

COBALT JOBBER DRILL SETS



Page 1 of 2

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Feed: inch/rev

How To Use This Chart:

1) Select your material in the ISO colored chart

2) Select your drill size in the columns

3) Start with the recommended RPM and feed (inch/rev)

-Use your machine's maximum spindle speed if the listed RPM is higher than your max. Adjust the feed rate to match.

-Us	e your ma	chine's maximum spindle	speed if the listed RPM is highe	er than your max. I	Adjust the	feed r	ate to match.								Feed: inch/rev
—					1			RPM: rev/min Drill Diameter							
ISO							Haas Cobalt								6
	VDI 3323	Material Description	Composition / Structure /	Heat Treatment	HB	HRC	Jobber Drill Sets	SFM	FRAC/NUM/LTR	3/64	2 #47	3 #32	#22		B
							Jobber Drill Sets			-					_
									DECIMAL (inch)	0.0469	.0785	.1160	.1570	.1960	.2380
Р	1		About 0.15% C	Annealed	125		•	132	RPM	10,723	6,407	4,336	3,203	2,566	2,113
	P 2								FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
Р			About 0.45% C	Annealed	190	13	•	115	RPM	9,383	5,606	3,794	2,803	2,245	1,849
							-	-	FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
Р	3	Non-alloy steel	About 0.45% C	Quenched &	250	25	•	99	RPM	8,043	4,805	3,252	2,403	1,924	1,585
- 1	, in the second s		Phote 0.40% 0	tempered			•	55	FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
Р	4		About 0.75% C	Annealed	270	28	0	66	RPM	5,362	3,203	2,168	1,602	1,283	1,057
- F	-		About 0.13% C			20		00	FEED	.0008002	.0008002	.00080024	.00160031	.00160039	.00160039
Р	5			Quenched &	200	20									
P	Э		About 0.75% C	tempered	300	32									
					400		•		RPM	9,383	5,606	3,794	2,803	2,245	1,849
Р	6			Annealed	180	180 10	-	115	FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
				Quenched &			-		RPM	8,043	4,770	3,252	2,403	1,924	1,585
P	7			tempered 27	275	29	0	99 99	FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
		Low alloy steel							RPM	8,043	4,770	3,252	2,403	1,924	1,585
P	8				300	32	0		FEED	.0008002	.0008002	.00080024	.00160031	.00160039	.00160039
				Quenched &					FEED	.0008002	.0008002	.00080024	.00100031	.00100039	.00100059
P	9			tempered	350	38									
				tempereu					2214	5.262	2 202	2.460	1 (02	4 202	1.057
Р	10	High alloyed steel, and tool steel		Annealed	200	15	0	66	RPM	5,362	3,203	2,168	1,602	1,283	1,057
									FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
Р	11			Quenched &	325	35									
				Tempered											
м	12		Ferritic / Martensitic	Annealed	200	15	•	82	RPM	6,702	4,004	2,710	2,002	1,604	1,321
									FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
м		Stainless steel	Martensitic	Quenched &	240	23	0	66	RPM	5,362	3,203	2,168	1,602	1,283	1,057
				Tempered	240	25	U	00	FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
м				Austenitic	180	10	0	49	RPM	4,021	2,403	1,626	1,201	962	792
				Austernuc	100	10	0		FEED	.0008002	.0008002	.00080024	.00160031	.00160039	.00160039
		Grey cast iron			400		<u> </u>		RPM	10,723	6,407	4,336	3,203	2,566	2,113
К	15		Pearlitic / ferritic		180	10	0	132	FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
						20	\cap		RPM	9,383	5,606	3,794	2,803	2,245	1.849
к	16		Pearlitic (Martensitic)		260	26	0	115	FEED	.0008002	.0008002	.00080024	.00160031	.00160039	.00160039
							-		RPM	10,723	6,407	4,336	3,203	2,566	2,113
к	17	Nodular cast iron	Ferritic		160	3	0	132 -	FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
										.0010 .0051	.5010 .0051	.5024 .0039		.5047 .0003	
к	18		Pearlitic		250	25									
									RPM	9,383	5,606	3,794	2,803	2,245	1,849
к	19	Malleable cast iron	Ferritic		130		0	115	FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
									FEED	.00100031	.00100031	.00240039	.00310047	.00470063	.00470003
К	20		Pearlitic		230 2	21									
								_		47.000	40	7.6	E 205		2.451
N	21	Aluminum-wrought alloy -	Not Curable		60		0	214	RPM	17,425	10,411	7,045	5,205	4,170	3,434
							-		FEED	.0020035	.0020035	.00280043	.00470063	.00470071	.00470071
N	22		Curable	Hardened	100		0	214	RPM	17,425	10,411	7,045	5,205	4,170	3,434
							Ŭ Ŭ		FEED	.0020035	.0020035	.00280043	.00470063	.00470071	.00470071
N	N 23		≤ 12% Si, Not Curable		75		0	165	RPM	13,404	8,008	5,419	4,004	3,207	2,641
	23	, aanintani cast, anoyea					<u> </u>	105	FEED	.0020035	.0020035	.00280043	.00470063	.00470071	.00470071
N	29		Duroplastic, Fiber Reinforced				0	99	RPM	8,043	4,805	3,252	2,403	1,924	1,585
	23	Non Metallic Materials	Plastic					33	FEED	.00160031	.00160031	.00240039	.00310047	.00470063	.00470063
N	30		Rubber, Wood, etc.												
	S 36	These town All	Dune Tite		100 0		0		RPM	5,362	3,203	2,168	1,602	1,283	1,057
s		Titanium Alloys	Pure Titanium		400 Rm		0	66	FEED	.0008002	.0008002	.00080024	.00160031	.0020035	.0020035

• Primary \bigcirc Secondary



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Feed: inch/rev

RPM: rev/min

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2) Select your drill size in the columns

3) Start with the recommended RPM and feed (inch/rev)

-Use your machine's maximum spindle speed if the listed RPM is higher than your max. Adjust the feed rate to match.

Image: matrix matri										I			Drill Diame	tor			RPM: rev/min
0 0<	ISO			Composition / Structure / Heat Treatment				Haas Cobalt	ŀ	MILIMETER (mm)	7	8			11	12	13
Image: book of the state of the		VDI 3323	Material Description			НВ	HRC	Jobber Drill Sets	SFM			0	-				
0 1										DECIMAL (inch)	.2770	.3160	.3580		.4375		
Image: Probability of the set of the	_		Non-alloy steel					•	422								
P 2 Matrice Matrice 10 11 110 040, 000, 000, 000, 000, 000, 000, 000,	Р	1		About 0.15% C	Annealed	125		•	132	FEED	.00470071	.00470071	.00630087	.00630087	.00710094	.00710094	.00710094
Image: problem integral problem integr		-			Amusclad	400	13		115	RPM	1,589	1,393	1,229	1,108	1,006	939	880
I Not day being into the section of the sectin of the section of the section of the section of the section o	P	2		About 0.45% C	Annealed	190		•		FEED	.00470071	.00470071	.00630087	.00630087	.00710094	.00710094	.00710094
image <	P	3		About 0.45% C		250	25	•	99								
Image Amount by Log Amount by L		, in the second		About 0.40 % 0	tempered	200	2.0	•									
Image: state in the stat	Р	4		About 0.75% C	Annealed	270	28	0	66								
N N </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>-</th> <th></th> <th>FEED</th> <th>.00240047</th> <th>.00240047</th> <th>.00310055</th> <th>.00310055</th> <th>.00470071</th> <th>.00470071</th> <th>.00470071</th>								-		FEED	.00240047	.00240047	.00310055	.00310055	.00470071	.00470071	.00470071
P A P A P A P	Р	5		About 0.75% C		300	32										
P C Particle Description Description <thdescription< th=""></thdescription<>					tempereu					PDM	1 590	1 202	1 220	1 109	1 006	020	880
1 1	Р	6			Annealed	180	10	•	115						· · · · · · · · · · · · · · · · · · ·		
p f			4	Contract Con	Quenched &	275											
P 8 Automated (a) 300 12 0 9 804 1,12/2 1,104 1,04/2 001 003 001 <	Р	7															-
Image of the state o	_		Low alloy steel		Quenched &					RPM	1,362	1,194	1,054	950	862	805	754
1 0	Р	ŏ			tempered	300	32			FEED	.00240047	.00240047	.00310055	.00310055	.00470071	.00470071	.00470071
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	D	٩			Quenched & 35	350	1 39										
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$					tempered	330	50										
Image allowed steel, and look Image allowed steel, and look Jobs	Р	10			Annealed	200	15	0	66								
P 11 cm Cm Tamperid 520 PM 1.13 975 578 722 718 670 62 M 121 Stainless ated Martenatic One-cell 200 66 PPM 913 995 578 722 718 670 623 M 131 Stainless ated Martenatic Ope-cell 800 66 PPM 908 766 772 633 575 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 556 653 557 <								-		FEED	.00470071	.00470071	.00630087	.00630087	.00710094	.00710094	.00710094
M 12 Ferritic / Martensitic Annealed 20 13 905 978 772 778 670 620 M 133 Stanies steel Martensitic Quarched A Tempered 240 23 0 66 PFM 995 772 633 975 936 973 973 993 973 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 973 993 993 973 993 993 973 993 973 993 993 993 993 993 993 993 993 993 993 993 993 993 993 993 993 993 993	Р	11	steel			325	35										
M 12 Ferritic / Marinatic Annaled 20 15 \bullet 62 (FEO) 0.007-072 0.003-007 0071-003					rempered					PDM.	1 125	005	979	702	719	670	620
M 13 Stainess steel Martensitic Quenched A Tesp 24 24 24 24 24 24 25 0 66 RPM 908 798 702 633 575 536 533 M 14 Constrained Austentic 188 0 0 49 RPM 966 177 517 536 533 K 15 Grey cast ion Pearitic / territic 188 0 0 132 RPM 0661 1597 137 431 402 397.007.001 0037.007 00	М	12	Stainless steel	Ferritic / Martensitic	Annealed	200	15	•	82								
M 13 Stainles stele Martensitic Tempored 240 23 0 66 FED 0.007, 0.007, 0.007, 0.007, 0.008, 0.007, 0.008, 0.007, 0.008, 0.007, 0.008, 0.007, 0.008, 0.007, 0.008, 0.007, 0.008, 0.007, 0.001, 0.007, 0.00					Quenched &			_									
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	м	13		Martensitic		240	23	0									
K 15 Peartilic / ferritic 10 0 132 RPR0 0.00240047 0.00340055 0.00340055 0.00470071 0.0						180	10	0									
K 15 Grey cast iron Pearlik (/ farritic 180 10 00 132 FEED 0007-0071 0007-0071 0007-0071 00073-0083 00073-0084 0071-0094 <th< th=""><th>м</th><th>14</th><th></th><th>Austenitic</th><th>180</th><th>10</th><th>0</th><th>49</th><th>FEED</th><th>.00240047</th><th>.00240047</th><th>.00310055</th><th>.00310055</th><th>.00470071</th><th>.00470071</th><th>.00470071</th></th<>	м	14			Austenitic	180	10	0	49	FEED	.00240047	.00240047	.00310055	.00310055	.00470071	.00470071	.00470071
K 16 Grey cast iron FEB 0.0047001 0.003008 0.0047001 0.003008 0.007008 0.007008 0.007008 0.007009 <	v	45		Poorlitio / forvitio		100	10	\cap	122	RPM	1,816	1,592	1,405	1,267	1,150	1,073	1,006
K 16 Pearlitic (Mattensitic) 260 26 ○ 115 RPM 1,383 1,229 1,105 1,005 539 880 K 17 Nodular cast iron Pearlitic (Mattensitic) 160 3 ○ 132 PEED 0.0024-0.0071 0031-0.005 00031-0.005 00037-0.0071 00047-0.0071 00047-0.0071 00047-0.0071 00047-0.0071 00047-0.0071 00047-0.0071 00047-0.0071 00047-0.0071 00047-0.0071 00047-0.0071 00071-0.0094 0071-0.009	ⁿ	15	Grev cast iron	Feathic / Territic		100	10	0	152	FEED	.00470071	.00470071	.00630087	.00630087	.00710094	.00710094	.00710094
K 17 Nodular cast iron Ferritic 160 3 \bigcirc 132 FEED .00240047 20130055 .00470071 .00630087 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094 .00710094	к	16	Grey cast from	Pearlitic (Martensitic)		260	26	0	115								
K 17 Nodular cast iron Ferritic 160 3 0 132 FEED 0.0047 - 0.071 0.003 - 0.087 0.0071 - 0.094 0.071 - 0.091 0.003 - 0.087 0.003 - 0.087 0.003 - 0.087 0.								0									
K 18 Nodular cast iron Pearitic 250 25 K 19 Malleable cast iron Ferritic 130 C 115 RPM 1,589 1,393 1,229 1,086 939 880 K 20 Malleable cast iron Ferritic 230 21 N 21 Aluminum-wrought alloy Not Curable 60 Curable	к	17	Nodular cast iron	Ferritic		160	3	0	132								
K 19 Malleable cast iron Ferritic 130 C 15 RPM 1,589 1,393 1,229 1,108 1,006 939 880 K 20 Malleable cast iron Pearlitic 230 21 RPM 1,589 1,393 1,229 1,108 1,006 939 880 N 21 Auminum-wrought alloy Pearlitic 230 21 RPM 2,950 2,586 2,283 2,059 1,868 1,743 1,635 N 22 Auminum-wrought alloy Curable Hardened 100 C 214 RPM 2,950 2,586 2,283 2,059 1,868 1,743 1,635 N 22 Auminum-wrought alloy Guarable Hardened 100 C 214 RPM 2,950 2,586 2,283 2,059 1,868 1,743 1,635 N 22 Auminum-cast, alloy 512%, Si, Not Curable 75 C 165 RPM <										FEED	.00470071	.00470071	.00630087	.00630087	.00710094	.00710094	.00710094
K 19 Malleable cast iron Malleable cast iron <th>К</th> <th>18</th> <th>Pearlitic</th> <th></th> <th>250</th> <th>25</th> <th></th>	К	18		Pearlitic		250	25										
K 19 Malleable cast iron Malleable cast iron <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>RPM</th> <th>1.589</th> <th>1.393</th> <th>1,229</th> <th>1.108</th> <th>1.006</th> <th>939</th> <th>880</th>										RPM	1.589	1.393	1,229	1.108	1.006	939	880
K 20 Maileable cast iron Pearitic 230 21 N 21 Not Curable 60 214 RPM 2,950 2,586 2,283 2,059 1,868 1,743 1,635 N 22 Curable Hardened 100 214 RPM 2,950 2,586 2,283 2,059 1,868 1,743 1,635 N 22 Curable Hardened 100 214 RPM 2,950 2,586 2,283 2,059 1,868 1,743 1,635 N 23 Aluminum-cast, alloyed Hardened 100 Curable RPM 2,950 2,586 2,083 0.087011	к	19	Malleable cast iron	Ferritic		130		0	115								
N 21 Not Curable 60 0 40 RPM 2,950 2,586 2,283 2,059 1,868 1,743 1,635 N 22 0005 0005 0005 0005 0005 0005 0005 0005 0003 0003 0003 0003 0007 00005 0005				De estate			~										
N 21 Aluminum-wrought alloy Not Curable 60 0 214 FEED .00550079 .00630087 .0087011 .008	ĸ	20		Pearittic		230	21										
N 22 Aluminum-wrought alloy N Curable Hardened 100 Curable RPM 2,950 2,586 2,283 2,009 1,868 1,743 1,635 N 23 Aluminum-cast, alloyed ≤ 12% Si, Not Curable To 75 0 165 RPM 2,270 1,989 1,756 1,584 1,437 1,341 1,257 N 24 Aluminum-cast, alloyed ≤ 12% Si, Not Curable Hardened 90 165 RPM 2,270 1,989 1,756 1,584 1,437 1,341 1,257 N 26 Copper and Copper Alloy (Bronze / Bras) Cutting Alloys, PB>1% 110 Cutting Alloys, PB>1% 110 Cutting Alloys, PB>1% 110 Cutting Alloys, PB>1% 100 N 27 Copper and Copper Alloy (Bronze / Bras) Duroplastic, Fiber Reinforced Plastic 90 Precession	N	21		Not Curable		60		0	214								
N 22 Curable Hardened 100 214 RPM 2,950 2,586 2,283 2,059 1,868 1,743 1,635 N 23 Aluminum-cast, alloyed ≤ 12% Si, Not Curable 75 0 165 RPM 2,275 0.0630087 0.0087011 0.00870			Aluminum-wrought alloy	Horourable	-			<u> </u>									
N Column P C	N	22		Curable	Hardened			0									
N 23 Aluminum-cast, alloyed \$12%, \$1, Not Curable Add and and and and and and and and and a								Ŭ									
N 24 Aluminum-cast, alloyed N 25 Aluminum-cast, alloyed N 26 Aluminum-cast, alloyed N 27 Copper and Copper Alloys (Bronze / Brass) 28 Cutting Alloys, Pl>1% 110 N 27 Copper and Copper Alloy (Bronze / Brass) Cutting Alloys, Pl>1% 110 N 28 Ouroplastic, Fiber Reinforced Plastic 90 N 29 Non Metallic Materials Duroplastic, Fiber Reinforced Plastic 0 S 26 Titanium Allow 001-0094 001-0094 6 RPM 908 796 702 633 575 536 503	N	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable		75		0	165					· · ·			
N 25 > 12% Si, Not Curable 130 1 N 26 Opper and Copper Alloys (Bronze / Brass) Cutting Alloys, PB>1% 110 100 N 27 Opper and Copper Alloys (Bronze / Brass) Cutting Alloys, PB>1% 110 100 100 N 27 Opper and Copper Alloys (Bronze / Brass) Duroplastic, Fiber Reinforce Plastic 90 Press Pres Pres Pres		24			Handanad	00				FEED	.00550079	.00550079	.00630087	.00630087	.0087011	.0087011	.0087011
N 26 N Copper and Copper Alloys (Bronz / Brass) Cutting Alloys, PB>1% 110 CuZn, CuSnZn (Brass) 90 N 27 (Bronz / Brass) 90 CuSn, lead-free copper and electrolytic copper 90 N 28 Non Metallic Materials Duroplastic, Fiber Reinforced Plastic 100 P P RPM 1,362 1,194 1,054 950 862 805 754 No 28 Titanium Allour Puro Titanium Allo Pm O 66 RPM 908 796 702 633 575 536 503					Hardened												
N 27 Copper and Copper Alloy (Bronze / Brass) CuZn, CuSnZn (Brass) 90 N 28 (Bronze / Brass) CuSn, lead-free copper and electrolytic copper 100 N 29 Non Metallic Materials Duroplastic, Fiber Reinforced Plastic P P P 1,362 1,194 1,054 950 862 805 754 S 26 Titanium Allour Puratice P P FEED .00470071 .00630087 .00710094 .007					B>1%												
N 28 CuSn, lead-free copper and electrolytic copper 100 N 29 Non Metallic Materials Duroplastic, Fiber Reinforced Plastic 100 99 RPM 1,362 1,194 1,054 950 862 805 754 S 36 Titanium Alloue Puro Titanium 400 Pm 66 RPM 908 796 702 633 575 536 503																	
N 29 Non Metallic Materials Duroplastic, Fiber Reinforced Plastic Plastic A Plastic			(Bronze / Brass)	CuSn, lead-free copper and e	electrolytic copper	100											
Plastic Plastic Output Plastic Output Outp			Non Metallic Materials					\bigcirc	99	RPM	1,362	1,194	1,054	950	862	805	754
S 36 Titanium Allove Duro Titanium () 66	N 29	29		Plastic				0		FEED	.00470071	.00470071	.00630087	.00630087	.00710094	.00710094	.00710094
FEED .00240039 .00280051 .00310055 .00310055 .00310055	s	36	Titanium Allovs	Pure Titanium		400 Rm		0	66				-				
		-0	- Haman Anoys	i wo Humum		100 1411		U U		FEED	.00240039	.00240039	.00280051	.00280051	.00310055	.00310055	.00310055