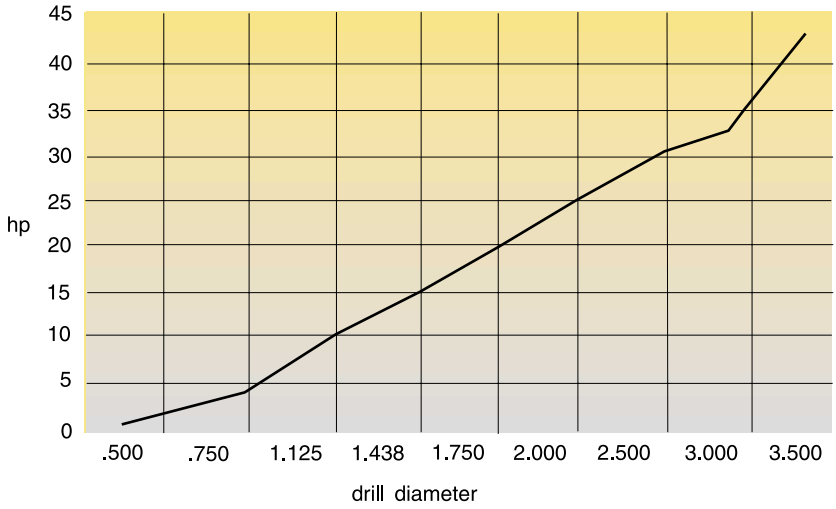
QPV Drills Technical Information

Speeds and Feeds

workpiece material group	hardness BHN	grades KC100 (TiN)	grades KC300 (TiAlN)	series / diameters feed (ipr) Y & Z .3740 - .5000	0 .5118 - .6890	1 .7031 - .9449	2 .9688 - 1.3780	3 1.4063 - 1.8750	4 1.8898 - 2.5625	5 2.5000 - 3.0000	6 - 7 - 8 3.0313 - 4.5000
low-carbon steels	85 - 125	175	—	.007	.009	.012	.015	.019	.023	.025	.027
1010, 1018, 1020, 1026	125 - 175	165	—	.006	.009	.012	.015	.019	.023	.024	.026
	175 - 225	155	—	.005	.008	.010	.014	.018	.021	.023	.025
	225 - 275	145	—	.005	.008	.010	.014	.018	.021	.023	.025
free-machining steels	100 - 150	200	—	.008	.011	.014	.017	.021	.025	.026	.028
1111, 1118, 1215, 12L14	150 - 200	180	—	.007	.010	.013	.016	.020	.023	.024	.026
	200 - 250	160	—	.006	.010	.013	.016	.020	.023	.024	.026
medium carbon steels	125 - 175	165	—	.006	.009	.012	.015	.019	.023	.025	.027
1030, 1040, 1045, 1055	175 - 225	155	—	.005	.008	.010	.014	.018	.021	.023	.025
	225 - 275	145	215	.005	.008	.010	.014	.018	.021	.022	.024
	275 - 325	135	200	.004	.007	.009	.012	.016	.019	.021	.023
alloy steel	125 - 175	150	—	.007	.009	.011	.014	.018	.021	.023	.025
4140, 5140, 8625, 8640	175 - 225	140	—	.006	.008	.010	.014	.017	.019	.021	.023
	225 - 275	130	185	.005	.007	.010	.013	.017	.019	.020	.021
	275 - 325	120	175	.004	.006	.009	.012	.015	.017	.018	.019
	325 - 375	110	160	.003	.006	.009	.012	.015	.017	.018	.019
high strength alloys	225 - 300	85	120	.005	.007	.009	.010	.014	.016	.018	.020
4340, 4330, 300M	300 - 350	65	90	.004	.007	.009	.010	.014	.016	.018	.020
	350 - 400	55	75	.003	.006	.008	.009	.012	.014	.016	.018
structural steel	100 - 150	150	—	.006	.010	.012	.014	.018	.021	.022	.024
A36, A235, A516	150 - 250	125	190	.005	.009	.010	.012	.016	.019	.020	.022
	250 - 350	100	160	.004	.008	.009	.010	.014	.017	.018	.020
tool steel	150 - 200	85	—	.005	.006	.008	.010	.012	.015	.016	.017
H13, H21, A4, S3	200 - 250	65	—	.004	.006	.008	.010	.012	.015	.016	.017
	250 - 300	45	70	.004	.005	.007	.008	.010	.013	.014	.015
	300 - 350	—	55	.003	.004	.006	.007	.009	.012	.013	.014
stainless steel	135 - 185	80	110	.006	.008	.009	.011	.014	.016	.018	.020
300, 400, PH series	185 - 275	65	100	.005	.007	.008	.010	.012	.014	.016	.018
	275 - 350	—	90	.005	.006	.007	.009	.011	.013	.015	.017
cast irons	120 - 150	180	270	.008	.012	.016	.020	.024	.027	.029	.031
gray, ductile, nodular	150 - 200	160	240	.007	.011	.014	.018	.022	.025	.027	.029
	200 - 220	140	210	.006	.009	.012	.016	.018	.021	.023	.025
	220 - 260	120	180	.005	.007	.009	.012	.014	.017	.019	.021
	260 - 320	100	150	.004	.006	.007	.009	.012	.014	.016	.018
aluminum / wrought	—	600	—	.007	.012	.015	.019	.021	.024	.025	.026
aluminum / cast	—	300	—	.008	.013	.016	.020	.022	.025	.026	.027
high-temp alloys	140 - 210	—	45	.005	.007	.008	.010	.012	.015	.016	.017
Hastelloy B, Inconel 600, etc.	210 - 280	—	40	.004	.006	.007	.008	.010	.012	.013	.014
	280 - 340	—	35	.004	.005	.006	.007	.009	.011	.012	.013

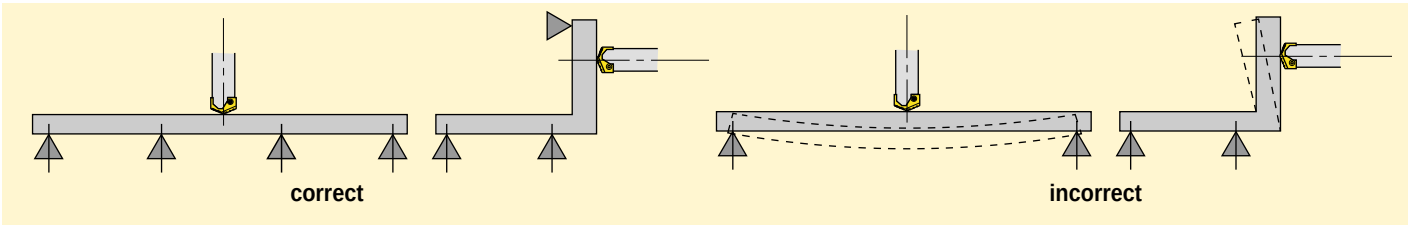
QPV Drills Technical Information

Horsepower Requirements



Approximate horsepower. Data based on drilling medium carbon steel (275 HB). Values may differ on your machine and application.

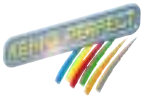
Workpiece Rigidity



Because QPV drills deliver much higher penetration rates, for best performance it is important that the workpiece receive adequate support.

QPV Drills Technical Information

Minimum Recommended Coolant Volumetric Flow Rate (GPM) and Coolant Pressure (PSI)



workpiece material group		series / diameters						
		Y & Z .3740 - .5000	0 .5118 - .6890	1 .7031 - .9449	2 .9688 - 1.3780	3 1.4063 - 1.8750	4 & 5 1.8898 - 3.0000	6 - 7 - 8 3.0313 - 4.5000
low-carbon steels 1010, 1018, 1020, 1026	flow — GPM	2.4 - 2.6	2.4 - 2.6	3.7 - 4.2	6 - 7	11 - 12	26 - 30	36 - 40
	pressure — PSI	160 - 170	75 - 90	75 - 95	60 - 80	55 - 75	30 - 40	> 50
free-machining steels 1111, 1118, 1215, 12L14	flow — GPM	2.5 - 2.7	2.8 - 3.0	4.4 - 5.2	7 - 8	12 - 14	30 - 33	37 - 41
	pressure — PSI	175 - 185	100 - 120	105 - 140	80 - 115	75 - 100	40 - 50	> 60
medium carbon steels 1030, 1040, 1045, 1055	flow — GPM	2.3 - 2.5	2.3 - 2.6	3.6 - 4.1	5 - 6	10 - 12	26 - 30	36 - 40
	pressure — PSI	155 - 165	70 - 85	70 - 90	55 - 75	50 - 70	30 - 40	> 50
alloy steel 4140, 5140, 8625, 8640	flow — GPM	2.2 - 2.4	2.2 - 2.4	3.5 - 3.9	5 - 6	10 - 11	26 - 28	31 - 35
	pressure — PSI	155 - 165	65 - 75	65 - 80	50 - 70	45 - 60	30 - 35	> 40
high strength alloy 4340, 4330, 300M	flow — GPM	2.2 - 2.4	2.2 - 2.4	2.9 - 3.1	4 - 5	7 - 8	21 - 23	27 - 30
	pressure — PSI	150 - 160	55 - 60	45 - 50	25 - 30	25 - 30	20 - 25	> 30
structural steel A36, A235, A516	flow — GPM	2.3 - 2.5	2.4 - 2.6	3.5 - 3.9	5 - 6	9 - 10	23 - 26	31 - 35
	pressure — PSI	155 - 165	75 - 85	65 - 80	40 - 55	40 - 50	25 - 30	> 40
tool steel H13, H21, A4, S3	flow — GPM	2.3 - 2.5	2.3 - 2.5	2.9 - 3.1	4 - 5	7 - 8	21 - 23	27 - 30
	pressure — PSI	145 - 155	55 - 60	45 - 50	25 - 30	25 - 30	20 - 25	> 30
stainless steel 300, 400, PH series	flow — GPM	2.3 - 2.5	2.3 - 2.6	3.5 - 3.7	5 - 6	9 - 10	23 - 26	33 - 37
	pressure — PSI	160 - 170	70 - 85	65 - 75	40 - 55	40 - 50	25 - 30	> 35
cast iron Gray, Ductile, Nodular	flow — GPM	2.2 - 2.4	2.2 - 2.4	3.1 - 3.3	4 - 5	8 - 9	23 - 26	27 - 30
	pressure — PSI	155 - 165	60 - 65	50 - 60	30 - 40	30 - 35	25 - 30	> 30
aluminum	flow — GPM	2.6 - 2.8	3.3 - 3.7	5.3 - 6.1	8 - 9	14 - 16	30 - 33	37 - 41
	pressure — PSI	185 - 200	140 - 180	150 - 200	115 - 160	90 - 125	40 - 50	> 60
high-temp alloy Hastelloy B, Inconel 600, etc.	flow — GPM	2.2 - 2.4	2.2 - 2.4	3.1 - 3.2	4 - 5	7 - 8	23 - 26	27 - 30
	pressure — PSI	150 - 160	60 - 65	50 - 55	30 - 35	25 - 30	25 - 30	> 30

Useful Formulas:

kW	=	hp	÷ 1.341022
kN	=	lbs.	÷ 225
Nm	=	ft.-lbs.	÷ .7375621

Coolant should be filtered prior to use to approximately 30-50 microns.

Chipping of the insert might occur in applications such as machines with fixed speed lower than recommended, old machines with loose spindles, or interrupted cuts. For these applications, KC100 is the recommended choice.