

Feed Rate Chart

Alpha Code	Feed in Inches per Revolution (IPR) ± 25%															Ø Diameter				
	1mm/ 1/32"	2mm/ 3/32"	3mm/ 1/8"	4mm/ 5/32"	5mm/ 3/16"	6mm/ 1/4"	8mm/ 5/16"	10mm/ 3/8"	12mm/ 1/2"	15mm/ 9/16"	16mm/ 5/8"	20mm/ 3/4"	25mm/ 1"	30mm/ 1.1/8"	40mm/ 1.5/8"	50mm/ 2"				
A	0.0004	0.0009	0.0011	0.0013	0.0014	0.0017	0.0021	0.0024	0.0027	0.0032	0.0034	0.0043	0.0049	0.0053	0.0061	0.0069				
B	0.0006	0.0011	0.0015	0.0016	0.0018	0.0021	0.0026	0.0031	0.0035	0.0041	0.0043	0.0053	0.0060	0.0065	0.0074	0.0082				
C	0.0006	0.0013	0.0017	0.0020	0.0022	0.0025	0.0031	0.0039	0.0043	0.0049	0.0051	0.0063	0.0071	0.0077	0.0087	0.0094				
D	0.0006	0.0015	0.0021	0.0024	0.0027	0.0031	0.0039	0.0047	0.0051	0.0059	0.0061	0.0074	0.0083	0.0090	0.0100	0.0108				
E	0.0007	0.0017	0.0024	0.0028	0.0031	0.0037	0.0045	0.0055	0.0059	0.0068	0.0071	0.0085	0.0094	0.0102	0.0112	0.0122				
F	0.0007	0.0020	0.0029	0.0033	0.0037	0.0043	0.0054	0.0065	0.0070	0.0080	0.0083	0.0098	0.0108	0.0116	0.0126	0.0135				
G	0.0007	0.0022	0.0033	0.0038	0.0043	0.0050	0.0063	0.0075	0.0081	0.0091	0.0094	0.0110	0.0122	0.0130	0.0140	0.0148				
H	0.0008	0.0026	0.0040	0.0046	0.0051	0.0059	0.0075	0.0090	0.0096	0.0107	0.0110	0.0126	0.0140	0.0148	0.0157	0.0165				
I	0.0008	0.0030	0.0047	0.0053	0.0059	0.0068	0.0087	0.0104	0.0110	0.0122	0.0126	0.0142	0.0157	0.0165	0.0173	0.0181				
J	0.0009	0.0033	0.0053	0.0060	0.0067	0.0078	0.0098	0.0117	0.0124	0.0137	0.0142	0.0159	0.0175	0.0183	0.0191	0.0198				
K	0.0010	0.0036	0.0059	0.0067	0.0075	0.0087	0.0110	0.0130	0.0138	0.0153	0.0157	0.0177	0.0193	0.0201	0.0209	0.0215				
L	0.0011	0.0040	0.0065	0.0073	0.0082	0.0094	0.0120	0.0142	0.0152	0.0165	0.0169	0.0191	0.0207	0.0215	0.0224	0.0231				
M	0.0012	0.0043	0.0071	0.0080	0.0089	0.0102	0.0130	0.0154	0.0165	0.0177	0.0181	0.0205	0.0220	0.0228	0.0238	0.0248				
N	0.0013	0.0047	0.0077	0.0086	0.0095	0.0110	0.0140	0.0165	0.0179	0.0189	0.0193	0.0219	0.0234	0.0242	0.0253	0.0265				
S	0.0003	0.0006	0.0008	0.0010	0.0012	0.0015	0.0020	0.0031	0.0039	0.0048	0.0051	0.0059	0.0070	0.0070	0.0090					
T	0.0006	0.0011	0.0016	0.0020	0.0024	0.0028	0.0035	0.0043	0.0051	0.0063	0.0067	0.0075	0.0080	0.0090	0.0100					
U	0.0010	0.0019	0.0028	0.0031	0.0035	0.0042	0.0055	0.0067	0.0079	0.0088	0.0091	0.0094	0.0110	0.0120	0.0140					
V	0.0015	0.0027	0.0039	0.0045	0.0051	0.0060	0.0079	0.0098	0.0110	0.0122	0.0126	0.0134	0.0160	0.0170	0.0200					
W	0.0019	0.0035	0.0051	0.0059	0.0067	0.0079	0.0102	0.0130	0.0150	0.0165	0.0169	0.0177	0.0190	0.0190	0.0200					
X	0.0022	0.0041	0.0059	0.0071	0.0083	0.0098	0.0130	0.0165	0.0189	0.0210	0.0217	0.0228								
Y	0.0027	0.0049	0.0071	0.0087	0.0102	0.0125	0.0169	0.0217	0.0276	0.0276	0.0276	0.0291								
Z	0.0037	0.0068	0.0098	0.0128	0.0157	0.0210	0.0315	0.0394	0.0433	0.0463	0.0472	0.0472								

How To Use This Chart to Find Cutting Feed Rate (IPR):

1. Find your Alpha Code on the AMG Chart (example: 279 U : U is the Alpha Code)
2. Find the closest diameter for your cutting application on the chart to find your IPR

Application Material Groups (AMG)		Hardness HRC	ISO
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120 HB P 1
	1.2 Structural Steel/ case carburising steel	1005-1025, 1214, 1215, A36	<200 HB P 1
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<24 P 2
	1.4 Alloy steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	<24 P 3
	1.5 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>24<38 P 4
	1.6 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>38 H 1
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55 H 3
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63 H 4
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<24 M 1
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<24 M 3
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, DUPLEX	<32 M 2
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	<32 S 2
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150 HB K 1
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 HB<32 K 2
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200 HB K 3
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 HB<32 K 4
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200 HB S 1
	4.2 Titanium, alloyed	6Al4V, 6A14V-2Sn, Monel, Monel K	<28 S 2
	4.3 Titanium, alloyed	6Al4V-4Mo, 7A14V-4Mo, 4911-4967	>28<38 S 3
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150 HB S 1
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<28 S 2
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>28<38 S 3
6. Copper	6.1 Copper	Commercially Pure	<100 HB N 3
	6.2 β-Brass, Bronze	314-340, 350-370	<200 HB N 4
	6.3 α-Brass	Alloyed Cu + Al + Fe, Long Chipping	<200 HB N 3
	6.4 High Strength Bronze	Ampco 18-25	<49 N 4
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100 HB N 1
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150 HB N 1
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120 HB N 1
	7.4 Al alloyed, Si>10% Mg alloys	Magnesium Whisker Reinforced	<120 HB N 2
8. Synthetic Materials	8.1 Thermoplastics	Ultradim, Polystrol	---
	8.2 Thermosetting plastics	Bakelit, Pertinax	---
	8.3 Reinforced plastic materials	CFK, GFKAFK	---
9. Hard Mat.	9.1 Cermets (Metal-ceramics)	Ferrotic	<54 H
10. Graphite	10.1 Standard graphite	---	O

TAPER SHANK DRILL

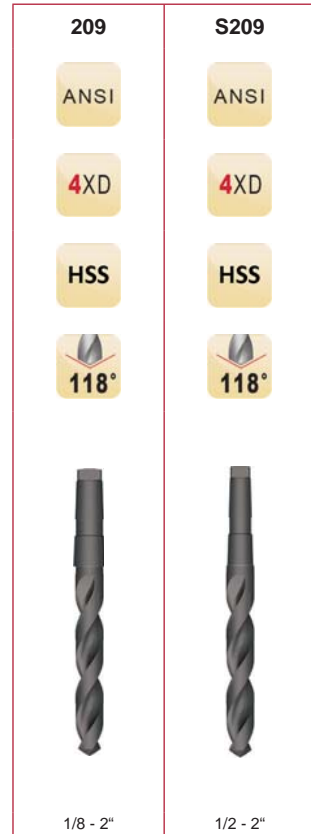
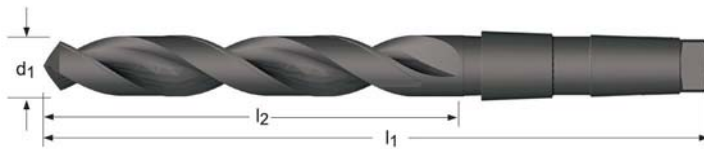


General Purpose Taper Shank

209 Standard Taper Type

S209 Small Taper Type

Steam Oxide for increased tool life & lubricity.



d_1 Ø	d_1 decimal	l_2	l_1	MTS	Pack Qty	209	S209
Inch	Inch	Inch	Inch				
1/8	0.1250	1.7/8	5.1/8	1	1	020008	—
9/64	0.1406	2.1/8	5.3/8	1	1	020009	—
5/32	0.1563	2.1/8	5.3/8	1	1	020010	—
11/64	0.1719	2.1/2	5.3/4	1	1	020011	—
3/16	0.1875	2.1/2	5.3/4	1	1	020012	—
13/64	0.2031	2.3/4	6"	1	1	020013	—
7/32	0.2188	2.3/4	6"	1	1	020014	—
15/64	0.2344	2.7/8	6.1/8	1	1	020015	—
1/4	0.2500	2.7/8	6.1/8	1	1	020016	—
17/64	0.2656	3"	6.1/4	1	1	020017	—
9/32	0.2813	3"	6.1/4	1	1	020018	—
19/64	0.2969	3.1/8	6.3/8	1	1	020019	—
5/16	0.3125	3.1/8	6.3/8	1	1	020020	—
21/64	0.3281	3.1/4	6.1/2	1	1	020021	—
11/32	0.3437	3.1/4	6.1/2	1	1	020022	—
23/64	0.3594	3.1/2	6.3/4	1	1	020023	—
3/8	0.3750	3.1/2	6.3/4	1	1	020024	—
25/64	0.3906	3.5/8	7"	1	1	020025	—
13/32	0.4063	3.5/8	7"	1	1	020026	—
27/64	0.4219	3.7/8	7.1/4	1	1	020027	—
7/16	0.4375	3.7/8	7.1/4	1	1	020028	—
29/64	0.4531	4.1/8	7.1/2	1	1	020029	—
15/32	0.4687	4.1/8	7.1/2	1	1	020030	—
31/64	0.4844	4.3/8	8.1/4	2	1	020031	—
1/2	0.5000	4.3/8	7.3/4	1	1	—	023032
1/2	0.5000	4.3/8	8.1/4	2	1	020032	—
33/64	0.5156	4.5/8	8"	1	1	—	023033
33/64	0.5156	4.5/8	8.1/2	2	1	020033	—
17/32	0.5313	4.5/8	8"	1	1	—	023034
17/32	0.5313	4.5/8	8.1/2	2	1	020034	—
35/64	0.5469	4.7/8	8.1/4	1	1	—	023035
35/64	0.5469	4.7/8	8.3/4	2	1	020035	—
9/16	0.5625	4.7/8	8.1/4	1	1	—	023036



TAPER SHANK DRILL

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	MTS	Pack Qty	209	S209
9/16	0.5625	4.7/8	8.3/4	2	1	020036	—
37/64	0.5781	4.7/8	8.3/4	2	1	020037	—
19/32	0.5937	4.7/8	8.3/4	2	1	020038	—
39/64	0.6094	4.7/8	8.3/4	2	1	020039	—
5/8	0.6250	4.7/8	8.3/4	2	1	020040	—
41/64	0.6406	5.1/8	9"	2	1	020041	—
21/32	0.6563	5.1/8	9"	2	1	020042	—
43/64	0.6719	5.3/8	9.1/4	2	1	020043	—
11/16	0.6875	5.3/8	9.1/4	2	1	020044	—
45/64	0.7031	5.5/8	9.1/2	2	1	020045	—
23/32	0.7188	5.5/8	9.1/2	2	1	020046	—
47/64	0.7344	5.7/8	9.3/4	2	1	020047	—
3/4	0.7500	5.7/8	9.3/4	2	1	020048	—
49/64	0.7656	6"	9.7/8	2	1	020049	—
25/32	0.7813	6"	9.7/8	2	1	020050	—
51/64	0.7969	6.1/8	10"	2	1	—	023051
51/64	0.7969	6.1/8	10.3/4	3	1	020051	—
13/16	0.8125	6.1/8	10"	2	1	—	023052
13/16	0.8125	6.1/8	10.3/4	3	1	020052	—
53/64	0.8281	6.1/8	10"	2	1	—	023053
53/64	0.8281	6.1/8	10.3/4	3	1	020053	—
27/32	0.8438	6.1/8	10"	2	1	—	023054
27/32	0.8438	6.1/8	10.3/4	3	1	020054	—
55/64	0.8594	6.1/8	10.3/4	3	1	020055	—
7/8	0.8750	6.1/8	10"	2	1	—	023056
7/8	0.8750	6.1/8	10.3/4	3	1	020056	—
57/64	0.8906	6.1/8	10.3/4	3	1	020057	—
29/32	0.9063	6.1/8	10"	2	1	—	023058
29/32	0.9063	6.1/8	10.3/4	3	1	020058	—
59/64	0.9219	6.1/8	10.3/4	3	1	020059	—
15/16	0.9375	6.1/8	10.3/4	3	1	020060	—
61/64	0.9531	6.3/8	11"	3	1	020061	—
31/32	0.9688	6.3/8	11"	3	1	020062	—
63/64	0.9844	6.3/8	11"	3	1	020063	—
1"	1.0000	6.3/8	11"	3	1	020100	—
1.1/64	1.0156	6.1/2	11.1/8	3	1	020101	—
1.1/32	1.0312	6.1/2	11.1/8	3	1	020102	—
1.3/64	1.0469	6.5/8	11.1/4	3	1	020103	—
1.1/16	1.0625	6.5/8	11.1/4	3	1	020104	—
1.5/64	1.0781	6.7/8	12.1/2	4	1	020105	—
1.3/32	1.0937	6.7/8	11.1/2	3	1	—	023106
1.3/32	1.0937	6.7/8	12.1/2	4	1	020106	—
1.7/64	1.1094	7.1/8	11.3/4	3	1	—	023107
1.7/64	1.1094	7.1/8	12.3/4	4	1	020107	—
1.1/8	1.1250	7.1/8	11.3/4	3	1	—	023108
1.1/8	1.1250	7.1/8	12.3/4	4	1	020108	—
1.9/64	1.1406	7.1/4	11.7/8	3	1	—	023109
1.9/64	1.1406	7.1/4	12.7/8	4	1	020109	—
1.5/32	1.1563	7.1/4	11.7/8	3	1	—	023110
1.5/32	1.1563	7.1/4	12.7/8	4	1	020110	—
1.11/64	1.1719	7.3/8	12"	3	1	—	023111
1.11/64	1.1719	7.3/8	13"	4	1	020111	—
1.3/16	1.1875	7.3/8	12"	3	1	—	023112
1.3/16	1.1875	7.3/8	13"	4	1	020112	—
1.13/64	1.2031	7.1/2	12.1/8	3	1	—	023113
1.7/32	1.2187	7.1/2	12.1/8	3	1	—	023114
1.7/32	1.2187	7.1/2	13.1/8	4	1	020114	—
1.15/64	1.2344	7.7/8	13.1/2	4	1	020115	—
1.1/4	1.2500	7.7/8	12.1/2	3	1	—	023116
1.1/4	1.2500	7.7/8	13.1/2	4	1	020116	—
1.17/64	1.2656	8.1/2	14.1/8	4	1	020117	—
1.9/32	1.2813	8.1/2	14.1/8	4	1	020118	—
1.19/64	1.2969	8.5/8	14.1/4	4	1	020119	—
1.5/16	1.3125	8.5/8	14.1/4	4	1	020120	—
1.21/64	1.3281	8.3/4	14.3/8	4	1	020121	—
1.11/32	1.3437	8.3/4	14.3/8	4	1	020122	—

TAPER SHANK DRILL



d_1 Ø	d_1 decimal	l_2	l_1	MTS	Pack Qty	209	S209
Inch	Inch	Inch	Inch				
1.3/8	1.3750	8.7/8	14.1/2	4	1	020124	—
1.13/32	1.4063	9"	14.5/8	4	1	020126	—
1.27/64	1.4219	9.1/8	14.3/4	4	1	020127	—
1.7/16	1.4375	9.1/8	14.3/4	4	1	020128	—
1.15/32	1.4687	9.1/4	14.7/8	4	1	020130	—
1.31/64	1.4844	9.3/8	15"	4	1	020131	—
1.1/2	1.5000	9.3/8	15"	4	1	020132	—
1.33/64	1.5156	9.3/8	15"	4	1	—	023133
1.17/32	1.5313	9.3/8	15"	4	1	—	023134
1.17/32	1.5313	9.3/8	16.3/8	5	1	020134	—
1.35/64	1.5469	9.5/8	15.1/4	4	1	—	023135
1.9/16	1.5625	9.5/8	15.1/4	4	1	—	023136
1.9/16	1.5625	9.5/8	16.5/8	5	1	020136	—
1.19/32	1.5937	9.7/8	15.1/2	4	1	—	023138
1.39/64	1.6094	10"	15.5/8	4	1	—	023139
1.5/8	1.6250	10"	15.5/8	4	1	—	023140
1.5/8	1.6250	10"	17"	5	1	020140	—
1.21/32	1.6563	10.1/8	15.3/4	4	1	—	023142
1.11/16	1.6875	10.1/8	15.3/4	4	1	—	023144
1.11/16	1.6875	10.1/8	17.1/8	5	1	020144	—
1.47/64	1.7344	10.3/8	16.1/4	4	1	—	023147
1.3/4	1.7500	10.1/8	17.1/8	5	1	020148	—
1.3/4	1.7500	10.3/8	16.1/4	4	1	—	023148
1.25/32	1.7813	10.3/8	16.1/4	4	1	—	023150
1.13/16	1.8125	10.1/8	17.1/8	5	1	020152	—
1.13/16	1.8125	10.3/8	16.1/4	4	1	—	023152
1.7/8	1.8750	10.1/2	16.1/2	4	1	—	023156
1.7/8	1.8750	10.3/8	17.3/8	5	1	020156	—
1.15/16	1.9375	10.3/8	17.3/8	5	1	020160	—
1.15/16	1.9375	10.5/8	16.5/8	4	1	—	023160
1.31/32	1.9687	10.5/8	16.5/8	4	1	—	023162
2"	2.0000	10.3/8	17.3/8	5	1	020200	—
2"	2.0000	10.5/8	16.5/8	4	1	—	023200