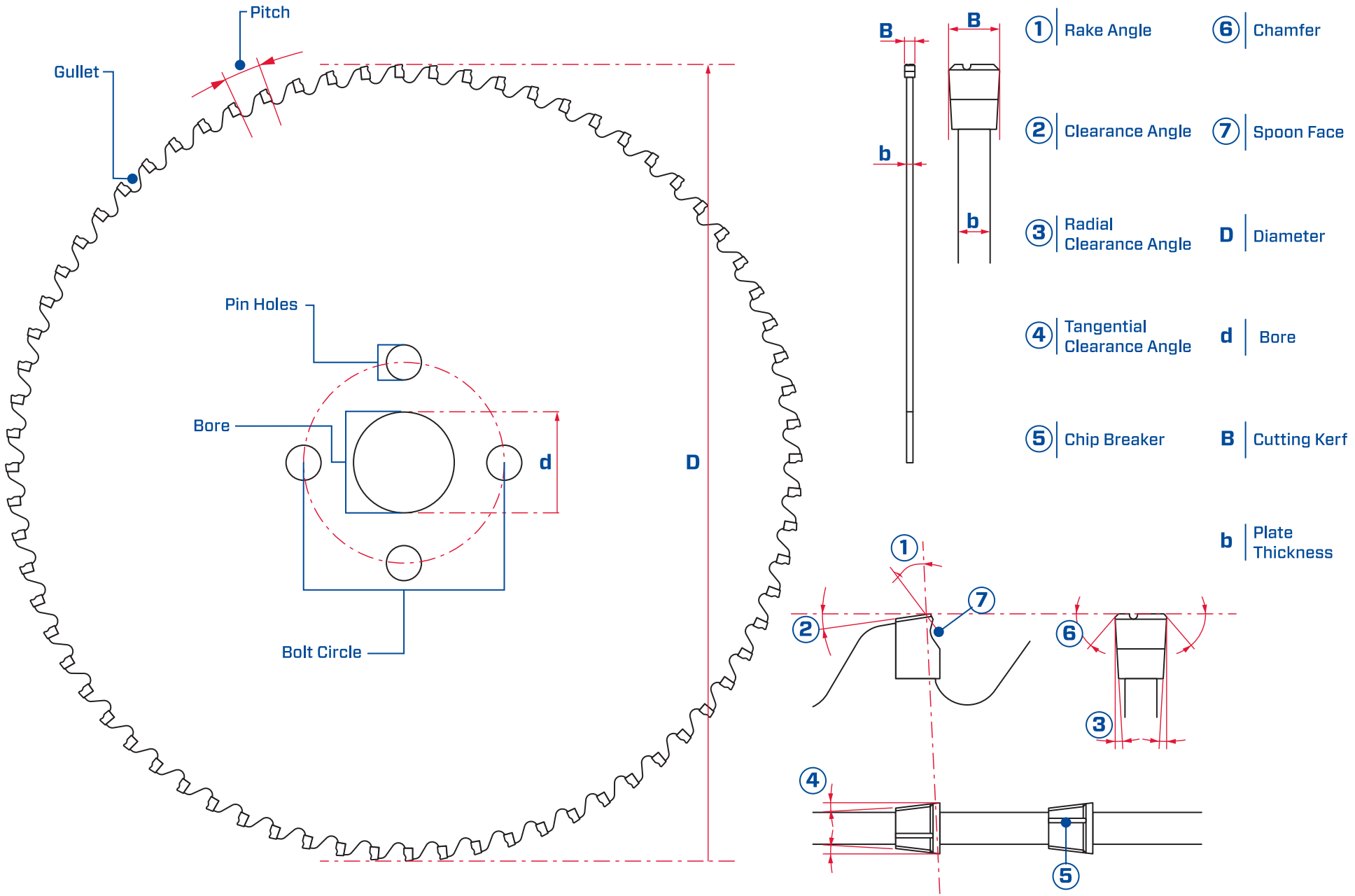
LENOX®

The Ultimate Performance in Precision Circular Sawing

PRECISION CM100

Technical Guide


Pitch
Gullet
Pin Holes
Bore
Bolt Circle
d
D
B
B
b
b
1 Rake Angle
2 Clearance Angle
3 Radial Clearance Angle
4 Tangential Clearance Angle
5 Chip Breaker
6 Chamfer
7 Spoon Face
D Diameter
d Bore
B Cutting Kerf
b Plate Thickness

Steel Cutting Size Chart

Blade Dia.	Teeth	Material Diameter in inches: 0	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7	4.9	5.1	5.3	5.5	5.7	5.9	6.1	6.3	6.5	6.7	6.9	7.1	7.3	7.5	7.7	7.9
		Material Diameter in mm: 0	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200
250	60																																							
250	72																																							
250	80																																							
250	100																																							
285	60																																							
285	72																																							
285	80																																							
285	100																																							
315	60																																							
315	80																																							
360	60																																							
360	80																																							
360	100																																							
420	60																																							
420	80																																							
460	60																																							
460	80																																							
460	100																																							

Optimal operation range

Non optimal operating range, but OK

Theoretical physical limitation of machine

Not recommended for this tooth count

PRECISION CM100

Feed Rates Based on Steel and Blade Size

Material (SAE Grade)	Cut Speed (m/min)	Chip Load (mm/tooth)	Feed Rate (mm/s)																						
			250				285				315		360			420		460				560			580	
			60T	72T	80T	100T	60T	72T	80T	100T	60T	80T	60T	80T	100T	60T	80T	40T	60T	80T	100T	40T	60T	80T	60T	80T
Stainless Steel - Austenitic Chromium-Nickel-Manganese																										
201	50	0.05	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	2.9	3.7	1.9	2.5	1.2	1.8	2.3	2.9	0.9	1.4	1.9	1.4	1.8
Stainless Steel - Austenitic Chromium-Nickel																										
302	50	0.05	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	2.9	3.7	1.9	2.5	1.2	1.8	2.3	2.9	0.9	1.4	1.9	1.4	1.8
303Se	50	0.055	3.5	4.2	4.7	5.9	3.1	3.7	4.1	5.1	2.8	3.7	2.4	3.2	4.0	2.1	2.8	1.3	1.9	2.6	3.2	1.0	1.5	2.1	1.5	2.0
304	50	0.05	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	2.9	3.7	1.9	2.5	1.2	1.8	2.3	2.9	0.9	1.4	1.9	1.4	1.8
304L	50	0.055	3.5	4.2	4.7	5.9	3.1	3.7	4.1	5.1	2.8	3.7	2.4	3.2	4.0	2.1	2.8	1.3	1.9	2.6	3.2	1.0	1.5	2.1	1.5	2.0
316	50	0.05	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	2.9	3.7	1.9	2.5	1.2	1.8	2.3	2.9	0.9	1.4	1.9	1.4	1.8
Stainless Steel - Ferritic and Martensitic Chromium																										
403	63	0.040	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	3.0	3.7	1.9	2.6	1.2	1.8	2.3	2.9	1.0	1.4	1.9	1.4	1.9
416	63	0.040	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	3.0	3.7	1.9	2.6	1.2	1.8	2.3	2.9	1.0	1.4	1.9	1.4	1.9
416Se	63	0.050	4.0	4.8	5.3	6.7	3.5	4.2	4.7	5.8	3.2	4.3	2.8	3.7	4.7	2.4	3.2	1.5	2.2	2.9	3.7	1.2	1.8	2.4	1.8	2.3
420	63	0.040	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	3.0	3.7	1.9	2.6	1.2	1.8	2.3	2.9	1.0	1.4	1.9	1.4	1.9
440A	60	0.030	2.3	2.7	3.0	3.8	2.0	2.4	2.7	3.4	1.8	2.4	1.6	2.1	2.7	1.4	1.8	0.8	1.3	1.7	2.1	0.7	1.0	1.4	1.0	1.3
Plain Carbon Steel																										
1005	135	0.07	12.0	14.4	16.1	20.1	10.6	12.7	14.1	17.6	9.5	12.7	8.3	11.1	13.9	7.1	9.5	4.3	6.5	8.7	10.9	3.6	5.4	7.2	5.2	6.9
1010	130	0.07	11.6	13.9	15.5	19.4	10.2	12.2	13.5	16.9	9.2	12.2	8.1	10.7	13.4	6.9	9.2	4.2	6.3	8.4	10.5	3.5	5.2	6.9	5.0	6.6
1018	120	0.06	9.2	11.0	12.2	15.3	8.0	9.6	10.7	13.4	7.3	9.7	6.4	8.5	10.6	5.5	7.3	3.3	5.0	6.6	8.3	2.7	4.1	5.4	4.0	5.3
1020	120	0.06	9.2	11.0	12.2	15.3	8.0	9.6	10.7	13.4	7.3	9.7	6.4	8.5	10.6	5.5	7.3	3.3	5.0	6.6	8.3	2.7	4.1	5.4	4.0	5.3
1030	118	0.07	10.5	12.6	14.0	17.5	9.2	11.1	12.3	15.4	8.3	11.1	7.3	9.7	12.1	6.2	8.3	3.8	5.7	7.7	9.6	3.1	4.7	6.3	4.6	6.1
1035	108	0.07	9.7	11.6	12.9	16.1	8.5	10.2	11.3	14.1	7.6	10.2	6.7	8.9	11.1	5.7	7.7	3.5	5.3	7.0	8.8	2.8	4.3	5.7	4.1	5.5
1040	102	0.07	9.1	10.9	12.1	15.2	8.0	9.6	10.6	13.3	7.2	9.6	6.3	8.4	10.5	5.4	7.2	3.3	5.0	6.6	8.3	2.7	4.1	5.4	3.9	5.2
1050	90	0.07	8.1	9.7	10.7	13.4	7.1	8.5	9.4	11.8	6.4	8.5	5.6	7.5	9.3	4.8	6.3	2.9	4.3	5.8	7.2	2.4	3.6	4.8	3.4	4.6
1070	82	0.07	7.3	8.7	9.7	12.1	6.4	7.7	8.6	10.7	5.8	7.7	5.1	6.8	8.5	4.3	5.8	2.7	4.0	5.3	6.7	2.2	3.3	4.4	3.2	4.2
1075	82	0.06	6.2	7.5	8.3	10.4	5.5	6.6	7.4	9.2	5.0	6.6	4.4	5.8	7.3	3.7	5.0	2.3	3.4	4.6	5.7	1.9	2.8	3.8	2.7	3.6
1085	70	0.06	5.3	6.4	7.1	8.9	4.7	5.6	6.2	7.8	4.3	5.7	3.7	5.0	6.2	3.2	4.2	1.9	2.9	3.8	4.8	1.6	2.4	3.2	2.3	3.0
1095	67	0.06	5.1	6.1	6.8	8.5	4.5	5.4	6.0	7.5	4.1	5.4	3.5	4.7	5.9	3.1	4.1	1.8	2.8	3.7	4.6	1.5	2.3	3.0	2.2	3.0
1045H	102	0.05	6.5	7.8	8.7	10.8	5.7	6.8	7.6	9.5	5.2	6.9	4.5	6.0	7.5	3.9	5.1	2.4	3.6	4.7	5.9	1.9	2.9	3.9	2.8	3.7
Resulfurized Carbon Steel																										
1117	115	0.06	8.8	10.5	11.7	14.6	7.7	9.2	10.2	12.8	7.0	9.3	6.1	8.2	10.2	5.2	7.0	3.2	4.8	6.4	8.0	2.6	3.9	5.2	3.8	5.0
1138	100	0.06	7.6	9.1	10.2	12.7	6.7	8.1	9.0	11.2	6.1	8.1	5.3	7.0	8.8	4.6	6.1	2.8	4.1	5.5	6.9	2.3	3.4	4.6	3.3	4.4
1146	95	0.06	7.3	8.7	9.7	12.1	6.4	7.6	8.5	10.6	5.8	7.7	5.0	6.7	8.4	4.3	5.8	2.6	4.0	5.3	6.6	2.2	3.2	4.3	3.1	4.2
Resulfurized and Rephosphorized Carbon Steel																										
1212	115	0.06	8.8	10.5	11.7	14.6	7.7	9.2	10.2	12.8	7.0	9.3	6.1	8.2	10.2	5.2	7.0	3.2	4.8	6.4	8.0	2.6	3.9	5.2	3.8	5.0
12L14	120	0.07	10.7	12.9	14.3	17.9	9.4	11.3	12.5	15.6	8.5	11.3	7.4	9.9	12.4	6.4	8.5	3.9	5.8	7.7	9.7	3.2	4.8	6.3	4.6	6.2
Manganese Steel																										
1330	94	0.07	8.4	10.1	11.2	14.0	7.4	8.8	9.8	12.3	6.7	8.9	5.8	7.7	9.7	5.0	6.6	3.0	4.6	6.1	7.6	2.5	3.7	4.9	3.6	4.9
1345	85	0.07	7.6	9.1	10.1	12.6	6.7	8.0	8.9	11.1	6.0	8.0	5.3	7.0	8.8	4.5	6.0	2.8	4.1	5.5	6.9	2.2	3.4	4.5	3.3	4.4

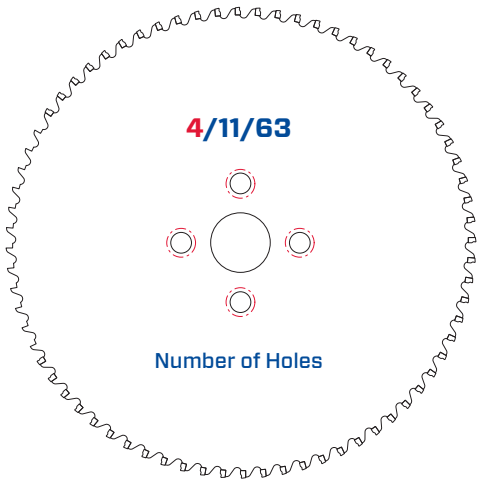
Feed Rates Based on Steel and Blade Size

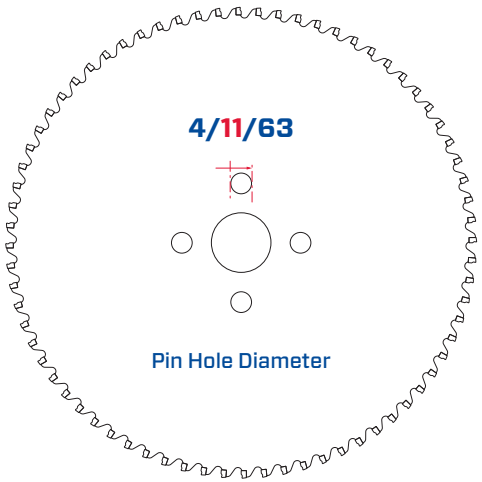
Material (SAE Grade)	Cut Speed (m/min)	Chip Load (mm/tooth)	Feed Rate (mm/s)																						
			250				285				315		360			420		460				560			580	
			60T	72T	80T	100T	60T	72T	80T	100T	60T	80T	60T	80T	100T	60T	80T	40T	60T	80T	100T	40T	60T	80T	60T	80T
Plain Carbon (Mn 1.00% to 1.65%)																										
1522	115	0.07	10.2	12.3	13.6	17.0	9.0	10.8	11.9	14.9	8.1	10.8	7.1	9.5	11.9	6.1	8.1	3.7	5.6	7.5	9.3	3.0	4.6	6.1	4.4	5.9
1524	112	0.07	10.0	12.0	13.3	16.7	8.8	10.5	11.7	14.6	7.9	10.5	6.9	9.2	11.6	6.0	7.9	3.6	5.5	7.3	9.1	3.0	4.5	6.0	4.3	5.7
1536	103	0.07	9.2	11.0	12.2	15.3	8.1	9.7	10.7	13.4	7.3	9.7	6.4	8.5	10.6	5.5	7.3	3.3	5.0	6.6	8.3	2.8	4.1	5.5	4.0	5.3
1547	89	0.07	7.9	9.5	10.5	13.2	6.9	8.3	9.2	11.6	6.3	8.4	5.5	7.4	9.2	4.7	6.3	2.9	4.3	5.8	7.2	2.4	3.6	4.8	3.4	4.6
1566	85	0.07	7.6	9.1	10.1	12.6	6.7	8.0	8.9	11.1	6.0	8.0	5.3	7.0	8.8	4.5	6.0	2.8	4.1	5.5	6.9	2.2	3.4	4.5	3.3	4.4
1522H	115	0.05	7.3	8.8	9.7	12.2	6.4	7.7	8.5	10.7	5.8	7.7	5.1	6.8	8.5	4.4	5.8	2.7	4.0	5.3	6.7	2.2	3.3	4.3	3.2	4.2
1524H	112	0.05	7.2	8.6	9.5	11.9	6.3	7.5	8.3	10.4	5.7	7.5	5.0	6.6	8.3	4.3	5.7	2.6	3.9	5.2	6.5	2.1	3.2	4.3	3.1	4.1
1526H	112	0.05	7.2	8.6	9.5	11.9	6.3	7.5	8.3	10.4	5.7	7.5	5.0	6.6	8.3	4.3	5.7	2.6	3.9	5.2	6.5	2.1	3.2	4.3	3.1	4.1
1541H	94	0.05	6.0	7.2	8.0	10.0	5.3	6.3	7.0	8.8	4.8	6.3	4.2	5.5	6.9	3.6	4.7	2.2	3.3	4.3	5.4	1.8	2.7	3.5	2.6	3.5
Molybdenum Steel																										
4027	112	0.07	10.0	12.0	13.3	16.7	8.8	10.5	11.7	14.6	7.9	10.5	6.9	9.2	11.6	6.0	7.9	3.6	5.5	7.3	9.1	3.0	4.5	6.0	4.3	5.7
4037	103	0.07	9.2	11.0	12.2	15.3	8.1	9.7	10.7	13.4	7.3	9.7	6.4	8.5	10.6	5.5	7.3	3.3	5.0	6.6	8.3	2.8	4.1	5.5	4.0	5.3
4047	98	0.07	8.8	10.5	11.7	14.6	7.6	9.2	10.2	12.7	6.9	9.2	6.1	8.1	10.2	5.2	6.9	3.2	4.8	6.3	7.9	2.6	3.9	5.2	3.8	5.0
4027H	112	0.05	7.2	8.6	9.5	11.9	6.3	7.5	8.3	10.4	5.7	7.5	5.0	6.6	8.3	4.3	5.7	2.6	3.9	5.2	6.5	2.1	3.2	4.3	3.1	4.1
4037H	103	0.05	6.6	7.9	8.7	10.9	5.8	6.9	7.7	9.6	5.2	6.9	4.6	6.1	7.6	3.9	5.2	2.4	3.6	4.7	5.9	2.0	3.0	3.9	2.9	3.8
4047H	98	0.05	6.3	7.5	8.3	10.4	5.5	6.5	7.3	9.1	5.0	6.6	4.4	5.8	7.3	3.7	4.9	2.3	3.4	4.5	5.7	1.9	2.8	3.7	2.7	3.6
Chromium-Molybdenum (Chromoly) Steel																										
4118	116	0.07	10.4	12.4	13.8	17.3	9.1	10.9	12.1	15.2	8.2	10.9	7.2	9.6	12.0	6.2	8.2	3.7	5.6	7.5	9.3	3.1	4.6	6.2	4.5	6.0
4120	100	0.07	8.9	10.7	11.9	14.8	7.8	9.4	10.5	13.1	7.1	9.4	6.2	8.2	10.3	5.3	7.1	3.2	4.8	6.4	8.1	2.7	4.0	5.3	3.9	5.1
4130	100	0.07	8.9	10.7	11.9	14.8	7.8	9.4	10.5	13.1	7.1	9.4	6.2	8.2	10.3	5.3	7.1	3.2	4.8	6.4	8.1	2.7	4.0	5.3	3.9	5.1
4135	95	0.07	8.5	10.2	11.3	14.1	7.4	8.9	9.9	12.4	6.7	9.0	5.9	7.8	9.8	5.0	6.7	3.1	4.6	6.2	7.7	2.5	3.8	5.0	3.6	4.9
4140	90	0.06	6.9	8.3	9.2	11.5	6.1	7.3	8.1	10.1	5.5	7.3	4.8	6.4	8.0	4.1	5.4	2.5	3.7	5.0	6.2	2.0	3.1	4.1	2.9	3.9
4150	80	0.05	5.1	6.1	6.8	8.5	4.5	5.3	5.9	7.4	4.1	5.4	3.6	4.7	5.9	3.1	4.1	1.8	2.8	3.7	4.6	1.5	2.3	3.0	2.2	2.9
4118H	116	0.05	7.4	8.9	9.9	12.3	6.5	7.8	8.7	10.8	5.9	7.8	5.2	6.9	8.6	4.4	5.9	2.7	4.0	5.3	6.7	2.2	3.3	4.4	3.2	4.3
4120H	100	0.05	6.4	7.6	8.5	10.6	5.6	6.7	7.5	9.3	5.1	6.7	4.4	5.9	7.3	3.8	5.1	2.3	3.5	4.6	5.8	1.9	2.9	3.8	2.8	3.7
4130H	100	0.05	6.4	7.6	8.5	10.6	5.6	6.7	7.5	9.3	5.1	6.7	4.4	5.9	7.3	3.8	5.1	2.3	3.5	4.6	5.8	1.9	2.9	3.8	2.8	3.7
4135H	95	0.05	6.1	7.3	8.1	10.1	5.3	6.4	7.1	8.8	4.8	6.4	4.2	5.6	7.0	3.6	4.8	2.2	3.3	4.4	5.5	1.8	2.7	3.6	2.6	3.5
4140H	90	0.04	4.6	5.5	6.1	7.7	4.0	4.8	5.4	6.7	3.6	4.9	3.2	4.3	5.3	2.7	3.6	1.7	2.5	3.3	4.1	1.4	2.0	2.7	2.0	2.6
4150H	80	0.035	3.6	4.3	4.8	6.0	3.1	3.7	4.2	5.2	2.8	3.8	2.5	3.3	4.1	2.1	2.8	1.3	1.9	2.6	3.2	1.1	1.6	2.1	1.5	2.1
Nickel-Chromium-Molybdenum Steel																										
4340	80	0.07	7.1	8.6	9.5	11.9	6.2	7.5	8.3	10.4	5.7	7.6	5.0	6.6	8.3	4.3	5.7	2.6	3.9	5.1	6.4	2.1	3.2	4.2	3.1	4.1
4340H	80	0.05	5.1	6.1	6.8	8.5	4.5	5.3	5.9	7.4	4.1	5.4	3.6	4.7	5.9	3.1	4.1	1.8	2.8	3.7	4.6	1.5	2.3	3.0	2.2	2.9
8620	95	0.07	8.5	10.2	11.3	14.1	7.4	8.9	9.9	12.4	6.7	9.0	5.9	7.8	9.8	5.0	6.7	3.1	4.6	6.2	7.7	2.5	3.8	5.0	3.6	4.9
8625	92	0.07	8.2	9.8	10.9	13.7	7.2	8.7	9.6	12.0	6.5	8.7	5.7	7.6	9.5	4.9	6.5	3.0	4.5	6.0	7.5	2.4	3.6	4.9	3.5	4.7
8630	92	0.07	8.2	9.8	10.9	13.7	7.2	8.7	9.6	12.0	6.5	8.7	5.7	7.6	9.5	4.9	6.5	3.0	4.5	6.0	7.5	2.4	3.6	4.9	3.5	4.7
8640	80	0.07	7.1	8.6	9.5	11.9	6.2	7.5	8.3	10.4	5.7	7.6	5.0	6.6	8.3	4.3	5.7	2.6	3.9	5.1	6.4	2.1	3.2	4.2	3.1	4.1
8645	76	0.07	6.8	8.1	9.1	11.3	6.0	7.1	7.9	9.9	5.4	7.2	4.7	6.3	7.8	4.1	5.4	2.5	3.7	4.9	6.2	2.0	3.0	4.0	2.9	3.9
8655	72	0.07	6.4	7.7	8.6	10.7	5.6	6.7	7.5	9.3	5.1	6.8	4.5	6.0	7.5	3.9	5.1	2.3	3.5	4.7	5.8	1.9	2.9	3.8	2.8	3.7
8620H	95	0.05	6.1	7.3	8.1	10.1	5.3	6.4	7.1	8.8	4.8	6.4	4.2	5.6	7.0	3.6	4.8	2.2	3.3	4.4	5.5	1.8	2.7	3.6	2.6	3.5
8625H	92	0.05	5.9	7.0	7.8	9.8	5.2	6.2	6.9	8.6	4.7	6.2	4.1	5.4	6.8	3.5	4.7	2.1	3.2	4.3	5.3	1.7	2.6	3.5	2.5	3.3
8630H	92	0.05	5.9	7.0	7.8	9.8	5.2	6.2	6.9	8.6	4.7	6.2	4.1	5.4	6.8	3.5	4.7	2.1	3.2	4.3	5.3	1.7	2.6	3.5	2.5	3.3
8640H	80	0.05	5.1	6.1	6.8	8.5	4.5	5.3	5.9	7.4	4.1	5.4	3.6	4.7	5.9	3.1	4.1	1.8	2.8	3.7	4.6	1.5	2.3	3.0	2.2	2.9
8645H	76	0.05	4.9	5.8	6.5	8.1	4.3	5.1	5.7	7.1	3.9	5.1	3.4	4.5	5.6	2.9	3.9	1.8	2.7	3.5	4.4	1.4	2.2	2.9	2.1	2.8
8655H	72	0.05	4.6	5.5	6.1	7.7	4.0	4.8	5.3	6.7	3.7	4.9	3.2	4.3	5.3	2.8	3.7	1.7	2.5	3.3	4.2	1.4	2.1	2.7	2.0	2.7

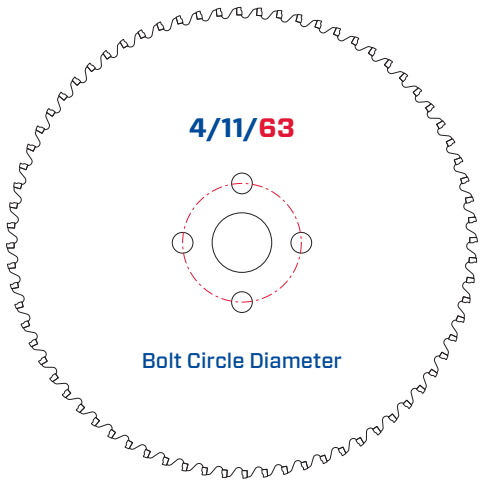
Feed Rates Based on Steel and Blade Size

Material (SAE Grade)	Cut Speed (m/min)	Chip Load (mm/tooth)	Feed Rate (mm/s)																						
			250				285				315		360			420		460				560			580	
			60T	72T	80T	100T	60T	72T	80T	100T	60T	80T	60T	80T	100T	60T	80T	40T	60T	80T	100T	40T	60T	80T	60T	80T
Chromium Steel																										
5120	115	0.07	10.2	12.3	13.6	17.0	9.0	10.8	11.9	14.9	8.1	10.8	7.1	9.5	11.9	6.1	8.1	3.7	5.6	7.5	9.3	3.0	4.6	6.1	4.4	5.9
5130	100	0.07	8.9	10.7	11.9	14.8	7.8	9.4	10.5	13.1	7.1	9.4	6.2	8.2	10.3	5.3	7.1	3.2	4.8	6.4	8.1	2.7	4.0	5.3	3.9	5.1
5140	80	0.07	7.1	8.6	9.5	11.9	6.2	7.5	8.3	10.4	5.7	7.6	5.0	6.6	8.3	4.3	5.7	2.6	3.9	5.1	6.4	2.1	3.2	4.2	3.1	4.1
5150	80	0.07	7.1	8.6	9.5	11.9	6.2	7.5	8.3	10.4	5.7	7.6	5.0	6.6	8.3	4.3	5.7	2.6	3.9	5.1	6.4	2.1	3.2	4.2	3.1	4.1
5160	78	0.07	6.9	8.3	9.2	11.6	6.1	7.3	8.1	10.2	5.5	7.4	4.8	6.4	8.1	4.1	5.5	2.5	3.8	5.0	6.3	2.1	3.1	4.1	3.0	4.0
5120H	115	0.05	7.3	8.8	9.7	12.2	6.4	7.7	8.5	10.7	5.8	7.7	5.1	6.8	8.5	4.4	5.8	2.7	4.0	5.3	6.7	2.2	3.3	4.3	3.2	4.2
5130H	100	0.05	6.4	7.6	8.5	10.6	5.6	6.7	7.5	9.3	5.1	6.7	4.4	5.9	7.3	3.8	5.1	2.3	3.5	4.6	5.8	1.9	2.9	3.8	2.8	3.7
5140H	80	0.05	5.1	6.1	6.8	8.5	4.5	5.3	5.9	7.4	4.1	5.4	3.6	4.7	5.9	3.1	4.1	1.8	2.8	3.7	4.6	1.5	2.3	3.0	2.2	2.9
5150H	80	0.05	5.1	6.1	6.8	8.5	4.5	5.3	5.9	7.4	4.1	5.4	3.6	4.7	5.9	3.1	4.1	1.8	2.8	3.7	4.6	1.5	2.3	3.0	2.2	2.9
5155H	78	0.05	5.0	5.9	6.6	8.3	4.4	5.2	5.8	7.3	4.0	5.3	3.5	4.6	5.8	3.0	3.9	1.8	2.7	3.6	4.5	1.5	2.2	2.9	2.2	2.9
5160H	78	0.05	5.0	5.9	6.6	8.3	4.4	5.2	5.8	7.3	4.0	5.3	3.5	4.6	5.8	3.0	3.9	1.8	2.7	3.6	4.5	1.5	2.2	2.9	2.2	2.9
52100	80	0.07	7.1	8.6	9.5	11.9	6.2	7.5	8.3	10.4	5.7	7.6	5.0	6.6	8.3	4.3	5.7	2.6	3.9	5.1	6.4	2.1	3.2	4.2	3.1	4.1
Chromium-Vanadium Steel																										
6150	60	0.04	3.0	3.6	4.1	5.1	2.7	3.2	3.6	4.5	2.4	3.3	2.1	2.8	3.5	1.8	2.4	1.1	1.7	2.2	2.8	0.9	1.4	1.8	1.3	1.8
6150H	89	0.05	5.7	6.8	7.5	9.4	5.0	5.9	6.6	8.3	4.5	6.0	4.0	5.3	6.6	3.4	4.5	2.1	3.1	4.1	5.2	1.7	2.6	3.4	2.5	3.3
Air-Hardening Tool Steel																										
A2	60	0.030	2.3	2.7	3.0	3.8	2.0	2.4	2.7	3.4	1.8	2.4	1.6	2.1	2.7	1.4	1.8	0.8	1.3	1.7	2.1	0.7	1.0	1.4	1.0	1.3
Chromium Tool Steel																										
D2	60	0.030	2.3	2.7	3.0	3.8	2.0	2.4	2.7	3.4	1.8	2.4	1.6	2.1	2.7	1.4	1.8	0.8	1.3	1.7	2.1	0.7	1.0	1.4	1.0	1.3
Hot Working Tool Steels																										
H11	63	0.04	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	3.0	3.7	1.9	2.6	1.2	1.8	2.3	2.9	1.0	1.4	1.9	1.4	1.9
H12	63	0.04	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	3.0	3.7	1.9	2.6	1.2	1.8	2.3	2.9	1.0	1.4	1.9	1.4	1.9
H13	63	0.03	2.4	2.9	3.2	4.0	2.1	2.5	2.8	3.5	1.9	2.6	1.7	2.2	2.8	1.4	1.9	0.9	1.3	1.8	2.2	0.7	1.1	1.4	1.1	1.4
High Speed Tool Steel (Molybdenum)																										
M1	45	0.03	1.7	2.1	2.3	2.9	1.5	1.8	2.0	2.5	1.4	1.8	1.2	1.6	2.0	1.0	1.4	0.6	0.9	1.2	1.6	0.5	0.8	1.0	0.8	1.0
M2	60	0.03	2.3	2.7	3.0	3.8	2.0	2.4	2.7	3.4	1.8	2.4	1.6	2.1	2.7	1.4	1.8	0.8	1.3	1.7	2.1	0.7	1.0	1.4	1.0	1.3
M3-1	45	0.03	1.7	2.1	2.3	2.9	1.5	1.8	2.0	2.5	1.4	1.8	1.2	1.6	2.0	1.0	1.4	0.6	0.9	1.2	1.6	0.5	0.8	1.0	0.8	1.0
M3-2	45	0.03	1.7	2.1	2.3	2.9	1.5	1.8	2.0	2.5	1.4	1.8	1.2	1.6	2.0	1.0	1.4	0.6	0.9	1.2	1.6	0.5	0.8	1.0	0.8	1.0
M4	45	0.03	1.7	2.1	2.3	2.9	1.5	1.8	2.0	2.5	1.4	1.8	1.2	1.6	2.0	1.0	1.4	0.6	0.9	1.2	1.6	0.5	0.8	1.0	0.8	1.0
High Speed Tool Steel (Tungsten)																										
T1	63	0.04	3.2	3.8	4.3	5.3	2.8	3.4	3.7	4.7	2.6	3.4	2.2	3.0	3.7	1.9	2.6	1.2	1.8	2.3	2.9	1.0	1.4	1.9	1.4	1.9
Shock Tesisting Tool Steel																										
S-2	60	0.03	2.3	2.7	3.0	3.8	2.0	2.4	2.7	3.4	1.8	2.4	1.6	2.1	2.7	1.4	1.8	0.8	1.3	1.7	2.1	0.7	1.0	1.4	1.0	1.3

PINHOLE CONFIGURATION







Measuring the Bolt Circle

1. Using calipers, measure diameter of pinhole (value A)
2. Using calipers, measure outside edge to outside edge of opposing pinholes (value B)
3. Subtract value A from value B
(this will give you an accurate center to center measurement of opposing pinholes (bolt circle)

TROUBLESHOOTING

Excessive Flank Wear - Tool Life Too Short	Reduce cutting speed
	Reduce cutting speed and increase feed rate if production is needed
	For work hardenable materials - increase feed rate
	Increase lubrication
Excessive Edge Chipping	Increase speed
	Reduce feed rate
	Reduce coolant flow (Thermal shock may be an issue if flood)
	Tooth pitch too coarse
Excessive Vibration / Noise	Increase feed rate
	Reduce speed
	Increase lubrication
Chip Welding or Built Up Edge (BUE)	Increase speed
	Switch to a coated product
	Use coolant with greater lubrication (Higher EP additives)
	Increase lubrication quantity
	Change coolant delivery method (Mist)
	Evaluate chip brush
	Engage chip brush deeper into gullets
Crooked Cutting	Tooth pitch too fine - Choose coarser tooth pitch
	Reduce feed rate
	Evaluate machine components (ex: guides)
Tooth Strippage	Reduce feed rate
	Reduce speed
	Built up edge, see above
	Use coolant with greater lubrication (Higher EP additives)
	Pitch too coarse

Gullet Packing With Chips	Evaluate and engage chip brush
	Use coolant with greater lubrication (Higher EP additives)
	Reduce feed rate
	Coarser pitch or a pitch with greater gullet capacity
Wavy Cutting	Increase feed rate
Poor Cut Finish	Reduce feed rate
	Increase speed
	Finer tooth count
	Replace blade
	Evaluate and engage chip brush
	Increase lubrication
Heavy Burr	Reduce feed rate
	Increase speed
	Inspect machine components (chip breaker)
	Replace blade
Chips Are Too Hot (Glow)	Reduce feed rate
	Reduce speed
	Increase lubrication

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