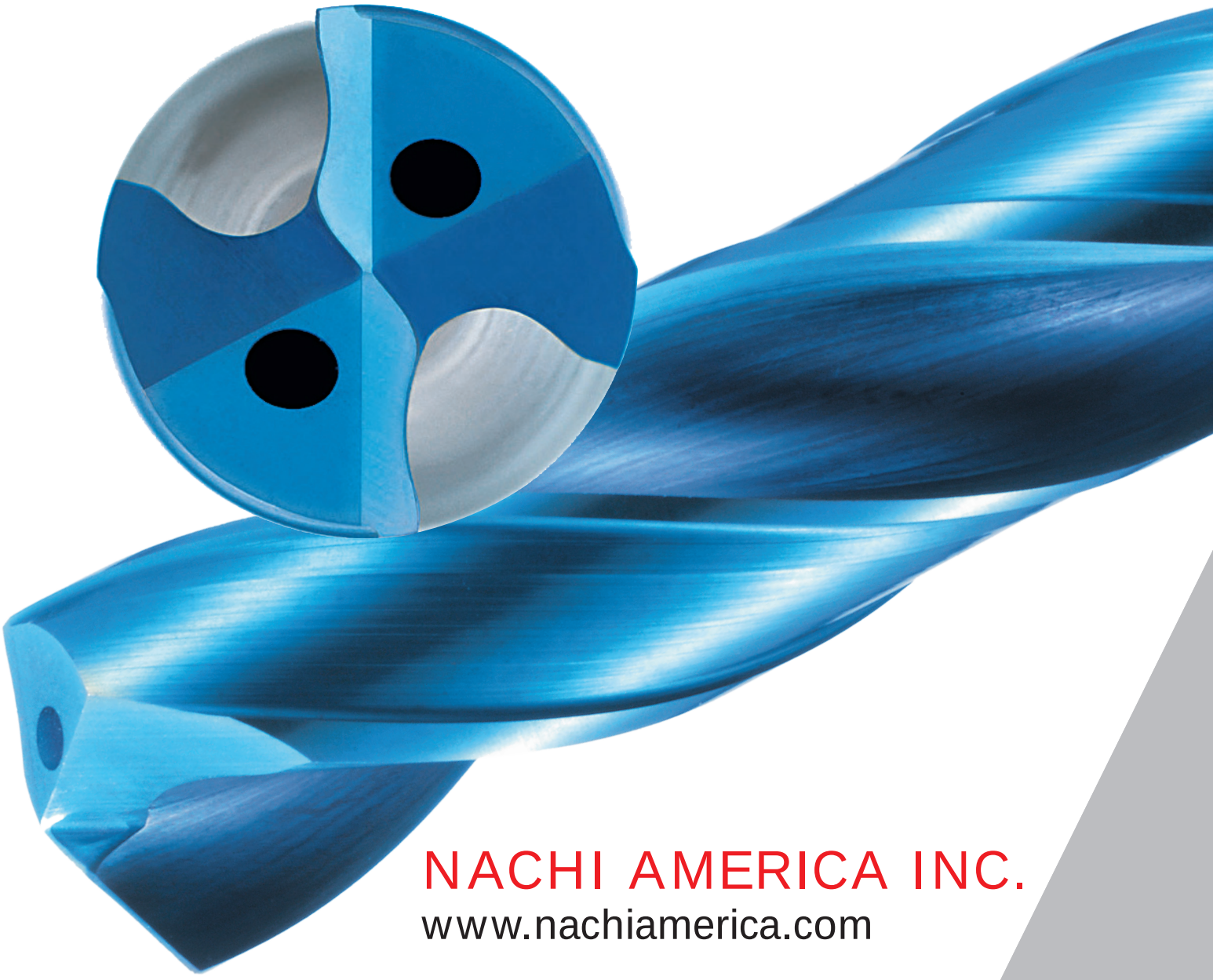
NEW!
Micro sizes
now available
in 25D, 30D
and 40D

NACHi

AQUA DRILL EX CARBIDE DRILL SERIES

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



NACHI AMERICA INC.
www.nachiamerica.com

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

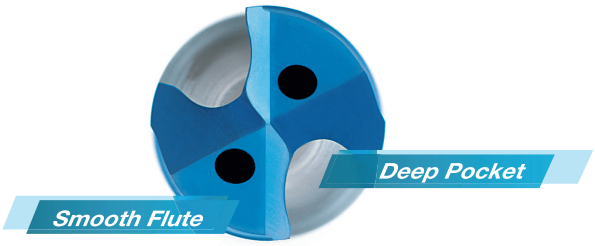
AQUA EX SERIES

AQUA DRILL EX CARBIDE DRILL SERIES

AQDEX0H10D, 15D, 20D, 25D, 30D, 40D, PLT

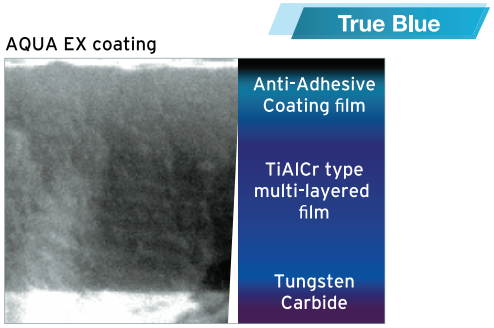
Features of Aqua EX Drill Series Fluting

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



Features of Aqua EX Drill Series Coating

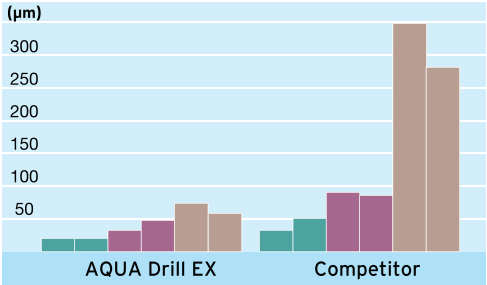
- Aqua EX coating is designed for superior performance in both dry and wet conditions.
- EX = Exotic materials, extreme conditions.
- Engineering to withstand heavy wear and maintain consistent performance.



Long Tool Life

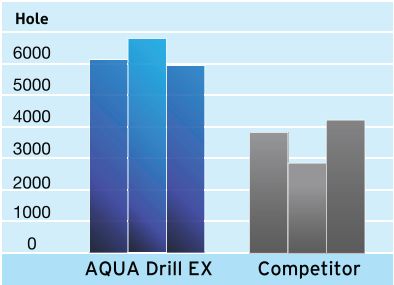
Cutting resistance is low

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

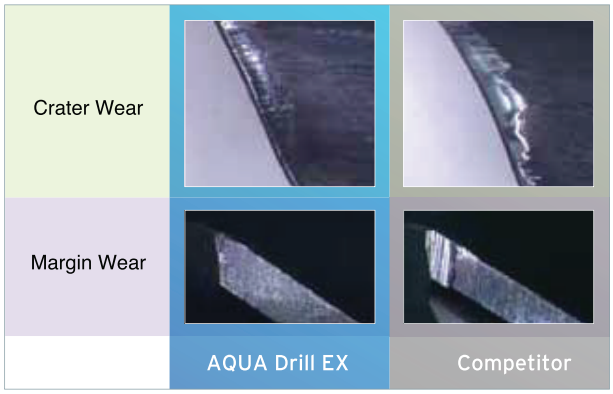
Fine Chips with AQUA DRILL EX

AQUA DRILL EX CARBIDE DRILL SERIES

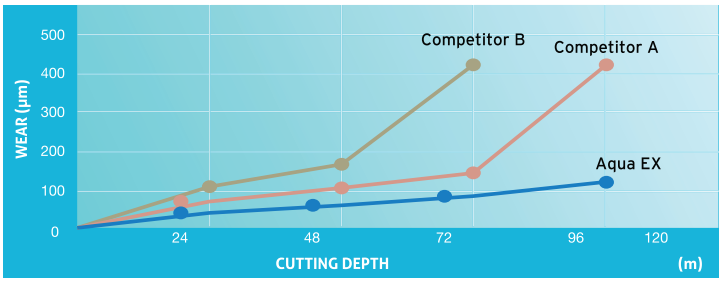
Delicate Cut

Tough Heart

Comparison of wear after 625 Holes in 304 SS



Comparison of wear on 304 SS



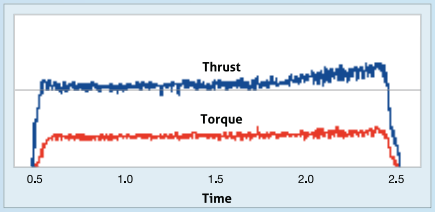
Cutting Conditions		
Tool : Ø9.0 5D	Feed : 640mm/min (IPR = 0.008 / IPM = 25)	Work Material : 304 Stainless
Speed : 90m/min (RPM = 3,200)	Depth : 40mm (1.57")	Cutting Fluid : Water Soluble

AQUA DRILL EX DESIGN

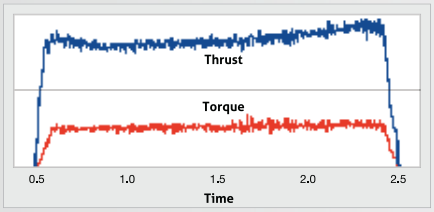
- Engineered to handle the full range of applications.
- Aqua EX coating stands up to the highest temperatures.
- Optimal design for hard materials like Nickel/Titanium alloys.
- From start to finish designed with optimum chip evacuation in mind.

TORQUE / THRUST COMPARISON

AQUA Drill EX

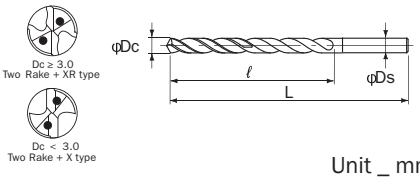


Competitor



Consistent Thrust & Torque with Aqua Drill EX

Aqua Drill EX Oil Hole 10D



LIST 9612 Metric sizes

Unit _ mm

EDP#	Size	Decimal Equiv.	Flute Length	Overall Length	Shank Diameter
	Dc		ℓ	L	Ds
0733673	1.000	0.0394	13	61	3
0733680	1.100	0.0433	14	63	
0733696	1.200	0.0472	16		
0733701	1.300	0.0512	17		
0733718	1.400	0.0551	18		
0733724	1.500	0.0591	20		
0733730	1.600	0.0630	21	70	
0733747	1.700	0.0669	22		
0733753	1.800	0.0709	23		
0733760	1.900	0.0748	25		
0733776	2.000	0.0787	26		
0733782	2.100	0.0827	27	80	
0733799	2.200	0.0866	29		
0733804	2.300	0.0906	30		
0733810	2.400	0.0945	31		
0733827	2.500	0.0984	33		
0733833	2.600	0.1024	34	89	
0733840	2.700	0.1063	35		
0733856	2.800	0.1102	36		
0733862	2.900	0.1142	38		
0726519	3.000	0.1181	39		
0729788	3.100	0.1220	46	96	4
0729794	3.200	0.1260			
0729800	3.300	0.1299			
0729816	3.400	0.1339			
0726525	3.500	0.1378			
0729822	3.600	0.1417	52	102	
0729839	3.700	0.1457			
0729845	3.800	0.1496			
0729851	3.900	0.1535			
0726531	4.000	0.1575			
0729868	4.100	0.1614	59	109	5
0729874	4.200	0.1654			
0729880	4.300	0.1693			
0729897	4.400	0.1732			
0726548	4.500	0.1772			
0729902	4.600	0.1811	65	115	
0729919	4.700	0.1850			
0729925	4.800	0.1890			
0729931	4.900	0.1929			
0726554	5.000	0.1969			
0729948	5.100	0.2008	72	122	6
0729954	5.200	0.2047			
0729960	5.300	0.2087			
0729977	5.400	0.2126			
0726560	5.500	0.2165			
0729983	5.600	0.2205	78	128	
0729990	5.700	0.2244			
0730003	5.800	0.2283			
0730010	5.900	0.2323			
0726577	6.000	0.2362			
0730026	6.100	0.2402	85	135	7
0730032	6.200	0.2441			
0730049	6.300	0.2480			
0730055	6.400	0.2520			
0726583	6.500	0.2559			

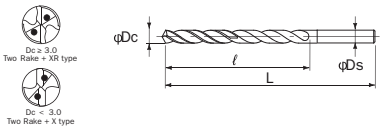
EDP#	Size	Decimal Equiv.	Flute Length	Overall Length	Shank Diameter
	Dc		ℓ	L	Ds
0730078	6.700	0.2638	91	141	7
0730084	6.800	0.2677			
0730090	6.900	0.2717			
0726590	7.000	0.2756			
0730106	7.100	0.2795	98	148	8
0730112	7.200	0.2835			
0730129	7.300	0.2874			
0730135	7.400	0.2913			
0726605	7.500	0.2953			
0730141	7.600	0.2992	104	154	
0730158	7.700	0.3031			
0730164	7.800	0.3071			
0730170	7.900	0.3110			
0726611	8.000	0.3150			
0730187	8.100	0.3189	111	161	9
0730193	8.200	0.3228			
0730209	8.300	0.3268			
0730215	8.400	0.3307			
0726628	8.500	0.3346			
0730221	8.600	0.3386	117	167	
0730238	8.700	0.3425			
0730244	8.800	0.3465			
0730250	8.900	0.3504			
0726634	9.000	0.3543			
0730267	9.100	0.3583	124	174	10
0730273	9.200	0.3622			
0730280	9.300	0.3661			
0730296	9.400	0.3701			
0726640	9.500	0.3740			
0730301	9.600	0.3780	130	180	
0730318	9.700	0.3819			
0730324	9.800	0.3858			
0730330	9.900	0.3898			
0726657	10.000	0.3937			
0730347	10.100	0.3976	137	197	11
0730353	10.200	0.4016			
0730360	10.300	0.4055			
0730376	10.400	0.4094			
0726663	10.500	0.4134			
0730382	10.600	0.4173	143	203	
0730399	10.700	0.4213			
0730404	10.800	0.4252			
0730410	10.900	0.4291			
0726670	11.000	0.4331			
0730427	11.100	0.4370	150	210	12
0730433	11.200	0.4409			
0730440	11.300	0.4449			
0730456	11.400	0.4488			
0726686	11.500	0.4528			
0730462	11.600	0.4567	156	216	
0730479	11.700	0.4606			
0730485	11.800	0.4646			
0730491	11.900	0.4685			
0726692	12.000	0.4724			

1 per tube

⚠ WARNING: Cancer - www.P65Warnings.ca.gov

Aqua Drill EX Oil Hole 15D

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



LIST 9614 Metric sizes
LIST 9615 Fractional sizes

• U.S Stock Item ■ Special Order

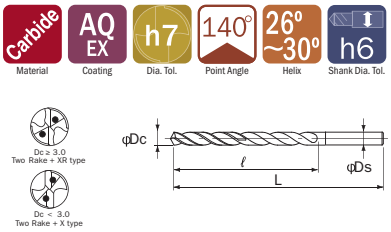
EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Diameter	Stock
	Dc			ℓ	L	Ds	
0733879	1.000	0.0394		18	66	3	•
0733885	1.100	0.0433		20	71		•
0733891	1.200	0.0472		22			•
0733907	1.300	0.0512		23			•
0733913	1.400	0.0551		25			•
0733920	1.500	0.0591		27			•
0733936	1.600	0.0630		29	80		•
0733942	1.700	0.0669		31			•
0733959	1.800	0.0709		32			•
0733965	1.900	0.0748		34			•
0733971	2.000	0.0787		36			•
0733988	2.100	0.0827		38	93		•
0733994	2.200	0.0866		40			•
0734009	2.300	0.0906		41			•
0734015	2.400	0.0945		43			•
0734021	2.500	0.0984		45			•
0734038	2.600	0.1024		47	104		•
0734044	2.700	0.1063		49			•
0734050	2.800	0.1102		50			•
0734067	2.900	0.1142		52			•
0726708	3.000	0.1181		54			•
0730507	3.100	0.1220		63	113	4	•
1519137	3.175	0.1250	1/8				•
0730513	3.200	0.1260					•
0730520	3.300	0.1299					•
0730536	3.400	0.1339					•
0726714	3.500	0.1378					•
1519143	3.572	0.1406	9/64	72	122		•
0730542	3.600	0.1417					•
0730559	3.700	0.1457					•
0730565	3.800	0.1496					•
0730571	3.900	0.1535					•
1519150	3.969	0.1562	5/32				•
0726720	4.000	0.1575					•
0730588	4.100	0.1614		81	131	5	•
0730594	4.200	0.1654					•
0730600	4.300	0.1693					•
1519166	4.366	0.1719	11/64				•
0730616	4.400	0.1732					•
0726737	4.500	0.1772					•
0730622	4.600	0.1811		90	140		•
0730639	4.700	0.1850					•
1519172	4.763	0.1875	3/16				•
0730645	4.800	0.1890					•
0730651	4.900	0.1929					•
0726743	5.000	0.1969					•
0730668	5.100	0.2008		99	149	6	•
1519189	5.159	0.2031	13/64				•
0730674	5.200	0.2047					•
0730680	5.300	0.2087					•
0730697	5.400	0.2126					•
1519195	5.408	0.2129	#3				•
0726750	5.500	0.2165					•
1519200	5.556	0.2187	7/32	108	158		•
0730702	5.600	0.2205					•
0730719	5.700	0.2244					•
0730725	5.800	0.2283					•
0730731	5.900	0.2323					•
1519217	5.953	0.2344	15/64				•
0726766	6.000	0.2362					•
0730748	6.100	0.2402		117	167	7	•
0730754	6.200	0.2441					•
0730760	6.300	0.2480					•
1519223	6.350	0.2500	1/4				•
0730777	6.400	0.2520					•
0726772	6.500	0.2559					•
0730783	6.600	0.2598		126	176		•
0730790	6.700	0.2638					•
	6.747	0.2656	17/64				■

EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Diameter	Stock
	Dc			ℓ	L	Ds	
0730805	6.800	0.2677		126	176	7	•
0730811	6.900	0.2717					•
0726789	7.000	0.2756					•
0730828	7.100	0.2795		135	185	8	•
1519230	7.144	0.2812	9/32				•
0730834	7.200	0.2835					•
0730840	7.300	0.2874					•
0730857	7.400	0.2913					•
0726795	7.500	0.2953					•
	7.541	0.2969	19/64	144	194		■
0730863	7.600	0.2992					•
0730870	7.700	0.3031					•
0730886	7.800	0.3071					•
0730892	7.900	0.3110					•
1519246	7.938	0.3125	5/16				•
0726800	8.000	0.3150					•
0730908	8.100	0.3189		153	203	9	•
0730914	8.200	0.3228					•
0730920	8.300	0.3268					•
	8.334	0.2969	21/64				■
0730937	8.400	0.3307					•
0726817	8.500	0.3346					•
0730943	8.600	0.3386		162	212		•
0730950	8.700	0.3425					•
1519252	8.731	0.3437	11/32				•
0730966	8.800	0.3465					•
0730972	8.900	0.3504					•
0726823	9.000	0.3543					•
0730989	9.100	0.3583		171	221	10	•
1519269	9.128	0.3594	23/64				•
0730995	9.200	0.3622					•
0731000	9.300	0.3661					•
0731016	9.400	0.3701					•
0726830	9.500	0.3740					•
1519275	9.525	0.3750	3/8	180	230		•
0731022	9.600	0.3780					•
0731039	9.700	0.3819					•
0731045	9.800	0.3858					•
0731051	9.900	0.3898					•
1519281	9.922	0.3906	25/64				•
0726846	10.000	0.3937					•
0731068	10.100	0.3976		189	249	11	•
0731074	10.200	0.4016					•
0731080	10.300	0.4055					•
0731097	10.400	0.4094					•
0726852	10.500	0.4134					•
0731102	10.600	0.4173		198	258		•
0731119	10.700	0.4213					•
	10.716	0.2969	27/64				■
0731125	10.800	0.4252					•
0731131	10.900	0.4291					•
0726869	11.000	0.4331					•
0731148	11.100	0.4370		207	267	12	•
	11.113	0.2969	7/16				■
0731154	11.200	0.4409					•
0731160	11.300	0.4449					•
0731177	11.400	0.4488					•
0726875	11.500	0.4528					•
	11.509	0.2969	29/64	216	276		■
0731183	11.600	0.4567					•
0731190	11.700	0.4606					•
0731205	11.800	0.4646					•
0731211	11.900	0.4685					•
0726881	12.000	0.4724					•
1519298	12.700	0.5000	1/2	234	294	13	•
1519303	13.494	0.5312	17/32	243	303	14	•
	14.288	0.2969	9/16	261	321	15	■

1 per tube

⚠ WARNING: Cancer - www.P65Warnings.ca.gov

Aqua Drill EX Oil Hole 20D



LIST 9616 Metric sizes
LIST 9617 Fractional sizes

• U.S Stock Item ■ Special Order

EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Diameter	Stock
	Dc			ℓ	L	Ds	
0734073	1.000	0.0394		23	71	3	•
0734080	1.100	0.0433		25	78		•
0734096	1.200	0.0472		28			•
0734101	1.300	0.0512		30			•
0734118	1.400	0.0551		32			•
0734124	1.500	0.0591		35			•
0734130	1.600	0.0630		37	90		•
0734147	1.700	0.0669		39			•
0734153	1.800	0.0709		41			•
0734160	1.900	0.0748		44			•
0734176	2.000	0.0787		46			•
0734182	2.100	0.0827		48	105		•
0734199	2.200	0.0866		51			•
0734204	2.300	0.0906		53			•
0734210	2.400	0.0945		55			•
0734227	2.500	0.0984		58			•
0734233	2.600	0.1024		60	119		•
0734240	2.700	0.1063		62			•
0734256	2.800	0.1102		64			•
0734262	2.900	0.1142		67			•
0726898	3.000	0.1181		69			•
0731228	3.100	0.1220		81	131	4	•
1519310	3.175	0.1250	1/8				•
0731234	3.200	0.1260					•
0731240	3.300	0.1299					•
0731257	3.400	0.1339					•
0726903	3.500	0.1378					•
1519326	3.572	0.1406	9/64	92	142		•
0731263	3.600	0.1417					•
0731270	3.700	0.1457					•
0731286	3.800	0.1496					•
0731292	3.900	0.1535					•
1519332	3.969	0.1562	5/32				•
0726910	4.000	0.1575					•
0731308	4.100	0.1614		104	154	5	•
0731314	4.200	0.1654					•
0731320	4.300	0.1693					•
1519349	4.366	0.1719	11/64				•
0731337	4.400	0.1732					•
0726926	4.500	0.1772					•
0731343	4.600	0.1811		115	165		•
0731350	4.700	0.1850					•
1519355	4.763	0.1875	3/16				•
0731366	4.800	0.1890					•
0731372	4.900	0.1929					•
0726932	5.000	0.1969					•
0731389	5.100	0.2008		127	177	6	•
	5.159	0.2031	13/64				■
0731395	5.200	0.2047					•
0731400	5.300	0.2087					•
0731417	5.400	0.2126					•
1519361	5.408	0.2129	#3				•
0726949	5.500	0.2165					•
1519378	5.556	0.2187	7/32	138	188		•
0731423	5.600	0.2205					•

EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Diameter	Stock
	Dc			ℓ	L	Ds	
0731430	5.700	0.2244		138	188	6	•
0731446	5.800	0.2283					•
0731452	5.900	0.2323					•
	5.953	0.2344	15/64				■
0726955	6.000	0.2362					•
0731469	6.100	0.2402		150	200	7	•
0731475	6.200	0.2441					•
0731481	6.300	0.2480					•
1519384	6.350	0.2500	1/4				•
0731498	6.400	0.2520					•
0726961	6.500	0.2559					•
0731503	6.600	0.2598		161	211		•
0731510	6.700	0.2638					•
1519390	6.747	0.2656	17/64				•
0731526	6.800	0.2677					•
0731532	6.900	0.2717					•
0726978	7.000	0.2756					•
0731549	7.100	0.2795		173	223	8	•
	7.144	0.2812	9/32				■
0731555	7.200	0.2835					•
0731561	7.300	0.2874					•
0731578	7.400	0.2913					•
0726984	7.500	0.2953					•
1519406	7.541	0.2969	19/64	184	234		•
0731584	7.600	0.2992					•
0731590	7.700	0.3031					•
0731606	7.800	0.3071					•
0731612	7.900	0.3110					•
1519412	7.938	0.3125	5/16				•
0726990	8.000	0.3150					•
0731629	8.100	0.3189		196	246	9	•
0731635	8.200	0.3228					•
0731641	8.300	0.3268					•
1519429	8.334	0.3281	21/64				•
0731658	8.400	0.3307					•
0727005	8.500	0.3346					•
0731664	8.600	0.3386		207	257		•
0731670	8.700	0.3425					•
1519435	8.731	0.3437	11/32				•
0731687	8.800	0.3465					•
0731693	8.900	0.3504					•
0727011	9.000	0.3543					•
0731709	9.100	0.3583		219	269	10	•
	9.128	0.3594	23/64				■
0731715	9.200	0.3622					•
0731721	9.300	0.3661					•
0731738	9.400	0.3701					•
0727028	9.500	0.3740					•
1519441	9.525	0.3750	3/8	230	280		•
0731744	9.600	0.3780					•
0731750	9.700	0.3819					•
0731767	9.800	0.3858					•
0731773	9.900	0.3898					•
1519458	9.922	0.3906	25/64				•
0727034	10.000	0.3937					•

1 per tube

⚠ WARNING: Cancer - www.P65Warnings.ca.gov

Drilling Conditions - Wet

LIST 9612, 9614, 9615, 9616, 9617

Work Material	Structural Steel Carbon Steel		Alloy Steel Heat Treated Steel (20 - 30 HRC)		Mold Steel Hardened Steel (30 - 40 HRC)		Ductile Cast Iron		Stainless Steel (300 Series)		Nickel Alloys PH Stainless		Aluminum Alloy	
Speed (SFM)	145-180 SFM		130-165 SFM		115-150 SFM		115-150 SFM		80-100 SFM		70-90 SFM			
Drill Diameter Metric	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
1.0	15500	0.0009	14000	0.0008	12100	0.0008	12100	0.0011	7750	0.0005	6800	0.0004	Contact Engineering	
1.5	10350	0.0013	9400	0.0012	8100	0.0012	8100	0.0016	5200	0.0007	4500	0.0006		
2.0	7800	0.0020	7000	0.0016	6050	0.0016	6050	0.0021	3900	0.0009	3400	0.0008		
2.5	6200	0.0030	5600	0.0020	4850	0.0020	4850	0.0027	3100	0.0015	2700	0.0013		
Speed (SFM)	320-350 SFM		230-250 SFM		200-230 SFM		200-230 SFM		120-150 SFM		100 - 120 SFM		340 - 360 SFM	
3.0	10350	0.0038	7400	0.0030	6500	0.0030	6500	0.0033	3900	0.0021	3200	0.0014	11300	0.0030
4.0	7800	0.0050	5600	0.0040	4850	0.0040	4850	0.0044	2900	0.0028	2400	0.0019	8500	0.0039
5.0	6200	0.0063	4500	0.0050	3900	0.0050	3900	0.0055	2300	0.0035	1950	0.0024	6800	0.0049
6.0	5200	0.0076	3700	0.0060	3200	0.0060	3200	0.0066	1950	0.0043	1600	0.0028	5700	0.0059
7.0	4400	0.0088	3200	0.0070	2800	0.0070	2800	0.0077	1650	0.0050	1400	0.0033	4850	0.0069
8.0	3900	0.0101	2800	0.0080	2400	0.0080	2400	0.0088	1450	0.0057	1200	0.0038	4250	0.0079
9.0	3450	0.0113	2500	0.0090	2150	0.0090	2150	0.0099	1300	0.0064	1100	0.0043	3800	0.0089
10.0	3100	0.0122	2200	0.0090	1900	0.0090	1900	0.0110	1150	0.0071	970	0.0047	3400	0.0098
11.0	2800	0.0134	2000	0.0100	1800	0.0100	1800	0.0121	1050	0.0078	880	0.0052	3100	0.0108
12.0	2600	0.0142	1850	0.0100	1600	0.0100	1600	0.0132	970	0.0085	810	0.0057	2800	0.0118

Cutting Condition Table Recommendations

1) Adjust cutting condition according to the rigidity of machine or work clamp state.
2) The table values are for drilling with water-soluble cutting fluid.
3) Reduce RPM and feed rate by 30% for non-water soluble coolant.
4) Straight shot drilling is possible. However, when experienceing poor chip evacuation please add a peck or review drilling parameters.
5) When pecking, set retract slightly below hole entrance.
6) Peck increment starting size should be 0.5-1XD.
7) Recommended pilot hole depth is 1.5-2XD.
8) Recommend the AQDEXOHPLT for pilot hole drilling.

Drilling Conditions - MQL

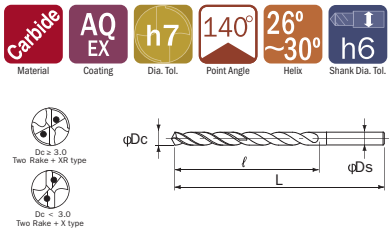
LIST 9612, 9614, 9615, 9616, 9617

Work Material	Structural Steel Carbon Steel		Alloy Steel Heat Treated Steel (20 - 30 HRC)		Mold Steel Hardened Steel (30 - 40 HRC)		Ductile Cast Iron	
Drill Diameter Metric	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
3.0	7600	0.0038	7600	0.0030	5700	0.0030	5700	0.0033
4.0	5700	0.0050	5000	0.0040	4300	0.0040	4300	0.0044
5.0	5100	0.0063	4450	0.0050	3800	0.0050	3800	0.0055
6.0	4200	0.0076	3700	0.0060	3200	0.0060	3200	0.0066
7.0	3600	0.0088	3200	0.0070	2700	0.0070	2700	0.0077
8.0	3200	0.0101	2800	0.0080	2400	0.0080	2400	0.0088
9.0	2800	0.0113	2500	0.0090	2100	0.0090	2100	0.0099
10.0	2550	0.0122	2200	0.0090	1900	0.0090	1900	0.0110
11.0	2300	0.0134	2000	0.0100	1700	0.0100	1700	0.0121
12.0	2100	0.0142	1900	0.0100	1600	0.0100	1600	0.0132

Cutting Condition Table Recommendations

1) Adjust cutting condition according to the rigidity of machine or work clamp state.
2) The table values are for MQL drilling.
3) Straight shot drilling is possible. However, when experiencing poor chip evacuation please add a peck or review drilling parameters.
4) When pecking, set retract slightly below hole entrance.
5) Peck increment starting size should be 0.5-1XD.
6) Recommended pilot hole depth is 1.5-2XD.
7) Recommend the AQDEXOHPLT for pilot hole drilling.
8) MQL not recommended for stainless and nickel applications. Please use wet drilling conditions.

Aqua Drill EX Oil Hole 25D



LIST 9618 Metric sizes
LIST 9619 Fractional sizes

• U.S Stock Item ■ Special Order

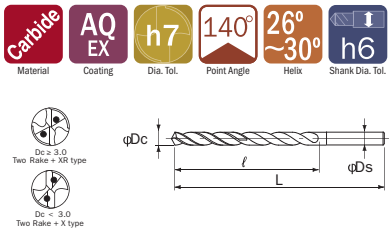
EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
1574446	1.000	0.0394		28	76	3	•
1574452	1.100	0.0433		31	86		•
1574469	1.200	0.0472		34			•
1574475	1.300	0.0512		36			•
1574481	1.400	0.0551		39			•
1574498	1.500	0.0591		42			•
1574503	1.600	0.0630		45	100		•
1574510	1.700	0.0669		48			•
1574526	1.800	0.0709		50			•
1574532	1.900	0.0748		53			•
1574549	2.000	0.0787		56			•
1574555	2.100	0.0827		59	115		•
1574584	2.200	0.0866		62			•
1574590	2.300	0.0906		64			•
1574606	2.400	0.0945		67			•
1574612	2.500	0.0984		70			•
1574629	2.600	0.1024		73	126		•
1574635	2.700	0.1063		76			•
1574641	2.800	0.1102		78			•
1574561	2.900	0.1142		81			•
0727040	3.000	0.1181		84	134		•
0731780	3.100	0.1220		98	148	4	•
1519464	3.175	0.1250	1/8				•
0731796	3.200	0.1260					•
0731801	3.300	0.1299					•
0731818	3.400	0.1339					•
0727057	3.500	0.1378					•
	3.572	0.1406	9/64	112	162		■
0731824	3.600	0.1417					•
0731830	3.700	0.1457					•
0731847	3.800	0.1496					•
0731853	3.900	0.1535					•
1519470	3.969	0.1562	5/32				•
0727063	4.000	0.1575					•
0731860	4.100	0.1614		126	176	5	•
0731876	4.200	0.1654					•
0731882	4.300	0.1693					•
	4.366	0.1719	11/64				■
0731899	4.400	0.1732					•
0727070	4.500	0.1772					•
0731904	4.600	0.1811		140	190		•
0731910	4.700	0.1850					•
1519487	4.763	0.1875	3/16				•

EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0731927	4.800	0.1890		140	190	5	•
0731933	4.900	0.1929					•
0727086	5.000	0.1969					•
0731940	5.100	0.2008		154	204	6	•
	5.159	0.2031	13/64				■
0731956	5.200	0.2047					•
0731962	5.300	0.2087					•
0731979	5.400	0.2126					•
1519493	5.408	0.2129	#3				•
0727092	5.500	0.2165					•
	5.556	0.2187	7/32	168	218		■
0731985	5.600	0.2205					•
0731991	5.700	0.2244					•
0732006	5.800	0.2283					•
0732012	5.900	0.2323					•
	5.953	0.2344	15/64				■
0727108	6.000	0.2362					•
0732029	6.100	0.2402		182	232	7	•
0732035	6.200	0.2441					•
0732041	6.300	0.2480					•
1519509	6.350	0.2500	1/4				•
0732058	6.400	0.2520					•
0727114	6.500	0.2559					•
0732064	6.600	0.2598		196	246		•
0732070	6.700	0.2638					•
	6.747	0.2656	17/64				■
0732087	6.800	0.2677					•
0732093	6.900	0.2717					•
0727120	7.000	0.2756					•
0732109	7.100	0.2795		210	260	8	•
	7.144	0.2812	9/32				■
0732115	7.200	0.2835					•
0732121	7.300	0.2874					•
0732138	7.400	0.2913					•
0727137	7.500	0.2953					•
	7.541	0.2969	19/64	224	274		■
0732144	7.600	0.2992					•
0732150	7.700	0.3031					•
0732167	7.800	0.3071					•
0732173	7.900	0.3110					•
1519515	7.938	0.3125	5/16				•
0727143	8.000	0.3150					•
1519521	9.525	0.3750	3/8	280	330	10	•

1 per tube

⚠ WARNING: Cancer - www.P65Warnings.ca.gov

Aqua Drill EX Oil Hole 30D



LIST 9620 Metric sizes
LIST 9621 Fractional sizes

• U.S Stock Item ■ Special Order

EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
1574578	1.000	0.0394		33	78	3	•
1574658	1.100	0.0433		36	93		•
1574664	1.200	0.0472		40			•
1574670	1.300	0.0512		43			•
1574687	1.400	0.0551		46			•
1574693	1.500	0.0591		50			•
1574709	1.600	0.0630		53	110		•
1574715	1.700	0.0669		56			•
1574721	1.800	0.0709		59			•
1574738	1.900	0.0748		63			•
1574744	2.000	0.0787		66			•
1574750	2.100	0.0827		69	127		•
1574767	2.200	0.0866		73			•
1574773	2.300	0.0906		76			•
1574780	2.400	0.0945		79			•
1574796	2.500	0.0984		83			•
1574801	2.600	0.1024		86	141		•
1574818	2.700	0.1063		89			•
1574824	2.800	0.1102		92			•
1574830	2.900	0.1142		96			•
0727150	3.000	0.1181		99	149		•
0732180	3.100	0.1220		116	166	4	•
1519538	3.175	0.1250	1/8				•
0732196	3.200	0.1260					•
0732201	3.300	0.1299					•
0732218	3.400	0.1339					•
0727166	3.500	0.1378					•
	3.572	0.1406	9/64	132	182		■
0732224	3.600	0.1417					•
0732230	3.700	0.1457					•
0732247	3.800	0.1496					•
0732253	3.900	0.1535					•
1519544	3.969	0.1562	5/32				•
0727172	4.000	0.1575					•
0732260	4.100	0.1614		149	199	5	•
0732276	4.200	0.1654					•
0732282	4.300	0.1693					•
	4.366	0.1719	11/64				■
0732299	4.400	0.1732					•
0727189	4.500	0.1772					•
0732304	4.600	0.1811		165	215		•
0732310	4.700	0.1850					•
1519550	4.763	0.1875	3/16				•
0732327	4.800	0.1890					•

EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Dia.	Stock
	Dc			ℓ	L	Ds	
0732333	4.900	0.1929		165	215	5	•
0727195	5.000	0.1969					•
0732340	5.100	0.2008		182	232	6	•
	5.159	0.2031	13/64				■
0732356	5.200	0.2047					•
0732362	5.300	0.2087					•
0732379	5.400	0.2126					•
	5.410	0.2130	#3				■
0727200	5.500	0.2165					•
	5.556	0.2187	7/32	198	248		■
0732385	5.600	0.2205					•
0732391	5.700	0.2244					•
0732407	5.800	0.2283					•
0732413	5.900	0.2323					•
	5.953	0.2344	15/64				■
0727217	6.000	0.2362					•
0732420	6.100	0.2402		215	265	7	•
0732436	6.200	0.2441					•
0732442	6.300	0.2480					•
1519567	6.350	0.2500	1/4				•
0732459	6.400	0.2520					•
0727223	6.500	0.2559					•
0732465	6.600	0.2598		231	281		•
0732471	6.700	0.2638					•
	6.747	0.2656	17/64				■
0732488	6.800	0.2677					•
0732494	6.900	0.2717					•
0727230	7.000	0.2756					•
0732500	7.100	0.2795		248	298	8	•
	7.144	0.2812	9/32				■
0732516	7.200	0.2835					•
0732522	7.300	0.2874					•
0732539	7.400	0.2913					•
0727246	7.500	0.2953					•
	7.541	0.2969	19/64	264	314		■
0732545	7.600	0.2992					•
0732551	7.700	0.3031					•
0732568	7.800	0.3071					•
0732574	7.900	0.3110					•
	7.938	0.3125	5/16				■
0727252	8.000	0.3150					•

1 per tube

⚠ WARNING: Cancer - www.P65Warnings.ca.gov

Drilling Conditions - Wet

LIST 9618, 9619, 9620, 9621

Work Material	Structural Steel Carbon Steel		Alloy Steel Heat Treated Steel (20 - 30 HRC)		Mold Steel Hardened Steel (30 - 40 HRC)		Ductile Cast Iron		Stainless Steel (300 Series)		Nickel Alloys PH Stainless		Aluminum Alloy	
Speed (SFM)	145-180 SFM		130-165 SFM		115-150 SFM		115-150 SFM		80-100 SFM		70-90 SFM			
Drill Diameter Metric	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
1.0	15500	0.0008	14000	0.0007	12100	0.0007	12100	0.0010	7750	0.0004	6800	0.0004	Contact Engineering	
1.5	10350	0.0012	9400	0.0011	8100	0.0011	8100	0.0015	5200	0.0006	4500	0.0006		
2.0	7800	0.0018	7000	0.0014	6050	0.0014	6050	0.0020	3900	0.0008	3400	0.0008		
2.5	6200	0.0028	5600	0.0017	4850	0.0017	4850	0.0026	3100	0.0014	2700	0.0012		
Speed (SFM)	320-350 SFM		230-250 SFM		200-230 SFM		200-230 SFM		120-150 SFM		100 - 120 SFM		340 - 360 SFM	
3.0	10350	0.0036	7400	0.0030	6500	0.0028	6500	0.0032	3900	0.0019	3200	0.0013	11300	0.0028
4.0	7800	0.0048	5600	0.0040	4850	0.0039	4850	0.0043	2900	0.0026	2400	0.0018	8500	0.0038
5.0	6200	0.0060	4500	0.0050	3900	0.0043	3900	0.0054	2300	0.0034	1950	0.0023	6800	0.0047
6.0	5200	0.0072	3700	0.0060	3200	0.0054	3200	0.0065	1950	0.0042	1600	0.0027	5700	0.0057
7.0	4400	0.0085	3200	0.0060	2800	0.0065	2800	0.0076	1650	0.0049	1400	0.0032	4850	0.0067
8.0	3900	0.0097	2800	0.0070	2400	0.0074	2400	0.0087	1450	0.0055	1200	0.0037	4250	0.0077

Cutting Condition Table Recommendations

1) Adjust cutting condition according to the rigidity of machine or work clamp state.
2) The table values are for drilling with water-soluble cutting fluid.
3) Reduce RPM and feed rate by 30% for non-water soluble coolant.
4) Straight shot drilling is possible. However, when experienceing poor chip evacuation please add a peck or review drilling parameters.
5) When pecking, set retract slightly below hole entrance.
6) Peck increment starting size should be 0.5-1XD.
7) Recommended pilot hole depth is 1.5-2XD.
8) Recommend the AQDEXOHPLT for pilot hole drilling.

Drilling Conditions - MQL

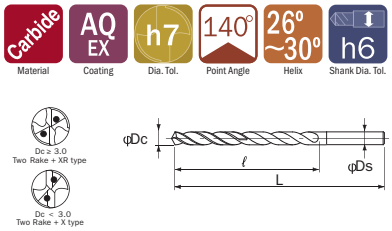
LIST 9618, 9619, 9620, 9621

Work Material	Structural Steel Carbon Steel		Alloy Steel Heat Treated Steel (20 - 30 HRC)		Mold Steel Hardened Steel (30 - 40 HRC)		Ductile Cast Iron	
Drill Diameter Metric	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
3.0	7600	0.0032	7600	0.0028	5700	0.0026	5700	0.0030
4.0	5700	0.0044	5000	0.0038	4300	0.0037	4300	0.0040
5.0	5100	0.0056	4450	0.0046	3800	0.0041	3800	0.0050
6.0	4200	0.0068	3700	0.0052	3200	0.0052	3200	0.0061
7.0	3600	0.0081	3200	0.0057	2700	0.0063	2700	0.0072
8.0	3200	0.0093	2800	0.0067	2400	0.0071	2400	0.0083

Cutting Condition Table Recommendations

1) Adjust cutting condition according to the rigidity of machine or work clamp state.
2) The table values are for MQL drilling.
3) Straight shot drilling is possible. However, when experiencing poor chip evacuation please add a peck or review drilling parameters.
4) When pecking, set retract slightly below hole entrance.
5) Peck increment starting size should be 0.5-1XD.
6) Recommended pilot hole depth is 1.5-2XD.
7) Recommend the AQDEXOHPLT for pilot hole drilling.
8) MQL not recommended for stainless and nickel applications. Please use wet drilling conditions.

Aqua Drill EX Oil Hole 40D



LIST 9626 Metric sizes
LIST 9627 Fractional sizes

• U.S Stock Item ■ Special Order

EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Diameter	Stock
	Dc			ℓ	L	Ds	
1575058	1.000	0.0394		43	88	3	•
1575064	1.100	0.0433		47	108		•
1575070	1.200	0.0472		52			•
1575087	1.300	0.0512		56			•
1575093	1.400	0.0551		60			•
1575109	1.500	0.0591		65			•
1575115	1.600	0.0630		69	130		•
1575121	1.700	0.0669		73			•
1575138	1.800	0.0709		77			•
1575144	1.900	0.0748		82			•
1575150	2.000	0.0787		76			•
1575167	2.100	0.0827		90	152		•
1575173	2.200	0.0866		95			•
1575180	2.300	0.0906		99			•
1575196	2.400	0.0945		103			•
1575201	2.500	0.0984		108			•
1575218	2.600	0.1024		112	170		•
1575224	2.700	0.1063		116			•
1575230	2.800	0.1102		120			•
1575247	2.900	0.1142		125			•
1519573	3.000	0.1181		129	179		•
	3.100	0.1220		151	201	4	■
1519618	3.175	0.1250	1/8				•
	3.200	0.1260					■
	3.300	0.1299					■
	3.400	0.1339					■
	3.500	0.1378					■
1519580	3.572	0.1406	9/64	172	222		•
	3.600	0.1417					■
	3.700	0.1457					■
	3.800	0.1496					■
	3.900	0.1535					■
1519624	3.969	0.1562	5/32				•
1519596	4.000	0.1575					•
	4.100	0.1614		194	244	5	■
	4.200	0.1654					■
	4.300	0.1693					■
	4.400	0.1732					■

EDP#	Size	Decimal Equiv.	Wire, Fractional, Letter	Flute Length	Overall Length	Shank Diameter	Stock
	Dc			ℓ	L	Ds	
	4.500	0.1772		194	244	5	■
	4.600	0.1811		215	265		■
	4.700	0.1850					■
1519630	4.763	0.1875	3/16				•
	4.800	0.1890					■
	4.900	0.1929					■
	5.000	0.1969					■
	5.100	0.2008		237	287	6	■
	5.200	0.2047					■
	5.300	0.2087					■
	5.400	0.2126					■
1519601	5.500	0.2165					■
	5.600	0.2205		258	308		■
	5.700	0.2244					■
	5.800	0.2283					■
	5.900	0.2323					■
	6.000	0.2362					■
	6.100	0.2402		280	330	7	■
	6.200	0.2441					■
	6.300	0.2480					■
1519647	6.350	0.2500	1/4				•
	6.400	0.2520					■
	6.500	0.2559					■
	6.600	0.2598		301	351		■
	6.700	0.2638					■
	6.800	0.2677					■
	6.900	0.2717					■
	7.000	0.2756					■
	7.100	0.2795		323	373	8	■
	7.200	0.2835					■
	7.300	0.2874					■
	7.400	0.2913					■
	7.500	0.2953					■
1519653	7.938	0.3125	5/16	344	394		•

1 per tube

⚠ WARNING: Cancer - www.P65Warnings.ca.gov

Drilling Conditions - Wet

LIST 9626, 9627

Work Material	Structural Steel Carbon Steel		Alloy Steel Heat Treated Steel (20 - 30 HRC)		Mold Steel Hardened Steel (30 - 40 HRC)		Ductile Cast Iron		Stainless Steel (300 Series)		Nickel Alloys PH Stainless		Aluminum Alloy	
Speed (SFM)	145-180 SFM		130-165 SFM		115-150 SFM		115-150 SFM		80-100 SFM		70-90 SFM			
Drill Diameter Metric	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
1.0	15500	0.0006	14000	0.0006	12100	0.0006	12100	0.0008	7750	0.0004	6800	0.0004	Contact Engineering	
1.5	10350	0.0009	9400	0.0008	8100	0.0008	8100	0.0012	5200	0.0006	4500	0.0006		
2.0	7800	0.0015	7000	0.0011	6050	0.0011	6050	0.0016	3900	0.0008	3400	0.0008		
2.5	6200	0.0024	5600	0.0014	4850	0.0014	4850	0.0022	3100	0.0012	2700	0.0011		
Speed (SFM)	320-350 SFM		230-250 SFM		200-230 SFM		200-230 SFM		120-150 SFM		100 - 120 SFM		340 - 360 SFM	
3.0	10350	0.0030	7400	0.0024	6500	0.0024	6500	0.0026	3900	0.0017	3200	0.0012	11300	0.0026
4.0	7800	0.0040	5600	0.0031	4850	0.0031	4850	0.0035	2900	0.0023	2400	0.0017	8500	0.0036
5.0	6200	0.0050	4500	0.0040	3900	0.0040	3900	0.0045	2300	0.0030	1950	0.0022	6800	0.0045
6.0	5200	0.0060	3700	0.0048	3200	0.0048	3200	0.0054	1950	0.0035	1600	0.0026	5700	0.0055
7.0	4400	0.0070	3200	0.0051	2800	0.0051	2800	0.0064	1650	0.0045	1400	0.0031	4850	0.0064
8.0	3900	0.0078	2800	0.0056	2400	0.0056	2400	0.0074	1450	0.0050	1200	0.0036	4250	0.0074

Cutting Condition Table Recommendations
1) Adjust cutting condition according to the rigidity of machine or work clamp state.
2) The table values are for drilling with water-soluble cutting fluid.
3) Reduce RPM and feed rate by 30% for non-water soluble coolant.
4) Straight shot drilling is possible. However, when experienceing poor chip evacuation please add a peck or review drilling parameters.
5) When pecking, set retract slightly below hole entrance.
6) Peck increment starting size should be 0.5-1XD.
7) Recommended pilot hole depth is 1.5-2XD.
8) Recommend the AQDEXOHPLT for pilot hole drilling.

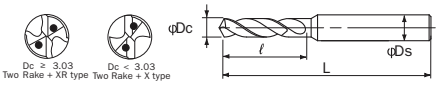
Drilling Conditions - MQL

LIST 9626, 9627

Work Material	Structural Steel Carbon Steel		Alloy Steel Heat Treated Steel (20 - 30 HRC)		Mold Steel Hardened Steel (30 - 40 HRC)		Ductile Cast Iron	
Drill Diameter Metric	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
3.0	7600	0.0030	7600	0.0024	5700	0.0024	5700	0.0026
4.0	5700	0.0040	5000	0.0031	4300	0.0031	4300	0.0035
5.0	5100	0.0050	4450	0.0040	3800	0.0040	3800	0.0045
6.0	4200	0.0060	3700	0.0048	3200	0.0048	3200	0.0054
7.0	3600	0.0070	3200	0.0051	2700	0.0051	2700	0.0064
8.0	3200	0.0078	2800	0.0056	2400	0.0056	2400	0.0074

Cutting Condition Table Recommendations
1) Adjust cutting condition according to the rigidity of machine or work clamp state.
2) The table values are for MQL drilling.
3) Straight shot drilling is possible. However, when experiencing poor chip evacuation please add a peck or review drilling parameters.
4) When pecking, set retract slightly below hole entrance.
5) Peck increment starting size should be 0.5-1XD.
6) Recommended pilot hole depth is 1.5-2XD.
7) Recommend the AQDEXOHPLT for pilot hole drilling.
8) MQL not recommended for stainless and nickel applications. Please use wet drilling conditions.

Aqua Drill EX Oil Hole Pilot



LIST 9622 Metric sizes
LIST 9623 Fractional sizes

• U.S Stock Item ■ Special Order

EDP#	Size	Decimal Equiv.	For Ø	Flute Length	Overall Length	Shank Diameter
	Dc			ℓ	L	Ds
0734279	1.015	0.0400		3.3	54	3
0734285	1.115	0.0439		3.6	56	
0734291	1.215	0.0478		3.9		
0734307	1.315	0.0518		4.2		
0734313	1.415	0.0557		4.6		
0734320	1.515	0.0596		4.9		
0734336	1.615	0.0636		5.2	60	
0734342	1.715	0.0675		5.5		
0734359	1.815	0.0715		5.8		
0734365	1.915	0.0754		6.2		
0734371	2.015	0.0793		9		
0734388	2.115	0.0833		11	63	
0734394	2.215	0.0872				
0734400	2.315	0.0911				
0734416	2.415	0.0951		12		
0734422	2.515	0.0990				
0734439	2.615	0.1030			68	
0734445	2.715	0.1069		14		
0734451	2.815	0.1108				
0734468	2.915	0.1148				
0727624	3.030	0.1193				
0732952	3.130	0.1232		15	72	4
1519660	3.205	0.1262	1/8			
0732969	3.230	0.1272				
0732975	3.330	0.1311				
0732981	3.430	0.1350		16		
0727630	3.530	0.1390				
1519676	3.601	0.1418	9/64			
0732998	3.630	0.1429				
0733002	3.730	0.1469		18		
0733019	3.830	0.1508				
0733025	3.930	0.1547				
1519682	3.998	0.1574	5/32			
0727647	4.030	0.1587				
0733031	4.130	0.1626		19	80	5
0733048	4.230	0.1665				
0733054	4.330	0.1705				
1519699	4.395	0.1730	11/64			
0733060	4.430	0.1744		21		
0727653	4.530	0.1783				
0733077	4.630	0.1823				
0733083	4.730	0.1862		22		
1519704	4.792	0.1887	3/16			
0733090	4.830	0.1902				
0733105	4.930	0.1941				
0727660	5.030	0.1980		23		
0733111	5.130	0.2020		24	82	6

EDP#	Size	Decimal Equiv.	For Ø	Flute Length	Overall Length	Shank Diameter
	Dc			ℓ	L	Ds
1519710	5.189	0.2043	13/64	24	82	6
0733128	5.230	0.2059				
0733134	5.330	0.2098				
0733140	5.430	0.2138		25		
1519727	5.440	0.2142	#3			
0727676	5.530	0.2177				
1519733	5.586	0.2199	7/32			
0733157	5.630	0.2217				
0733163	5.730	0.2256		27		
0733170	5.830	0.2295				
0733186	5.930	0.2335				
1519740	5.983	0.2356	15/64			
0727682	6.030	0.2374				
0733192	6.130	0.2413		28	88	7
0733208	6.230	0.2453				
0733214	6.330	0.2492				
1519756	6.380	0.2512	1/4			
0733220	6.430	0.2531		30		
0727699	6.530	0.2571				
0733237	6.630	0.2610				
0733243	6.730	0.2650		31		
1519762	6.777	0.2668	17/64			
0733250	6.830	0.2689				
0733266	6.930	0.2728				
0727704	7.030	0.2768		32		
0733272	7.130	0.2807		33	94	8
1519779	7.173	0.2824	9/32			
0733289	7.230	0.2846				
0733295	7.330	0.2886				
0733300	7.430	0.2925		34		
0727710	7.530	0.2965				
1519785	7.571	0.2981	19/64			
0733317	7.630	0.3004				
0733323	7.730	0.3043		36		
0733330	7.830	0.3083				
0733346	7.930	0.3122				
1519791	7.967	0.3137	5/16			
0727727	8.030	0.3161				
0733352	8.130	0.3201		37	100	9
0733369	8.230	0.3240				
0733375	8.330	0.3280				
1519807	8.364	0.3293	21/64			
0733381	8.430	0.3319		39		
0727733	8.530	0.3358				
0733398	8.630	0.3398				
0733403	8.730	0.3437		40		
1519813	8.761	0.3449	11/32			

Aqua Drill EX Oil Hole Pilot

LIST 9622 Metric sizes

LIST 9623 Fractional sizes

EDP#	Size	Decimal Equiv.	For Ø	Flute Length	Overall Length	Shank Diameter
	Dc			ℓ	L	Ds
0733410	8.830	0.3476		40	100	9
0733426	8.930	0.3516				
0727740	9.030	0.3555		41		
0733432	9.130	0.3594		42	106	10
1519820	9.158	0.3606	23/64			
0733449	9.230	0.3634				
0733455	9.330	0.3673				
0733461	9.430	0.3713		43		
0727756	9.530	0.3752				
1519836	9.555	0.3762	3/8			
0733478	9.630	0.3791				
0733484	9.730	0.3831		45		
0733490	9.830	0.3870				
0733506	9.930	0.3909				
1519842	9.951	0.3918	25/64			
0727762	10.030	0.3949				
0733512	10.130	0.3988		46	116	11
0733529	10.230	0.4028				
0733535	10.330	0.4067				
0733541	10.430	0.4106		48		
0727779	10.530	0.4146				

EDP#	Size	Decimal Equiv.	For Ø	Flute Length	Overall Length	Shank Diameter
	Dc			ℓ	L	Ds
0733558	10.630	0.4185		48	116	11
0733564	10.730	0.4224		49		
1545117	10.745	0.4230	27/64			
0733570	10.830	0.4264				
0733587	10.930	0.4303				
0727785	11.030	0.4343				
0733593	11.130	0.4382		50	122	12
1545123	11.142	0.4387	7/16			
0733609	11.230	0.4421		51		
0733615	11.330	0.4461				
0733621	11.430	0.4500		52		
0727791	11.530	0.4539				
1545130	11.549	0.4547	29/64			
0733638	11.630	0.4579				
0733644	11.730	0.4618		54		
0733650	11.830	0.4657				
0733667	11.930	0.4697				
0727807	12.030	0.4736				
1519859	12.730	0.5012	1/2	57	127	13
1519865	13.524	0.5324	17/32	62	132	14
1545146	14.318	0.5637	9/16	65	140	15

1 per tube

⚠ WARNING: Cancer - www.P65Warnings.ca.gov

Drilling Conditions - Wet

LIST 9622, 9623

Work Material	Structural Steel Carbon Steel		Alloy Steel Heat Treated Steel (20 - 30 HRC)		Mold Steel Hardened Steel (30 - 40 HRC)		Ductile Cast Iron		Stainless Steel (300 Series)		Nickel Alloys PH Stainless		Aluminum Alloy	
Speed (SFM)	145-180 SFM		130-165 SFM		115-150 SFM		115-150 SFM		80-100 SFM		70-90 SFM		280-300 SFM	
Drill Diameter Metric	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
1.015	15500	0.0011	14000	0.0010	12100	0.0008	12100	0.0014	7750	0.0005	6800	0.0004	27200	0.0010
1.515	10350	0.0016	9400	0.0015	8100	0.0012	8100	0.0018	5200	0.0007	4500	0.0006	18100	0.0015
2.015	7800	0.0025	7000	0.0020	6050	0.0016	6050	0.0024	3900	0.0010	3400	0.0008	13600	0.0020
2.515	6200	0.0032	5600	0.0025	4850	0.0020	4850	0.0030	3100	0.0015	2700	0.0013	10900	0.0025
Speed (SFM)	320-350 SFM		230-250 SFM		200-230 SFM		200-230 SFM		120-150 SFM		100 - 120 SFM		340 - 360 SFM	
3.03	10350	0.0040	7400	0.0035	6500	0.0030	6500	0.0038	3900	0.0026	3200	0.0020	11300	0.0034
4.03	7800	0.0055	5600	0.0045	4850	0.0040	4850	0.0048	2900	0.0032	2400	0.0025	8500	0.0046
5.03	6200	0.0065	4500	0.0055	3900	0.0050	3900	0.0059	2300	0.0039	1950	0.0030	6800	0.0057
6.03	5200	0.0078	3700	0.0065	3200	0.0060	3200	0.0070	1950	0.0047	1600	0.0033	5700	0.0068
7.03	4400	0.0090	3200	0.0075	2800	0.0070	2800	0.0081	1650	0.0055	1400	0.0038	4850	0.0080
8.03	3900	0.0105	2800	0.0085	2400	0.0080	2400	0.0092	1450	0.0062	1200	0.0042	4250	0.0091
9.03	3450	0.0115	2500	0.0095	2150	0.0090	2150	0.0102	1300	0.0068	1100	0.0048	3800	0.0103
10.03	3100	0.0125	2200	0.0100	1900	0.0090	1900	0.0115	1150	0.0075	970	0.0052	3400	0.0114
11.03	2800	0.0135	2000	0.0105	1800	0.0102	1800	0.0012	1050	0.0083	880	0.0057	3100	0.0126
12.03	2600	0.0145	1850	0.0107	1600	0.0105	1600	0.0135	970	0.0090	810	0.0063	2800	0.0137

Cutting Condition Table Recommendations

1) Adjust cutting condition according to the rigidity of machine or work clamp state.
2) The table values are for drilling with water-soluble cutting fluid.
3) Reduce RPM and feed rate by 20% for non-water soluble coolant.
4) Use internal coolant.

Drilling Conditions - MQL

LIST 9622, 9623

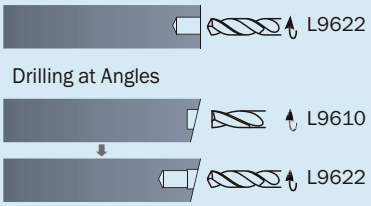
Work Material	Structural Steel Carbon Steel		Alloy Steel Heat Treated Steel (20 - 30 HRC)		Mold Steel Hardened Steel (30 - 40 HRC)		Ductile Cast Iron	
Drill Diameter Metric	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
3.03	7600	0.0040	7600	0.0035	5700	0.0030	5700	0.0038
4.03	5700	0.0055	5000	0.0045	4300	0.0040	4300	0.0048
5.03	5100	0.0065	4450	0.0055	3800	0.0050	3800	0.0059
6.03	4200	0.0078	3700	0.0065	3200	0.0060	3200	0.0070
7.03	3600	0.0090	3200	0.0075	2700	0.0070	2700	0.0081
8.03	3200	0.0105	2800	0.0085	2400	0.0080	2400	0.0092
9.03	2800	0.0115	2500	0.0095	2100	0.0090	2100	0.0102
10.03	2550	0.0125	2200	0.0100	1900	0.0090	1900	0.0115
11.03	2300	0.0135	2000	0.0105	1700	0.0102	1700	0.0012
12.03	2100	0.0145	1900	0.0107	1600	0.0105	1600	0.0135

Cutting Condition Table Recommendations

1) Adjust cutting condition according to the rigidity of machine or work clamp state.
2) The table values are for MQL drilling.
3) Straight shot drilling is possible. However, when experiencing poor chip evacuation please add a peck or review drilling parameters.
4) MQL not recommended for stainless and nickel applications. Please use wet drilling conditions.

Small Diameter Deep Hole Drill Cutting Conditions:

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



- 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

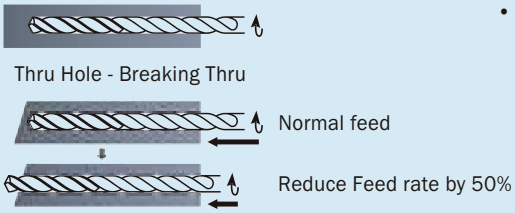
2. Deep Hole Drilling into guide Hole

- 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

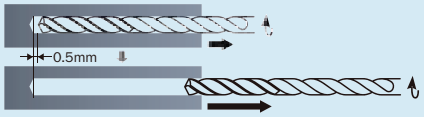
- Start Drilling at recommended feeds & Speeds

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



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

5. Retracting Drill from the Hole

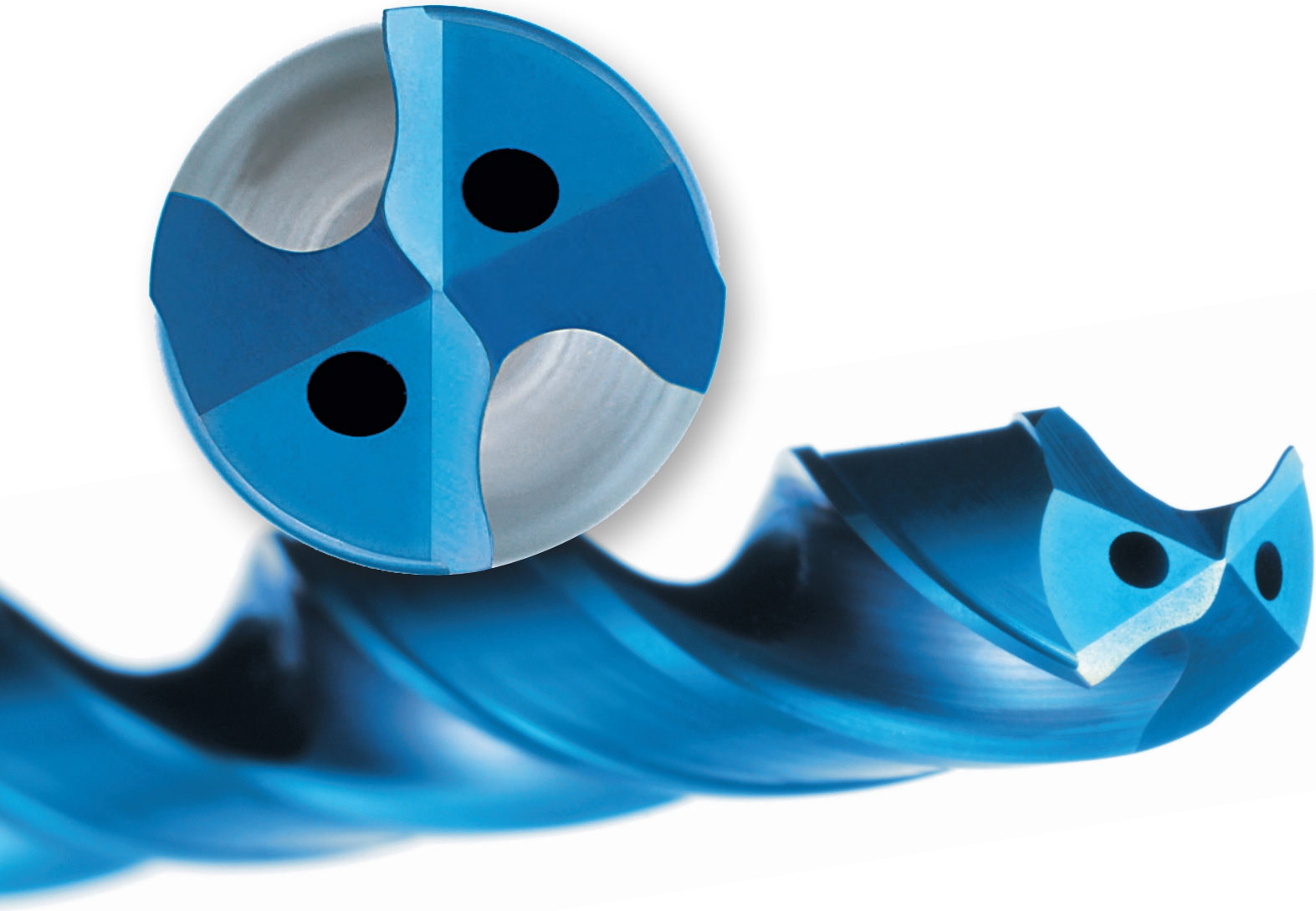


- After drilling is complete, decrease RPM and pull the drill back through the hole
- About , RPM = 500, Feed = 2000 mm/min (IPR=0.157 IPM=79)

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 5μm)
   - 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

WARNING: This product can expose you to chemicals including cobalt, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov



NACHI

NACHI AMERICA INC.

www.nachiamerica.com

Nachi America Inc. - Headquarters
715 Pushville Road, Greenwood, Indiana 46143
Tel: +1-317-530-1001 Fax: +1-317-530-1011

West Coast Branch
12652 Alondra Blvd., Cerritos, California 90703
Tel: +1-562-802-0055 Fax: +1-562-802-2455

Nachi Canada Inc.
89 Courtland Ave., Unit No. 2, Concord Ontario, Canada L4K3T4
Tel: +1-905-660-0088 Fax: +1-905-660-1146
www.nachicanada.com

Nachi Mexicana, S.A. de C.V.
Calle Tequisquipan 2 Aerotech Industrial Park, Localidad Galeras,
Municipio de Colon, Queretaro, C.P. Mexico 76295
Tel: +52-442-153-2424 Fax: +52-442-153-2435
www.nachi.com.mx

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