NACHI

AQDEXOH3F 3D 5D

AQUA Drills EX Oil-Hole 3 Flutes

High Accuracy - High Precision Drilling up to 5xD of Drill

AQDEXOH3F

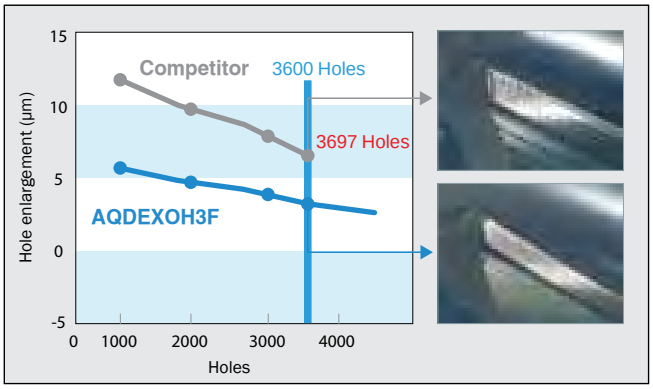
3D
5D

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

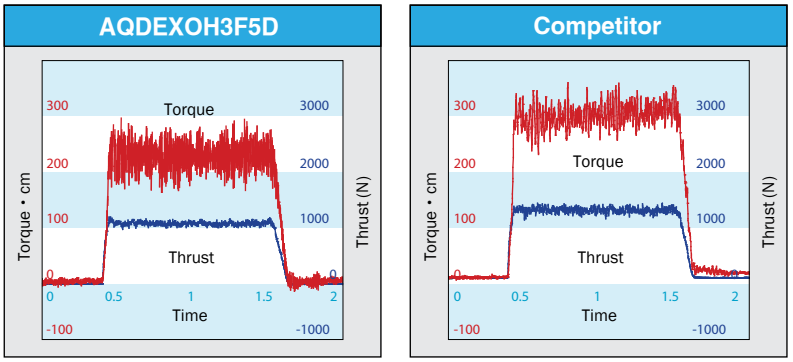
Super accurate drilling up 5xDiameter at speeds of 59.0 inches per minute (1500 mm/min)

Hole enlargement

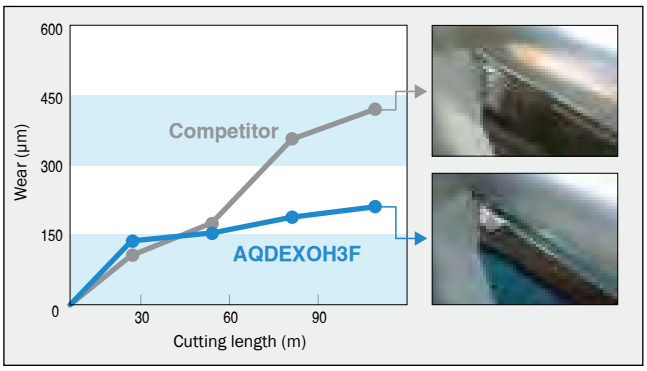


Comparison of cutting force

Cutting force is small, and controls amount of oversize.



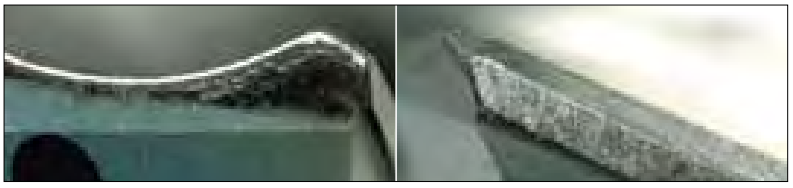
SS400 Wear after 105m (4100")



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

SUS304 Wear after 60m (2360")



Cutting condition

Tools Ø	Ø6	400 Stainless (SS400)	Work Material
Speed	328 SFM (100m/min)	Water Soluble	Type of Coolant
Feed	50 IPM 1280mm/min (0.24mm/rev)	30mm - 1.2" (5D)	Depth/Blind Hole

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
SS400	S45C/S50C	SCR/NAK	30~40HRC	40~50HRC	50~65HRC	SUS304/SUS316	SUS420		FCD/FC	AC/ADC	Cu
○	○	○	○	○	X	●	●	X	●	●	●

○ Great ● Good X Not Suitable

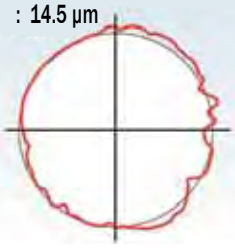
AQDEXOH3F

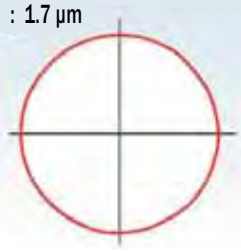
AQUA Drills EX Oil-Hole 3 Flutes

Highly Precise Holes at High Feeds

Roundness Comparison

2-Flute Drill	AQDEXOH3F	Cutting Conditions
Cutting Speed : 150 SFM (45m/min) Feed Speed : 0.010 IPR - 12 IPM (300mm/min) Roundness : 14.5 µm	Cutting Speed : 170 SFM (50m/min) Feed Speed : 0.017 IPR - 22 IPM (570mm/min) Roundness : 1.7 µm	Tool Diameter : Ø 12 mm Hole Depth/Blind Hole : 36 mm (1.4") Work Material : SUS304 Cutting Fluid : Water Soluble

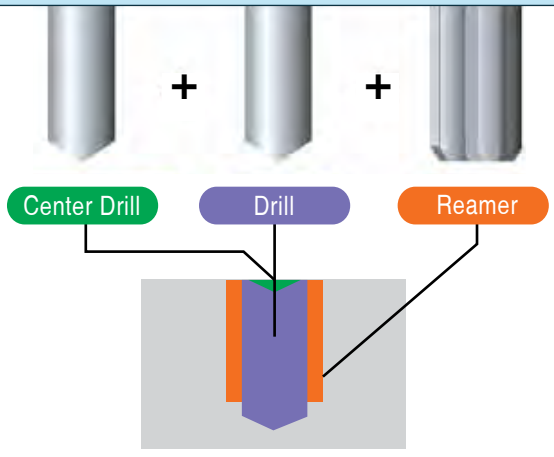




Superior Hole Finish

Streamline Process & Reduce Cycle Time

Usual Process



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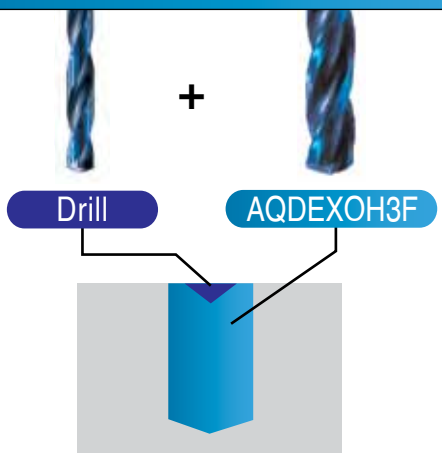
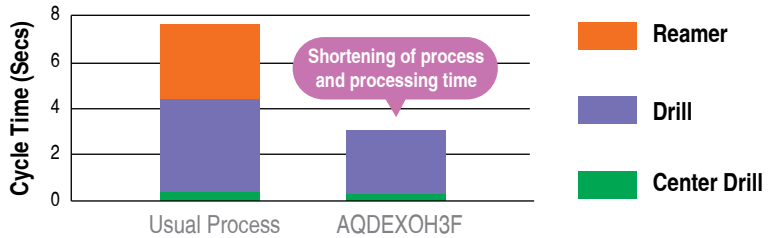


Processing Efficiency



Cutting Conditions

Diameter of Hole	:	Ø12 H7
Hole Depth	:	20 mm
Work Material	:	Carbon Steel

Material | Coating | Helix | Tolerance | Point Angle | Shank Tol.

AQDEXOH3F3D

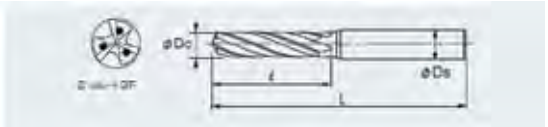
LIST 9826

EDP No.	Size	Decimal Equivalent	FL	OAL	Shank	Stock
0723876	3.0	0.1181	17	68	3	•
0728483	3.1	0.1220	20	72	4	•
0728490	3.2	0.1260	20	72	4	•
0728505	3.3	0.1299	20	72	4	•
0723882	3.4	0.1339	20	72	4	•
0723899	3.5	0.1378	20	72	4	•
0728511	3.6	0.1417	22	72	4	•
0728528	3.7	0.1457	22	72	4	•
0728534	3.8	0.1496	22	72	4	•
0728540	3.9	0.1535	22	72	4	•
0723904	4.0	0.1575	22	72	4	•
0728557	4.1	0.1614	25	80	5	•
0728563	4.2	0.1654	25	80	5	•
0723910	4.3	0.1693	25	80	5	•
0729736	4.4	0.1732	25	80	5	•
0723927	4.5	0.1772	25	80	5	•
0728570	4.6	0.1811	27	80	5	•
0728586	4.7	0.1850	27	80	5	•
0728592	4.8	0.1890	27	80	5	•
0728608	4.9	0.1929	27	80	5	•
0723933	5.0	0.1969	27	80	5	•
0723940	5.1	0.2008	27	82	6	•
0728614	5.2	0.2047	27	82	6	•
0728620	5.3	0.2087	27	82	6	•
0728637	5.4	0.2126	27	82	6	•
0723956	5.5	0.2165	27	82	6	•
0728643	5.6	0.2205	30	82	6	•
0728650	5.7	0.2244	30	82	6	•
0728666	5.8	0.2283	30	82	6	•
0728672	5.9	0.2323	30	82	6	•
0723962	6.0	0.2362	30	82	6	•
0728689	6.1	0.2402	32	88	7	•
0728695	6.2	0.2441	32	88	7	•
0728700	6.3	0.2480	32	88	7	•
0728717	6.4	0.2520	32	88	7	•
0723979	6.5	0.2559	32	88	7	•
0728723	6.6	0.2598	35	88	7	•
0728730	6.7	0.2638	35	88	7	•
0723985	6.8	0.2677	35	88	7	•
0723991	6.9	0.2717	35	88	7	•
0724006	7.0	0.2756	35	88	7	•
0729742	7.1	0.2795	37	94	8	•
0729759	7.2	0.2835	37	94	8	•
0729765	7.3	0.2874	37	94	8	•
0729771	7.4	0.2913	37	94	8	•
0724012	7.5	0.2953	37	94	8	•
0728746	7.6	0.2992	40	94	8	•
0728752	7.7	0.3031	40	94	8	•
0728769	7.8	0.3071	40	94	8	•
0728775	7.9	0.3110	40	94	8	•
0724029	8.0	0.3150	40	94	8	•
0728781	8.1	0.3189	42	100	9	•
0728798	8.2	0.3228	42	100	9	•
0728803	8.3	0.3268	42	100	9	•
0728810	8.4	0.3307	42	100	9	•
0724035	8.5	0.3346	42	100	9	•
0724041	8.6	0.3386	45	100	9	•
0728826	8.7	0.3425	45	100	9	•
0728832	8.8	0.3465	45	100	9	•
0728849	8.9	0.3504	45	100	9	•
0724058	9.0	0.3543	45	100	9	•

EDP No.	Size	Decimal Equivalent	FL	OAL	Shank	Stock
0728855	9.1	0.3583	47	106	10	•
0728861	9.2	0.3622	47	106	10	•
0728878	9.3	0.3661	47	106	10	•
0728884	9.4	0.3701	47	106	10	•
0724064	9.5	0.3740	47	106	10	•
0728890	9.6	0.3780	50	106	10	•
0728906	9.7	0.3819	50	106	10	•
0728912	9.8	0.3858	50	106	10	•
0728929	9.9	0.3898	50	106	10	•
0724070	10.0	0.3937	50	106	10	•
0728935	10.1	0.3976	52	116	11	•
0728941	10.2	0.4016	52	116	11	•
0724087	10.3	0.4055	52	116	11	•
0728958	10.4	0.4094	52	116	11	•
0724093	10.5	0.4134	52	116	11	•
0728964	10.6	0.4173	52	116	11	•
0728970	10.7	0.4213	55	106	11	•
0728987	10.8	0.4252	55	106	11	•
0728993	10.9	0.4291	55	106	11	•
0724109	11.0	0.4331	55	106	11	•
0729008	11.1	0.4370	57	122	12	•
0729014	11.2	0.4409	57	122	12	•
0729020	11.3	0.4449	57	122	12	•
0729037	11.4	0.4488	57	122	12	•
0724115	11.5	0.4528	57	122	12	•
0729043	11.6	0.4567	60	122	12	•
0729050	11.7	0.4606	60	122	12	•
0729066	11.8	0.4646	60	122	12	•
0729072	11.9	0.4685	60	122	12	•
0724121	12.0	0.4724	60	122	12	•
0724138	12.1	0.4764	62	128	13	•
0724144	12.5	0.4921	62	128	13	•
0724150	13.0	0.5118	65	128	13	•
0724167	13.5	0.5315	67	134	14	•
0724173	14.0	0.5512	70	134	14	•
0724180	14.1	0.5551	72	140	15	•
0724196	14.5	0.5709	72	140	15	•
0724201	15.0	0.5906	75	140	15	•
0724218	15.5	0.6102	77	146	16	•
0724224	15.6	0.6142	80	146	16	•
0724230	16.0	0.6299	80	146	16	•

Tolerance of Drill Diameter **unit:mm**

Tolerance (js6)			
Diameter	3.0 - 6.0	6.1 - 10.0	10.1 - 16.0
Tolerance	+0.004	+0.0045	+0.0055



AQDEXOH3F5D

LIST 9820

EDP No.	Size	Decimal Equivalent	FL	OAL	Shank	Stock
0724247	3.0	0.1181	28	78	3	•
0729089	3.1	0.1220	32	86	4	•
0729095	3.2	0.1260	32	86	4	•
0729100	3.3	0.1299	32	86	4	•
0724253	3.4	0.1339	32	86	4	•
0724260	3.5	0.1378	32	86	4	•
0729117	3.6	0.1417	36	86	4	•
0729123	3.7	0.1457	36	86	4	•
0729130	3.8	0.1496	36	86	4	•
0729146	3.9	0.1535	36	86	4	•
0724276	4.0	0.1575	36	86	4	•
0729152	4.1	0.1614	40	98	5	•
0729169	4.2	0.1654	40	98	5	•
0724282	4.3	0.1693	40	98	5	•
0729175	4.4	0.1732	40	98	5	•
0724299	4.5	0.1772	40	98	5	•
0729181	4.6	0.1811	44	98	5	•
0729198	4.7	0.1850	44	98	5	•
0729203	4.8	0.1890	44	98	5	•
0729210	4.9	0.1929	44	98	5	•
0724304	5.0	0.1969	44	98	5	•
0724310	5.1	0.2008	44	100	6	•
0729226	5.2	0.2047	44	100	6	•
0729232	5.3	0.2087	44	100	6	•
0729249	5.4	0.2126	44	100	6	•
0724327	5.5	0.2165	44	100	6	•
0729255	5.6	0.2205	48	100	6	•
0729261	5.7	0.2244	48	100	6	•
0729278	5.8	0.2283	48	100	6	•
0729284	5.9	0.2323	48	100	6	•
0724333	6.0	0.2362	48	100	6	•
0729290	6.1	0.2402	52	109	7	•
0729306	6.2	0.2441	52	109	7	•
0729312	6.3	0.2480	52	109	7	•
0729329	6.4	0.2520	52	109	7	•
0724340	6.5	0.2559	52	109	7	•
0729335	6.6	0.2598	56	109	7	•
0729341	6.7	0.2638	56	109	7	•
0724356	6.8	0.2677	56	109	7	•
0724362	6.9	0.2717	56	109	7	•
0724379	7.0	0.2756	56	109	7	•
0729358	7.1	0.2795	60	118	8	•
0729364	7.2	0.2835	60	118	8	•
0729370	7.3	0.2874	60	118	8	•
0729387	7.4	0.2913	60	118	8	•
0724385	7.5	0.2953	60	118	8	•
0729393	7.6	0.2992	64	118	8	•
0729409	7.7	0.3031	64	118	8	•
0729415	7.8	0.3071	64	118	8	•
0729421	7.9	0.3110	64	118	8	•
0724391	8.0	0.3150	64	118	8	•
0729438	8.1	0.3189	68	127	9	•
0729444	8.2	0.3228	68	127	9	•
0729450	8.3	0.3268	68	127	9	•
0729467	8.4	0.3307	68	127	9	•
0724407	8.5	0.3346	68	127	9	•
0724413	8.6	0.3386	72	127	9	•
0729473	8.7	0.3425	72	127	9	•
0729480	8.8	0.3465	72	127	9	•
0729496	8.9	0.3504	72	127	9	•
0724420	9.0	0.3543	72	127	9	•

EDP No.	Size	Decimal Equivalent	FL	OAL	Shank	Stock
0729501	9.1	0.3583	76	136	10	•
0729518	9.2	0.3622	76	136	10	•
0729524	9.3	0.3661	76	136	10	•
0729530	9.4	0.3701	76	136	10	•
0724436	9.5	0.3740	76	136	10	•
0729547	9.6	0.3780	80	136	10	•
0729553	9.7	0.3819	80	136	10	•
0729560	9.8	0.3858	80	136	10	•
0729576	9.9	0.3898	80	136	10	•
0724442	10.0	0.3937	80	136	10	•
0729582	10.1	0.3976	84	149	11	•
0729599	10.2	0.4016	84	149	11	•
0724459	10.3	0.4055	84	149	11	•
0729604	10.4	0.4094	84	149	11	•
0724465	10.5	0.4134	84	149	11	•
0729610	10.6	0.4173	88	149	11	•
0729627	10.7	0.4213	88	149	11	•
0729633	10.8	0.4252	88	149	11	•
0729640	10.9	0.4291	88	149	11	•
0724471	11.0	0.4331	88	149	11	•
0729656	11.1	0.4370	92	158	12	•
0729662	11.2	0.4409	92	158	12	•
0729679	11.3	0.4449	92	158	12	•
0729685	11.4	0.4488	92	158	12	•
0724488	11.5	0.4528	92	158	12	•
0729691	11.6	0.4567	96	158	12	•
0729707	11.7	0.4606	96	158	12	•
0729713	11.8	0.4646	96	158	12	•
0729720	11.9	0.4685	96	158	12	•
0724494	12.0	0.4724	96	158	12	•
0724500	12.1	0.4764	100	167	13	•
0724516	12.5	0.4921	100	167	13	•
0724522	13.0	0.5118	104	167	13	•
0724539	13.5	0.5315	108	176	14	•
0724545	14.0	0.5512	112	176	14	•
0724551	14.1	0.5551	116	185	15	•
0724568	14.5	0.5709	116	185	15	•
0724574	15.0	0.5906	120	185	15	•
0724580	15.5	0.6102	124	194	16	•
0724597	15.6	0.6142	128	194	16	•
0724602	16.0	0.6299	128	194	16	•

Tolerance of Drill Diameter **unit:mm**

Tolerance (js6)			
Diameter	3.0 - 6.0	6.1 - 10.0	10.1 - 16.0
Tolerance	+0.004	+0.0045	+0.0055

Aqua Drill EX 3-Flute - Standard Drilling Conditions

LIST 9826 AQDEXOH3F3D / List 9820 AQDEXOH3F5D

Work Material / Speed (SFM) / Drilling Diameter			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	
			325-330 SFM		260-265 SFM		225-230 SFM		170-175 SFM		260-265 SFM		160-165 SFM		260-400 SFM	
Drill Dia. (mm/inches)	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

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:

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

The Ultimate High Performance Carbide Drill

NEW

✓ Ideally suited for flat bottom applications in the oil and gas, automotive and general industries.

- ✓ One drill does it all - Eliminates the need to use a “center drill” or “end mill” on inclined or curved surfaces.
- ✓ True 180° flat cutting edges creates minimal exit burr in tubing & thin plates.
- ✓ “Double Margin” for stable and precision drilling.

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2014.07.M-TYREE