

STARTING FEED AND SPEED

Cutting speed for HSS cutters in surface feet per minute

DRILLING MATERIAL	HSS CUTTER (SFPM)	TINI CUTTER (SFPM)
Freecutting-lead	100	150
Up to 180 Brinell A-36	80-110	130
180/285 Brinell	45-70	80
285/375 Brinell	30-45	55
Steel		
375 and up Brinell	15-25	35
Manganese (low)	15-20	25
Stainless-freecutting	30-60	70
Stainless 304-316-320-320W and tough grades	20-40	50
Inconel, Hastelloy	25-40	55
Inconel-X	20-25	35
Titanium	30-40	50
A-286	25-35	50
Aluminum	300	500
Brass		
Ordinary	150	250
Leaded	200	300
Bronze		
Ordinary	100	200
Hi-tensile	70	100
Cast Iron		
Soft	100	150
Medium	80	90
Hard	50	70
Chilled	25	35
Copper	100	200
Magnesium	Up to 300	400
Malleable Iron	70	80

Cutting speed for carbide cutters in surface feet per minute*

STEEL PLATE	STAINLESS STEEL	CAST IRON
164	115	131

*For carbide cutters listed on page 16 only.

Recommended operating feed for HSS cutters in inches per revolution

CUTTER DIAMETER	FEED (IPR)
7/16" — 9/16"	.002 to .006
5/8" — 3/4"	.003 to .007
13/16" — 1-1/16"	.004 to .008
1-1/8" — 1-7/16"	.006 to .010
1-1/2" — 2"	.008 to .012
2" — 2-1/2"	.012 to .025

Recommended operating feed for carbide cutters in inches per revolution*

STEEL PLATE	STAINLESS STEEL	CAST IRON
.0031-.0047	.0031-.0039	.0047-.0079

*For carbide cutters listed on page 16 only.



FEED AND SPEED CALCULATORS

Recommended for the calculation of feed and speed using suggested cutting speed chart

TO FIND	REQUIRED VARIABLES	RULE	SPEED AND FEED FORMULA
Speed of cutter in surface feet per minute (SFPM)	Diameter of cutter (inches) and revolutions per minute (RPM)	(Diameter of cutter multiplied by 3.1416 multiplied by revolutions per minute) divided by (12)	$SFPM = \frac{(3.1416 \times D \times RPM)}{(12)}$
Revolutions per minute (RPM)	Surface feet per minute (SFPM) and diameter of cutter (inches)	(Surface feet per minute multiplied by 12) divided by (cutter diameter multiplied by 3.1416)	$RPM = \frac{(SFPM \times 12)}{(D \times 3.1416)}$
Feed in inches per minute (IPM) or (F)	Feed per tooth (f), number of teeth (T) and revolutions per minute (RPM)	(Feed per tooth) multiplied by (number of teeth) multiplied by (revolutions per minute)	$F = (f \times T \times RPM)$
Feed per tooth in inches (FPT) or (f)	Feed in inches per minute (IPM), number of teeth (T) and revolutions per minute (RPM)	(Feed in inches per minute) divided by (number of teeth multiplied by revolutions per minute)	$f = \frac{F}{(T \times RPM)}$

T = Number of teeth in cutter / **D** = Cutter diameter in inches / **RPM** = Revolutions per minute / **SFPM** = Surface feet per minute
F = Feed in inches per minute / **f** = Feed per tooth in inches / **IPM** = Inches per minute

SFPM TO RPM CONVERSIONS

Match cutter diameter to cutter speed to determine revolutions per minute (M2 cutters)

Cutter Diameter (in inches)

Cutting Speed (SFPM)	Cutter Diameter (in inches)																		
	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1	1-1/8	1-1/4	1-3/8	1-1/2	2	2-1/2	3	3-1/2	4
10	87	76	68	61	55	51	47	44	41	38	34	30	28	25	19	15	13	11	9
20	175	153	136	122	111	102	94	87	81	76	68	61	55	51	38	30	25	22	19
30	262	229	204	183	167	153	141	131	122	114	102	91	83	76	57	46	38	33	28
40	349	306	272	244	222	204	188	174	163	153	136	122	111	102	76	61	51	43	38
50	437	382	339	305	278	255	235	218	204	191	170	153	139	127	95	76	63	54	48
60	524	458	407	367	333	305	282	262	244	229	203	183	166	153	114	91	76	65	57
70	611	535	475	428	389	356	329	305	285	267	237	214	194	178	133	107	89	76	67
80	699	611	543	489	444	407	376	349	326	305	271	244	222	203	152	122	102	87	76
90	786	688	611	550	500	458	423	393	366	344	305	275	250	229	172	137	114	98	86
100	873	764	679	611	555	509	470	436	407	382	339	305	277	254	191	152	127	109	95
120	1048	917	815	733	667	611	564	524	489	458	407	366	333	305	229	183	152	131	114
140	1223	1070	951	856	778	713	658	611	570	534	475	427	389	356	267	213	178	152	133
160	1398	1223	1087	978	889	815	752	698	652	611	543	488	444	407	305	244	203	174	152
180	1572	1375	1222	1100	1000	917	846	785	733	687	611	550	500	458	343	275	229	196	171
200	1747	1528	1358	1222	1111	1018	940	873	814	764	679	611	555	509	381	305	254	218	191
220	1922	1681	1494	1345	1222	1120	1034	960	896	840	746	672	611	560	420	336	280	240	210
240	2096	1834	1630	1467	1333	1222	1128	1047	977	916	814	733	666	611	458	366	305	261	229
260	2271	1987	1766	1589	1444	1324	1222	1135	1059	993	882	794	722	661	496	397	330	283	248
280	2446	2140	1902	1711	1556	1426	1316	1222	1140	1069	950	855	777	712	534	427	356	305	267
300	2620	2293	2038	1834	1667	1528	1410	1309	1222	1145	1018	916	833	763	572	458	381	327	286

DECIMAL CONVERSIONS

Millimeter to inches equivalents

.1	.00394	29	1.14173	66	2.59842
.2	.00787	30	1.18110	67	2.63779
.3	.01181	31	1.22047	68	2.67716
.4	.01575	32	1.25984	69	2.71653
.5	.01968	33	1.29921	70	2.75590
.6	.02362	34	1.33858	71	2.79527
.7	.02756	35	1.37795	72	2.83464
.8	.03149	36	1.41732	73	2.87401
.9	.03543	37	1.45669	74	2.91338
1	.03937	38	1.49606	75	2.95275
2	.07874	39	1.53543	76	2.99212
3	.11811	40	1.57480	77	3.03149
4	.15748	41	1.61417	78	3.07086
5	.19685	42	1.65354	79	3.11023
6	.23622	43	1.69291	80	3.14960
7	.27559	44	1.73228	81	3.18897
8	.31496	45	1.77165	82	3.22834
9	.35433	46	1.81102	83	3.26771
10	.39370	47	1.85039	84	3.30708
11	.43307	48	1.88976	85	3.34645
12	.47244	49	1.92913	86	3.38582
13	.51181	50	1.96850	87	3.42519
14	.55118	51	2.00787	88	3.46456
15	.59055	52	2.04724	89	3.50393
16	.62992	53	2.08661	90	3.54330
17	.66929	54	2.12598	91	3.58267
18	.70866	55	2.16535	92	3.62204
19	.74803	56	2.20472	93	3.66141
20	.78740	57	2.24409	94	3.70078
21	.82677	58	2.28346	95	3.74015
22	.86614	59	2.32283	96	3.77952
23	.90551	60	2.36220	97	3.81889
24	.94488	61	2.40157	98	3.85826
25	.98425	62	2.44094	99	3.89763
26	1.02362	63	2.48031	100	3.93700
27	1.06299	64	2.51968		
28	1.10236	65	2.55905		

Fraction to decimal equivalents

1/64"	.015625	33/64"	.515625
1/32"	.03125	17/32"	.53125
3/64"	.046875	35/64"	.546875
1/16"	.0625	9/16"	.5625
5/64"	.078125	37/64"	.578125
3/32"	.09375	19/32"	.59375
7/64"	.109375	39/64"	.609375
1/8"	.125	5/8"	.625
9/64"	.140625	41/64"	.640625
5/32"	.15625	21/32"	.65625
11/64"	.171875	43/64"	.671875
3/16"	.1875	11/16"	.6875
13/64"	.203125	45/64"	.703125
7/32"	.21875	23/32"	.71875
15/64"	.234375	47/64"	.734375
1/4"	.2500	3/4"	.7500
17/64"	.265625	49/64"	.765625
9/32"	.2812	25/32"	.78125
19/64"	.296875	51/64"	.796875
5/16"	.3125	13/16"	.8125
21/64"	.328125	53/64"	.828125
11/32"	.34375	27/32"	.84375
23/64"	.359375	55/64"	.859375
3/8"	.3750	7/8"	.8750
25/64"	.390625	57/64"	.890625
13/32"	.40625	29/32"	.90625
27/64"	.421875	59/64"	.921875
7/16"	.4375	15/16"	.9375
29/64"	.453125	61/64"	.953125
15/32"	.46875	31/32"	.96875
31/64"	.484375	63/64"	.984375
1/2"	.5000	1"	1.000

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