT HOLE

LIST 9610



Material: Carbide | Coating: AQ EX | Helix: 20° | Dia. Tol: h7 | Point Angle: 180° | Shank Dia. Tolerance: h6

List #	EDP #	Size	Decimal Equivalent	For Φ	Flute Length	Overall Length	Shank Dia.	Stock
		Dc			ℓ	L	Ds	
9622	0734279	1.015	0.0400		3.3	54		•
9622	0734285	1.115	0.0439		3.6			•
9622	0734291	1.215	0.0478		3.9			•
9622	0734307	1.315	0.0518		4.2	56		•
9622	0734313	1.415	0.0557		4.6			•
9622	0734320	1.515	0.0596		4.9			•
9622	0734336	1.615	0.0636		5.2			•
9622	0734342	1.715	0.0675		5.5			•
9622	0734359	1.815	0.0715		5.8	60		•
9622	0734365	1.915	0.0754		6.2			•
9622	0734371	2.015	0.0793		9.0		3	•
9622	0734388	2.115	0.0833					•
9622	0734394	2.215	0.0872		11.0			•
9622	0734400	2.315	0.0911			63		•
9622	0734416	2.415	0.0951					•
9622	0734422	2.515	0.0990		12.0			•
9622	0734439	2.615	0.1030					•
9622	0734445	2.715	0.1069					•
9622	0734451	2.815	0.1108		14.0	68		•
9622	0734468	2.915	0.1148					•
9622	0727624	3.030	0.1193					•
9622	0732952	3.130	0.1232			72	4	•
9610	0713260	3.200	0.1260	1/8	15.0	50	6	•
9622	0732969	3.230	0.1272					•
9622	0732975	3.330	0.1311					•
9622	0732981	3.430	0.1350		72	4		•
9622	0727630	3.530	0.1390					•
9610	0713283	3.600	0.1417	9/64	16.0	50	6	•
9622	0732998	3.630	0.1429					•
9622	0733002	3.730	0.1469			72	4	•
9622	0733019	3.830	0.1508					•
9622	0733025	3.930	0.1547		18.0			•
9610	0709942	4.000	0.1575	5/32		50	6	•
9622	0727647	4.030	0.1587			72	4	•
9622	0733031	4.130	0.1626					•
9622	0733048	4.230	0.1665		19.0	80	5	•
9622	0733054	4.330	0.1705					•
9610	0713340	4.400	0.1732	11/64		60	6	•
9622	0733060	4.430	0.1744					•
9622	0727653	4.530	0.1783			80	5	•
9622	0733077	4.630	0.1823					•
9622	0733083	4.730	0.1862					•
9610	0713370	4.800	0.1890	3/16		60	6	•
9622	0733090	4.830	0.1902					•
9622	0733105	4.930	0.1941			80	5	•
9622	0727660	5.030	0.1980					•
9622	0733111	5.130	0.2020			82		•
9610	0713408	5.200	0.2047	13/64	24.0	60		•
9622	0733128	5.230	0.2059					•
9622	0733134	5.330	0.2098					•
9622	0733140	5.430	0.2138			82		•
9622	0733140	5.440	0.2142	#3				•
9622	0727676	5.530	0.2177					•
9610	0713420	5.600	0.2205	7/32		60	6	•
9622	0733157	5.630	0.2217					•
9622	0733163	5.730	0.2256					•
9622	0733170	5.830	0.2295			82		•
9622	0733186	5.930	0.2335					•
9610	0709988	6.000	0.2362	15/64		60		•
9622	0727682	6.030	0.2374					•
9622	0733192	6.130	0.2413			82		•
9622	0733208	6.230	0.2453					•
9622	0733214	6.330	0.2492					•
9610	0713495	6.400	0.2520	1/4		70	7	•
9622	0733220	6.430	0.2531					•
9622	0727699	6.530	0.2571			88		•

List #	EDP #	Size	Decimal Equivalent	For Φ	Flute Length	Overall Length	Shank Dia.	Stock		
		Dc			ℓ	L	Ds			
9622	0733237	6.630	0.2610		30.0			•		
9622	0733243	6.730	0.2650				88	7	•	
9610	0710851	6.800	0.2677	17/64	31.0		70	6	•	
9622	0733250	6.830	0.2689					•		
9622	0733266	6.930	0.2728				88	7	•	
9622	0727704	7.030	0.2768			32.0		•		
9622	0733272	7.130	0.2807					•		
9610	0713546	7.200	0.2835	9/32	33.0		94	8	•	
9622	0733289	7.230	0.2846				70	6	•	
9622	0733295	7.330	0.2886					•		
9622	0733300	7.430	0.2925				94	8	•	
9622	0727710	7.530	0.2965					•		
9610	0713575	7.600	0.2992	19/64	34.0		70	6	•	
9622	0733317	7.630	0.3004					•		
9622	0733323	7.730	0.3043				94	8	•	
9622	0733330	7.830	0.3083					•		
9622	0733346	7.930	0.3122					•		
9610	0710020	8.000	0.3150	5/16	36.0		70	•		
9622	0727727	8.030	0.3161				94	•		
9622	0733352	8.130	0.3201					•		
9622	0733369	8.230	0.3240			37.0	100	9	•	
9622	0733375	8.330	0.3280					•		
9610	0713649	8.400	0.3307	21/64	39.0		80	8	•	
9622	0733381	8.430	0.3319					•		
9622	0727733	8.530	0.3358				100	9	•	
9622	0733398	8.630	0.3398					•		
9622	0733403	8.730	0.3437					•		
9610	0711405	8.800	0.3465	11/32	40.0		80	8	•	
9622	0733410	8.830	0.3476					•		
9622	0733426	8.930	0.3516				100	9	•	
9622	0727740	9.030	0.3555			41.0		•		
9622	0733432	9.130	0.3594				42.0	106	10	•
9610	0713690	9.200	0.3622	23/64	43.0		80	8	•	
9622	0733449	9.230	0.3634					•		
9622	0733455	9.330	0.3673					•		
9622	0733461	9.430	0.3713				106	10	•	
9622	0727756	9.530	0.3752					•		
9610	0713729	9.600	0.3780	3/8	43.0		80	8	•	
9622	0733478	9.630	0.3791					•		
9622	0733484	9.730	0.3831					•		
9622	0733490	9.830	0.3870				106	10	•	
9622	0733506	9.930	0.3909					•		
9610	0710066	10.000	0.3937	25/64	45.0		80	•		
9622	0727762	10.030	0.3949				106	•		
9622	0733512	10.130	0.3988					•		
9622	0733529	10.230	0.4028					•		
9622	0733535	10.330	0.4067					•		
9622	0733541	10.430	0.4106					•		
9622	0727779	10.530	0.4146					•		
9622	0733558	10.630	0.4185					•		
9622	0733564	10.730	0.4224					•		
9622	0733570	10.830	0.4264					•		
9622	0733587	10.930	0.4303					•		
9622	0727785	11.030	0.4343					•		
9622	0733593	11.130	0.4382					•		
9622	0733609	11.230	0.4421					•		
9622	0733615	11.330	0.4461					•		
9622	0733621	11.430	0.4500					•		
9622	0727791	11.530	0.4539					•		
9622	0733638	11.630	0.4579					•		
9622	0733644	11.730	0.4618					•		
9622	0733650	11.830	0.4657					•		
9622	0733667	11.930	0.4697					•		
9622	0727807	12.030	0.4736					•		
9610	0724660	12.700	0.5000	1/2			57.0	•		
9610	0710130	13.500	0.5315	17/32			61.0	•		

## Drilling Conditions - Wet L9622

Work Material		Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 HRC)		Hardened Steels		Ductile Cast Irons		Stainless Steels		Nickel Alloys Titanium Alloys (30~40 HRC)		
Drilling Diameter		RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	
Metric	Decimal															
Drill Dia. (mm/inches)	1.015	0.0400	15700	0.0010	14100	0.0010	12500	0.0008	9400	0.0006	12550	0.0010	9400	0.0005	3150	0.0004
	1.515	0.0596	10500	0.0015	9450	0.0015	8400	0.0012	6300	0.0009	8400	0.0015	6300	0.0007	2100	0.0006
	2.015	0.0793	7900	0.0020	4100	0.0030	6300	0.0020	4750	0.0012	6300	0.0020	4750	0.0010	1550	0.0008
	2.515	0.0990	7600	0.0030	6950	0.0030	6300	0.0020	4400	0.0020	6300	0.0030	4400	0.0015	1650	0.0012
	3.03	0.1193	10500	0.0040	7600	0.0040	6800	0.0030	4200	0.0030	8400	0.0040	6800	0.0030	2650	0.0020
	4.03	0.1587	7900	0.0050	6300	0.0050	5100	0.0040	3150	0.0030	6300	0.0050	5100	0.0040	2000	0.0030
	5.03	0.1980	6350	0.0060	5050	0.0060	4100	0.0050	2550	0.0040	5050	0.0060	4100	0.0050	1600	0.0040
	6.03	0.2374	5300	0.0070	4200	0.0070	3400	0.0060	2100	0.0050	4200	0.0070	3400	0.0060	1300	0.0050
	7.03	0.2768	4550	0.0080	3600	0.0080	2950	0.0060	1800	0.0050	3600	0.0080	2950	0.0070	1150	0.0050
	8.03	0.3161	4000	0.0090	3150	0.0090	2600	0.0070	1600	0.0060	3150	0.0090	2600	0.0080	1000	0.0060
	9.03	0.3555	3550	0.0090	2800	0.0090	2300	0.0070	1400	0.0060	2800	0.0090	2300	0.0090	900	0.0060
	10.03	0.3949	3200	0.0100	2550	0.0100	2050	0.0080	1250	0.0070	2550	0.0100	2050	0.0090	800	0.0070
11.03	0.4343	2900	0.0110	2300	0.0110	1900	0.0090	1150	0.0080	2300	0.0110	1900	0.0090	720	0.0080	
12.03	0.4736	2650	0.0100	2100	0.0100	1700	0.0090	1050	0.0070	2100	0.0100	1700	0.0090	650	0.0080	

Warnings on using the drilling condition tables

1. Adjust drilling condition according to the rigidity of machine or work clamp state.
2. Wet condition are for drilling with water soluble cutting fluid.
3. In non water soluble cutting fluid, reduce the rotation and feed by 20%.
4. Use on internal coolant.

## Drilling Conditions - MQL L9622

Work Material		Structural Steels Carbon Steels (~200HB)		Alloy Steels Heat Treated Steels (20~30 HRC)		Mold Steels Hardened Steels (30~40 HRC)		Hardened Steels (40~50 HRC)		Ductile Cast Irons		
Drilling Diameter		RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	
Metric	Decimal											
Drill Dia. (mm/inches)	3.03	0.1193	6800	0.003	7600	0.003	5250	0.003	2600	0.002	5800	0.003
	4.03	0.1587	5100	0.004	4350	0.004	3950	0.004	2000	0.003	4350	0.005
	5.03	0.1980	4100	0.005	3500	0.005	3150	0.004	1600	0.004	3500	0.006
	6.03	0.2374	3400	0.006	2900	0.006	2650	0.005	1300	0.004	2900	0.006
	7.03	0.2768	2950	0.007	2500	0.007	2250	0.006	1150	0.005	2500	0.007
	8.03	0.3161	2600	0.008	2200	0.008	2000	0.006	1000	0.006	2200	0.008
	9.03	0.3555	2300	0.008	1950	0.008	1750	0.007	900	0.006	1950	0.008
	10.03	0.3949	2050	0.009	1750	0.009	1600	0.007	800	0.006	1750	0.009
	11.03	0.4343	1900	0.010	1600	0.010	1450	0.008	700	0.007	1600	0.010
	12.03	0.4736	1700	0.009	1450	0.009	1300	0.008	650	0.007	1450	0.010

Warnings on using the drilling condition tables

1. Adjust drilling condition according to the rigidity of machine or work clamp state.
2. The table values condition are for drilling with MQL.
3. Non-step drilling is possible. However, a work material and drilling condition to chip removal may be worse. In that case, add step feed or review the drilling condition.

Drilling Conditions for Angled Surfaces					
Reduction % to above table values					
Degree Angle	Reduction %		Reduction % (Multiplier)		
	RPM	Feed	RPM	Feed	
0°	5°	100%	100%	Table Value	Table Value
6°	20°	50%	50%	(Table Value)x0.5	(Table Value)x0.5
21°	35°	70%	40%	(Table Value)x0.3	(Table Value)x0.6
36°	60°	70%	40%	(Table Value)x0.3	(Table Value)x0.6
61°		70%	30%	(Table Value)x0.3	(Table Value)x0.7

## Standard Drilling Conditions L9610

Work Material		Cast Irons / Carbon Steels		Alloy Steels (20-30 HRC)		Mold Steels/ Hardened Steels (30-35 HRC)		Ductile Cast Irons		Aluminum Alloys		Aluminum Casting		
Speed (SFM)		325-328 SFM		290-295 SFM		220-225 SFM		290-295 SFM		515-525 SFM		260-400 SFM		
Drill Diameter		RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	
Metric	Decimal													
Drill Dia. (mm/inches)	3	0.118	7950	0.0020	6900	0.0020	3700	0.0020	6900	0.0015	17000	0.0025	12500	0.0020
	4	0.157	5950	0.0025	5150	0.0025	2800	0.0025	5150	0.0025	12500	0.0030	9550	0.0025
	5	0.197	4800	0.0035	4150	0.0035	2200	0.0030	4100	0.0030	10000	0.0040	7650	0.0035
	6	0.236	4000	0.0040	3450	0.0040	1800	0.0035	3450	0.0035	8500	0.0045	6400	0.0040
	8	0.315	3000	0.0055	2600	0.0055	1400	0.0050	2600	0.0045	6350	0.0065	4750	0.0055
	10	0.394	2400	0.0070	2050	0.0070	1100	0.0060	2050	0.0060	5100	0.0080	3800	0.0070
	12	0.472	2000	0.0085	1700	0.0085	950	0.0070	1700	0.0070	4250	0.0095	3200	0.0080
	16	0.630	1500	0.0110	1300	0.0110	700	0.0095	1300	0.0095	3200	0.0125	2400	0.0110
	20	0.787	1200	0.0140	1050	0.0135	550	0.0120	1050	0.0115	2550	0.0155	1900	0.0135

# AQDEXOH3F

**3D  
5D**

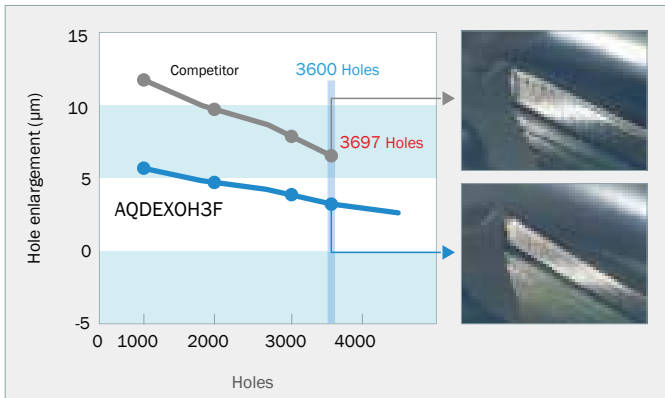
## AQUA Drills EX Oil-Hole 3 Flutes

- ◆ High Precision drilling as deep as 5xD of drill.
- ◆ High accuracy achieved at high feed rate with optimized cutting edge form and superior drilling balance of 3-flutes.
- ◆ Multi-layered Aqua EX Coating (TiAlN + TiAlCr)
- ◆ Anti-adhesive coating film for added lubrication



### Super accurate drilling up 5xDiameter at speeds of 59.0 inches per minute (1500 mm/min)

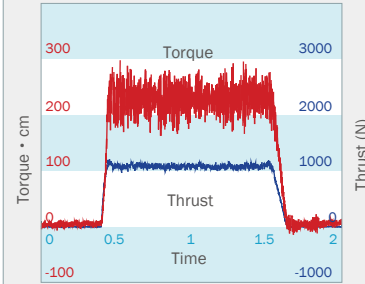
#### Hole enlargement



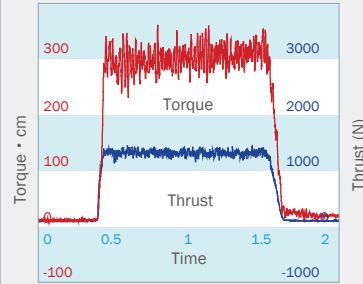
#### Comparison of cutting force

Cutting force is small, and controls amount of oversize.

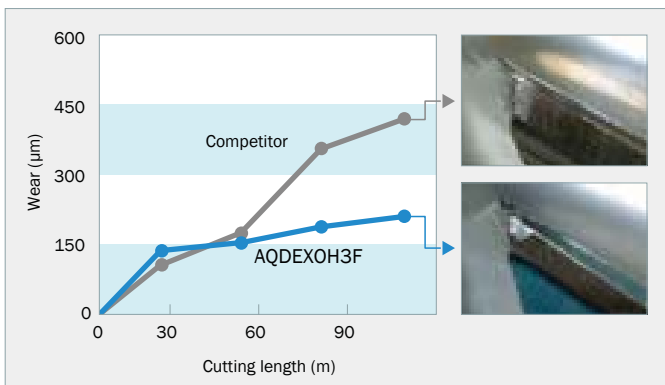
##### AQDEXOH3F5D



##### Competitor



### 400 Stainless Steel Wear after 105m (4100")



#### Cutting condition

Tools Ø	Ø6	Carbon Steel (S50C)	Work Material
Speed	400 SFM (120m/min)	Water Soluble	Type of Coolant
Feed	59 IPM 1500mm/min (0.24mm/rev)	30mm - 1.2" (5D)	Depth/Blind Hole

### 304 Stainless Steel Wear after 60m (2360")



#### Cutting condition

Tools Ø	Ø6	304 Stainless (SUS304)	Work Material
Speed	164 SFM (50m/min)	Water Soluble	Type of Coolant
Feed	18 IPM 480mm/min (0.18mm/rev)	30mm - 1.2" (5D)	Depth/Blind Hole

### Applicable work materials

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
				40~50HRC	50~65HRC	SUS304/SUS316	SUS420					
SS400	S45C/S50C	SCR/NAK	30~40HRC	40~50HRC	50~65HRC	SUS304/SUS316	SUS420	X	●	●	●	
○	○	○	○	○	X	●	●		●	●	●	

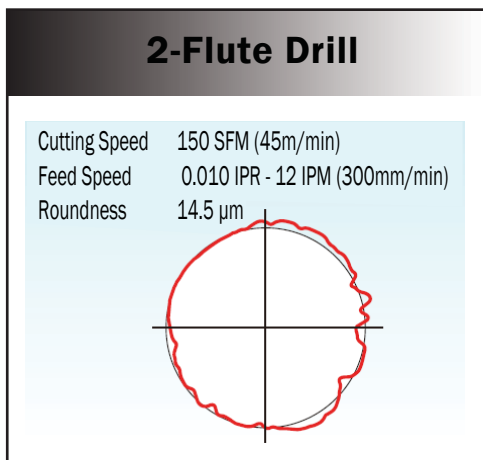
○ Great ● Good X Not Suitable

# AQDEXOH3F

AQUA Drills EX Oil-Hole 3 Flutes

## Highly Precise Holes at High Feeds

### Roundness Comparison



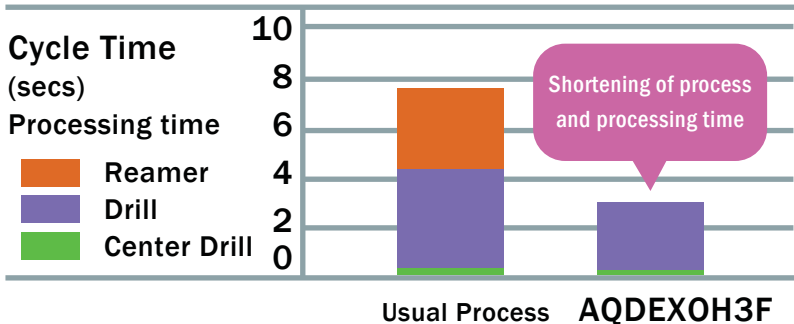
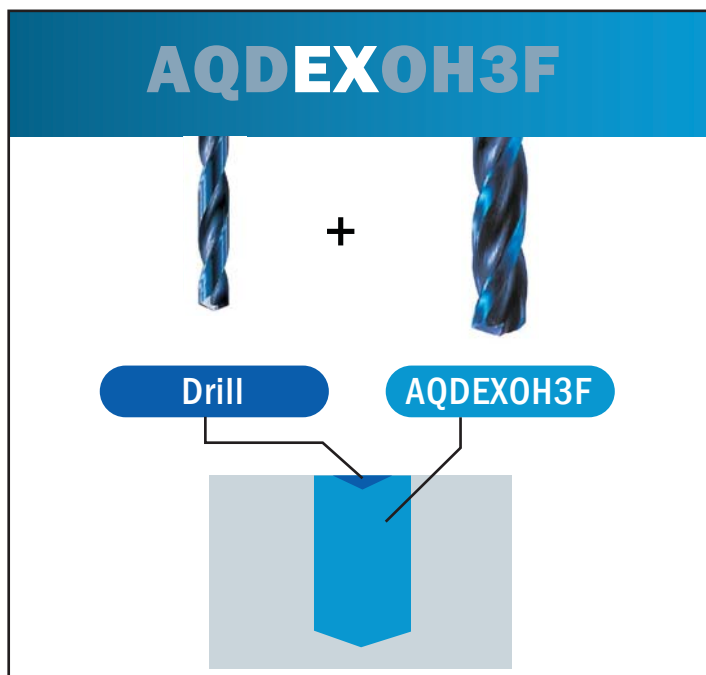
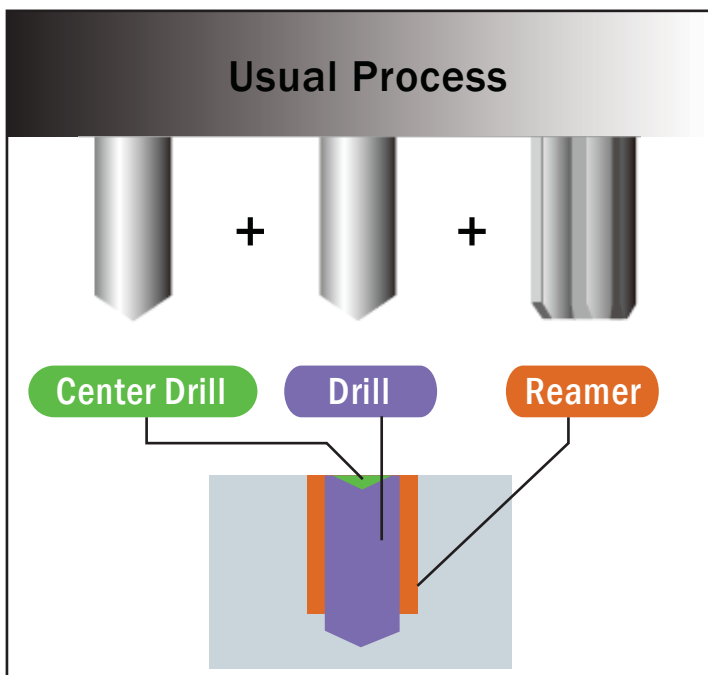
**Cutting Conditions**

Tool Diameter	$\varnothing$ 12 mm
Hole Depth/Blind Hole	36 mm (1.4")
Work Material	SUS304
Cutting Fluid	Water Soluble



Superior Hole Finish

## Streamline Process & Reduce Cycle Time

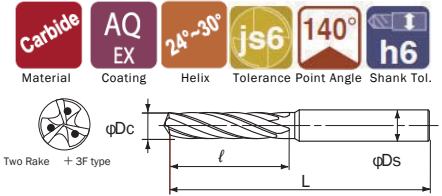


**Cutting Conditions**

Diameter of Hole	$\varnothing$ 12 H7
Hole Depth	20 mm
Work Material	Carbon Steel

# AQDEXOH3F3D

## AQUA DRILL EX OIL HOLE 3 FLUTE 3XD



LIST 9826

EDP #	Size	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
			ℓ	L	Ds	
0723876	3.0	0.1181	17	68	3	•
0728483	3.1	0.1220	20	72	4	•
0728490	3.2	0.1260				•
0728505	3.3	0.1299				•
0723882	3.4	0.1339				•
0723899	3.5	0.1378				•
0728511	3.6	0.1417				•
0728528	3.7	0.1457				•
0728534	3.8	0.1496				•
0728540	3.9	0.1535				•
0723904	4.0	0.1575				•
0728557	4.1	0.1614	25	80	5	•
0728563	4.2	0.1654				•
0723910	4.3	0.1693				•
0729736	4.4	0.1732				•
0723927	4.5	0.1772				•
0728570	4.6	0.1811				•
0728586	4.7	0.1850				•
0728592	4.8	0.1890				•
0728608	4.9	0.1929				•
0723933	5.0	0.1969				•
0723940	5.1	0.2008	27	82	6	•
0728614	5.2	0.2047				•
0728620	5.3	0.2087				•
0728637	5.4	0.2126				•
0723956	5.5	0.2165				•
0728643	5.6	0.2205				•
0728650	5.7	0.2244				•
0728666	5.8	0.2283				•
0728672	5.9	0.2323				•
0723962	6.0	0.2362				•
0728689	6.1	0.2402	30	88	7	•
0728695	6.2	0.2441				•
0728700	6.3	0.2480				•
0728717	6.4	0.2520				•
0723979	6.5	0.2559				•
0728723	6.6	0.2598				•
0728730	6.7	0.2638				•
0723985	6.8	0.2677				•
0723991	6.9	0.2717				•
0724006	7.0	0.2756				•
0729742	7.1	0.2795	32	94	8	•
0729759	7.2	0.2835				•
0729765	7.3	0.2874				•
0729771	7.4	0.2913				•
0724012	7.5	0.2953				•
0728746	7.6	0.2992				•
0728752	7.7	0.3031				•
0728769	7.8	0.3071				•
0728775	7.9	0.3110				•
0724029	8.0	0.3150				•

EDP #	Size	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock			
			ℓ	L	Ds				
0728781	8.1	0.3189	42	100	9	•			
0728798	8.2	0.3228				•			
0728803	8.3	0.3268				•			
0728810	8.4	0.3307				•			
0724035	8.5	0.3346				•			
0724041	8.6	0.3386				•			
0728826	8.7	0.3425				•			
0728832	8.8	0.3465				45	106	10	•
0728849	8.9	0.3504							•
0724058	9.0	0.3543							•
0728855	9.1	0.3583	•						
0728861	9.2	0.3622	•						
0728878	9.3	0.3661	•						
0728884	9.4	0.3701	•						
0724064	9.5	0.3740	•						
0728890	9.6	0.3780	•						
0728906	9.7	0.3819	47	116	11				•
0728912	9.8	0.3858				•			
0728929	9.9	0.3898				•			
0724070	10.0	0.3937				•			
0728935	10.1	0.3976				•			
0728941	10.2	0.4016				•			
0724087	10.3	0.4055				•			
0728958	10.4	0.4094				•			
0724093	10.5	0.4134				•			
0728964	10.6	0.4173				50	122	12	•
0728970	10.7	0.4213	•						
0728987	10.8	0.4252	•						
0728993	10.9	0.4291	•						
0724109	11.0	0.4331	•						
0729008	11.1	0.4370	•						
0729014	11.2	0.4409	•						
0729020	11.3	0.4449	•						
0729037	11.4	0.4488	•						
0724115	11.5	0.4528	52	128	13				•
0729043	11.6	0.4567				•			
0729050	11.7	0.4606				•			
0729066	11.8	0.4646				•			
0729072	11.9	0.4685				•			
0724121	12.0	0.4724				•			
0724138	12.1	0.4764				•			
0724144	12.5	0.4921				•			
0724150	13.0	0.5118				62	134	14	•
0724167	13.5	0.5315				65			•
0724173	14.0	0.5512	67	140	15	•			
0724180	14.1	0.5551	70			•			
0724196	14.5	0.5709	72			•			
0724201	15.0	0.5906	75			•			
0724218	15.5	0.6102	77			•			
0724224	15.6	0.6142	80			•			
0724230	16.0	0.6299	80			146	16	•	

• U.S. stock item

### Standard Drilling Conditions

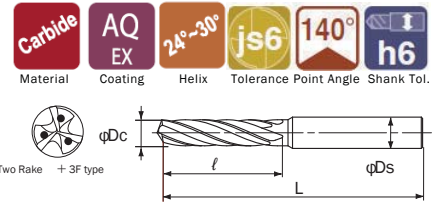
#### LIST 9826, 9820

Work Material		Cast Irons/Carbon Steel	Alloy Steels/Pre-Hardened (20-30 HRC)		Mold Steels/Hardened Steels (30-40 HRC)		Hardened Steels (40-50 HRC)		Cast Irons		Stainless Steel (300-Series Stainless)		Cast Aluminum		
Speed (SFM)		325-330 SFM		260-265 SFM		225-230 SFM		170-175 SFM		260-265 SFM		160-165 SFM		260-450 SFM	
Drilling Diameter															
Metric	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
3	0.118	10,700	0.005	8,500	0.005	7,450	0.004	5,600	0.005	8,500	0.005	5,300	0.004	14,800	0.007
4	0.157	8,000	0.006	6,400	0.006	5,600	0.005	4,200	0.007	6,400	0.006	4,000	0.006	11,200	0.009
6	0.236	5,300	0.010	4,250	0.009	3,750	0.008	2,800	0.011	4,250	0.009	2,650	0.008	7,400	0.010
8	0.315	4,000	0.013	3,200	0.013	2,800	0.011	2,100	0.015	3,200	0.013	2,000	0.011	5,600	0.013
10	0.394	3,200	0.016	2,550	0.016	2,250	0.014	1,700	0.018	2,550	0.016	1,600	0.014	4,500	0.016
12	0.472	2,650	0.019	2,100	0.019	1,850	0.017	1,400	0.022	2,100	0.019	1,350	0.016	3,700	0.019
14	0.551	2,250	0.020	1,800	0.020	1,600	0.016	1,200	0.022	1,800	0.019	1,150	0.016	3,200	0.022
16	0.630	2,000	0.022	1,600	0.022	1,400	0.019	1,050	0.025	1,600	0.022	1,000	0.019	2,200	0.032



# AQDEXOH3F5D

## AQUA DRILL EX OIL HOLE 3 FLUTE 5XD



### LIST 9820

EDP #	Size	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc		l	L	Ds	
0724247	3.0	0.1181	28	78	3	•
0729089	3.1	0.1220				•
0729095	3.2	0.1260				•
0729100	3.3	0.1299	32			•
0724253	3.4	0.1339				•
0724260	3.5	0.1378		86	4	•
0729117	3.6	0.1417				•
0729123	3.7	0.1457				•
0729130	3.8	0.1496	36			•
0729146	3.9	0.1535				•
0724276	4.0	0.1575				•
0729152	4.1	0.1614				•
0729169	4.2	0.1654				•
0724282	4.3	0.1693	40	98	5	•
0729175	4.4	0.1732				•
0724299	4.5	0.1772				•
0729181	4.6	0.1811				•
0729198	4.7	0.1850				•
0729203	4.8	0.1890		98	5	•
0729210	4.9	0.1929				•
0724304	5.0	0.1969	44			•
0724310	5.1	0.2008				•
0729226	5.2	0.2047				•
0729232	5.3	0.2087				•
0729249	5.4	0.2126				•
0724327	5.5	0.2165		100	6	•
0729255	5.6	0.2205				•
0729261	5.7	0.2244				•
0729278	5.8	0.2283	48			•
0729284	5.9	0.2323				•
0724333	6.0	0.2362				•
0729290	6.1	0.2402				•
0729306	6.2	0.2441				•
0729312	6.3	0.2480	52			•
0729329	6.4	0.2520				•
0724340	6.5	0.2559		109	7	•
0729335	6.6	0.2598				•
0729341	6.7	0.2638				•
0724356	6.8	0.2677	56			•
0724362	6.9	0.2717				•
0724379	7.0	0.2756				•
0729358	7.1	0.2795				•
0729364	7.2	0.2835				•
0729370	7.3	0.2874	60			•
0729387	7.4	0.2913				•
0724385	7.5	0.2953				•
0729393	7.6	0.2992		118	8	•
0729409	7.7	0.3031				•
0729415	7.8	0.3071	64			•
0729421	7.9	0.3110				•
0724391	8.0	0.3150				•

EDP #	Size	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc		l	L	Ds	
0729438	8.1	0.3189				•
0729444	8.2	0.3228				•
0729450	8.3	0.3268	68			•
0729467	8.4	0.3307				•
0724407	8.5	0.3346				•
0724413	8.6	0.3386		127	9	•
0729473	8.7	0.3425				•
0729480	8.8	0.3465	72			•
0729496	8.9	0.3504				•
0724420	9.0	0.3543				•
0729501	9.1	0.3583				•
0729518	9.2	0.3622				•
0729524	9.3	0.3661	76			•
0729530	9.4	0.3701				•
0724436	9.5	0.3740				•
0729547	9.6	0.3780		136	10	•
0729553	9.7	0.3819				•
0729560	9.8	0.3858	80			•
0729576	9.9	0.3898				•
0724442	10.0	0.3937				•
0729582	10.1	0.3976				•
0729599	10.2	0.4016				•
0724459	10.3	0.4055	84			•
0729604	10.4	0.4094				•
0724465	10.5	0.4134		149	11	•
0729610	10.6	0.4173				•
0729627	10.7	0.4213				•
0729633	10.8	0.4252	88			•
0729640	10.9	0.4291				•
0724471	11.0	0.4331				•
0729656	11.1	0.4370				•
0729662	11.2	0.4409				•
0729679	11.3	0.4449	92			•
0729685	11.4	0.4488				•
0724488	11.5	0.4528		158	12	•
0729691	11.6	0.4567				•
0729707	11.7	0.4606				•
0729713	11.8	0.4646	96			•
0729720	11.9	0.4685				•
0724494	12.0	0.4724				•
0724500	12.1	0.4764	100			•
0724516	12.5	0.4921		167	13	•
0724522	13.0	0.5118	104			•
0724539	13.5	0.5315	108			•
0724545	14.0	0.5512	112	176	14	•
0724551	14.1	0.5551				•
0724568	14.5	0.5709	116		15	•
0724574	15.0	0.5906	120	185		•
0724580	15.5	0.6102	124			•
0724597	15.6	0.6142		194	16	•
0724602	16.0	0.6299	128			•

• U.S. stock item

### Note:

- 1) Adjust drilling conditions according to the rigidity of machine or work clamp state.
- 2) Use the table values as starting parameters. Adjust per your machine & set up as required.
- 3) Above table values are for drilling water soluble cutting fluid. For non-water soluble cutting fluid reduce the RPM and feed rates by 20%
- 4) Use Internal Coolant. If drilling more than 3xD or 5xD use peck drill cycle (G83).
- 5) Peck Depth interval = 1xD

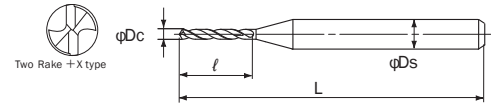
### Formulas:

$$\text{RPM} = \frac{\text{SFM} \times 3.82}{\text{Drill Dia.}}$$

$$\text{Feed rate (in/min)}: \text{RPM} \times \text{IPR}$$

# AQMD

AQUA SOLID CARBIDE MICRO DRILL



**L9544** Metric Sizes Range 0.20 to 1.99

(Unit) : mm

EDP #	Size	Decimal Equivalent	Flute Length ℓ	Overall Length L	Shank Dia. Ds	Stock
0634002	0.20	0.0079	2.5	L	Ds	•
0634019	0.21	0.0083				•
0634025	0.22	0.0087				•
0634031	0.23	0.0091				•
0634048	0.24	0.0094				•
0634054	0.25	0.0098				•
0634060	0.26	0.0102				•
0634077	0.27	0.0106				•
0634083	0.28	0.0110				•
0634090	0.29	0.0114				•
0634105	0.30	0.0118	3	L	Ds	•
0634111	0.31	0.0122				•
0634128	0.32	0.0126				•
0634134	0.33	0.0130				•
0634140	0.34	0.0134				•
0634157	0.35	0.0138	4	L	Ds	•
0634163	0.36	0.0142				•
0634170	0.37	0.0146				•
0634186	0.38	0.0150				•
0634192	0.39	0.0154				•
0634208	0.40	0.0157	5	38	3	•
0634214	0.41	0.0161				•
0634220	0.42	0.0165				•
0634237	0.43	0.0169				•
0634243	0.44	0.0173				•
0634250	0.45	0.0177				•
0634266	0.46	0.0181				•
0634272	0.47	0.0185				•
0634289	0.48	0.0189				•
0634295	0.49	0.0193				•
0634300	0.50	0.0197	6	L	Ds	•
0634317	0.51	0.0201				•
0634323	0.52	0.0205				•
0634330	0.53	0.0209				•
0634346	0.54	0.0213				•
0634352	0.55	0.0217				•
0634369	0.56	0.0220				•
0634375	0.57	0.0224				•
0634381	0.58	0.0228				•
0634398	0.59	0.0232				•
0634403	0.60	0.0236	7	L	Ds	•
0634410	0.61	0.0240				•
0634426	0.62	0.0244				•
0634432	0.63	0.0248				•
0634449	0.64	0.0252				•
0634455	0.65	0.0256				•
0634461	0.66	0.0260				•
0634478	0.67	0.0264				•
0634484	0.68	0.0268				•
0634490	0.69	0.0272				•
0634506	0.70	0.0276	9	L	Ds	•
0634512	0.71	0.0280				•
0634529	0.72	0.0283				•
0634535	0.73	0.0207				•
0634541	0.74	0.0291				•

EDP #	Size	Decimal Equivalent	Flute Length ℓ	Overall Length L	Shank Dia. Ds	Stock			
0634558	0.75	0.0295	9	L	Ds	•			
0634564	0.76	0.0299				•			
0634570	0.77	0.0303				•			
0634587	0.78	0.0307				•			
0634593	0.79	0.0311				•			
0634609	0.80	0.0315				•			
0634615	0.81	0.0319				•			
0634621	0.82	0.0323				•			
0634638	0.83	0.0327				10	38	3	•
0634644	0.84	0.0331							•
0634650	0.85	0.0335	•						
0634667	0.86	0.0339	•						
0634673	0.87	0.0343	•						
0634680	0.88	0.0346	11	L	Ds	•			
0634696	0.89	0.0350				•			
0634701	0.90	0.0354				•			
0634718	0.91	0.0358				•			
0634724	0.92	0.0362				•			
0634730	0.93	0.0366				•			
0634747	0.94	0.0370				•			
0634753	0.95	0.0374				•			
0634760	0.96	0.0378				12	47	3	•
0634776	0.97	0.0382							•
0634782	0.98	0.0386	•						
0634799	0.99	0.0390	•						
0634804	1.00	0.0394	•						
0634810	1.01	0.0398	14	L	Ds	•			
0634827	1.02	0.0402				•			
0634833	1.03	0.0406				•			
0634840	1.04	0.0409				•			
0634856	1.05	0.0413				•			
0634862	1.06	0.0417				•			
0634879	1.07	0.0421				•			
0634885	1.08	0.0425				•			
0634891	1.09	0.0429				•			
0634907	1.10	0.0433				15	L	Ds	•
0634913	1.11	0.0437	•						
0634920	1.12	0.0441	•						
0634936	1.13	0.0445	•						
0634942	1.14	0.0449	•						
0634959	1.15	0.0453	•						
0634965	1.16	0.0457	•						
0634971	1.17	0.0461	•						
0634988	1.18	0.0465	•						
0634994	1.19	0.0469	•						
0635009	1.20	0.0472	15	L	Ds	•			
0635015	1.21	0.0476				•			
0635021	1.22	0.0480				•			
0635038	1.23	0.0484				•			
0635044	1.24	0.0488				•			
0635050	1.25	0.0492				•			
0635067	1.26	0.0496				•			
0635073	1.27	0.0500				•			
0635080	1.28	0.0504				•			
0635096	1.29	0.0508	•						

EDP #	Size	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc		ℓ	L	Ds	
0635101	1.30	0.0512				•
0635118	1.31	0.0516				•
0635124	1.32	0.0520				•
0635130	1.33	0.0524				•
0635147	1.34	0.0528				•
0635153	1.35	0.0531				•
0635160	1.36	0.0535				•
0635176	1.37	0.0539				•
0635182	1.38	0.0543				•
0635199	1.39	0.0547				•
0635204	1.40	0.0551				•
0635210	1.41	0.0555				•
0635227	1.42	0.0559				•
0635233	1.43	0.0563				•
0635240	1.44	0.0567				•
0635256	1.45	0.0571				•
0635262	1.46	0.0575				•
0635279	1.47	0.0579	15	47	3	•
0635285	1.48	0.0583				•
0635291	1.49	0.0587				•
0635307	1.50	0.0591				•
0635313	1.51	0.0594				•
0635320	1.52	0.0598				•
0635336	1.53	0.0602				•
0635342	1.54	0.0606				•
0635359	1.55	0.0610				•
0635365	1.56	0.0614				•
0635371	1.57	0.0618				•
0635388	1.58	0.0622				•
0635394	1.59	0.0626				•
0635400	1.60	0.0630				•
0635416	1.61	0.0634				•
0635422	1.62	0.0638				•
0635439	1.63	0.0642				•
0635445	1.64	0.0646				•

EDP #	Size	Decimal Equivalent	Flute Length	Overall Length	Shank Dia.	Stock
	Dc		ℓ	L	Ds	
0635451	1.65	0.0650				•
0635468	1.66	0.0654				•
0635474	1.67	0.0657				•
0635480	1.68	0.0661				•
0635497	1.69	0.0665				•
0635502	1.70	0.0669				•
0635519	1.71	0.0673				•
0635525	1.72	0.0677				•
0635531	1.73	0.0681				•
0635548	1.74	0.0685				•
0635554	1.75	0.0689				•
0635560	1.76	0.0693				•
0635577	1.77	0.0697				•
0635583	1.78	0.0701				•
0635590	1.79	0.0705				•
0635605	1.80	0.0709				•
0635611	1.81	0.0713				•
0635628	1.82	0.0717	15	47	3	•
0635634	1.83	0.0720				•
0635640	1.84	0.0724				•
0635657	1.85	0.0728				•
0635663	1.86	0.0732				•
0635670	1.87	0.0736				•
0635686	1.88	0.0740				•
0635692	1.89	0.0744				•
0635708	1.90	0.0748				•
0635714	1.91	0.0752				•
0635720	1.92	0.0756				•
0635737	1.93	0.0760				•
0635743	1.94	0.0764				•
0635750	1.95	0.0768				•
0635766	1.96	0.0772				•
0635772	1.97	0.0776				•
0635789	1.98	0.0780				•
0635795	1.99	0.0783				•

## Standard Drilling Conditions

### L9544

Workpiece Material		Carbon Steels Cast Irons			Alloy Steels			Die Steels Hardened Steels (30-40HRC)			Hardened Steels (40-50HRC)			Hardened Steels (50-55HRC)			Ductile Cast Irons			Stainless Steels		
Metric mm	Decimal	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)	RPM	Feed (IPR)	Step Feed(mm)
0.2	0.0079	31,800	0.0001	0.1D	26,500	0.0001	0.1D	21,200	0.0001	0.1D	12,700	0.0001	0.1D	10,600	0.0001	0.1D	31,800	0.0001	0.1D	10,600	0.0001	0.1D
0.3	0.0118	31,800	0.0001		26,500	0.0001		21,200	0.0001		12,700	0.0001		10,600	0.0001		31,800	0.0001		10,600	0.0001	
0.4	0.0157	31,800	0.0002		25,900	0.0002		19,900	0.0002		12,700	0.0002		9,900	0.0002		31,800	0.0002		9,500	0.0002	
0.5	0.0197	31,800	0.0002	0.2D	25,900	0.0002	0.2D	19,100	0.0002	0.2D	12,700	0.0002	0.2D	9,500	0.0002	0.2D	31,800	0.0002	0.2D	9,500	0.0002	0.2D
1.0	0.0394	23,900	0.0006		15,900	0.0006		12,700	0.0006		8,000	0.0005		5,600	0.0004		19,100	0.0006		5,600	0.0006	
1.5	0.0591	21,200	0.0011		13,800	0.0011		9,500	0.0011		6,400	0.0009		4,200	0.0006		17,000	0.0011		4,200	0.0012	
1.99	0.0783	19,200	0.0019	12,800	0.0020	8,000	0.0020	5,600	0.0015	3,600	0.0008	16,000	0.0014	3,600	0.0015							

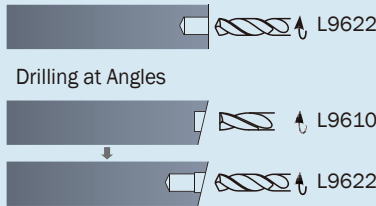
Note:

- 1) Utilize the standard drilling conditions shown in the catalogs just a general guide when starting operation.
- 2) Adjust drilling conditions if required if any vibration or unusual sound occurs when cutting.
- 3) When using low speed machines, use the maximum speed and adjust the feed rate.
- 4) Use of water soluble cutting fluid is recommended.
- 5) In case of drying drilling - use Air blow and reduce feeds/speeds by 30%

Formulas:  $RPM = \frac{SFM \times 3.82}{\text{Drill Dia.}}$  Feed rate (in/min):  $RPM \times IPR$

## Small Diameter Deep Hole Drill Cutting Conditions:

### 1. Use Guide Hole Drill (L9622 and L9610, p. 20 )



Drilling at Angles

- We recommend pre-drilling with guide hole drill. Hole depth  $1D - 2D$
- We recommend using L9622 or L9610 for guide hole drilling. Select one with a diameter 0.015mm - .05 mm larger than deep hole drill.
- If drilling at an angle use Aqua EX flat drill (L9610) to create a flat surface and then use Pilot Drill

### 2. Deep Hole Drilling into guide Hole



- Penetrate into the guide hole at 50% lower RPM until 0.5-1.0mm (0.02"- 0.04") from depth of guide

### 3. Deep Hole Drilling



- Start Drilling at recommended feeds & Speeds

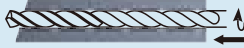
### 4. Deep Hole Drilling (Breaking thru or blind hole)



Thru Hole - Breaking Thru



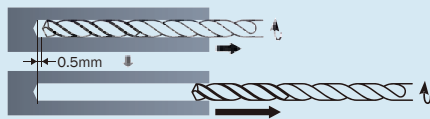
Normal feed



Reduce Feed rate by 50%

- When breaking thru for a thru hole reduce feed rate by 50% to prevent drill from breaking

### 5. Retracting Drill from the Hole



- After drilling is complete, decrease RPM and pull the drill back through the hole
- About , RPM = 500, Feed = 2000 mm/min (IPR=0.157 IPM=79)

## Precautions for Small Diameter Drills

1. Handling of Cutting Fluid
  - To prevent Coolant holes from being blocked use a fine mesh filter. (Recommended Filtration efficiency  $5\mu\text{m}$ )
  - Water Soluble cutting fluid is recommended
2. Min. Coolant pressure requirement
  - Min. Coolant pressure requirement = 300 psi or 2.0 Mpa
  - Above recommended pressure will enable stable machining
  - If using non-water soluble cutting oils, higher pressure might be required
3. ATC
  - To reduce shock and vibration reduce ATC feed if required

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