

Aqua Drill EX Stub Drills List No. 9600, 9601 AQDEXS

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		
Drill 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		
Metric	mm	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	0.118	8500	0.003	7000	0.003	3700	0.003	2700	0.003	6000	0.003	3200	0.002	2900	0.002	9700	0.004	
4	0.157	6500	0.004	5200	0.004	2800	0.004	2100	0.003	4400	0.004	2400	0.002	2200	0.003	7300	0.005	
5	0.197	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	0.236	4300	0.006	3500	0.006	1800	0.006	1300	0.005	2900	0.006	1600	0.004	1450	0.004	4900	0.007	
8	0.315	3200	0.008	2600	0.008	1400	0.007	900	0.007	2200	0.008	1200	0.005	1090	0.005	3700	0.009	
10	0.394	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	0.472	2100	0.011	1700	0.011	950	0.010	700	0.009	1500	0.010	800	0.006	730	0.007	2200	0.013	
14	0.551	1800	0.011	1500	0.012	800	0.011	600	0.011	1300	0.011	700	0.007	620	0.008	1900	0.013	
16	0.630	1600	0.014	1300	0.013	700	0.012	500	0.011	1100	0.013	600	0.008	550	0.009	1700	0.015	

Aqua Drill EX Jobber Length List No. 9602, 9603 AQDEXR

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		
Drill 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		
Metric	mm	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	0.118	8500	0.003	7000	0.003	3700	0.003	2700	0.003	6000	0.003	3200	0.002	2900	0.002	9700	0.004	
4	0.157	6500	0.004	5200	0.004	2800	0.004	2100	0.003	4400	0.004	2400	0.002	2200	0.003	7300	0.005	
5	0.197	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	0.236	4300	0.006	3500	0.006	1800	0.006	1300	0.005	2900	0.006	1600	0.004	1450	0.004	4900	0.007	
8	0.315	3200	0.008	2600	0.008	1400	0.007	900	0.007	2200	0.008	1200	0.005	1090	0.005	3700	0.009	
10	0.394	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	0.472	2100	0.011	1700	0.011	950	0.010	700	0.009	1500	0.010	800	0.006	730	0.007	2200	0.013	
14	0.551	1800	0.011	1500	0.012	800	0.011	600	0.011	1300	0.011	700	0.007	620	0.008	1900	0.013	
16	0.630	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 : $RPM = \frac{SFM \times 3.82}{\text{Drill dia.}}$ Feed Rate (in/min) : $RPM \times IPR$

Aqua Drill EX Flat List No. 9610, 9611

Work Material		Cast Irons / Carbon Steels		Alloy Steels (20-30 HRC)		Mold Steels / Hardened Steels (30-35 Hrc)		Ductile Cast Irons		Aluminum Alloys		Aluminum Castings		
Speed (SFM)		325-328 SFM		290-295 SFM		220-225 SFM		290-295 SFM		515-525 SFM		260-400 SFM		
Drilling Diameter		325-328 SFM		290-295 SFM		220-225 SFM		290-295 SFM		515-525 SFM		260-400 SFM		
Metric	mm	Decimal	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)	RPM	Feed (IPR)
3	0.118	7950	0.002	6900	0.002	3700	0.002	6900	430	17000	0.002	12500	0.002	
4	0.157	5950	0.003	5150	0.002	2800	0.002	5150	430	12500	0.002	9500	0.003	
5	0.197	4800	0.004	4150	0.003	2200	0.003	4150	430	10000	0.003	7600	0.004	
6	0.236	4000	0.005	3450	0.004	1800	0.004	3450	430	8500	0.003	6400	0.005	
8	0.315	3000	0.006	2600	0.005	1400	0.005	2600	430	6350	0.005	4780	0.006	
10	0.394	2400	0.008	2050	0.006	1100	0.006	2050	430	5100	0.006	3800	0.008	
12	0.472	2000	0.009	1700	0.007	950	0.007	1700	430	4250	0.007	3180	0.009	
16	0.630	1500	0.012	1300	0.009	700	0.009	1300	430	3200	0.009	2390	0.013	
20	0.787	1200	0.016	1050	0.012	550	0.012	1050	430	2550	0.012	1910	0.016	
1/8	0.125	7500	0.003	6500	0.002	3500	0.002	6500	430	16000	0.002	12000	0.002	
5/32	0.1562	6000	0.004	5200	0.003	2800	0.002	5200	430	12800	0.002	9600	0.003	
3/16	0.1875	5000	0.005	4350	0.004	2350	0.003	4350	430	10700	0.003	8050	0.004	
1/4	0.2500	3750	0.006	3250	0.005	1750	0.004	3250	430	8000	0.003	6000	0.005	
5/16	0.3125	3000	0.008	2600	0.006	1400	0.005	2600	430	6400	0.005	4800	0.006	
3/8	0.3750	2500	0.010	2150	0.008	1150	0.006	2150	430	5350	0.006	4000	0.008	
1/2	0.5000	1900	0.012	1650	0.009	900	0.007	1650	430	4000	0.007	3000	0.009	
5/8	0.6250	1500	0.016	1300	0.013	700	0.009	1300	430	3200	0.009	2400	0.013	
3/4	0.750	1250	0.020	1100	0.016	600	0.012	1100	430	2650	0.012	2000	0.016	

- Note : 1) Adjust drilling conditions according to the rigidity of machine and work clamp states.
 2) For drilling after the forged surface has been removed.
 3) For drilling with water soluble cutting fluid. With non water soluble cutting fluid, reduce the RPM and feed by 20%.
 4) For drilling depths of 2D or less. Drilling holes deeper than 2D is not recommended.
 5) Drilling Stainless Steel (SUS304, 316) is not recommended.
 6) When drilling angle is less than 30°, reduce feed to 50%; When drilling angle is over 30°, reduce the RPM to under 70%, the feed to under 30%.