NACHI

MQL Power Long Drill

- Coolant Through Solid Carbide Drill
- Double Margin with “S” shaped cutting edge
- 10,15, 20, 25 L/D Non Pecking Deep Hole Drilling
- TiAlN+Al-Ti-Cr Dual layer coating for optimum performance

MQL Power Long Drill - Technical Information

Solid Carbide Coolant Thru long Drill

Features


"S" shaped cutting edge

- Made from sub-micro grain carbide for high toughness, hardness & wear resistance
- New Proprietary back taper, flute geometry & "S" shaped cutting edge for superior chip evacuation
- Ground "K-land" on the cutting edge for optimum performance
- Double Margin for increased drilling stability & performance
- TiAlN + Al-Ti-Cr Dual layer coating enchances tool performance by providing excellent heat resistance & thermal insulation properties


Use of a double margin increases drilling straightness by controlling drill bending and swelling

Cutting Performance

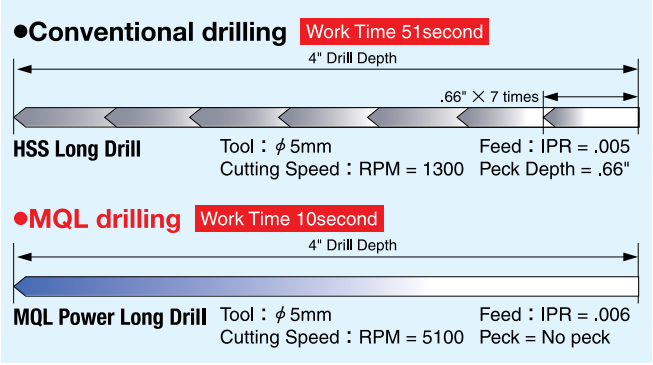
• Streamline the Process and reduce machining time dramatically.

Limit comparison at feed

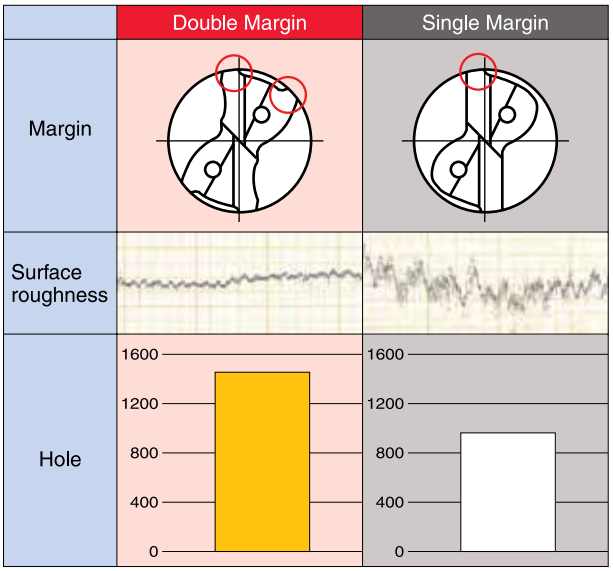
Feed	IPR	.007	.011	.013	.015	.017	.019	.027	.023
	mm/rev	0.2	0.3	0.35	0.4	0.45	0.5	0.55	0.6
MQL Power Long Drill		○	○	○	○	○	○	○	○
Competitor		○	○	○	○	×			

Tool : 6×150×200×6
Cutting Speed : RPM = 4250
Feed : IPR = .007~.024
Hole Depth : 4.7"
Guide Hole Depth : 1"
Work Material : Carbon Steel
Cutting Fluid : MQL(3cc/h)

Non-step drilling improves machining efficiency by 5x.



Drilling surface roughness and tool life in double margin



Tool : 5×130×180×5
Cutting Speed : RPM = 5100
Feed : IPR = .006(0.15mm/rev)
Hole Depth : 4"
Work Material : Carbon Steel
Cutting Fluid : MQL

Work Materials

• Structural Steels, Carbon Steels, Alloy Steels, Stainless Steels, Cast Irons, Hardened Steel (up to 40HRc)

MQL Pilot Drills

Precision guide hole drills for MQL Long Drills

Features


"S" shaped cutting edge

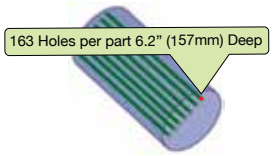
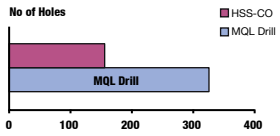
- Precision Guide hole drills for our MQL long Drills
- Double Margin to provide accurate and straight guide hole for MQL long drills
- Made from sub-micro grain carbide for high toughness, hardness & wear resistance
- Ground "K-land" on the cutting edge for optimum performance
- TiAlN + Al-Ti-Cr Dual layer coating enchances tool performance

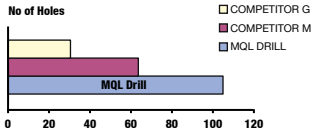
Work Materials

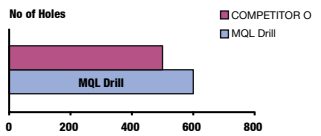
Structural Steels, Carbon Steels, Alloy Steels, Stainless Steels, Cast Irons, Hardened Steels (up to 40Hrc)

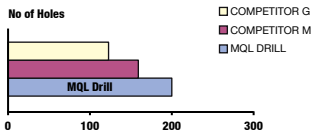
MQL Power Long Drill - Application Success Data

MQL POWER LONG CARBIDE DRILL FOR DEEP HOLES

Drill		MQL Power Long Drill
WORK PIECE		
INDUSTRY		Nuclear Industry
COMPONENT		Nuclear application
CUTTING CONDITIONS	DRILL DIAMETER	7.5mm
	CUTTING SPEED *(SFM)*	200
	RPM	2590
	FEED *(IPR)*	0.005
	FEED *(mm/rev)*	0.127
	DOC	6.2"(157.4mm)
	HOLE DESCRIPTION	Thru
COOLANT		Water Soluble - 1000 psi
MATERIAL		A 514-C
HARDNESS		25-30 HRC
MACHINE		CNC Mazak Horizontal Machining Ctr.
PERFORMANCE		
RESULT		2-Times more Tool life & 72% cycle Time Red

Drill		MQL Power Long Drill
WORK PIECE		
INDUSTRY		Mold
COMPONENT		Plastic Injection Mold
CUTTING CONDITIONS	DRILL DIAMETER	14.0mm
	CUTTING SPEED *(SFM)*	236
	RPM	1630
	FEED *(IPR)*	0.011
	FEED *(mm/rev)*	0.27
	DOC	5.9"(150mm)
	HOLE DESCRIPTION	Thru
COOLANT		Water Soluble
MATERIAL		P-20
HARDNESS		30-32 HRC
MACHINE		CNC Milling Ctr.
PERFORMANCE		
RESULT		1.5 Times more tool life than Competitors

Drill		MQL Power Long Drill
WORK PIECE		
INDUSTRY		Automotive
COMPONENT		Output Shaft
CUTTING CONDITIONS	DRILL DIAMETER	7mm
	CUTTING SPEED *(SFM)*	265
	RPM	3600
	FEED *(IPR)*	0.009
	FEED *(mm/rev)*	0.23
	DOC	3.94"(100mm)
	HOLE DESCRIPTION	Blind
COOLANT		MQL
MATERIAL		Carbon Steel
HARDNESS		20-25 HRC
MACHINE		Horkos
PERFORMANCE		
RESULT		1.2 times more tool life than Competitor

Drill		MQL Power Long Drill
WORK PIECE		
INDUSTRY		Automotive
COMPONENT		Crankshaft (L4 Engine)
CUTTING CONDITIONS	DRILL DIAMETER	6.19mm (Special)
	CUTTING SPEED *(SFM)*	267
	RPM	4180
	FEED *(IPR)*	0.008
	FEED *(mm/rev)*	0.2
	DOC	3.75"(95mm)
	HOLE DESCRIPTION	Blind
COOLANT		MQL
MATERIAL		Carbon Steel
HARDNESS		25 HRC
MACHINE		Toyoseiki MQL Machine
PERFORMANCE		
RESULT		Consistent tool life of 200 Cranks

MQL Power Long Drill

h7 GS Carbide 140° 2RAKE-I-XW

Range 1/8 to (11/16)
Range 3.0 to 17.5

SOLID CARBIDE GS COATED COOLANT THRU

List No.9564 10D

Unit : mm

EDP No	Size D		Decimal Equivalent	Flute Length	Overall Length	Shank Dia
	Fractional	Metric				
1386300		3.0	0.1181	41	91	3
1386323	1/8	3.175	0.1250	48	98	1/8
1386369		3.5	0.1378	48	98	4
1386398	#25	3.8	0.1496	54	104	4
1386403		3.9	0.1535	54	104	4
1386410		4.0	0.1575	54	104	4
1386432	(#19)	4.2	0.1654	61	111	5
1386449	(#18)	4.3	0.1693	61	111	5
1386461	(#16)	4.5	0.1772	61	111	5
1386478		4.6	0.1811	68	118	5
1386484	#13	4.7	0.1850	68	118	5
1386490	#12	4.8	0.1890	68	118	5
1386506		4.9	0.1929	68	118	5
1386512	(#9)	5.0	0.1969	68	118	5
1386529	#7	5.1	0.2008	75	125	6
1386558	(#3)	5.4	0.2126	75	125	6
1386564		5.5	0.2165	75	125	6
1386570	(#2)	5.6	0.2205	81	131	6
1386587		5.7	0.2244	81	131	6
1386593	(#1)	5.8	0.2283	81	131	6
1386615		6.0	0.2362	81	131	6
1386638		6.2	0.2441	88	138	7
1386650	1/4	6.35	0.2500	88	138	1/4
1386667		6.4	0.2520	88	138	7
1386673		6.5	0.2559	88	138	7
1386701	17/64	6.75	0.2656	95	145	17/64
1386730		7.0	0.2756	95	145	7
1386747		7.1	0.2795	102	152	8
1386776		7.4	0.2913	102	152	8
1386782	(M)	7.5	0.2953	102	152	8
1386804		7.7	0.3031	108	158	8
1386810		7.8	0.3071	108	158	8
1386827		7.9	0.3110	108	158	8
1386833		8.0	0.3150	108	158	8
1386840		8.1	0.3189	115	165	9
1386885		8.5	0.3346	115	165	9
1386913	11/32	8.73	0.3438	122	172	11/32
1386942		9.0	0.3543	122	172	9
1387009	3/8	9.525	0.3750	135	185	3/8
1387050		10.0	0.3937	135	185	10
1409814		10.3	0.4055	140	205	11
1409820	(7/16)	11.1	0.4370	155	215	12
1409837		11.2	0.4409	155	215	12
1409843	(17/32)	13.5	0.5315	165	215	14
1409850		14.0	0.5512	180	240	14
1409866	9/16	14.28	0.5622	170	220	15
1409872	(11/16)	17.5	0.6890	205	260	18

NOTE : Pilot Hole Drill (L9566) sizes for 10D,15D, 20D, 25D are available and in stock. Please inquire for available sizes.

( ) closest Fractional size

List No.9536 15D

Unit : mm

EDP No	Size D		Decimal Equivalent	Flute Length	Overall Length	Shank Dia
	Fractional	Metric				
1383892		4.0	0.1575	80	130	4
1383908	(#16)	4.5	0.1772	90	140	5
1383914	(#9)	5.0	0.1969	100	150	5
1383920		5.5	0.2165	110	160	6
1383937		6.0	0.2362	120	170	6
1384016	1/4	6.35	0.2500	130	180	1/4
1383943		6.5	0.2559	130	180	7
1383950		7.0	0.2756	140	190	7
1383966	(M)	7.5	0.2953	150	200	8
1383972		8.0	0.3150	160	210	8
1383989		8.5	0.3346	170	220	9
1383995		9.0	0.3543	180	230	9
1384022	3/8	9.525	0.3750	190	240	3/8
1384000		10.0	0.3937	200	250	10

List No.9536 20D

Unit : mm

EDP No	Size D		Decimal Equivalent	Flute Length	Overall Length	Shank Dia
	Fractional	Metric				
1384039		4.0	0.1575	100	150	4
1384045	(#16)	4.5	0.1772	115	165	5
1384051	(#9)	5.0	0.1969	125	175	5
1384068		5.5	0.2165	140	190	6
1384074		6.0	0.2362	150	200	6
1384154	1/4	6.35	0.2500	165	215	1/4
1384080		6.5	0.2559	165	215	7
1384097		7.0	0.2756	175	225	7
1384102	(M)	7.5	0.2953	190	240	8
1384119		8.0	0.3150	200	250	8
1384125		8.5	0.3346	215	265	9
1384131		9.0	0.3543	225	275	9
1409551		9.3	0.3661	225	275	10
1384160	3/8	9.525	0.3750	240	290	3/8
1384148		10.0	0.3937	250	300	10

List No.9536 25D

Unit : mm

EDP No	Size D		Decimal Equivalent	Flute Length	Overall Length	Shank Dia
	Fractional	Metric				
1384183		4.0	0.1575	120	170	4
1384190	(#16)	4.5	0.1772	135	185	5
1384205	(#9)	5.0	0.1969	150	200	5
1384211		5.5	0.2165	165	215	6
1384228		6.0	0.2362	180	230	6
1384177	1/4	6.35	0.2500	195	245	1/4
1384234		6.5	0.2559	195	245	7
1384240		7.0	0.2756	210	260	7
1384257	(M)	7.5	0.2953	225	275	8
1384263		8.0	0.3150	240	290	8

Unit : mm

Drill Dia. D		Tolerance
Above	Up to	
	3	0~0.01
3	6	0~0.012
6		0~0.015

● Tolerance of Shank Dia. : h6 ● Point angle : 140°

MQL Drills Recommended Cutting Conditions

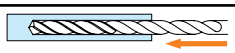
1 Guide Hole Drilling

①We recommend pre-drilling of guide holes.
②It is recommended that the pilot hole size be .05mm to .1mm bigger than the MQLPLD.
③Drill depth : 2-3D or deeper.
④Ensure a high precision hole is drilled for the guide.
We recommend the Aqua Drill 3 Flutes for precision guide hole drilling.
⑤If the part is slanted or at an angle, use an endmill to mill a flat surface for the guide hole & MQLPLD.

2 Initial cutting with MQL Drill

①Penetrate the pilot hole at reduced RPMs.
②Stay about 2 to 3mm (.07"-.1") short of the bottom of the guide hole.

3 Deep Hole Drilling

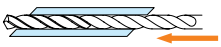


①Start cutting at the recommended speeds and feeds with continous feed cycle(no pecking required)

4 Retracting the Drill from the hole

①After the drilling has been completed and drill depth has been achieved, retract the drill at reduced RPM's when exiting the hole.

5 Breaking Through



①When breaking through, the cutting edge can be damaged. Reduce feed rate.
②A feed rate of 0.05mm-.1mm/rev (.001-.004 IPR) is recommended.

Precision Guide Hole Drills for MQL Long Drills

List No.9566

h7 GS Carbide 140° 2RAKE+XW

SOLID CARBIDE GS COATED

Precision guide hole drills for MQL Long Drills
Coolant Thru Solid Carbide drills
Double margin to provide accurate and straight guide hole for MQL Long Drills

EDP No	Size D Metric	Decimal Equivalent	Flute Length	Overall Length	Shank Dia	Recommend Long Drill Dia		
						Metric	Decimal	Fractional
1396086	3.05	0.1201	20	72	4	3.00	0.1181	
1401470	3.23	0.1272	20	72	4	3.18	0.1250	1/8
1396166	3.85	0.1516	23	72	4	3.80	0.1496	
1396172	3.95	0.1555	23	72	4	3.90	0.1535	
1396189	4.05	0.1594	25	80	5	4.00	0.1575	
1396200	4.25	0.1673	25	80	5	4.20	0.1654	
1396217	4.35	0.1713	25	80	5	4.30	0.1693	
1396230	4.55	0.1791	28	80	5	4.50	0.1772	
1396246	4.65	0.1831	28	80	5	4.60	0.1811	
1396252	4.75	0.1870	28	80	5	4.70	0.1850	
1396269	4.85	0.1909	28	80	5	4.80	0.1890	
1396275	4.95	0.1949	28	80	5	4.90	0.1929	
1396281	5.05	0.1988	28	82	6	5.00	0.1969	
1396298	5.15	0.2028	28	82	6	5.10	0.2008	
1396326	5.45	0.2146	28	82	6	5.40	0.2126	
1396332	5.55	0.2185	30	82	6	5.50	0.2165	
1396349	5.65	0.2224	30	82	6	5.60	0.2205	
1396355	5.75	0.2264	30	82	6	5.70	0.2244	
1396361	5.85	0.2303	30	82	6	5.80	0.2283	
1396384	6.05	0.2382	33	88	7	6.00	0.2362	

EDP No	Size D Metric	Decimal Equivalent	Flute Length	Overall Length	Shank Dia	Recommend Long Drill Dia		
						Metric	Decimal	Fractional
1396406	6.25	0.2461	33	88	7	6.20	0.2441	
1396429	6.40	0.2520	33	88	7	6.35	0.2500	1/4
1396435	6.45	0.2539	33	88	7	6.40	0.2520	
1396441	6.55	0.2579	35	88	7	6.50	0.2559	
1396470	6.80	0.2677	35	88	7	6.75	0.2657	17/64
1396509	7.05	0.2776	38	94	8	7.00	0.2756	
1396515	7.15	0.2815	38	94	8	7.10	0.2795	
1396544	7.45	0.2933	38	94	8	7.40	0.2913	
1396550	7.55	0.2972	40	94	8	7.50	0.2953	
1396573	7.75	0.3051	40	94	8	7.70	0.3031	
1396580	7.85	0.3091	40	94	8	7.80	0.3071	
1396596	7.95	0.3130	40	94	8	7.90	0.3110	
1396601	8.05	0.3169	43	100	9	8.00	0.3150	
1396618	8.15	0.3209	43	100	9	8.10	0.3189	
1396653	8.55	0.3366	45	100	9	8.50	0.3346	
1396660	8.65	0.3406	45	100	9	8.60	0.3386	
1396682	8.80	0.3465	45	100	9	8.75	0.3445	11/32
1396710	9.05	0.3563	48	108	10	9.00	0.3543	
1396779	9.60	0.3780	50	108	10	9.55	0.3760	3/8
1396820	10.05	0.3957	53	118	11	10.00	0.3937	

Selection Chart ●:Great ○:Good △:OK

Drilling Depth				Workpiece Material																
				Carbon Steel		Alloy Steel	Die Steel	Hardened Steel			Stainless Steel		Titanium Alloys	Nickel Alloys	Cast Iron		Aluminum			Copper Alloys
≦3D	≦5D	≦7D	>7D	Low Carbon	High Carbon			HRc			Austenitic	Martensitic			Soft	Hard	6061 7075	Casting Si ≦ 12%	High Si Si > 13%	
				1010,1018	1045,1065	4140,4330	D2	up to 35	35 to 45	45 to 65	300 Series	400 Series			< 200HB	> 200HB				
●				●	●	●	●	○			●	●			●	△	●	○		●

- *For all Deep Hole Drilling operations over 5 X D Guide holes are recommended*
- *Deep Hole drills are prone to breaking without Guide holes*
- *Minimum of 800+ psi coolant pressure recommended*

MQL Power Long Drills List No. 9564, 9536

Drilling in MQL Conditions

	Work Material				Cast Irons / Carbon Steels		Alloy Steels Pre-Hardened Steels		Mold Steels / Hardened Steels (-40HRc)		Ductile Cast Irons	
	Drilling Condition				235 - 260 SFM		200 - 225 SFM		160 - 185 SFM		200 - 225 SFM	
		Fractional	Metric (mm)	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
10D 15D 20D	Drill Dia. (mm/ inches)		3	0.118	7,600	0.004	6,400	0.003	5,100	0.003	6,500	0.003
		1/8	3.175	0.125	7,180	0.004	6,100	0.003	4,800	0.003	6,100	0.003
			4	0.157	5,700	0.005	4,850	0.004	3,850	0.004	4,850	0.004
			5	0.197	4,500	0.006	3,850	0.006	3,100	0.005	3,850	0.006
			6	0.236	3,800	0.007	3,200	0.007	2,600	0.006	3,200	0.007
		1/4	6.35	0.250	3,500	0.008	3,100	0.007	2,500	0.006	3,100	0.007
			7	0.276	3,250	0.008	2,750	0.008	2,200	0.007	2,800	0.008
			8	0.315	2,850	0.009	2,400	0.009	1,900	0.008	2,450	0.009
		11/32	8.731	0.344	2,600	0.009	2,200	0.009	1,750	0.009	2,250	0.010
			9	0.354	2,550	0.010	2,150	0.010	1,700	0.010	2,150	0.010
		3/8	9.525	0.375	2,400	0.010	2,000	0.010	1,650	0.010	2,000	0.011
			10	0.394	2,300	0.010	1,900	0.010	1,550	0.010	1,900	0.011
			11	0.433	2,100	0.011	1,750	0.011	1,400	0.011	1,800	0.012
			12	0.472	1,900	0.011	1,600	0.011	1,300	0.011	1,600	0.012
			13	0.512	1,750	0.012	1,500	0.012	1,200	0.012	1,500	0.012
			14	0.551	1,650	0.012	1,400	0.012	1,100	0.012	1,400	0.012
		9/16	14.28	0.562	1,600	0.012	1,350	0.012	1,100	0.012	1,400	0.012
			15	0.591	1,550	0.013	1,300	0.013	1,050	0.012	1,300	0.012
			16	0.630	1,450	0.013	1,200	0.013	1,000	0.012	1,200	0.013
			17	0.669	1,350	0.013	1,150	0.013	950	0.013	1,100	0.013
			18	0.709	1,250	0.013	1,050	0.013	900	0.013	1,050	0.013
25D	Drill Dia. (mm/ inches)		4	0.157	5,700	0.004	4,800	0.003	3,850	0.004	4,850	0.004
			5	0.197	4,500	0.005	3,850	0.005	3,100	0.005	3,850	0.005
			6	0.236	3,800	0.006	3,200	0.006	2,600	0.006	3,200	0.006
		1/4	6.35	0.250	3,600	0.006	3,100	0.006	2,450	0.006	3,100	0.006
			7	0.276	3,200	0.007	2,750	0.007	2,200	0.007	2,750	0.007
			8	0.315	2,900	0.008	2,400	0.008	1,950	0.008	2,400	0.008
			9	0.354	2,500	0.009	2,200	0.009	1,750	0.009	2,150	0.009
		3/8	9.525	0.375	2,400	0.010	2,050	0.009	1,650	0.009	2,050	0.009
			10	0.394	2,300	0.010	1,950	0.009	1,550	0.009	1,950	0.010

Drilling in WET Conditions

	Work Material				Cast Irons / Carbon Steels		Alloy Steels Pre-Hardened Steels		Mold Steels / Hardened Steels (-40HRc)		Ductile Cast Irons		Stainless Steel	
	Drilling Condition				295-320 SFM		200-225 SFM		160-185 SFM		200-225 SFM		140 - 170 SFM	
		Fractional	Metric (mm)	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
10D 15D 20D	Drill Dia. (mm/ inches)		3	0.118	9,500	0.0035	6,500	0.003	5,100	0.003	6,500	0.003	5,100	0.003
		1/8	3.175	0.125	9,000	0.004	6,100	0.003	4,900	0.003	6,100	0.003	4,800	0.003
			4	0.157	7,100	0.005	4,900	0.004	3,900	0.004	4,800	0.004	3,800	0.004
			5	0.197	5,700	0.006	3,900	0.006	3,100	0.005	3,900	0.006	3,100	0.005
			6	0.236	4,750	0.007	3,300	0.007	2,600	0.006	3,300	0.007	2,600	0.006
		1/4	6.35	0.250	4,500	0.008	3,100	0.007	2,500	0.006	3,100	0.008	2,400	0.006
			7	0.276	4,100	0.009	2,800	0.008	2,200	0.007	2,800	0.008	2,200	0.007
			8	0.315	3,600	0.010	2,500	0.009	2,000	0.008	2,500	0.009	1,900	0.008
		11/32	8.731	0.344	3,300	0.011	2,300	0.009	1,800	0.009	2,300	0.010	1,750	0.008
			9	0.354	3,200	0.011	2,200	0.010	1,700	0.009	2,200	0.010	1,700	0.008
		3/8	9.525	0.375	3,000	0.011	2,100	0.010	1,600	0.009	2,100	0.011	1,600	0.008
			10	0.394	2,900	0.012	2,000	0.010	1,500	0.010	2,000	0.011	1,500	0.008
			11	0.433	2,600	0.013	1,800	0.011	1,400	0.011	1,800	0.012	1,400	0.009
			12	0.472	2,400	0.014	1,600	0.011	1,300	0.011	1,600	0.013	1,300	0.010
			13	0.512	2,200	0.015	1,500	0.012	1,200	0.012	1,500	0.013	1,200	0.011
			14	0.551	2,100	0.014	1,400	0.012	1,100	0.012	1,400	0.013	1,100	0.011
		9/16	14.28	0.562	2,000	0.014	1,400	0.012	1,100	0.012	1,400	0.013	1,100	0.011
			15	0.591	1,900	0.013	1,300	0.013	1,050	0.013	1,300	0.013	1,000	0.012
			16	0.630	1,800	0.013	1,200	0.013	950	0.013	1,200	0.013	900	0.012
			17	0.669	1,700	0.014	1,150	0.014	900	0.014	1,150	0.014	850	0.012
			18	0.709	1,600	0.014	1,100	0.014	850	0.014	1,100	0.014	800	0.013
25D	Drill Dia. (mm/ inches)		4	0.157	7,150	0.005	4,850	0.004	3,850	0.004	4,850	0.004	3,850	0.003
			5	0.197	5,700	0.006	3,850	0.005	3,100	0.005	3,850	0.005	3,100	0.004
			6	0.236	4,750	0.007	3,200	0.006	2,550	0.006	3,200	0.006	2,500	0.005
		1/4	6.35	0.250	4,500	0.008	3,050	0.006	2,450	0.006	3,100	0.006	2,400	0.005
			7	0.276	4,100	0.009	2,750	0.007	2,200	0.007	2,750	0.007	2,200	0.006
			8	0.315	3,600	0.010	2,400	0.008	1,950	0.008	2,400	0.008	1,900	0.007
			9	0.354	3,200	0.011	2,150	0.009	1,700	0.009	2,150	0.009	1,700	0.007
		3/8	9.525	0.375	3,000	0.011	2,050	0.009	1,650	0.009	2,050	0.009	1,600	0.007
			10	0.394	2,900	0.012	1,950	0.010	1,550	0.009	1,950	0.010	1,500	0.007

1) Guide(Pilot) hole is required. It is recommended to use same diameter or up to 0.1mm larger than diameter of the long drill. The depth of cut of the pilot hole should be 2×D in most cases or deeper.
2) We recommend using Nachi Guide(Pilot) Hole Drills with MQL Long Drills.
3) Utilize the standard drilling condition shown in catalogs just as general guide, when starting operation.
4) Adjust drilling conditions when unusual vibration or unusual sound occurs when cutting.
5) When using low speed machines, use maximum speed and adjust the feed rate.

Formulas :

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

Feed Rate (in/min) : RPM × IPR

MQL Pilot Drills List No.9566

Drilling in MQL Conditions

Work Material				Cast Irons / Carbon Steels		Alloy Steels / Pre-Hardened Steels		Mold Steels / Hardened Steels (-40HRc)		Ductile Cast Irons	
Drilling Condition				235-260 SFM		200-225 SFM		160-185 SFM		200-225 SFM	
Drill Dia. (mm/ inches)	Fractional	Metric (mm)	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
		3	0.118	7,600	0.004	6,400	0.003	5,100	0.003	6,400	0.003
		4	0.157	5,700	0.005	4,800	0.004	3,800	0.004	4,800	0.004
		5	0.197	4,500	0.006	3,800	0.006	3,100	0.005	3,800	0.006
		6	0.236	3,800	0.008	3,200	0.007	2,500	0.006	3,200	0.007
		7	0.276	3,200	0.010	2,700	0.008	2,200	0.008	2,700	0.008
		8	0.315	2,800	0.011	2,400	0.009	1,900	0.009	2,400	0.009
		9	0.354	2,500	0.012	2,100	0.010	1,700	0.010	2,100	0.010
		10	0.394	2,200	0.013	1,900	0.010	1,500	0.010	1,900	0.011

Drilling in WET Conditions

Work Material				Cast Irons / Carbon Steels		Alloy Steels / Pre-Hardened Steels		Mold Steels / Hardened Steels (-40HRc)		Ductile Cast Irons		Stainless Steel	
Drilling Condition				295-320 SFM		200-225 SFM		160-185 SFM		200-225 SFM		140-170 SFM	
Drill Dia. (mm/ inches)	Fractional	Metric (mm)	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
		3	0.118	9,500	0.004	6,400	0.003	5,100	0.003	6,450	0.003	5,170	0.003
		4	0.157	7,100	0.005	4,850	0.004	3,850	0.004	4,850	0.004	3,850	0.003
		5	0.197	5,700	0.007	3,880	0.006	3,100	0.005	3,850	0.006	3,100	0.005
		6	0.236	4,700	0.009	3,200	0.007	2,500	0.007	3,200	0.007	2,500	0.006
		7	0.276	4,000	0.010	2,750	0.008	2,200	0.008	2,750	0.008	2,200	0.007
		8	0.315	3,500	0.012	2,400	0.009	1,900	0.009	2,400	0.009	1,950	0.008
		9	0.354	3,100	0.012	2,150	0.010	1,700	0.010	2,150	0.010	1,700	0.008
		10	0.394	2,800	0.013	1,950	0.010	1,550	0.010	1,950	0.010	1,500	0.008

NOTE:

1) It is recommended that the pilot hole size be .05mm or .1mm bigger than the MQLPLD
2) Drill Depth for Pilot Holes: 2~3D or deeper
3) Utilize the standard drilling condition shown in catalogs just as general guide, when starting operation.
4) Adjust drilling conditions when unusual vibration or unusual sound occurs when cutting.
5) When using low speed machines, use maximum speed and adjust the feed rate.

Formulas:

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

Feed Rate (in/min): RPM×IPR

• For all Deep Hole Drilling operations over 5 X D Guide holes are recommended
• Deep Hole drills are prone to breaking without Guide holes
• Minimum of 800+ psi coolant pressure recommended

Also Available

AG Power Long Deep Hole Series HSCo Parabolic Style TiAlN Coated Drills

Features

New Style Parablolic Drills

- Flute geometry and coating enables non pecking deep hole drilling up to 20XD
- AG Coating (TiAlN) and HSS-Co material increases tool life
- Available in 10D / 15D / 20D lengths in Metric & Fractional sizes (USA Stock)

Work Materials

APPLICABLE MATERIAL

- Carbon Steel
- Alloy Steel
- Tool Steel
- Die Steel
- Cast Iron
- Stabilized Steel (under 35HRC)

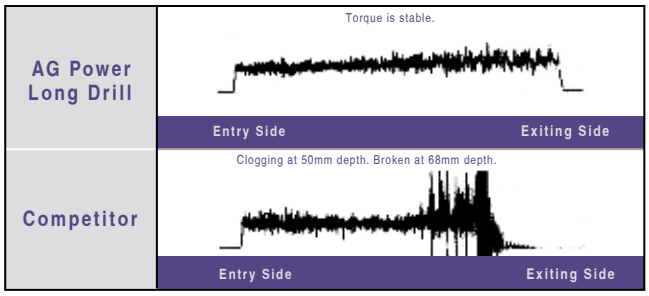
UNSUITABLE MATERIAL

- Soft Steel
- Alluminum
- Copper Alloy
- Hardened Steel (over 40HRC)

Performance

AG POWER LONG DRILL VS. STANDARD DRILL

Stable torque



CUTTING CONDITION

Drill : 6mm (0.236in)
Material : 1050 (217HB) S50C
Hole Depth : 102mm (4.01in : 17D) through
Speed : 1590rpm (98 SFM)
Feed : 0.1mm/rev (6.26 IPM)
non-pecking drilling
Fluid : Emulsion

Long tool life