



# FEEDS & SPEEDS CHART FOR DRILLS, REAMERS, MILLS & SAWS (CARBIDE TIPPED)

$$\text{RPM} = \text{SFPM} \times 3.82 / \text{CUTTER DIAM.}$$

$$\text{IPM} = \text{IPT} \times \text{RPM} \times \# \text{ TEETH}$$

Feeds & speeds are a starting recommendation only. Factors such as machine, fixture and tooling rigidity, horsepower available, coolant application and others will affect the performance significantly. Please read machine operators instructions and use all safety shields and glasses before performing these operations.  
(\*Half and full side mills & face mill cutters.) **Rev.030801**

CLASS OF MATERIAL	MATERIAL	APPLICATION			SPEED IN SFPM		FEED RATE (INCHES PER REVOLUTION)								HOLE DIAMETER IN INCHES												
		BRINELL	*MILLING SFPM/IPT	SAWS SFPM/IPT	HOLE MAKING	GENERAL PURPOSE	COOLANT FED	1/8		1/4		3/8		1/2		5/8		3/4		1		1 1/4		1 1/2			
						G.P.	C.F.	G.P.	C.F.	G.P.	C.F.	G.P.	C.F.	G.P.	C.F.	G.P.	C.F.	G.P.	C.F.	G.P.	C.F.	G.P.	C.F.	G.P.	C.F.	G.P.	C.F.
NON-FERROUS (SOFT)	ALUMINUM ALLOY - WROUGHT	30-150 (500kg)	3000-6000	2000-6000	DRILL	250-350	375-550	.003	-	.005	.004	.007	.005	.008	.006	.010	.006	.011	.007	.014	.009	.017	-	.019	-		
			.008-.020	.003-.006	REAM	150-250	200-300	.004	-	.006	.008	.008	.010	.013	.012	.015	.012	.015	.013	.017	.016	.021	.019	.022	.020	.024	
	MAGNESIUM ALLOY	50-90	3000-5000	3000-5000	DRILL	300-400	450-550	.003	-	.005	.005	.006	.006	.007	.007	.008	.008	.009	.009	.009	.009	.013	.013	.015	-	.016	-
			.006-.018	.003-.004	REAM	130-190	150-250	.005	-	.010	.012	.012	.015	.015	.018	.016	.019	.017	.020	.020	.024	.022	.026	.025	.028		
	LEAD ALLOY	10-20	300-2700	300-2500	DRILL	350-450	400-500	.003	-	.005	.004	.006	.006	.007	.007	.008	.008	.009	.009	.013	.013	.015	-	.017	-		
		.008-.012	.003-.004	REAM	150-250	200-300	.002	-	.006	.008	.008	.010	.012	.016	.014	.017	.015	.018	.018	.022	.021	.024	.022	.026			
	NON-METAL AND PLASTIC	-	3500-6500	3000-6000	DRILL	175-450	-	.002	-	.004	-	.005	-	.005	-	.006	-	.008	-	.009	-	.010	-	.012	-		
			.008-.025	.003-.006	REAM	90-250	125-300	.004	-	.005	.006	.007	.008	.009	.009	.010	.012	.014	.014	.016	.016	.018	.018	.020			
	ZINC ALLOY - DIE CAST	80-100	2500-6000	2500-6000	DRILL	300-400	400-500	.003	-	.005	.004	.007	.005	.009	.006	.011	.008	.012	.009	.014	.010	.016	-	.018	-		
			.008-.025	.003-.005	REAM	140-210	170-240	.005	-	.007	.009	.008	.011	.010	.013	.011	.014	.012	.016	.015	.020	.018	.022	.020	.025		
NON-FERROUS (HARD)	ALUMINUM BRONZE	40-175	300-2700	200-2500	DRILL	125-190	200-300	.002	-	.005	.004	.007	.005	.008	.006	.009	.007	.010	.008	.012	.010	.014	-	.016	-		
			.008-.012	.003-.004	REAM	50-90	70-105	.004	-	.006	.008	.010	.013	.012	.015	.014	.016	.016	.018	.018	.021	.020	.024	.022	.028		
	BRASS ALLOY - LEADED AND FREE CUTTING	10-100Rb	450-3000	500-3000	DRILL	225-400	300-450	.003	-	.005	.004	.007	.005	.008	.006	.009	.007	.010	.008	.012	.010	.014	-	.016	-		
			.008-.012	.003-.004	REAM	100-250	125-300	.005	-	.008	.010	.011	.014	.015	.020	.017	.022	.018	.024	.020	.026	.022	.028	.025	.032		
	NICKEL SILVER	10-100Rb	350-1500	300-1200	DRILL	125-190	225-300	.002	-	.005	.004	.007	.005	.008	.006	.009	.007	.010	.008	.012	.010	.014	-	.016	-		
		.006-.010	.003-.004	REAM	50-90	70-190	.004	-	.006	.007	.008	.010	.010	.012	.011	.013	.012	.014	.014	.017	.015	.018	.016	.018			
	COPPER ALLOY - TOUGH	40-200	300-1200	300-1000	DRILL	125-190	225-300	.002	-	.005	.004	.007	.005	.008	.006	.009	.007	.010	.008	.012	.010	.014	-	.016	-		
			.006-.010	.003-.004	REAM	50-90	70-105	.005	-	.006	.008	.008	.010	.010	.013	.011	.014	.012	.016	.014	.018	.016	.019	.017	.020		
CAST IRON	DUCTILE CAST IRON - AUSTENITIC	120-275	275-1200	250-1100	DRILL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
			.008-.015	.003-.004	REAM	45-70	65-100	.004	-	.006	.008	.007	.009	.008	.011	.010	.014	.013	.016	.015	.018	.018	.020	.020	.025		
	DUCTILE CAST IRON - FERRITIC	140-270	275-900	225-850	DRILL	150-225	200-250	.002	-	.004	.004	.006	.005	.008	.006	.010	.007	.012	.008	.014	.010	.016	-	.018	-		
			.006-.012	.003-.004	REAM	50-90	70-105	.004	-	.005	.007	.008	.010	.010	.012	.012	.015	.014	.017	.017	.022	.020	.024	.023	.027		
	DUCTILE CAST IRON - MARTENSITIC	270-400	225-600	175-450	DRILL	-	200-250	-	-	-	.004	-	.005	-	.006	-	.007	-	.008	-	.010	-	-	-	-		
			.005-.010	.002-.004	REAM	35-60	50-85	.004	-	.006	.008	.007	.009	.008	.010	.009	.011	.010	.013	.012	.014	.014	.017	.016	.019		
	GRAY - PEARLITIC	220-320	225-750	225-450	DRILL	130-225	225-325	.002	-	.004	.004	.006	.006	.007	.008	.009	.010	.010	.012	.013	.015	.016	-	.018	-		
		.004-.010	.003-.004	REAM	45-70	55-100	.004	-	.006	.008	.008	.010	.009	.012	.010	.014	.012	.015	.014	.018	.018	.020	.020	.026			
	GRAY - FERRITIC	110-240	250-750	200-600	DRILL	125-190	200-250	.002	-	.005	.004	.008	.006	.009	.008	.010	.008	.011	.008	.012	.010	.014	-	.016	-		
			.005-.012	.002-.004	REAM	60-120	70-105	.004	-	.006	.007	.010	.012	.011	.014	.012	.014	.013	.014	.014	.017	.016	.020	.018	.022		
	MALLEABLE CAST IRON - MARTENSITIC	200-320	225-850	175-375	DRILL	100-150	200-250	.002	-	.004	.004	.006	.005	.007	.006	.008	.007	.010	.008	.012	.010	.014	-	.016	-		
			.005-.012	.002-.003	REAM	45-70	65-100	.004	-	.006	.008	.008	.010	.010	.012	.012	.014	.013	.015	.015	.020	.018	.023	.025	.030		
LOW CARBON STEELS	LOW AND MEDIUM CARBON STEEL - FREE MACHINING	100-250	350-1500	200-650	DRILL	125-175	150-250	.003	-	.004	.005	.008	.006	.010	.008	.012	.009	.014	.010	.017	.012	.018	-	.019	-		
			.008-.012	.002-.004	REAM	70-100	100-150	.005	-	.008	.012	.010	.014	.012	.016	.014	.018	.015	.020	.020	.025	.025	.030	.030	.035		
	LOW AND MEDIUM CARBON STEEL - WROUGHT	100-375	400-1750	200-550	DRILL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
			.008-.012	.002-.004	REAM	30-85	40-110	.004	-	.008	.009	.009	.011	.013	.013	.015	.015	.017	.018	.022	.020	.024	.022	.026			
MEDIUM STRENGTH STEELS	LOW AND MEDIUM CARBON ALLOY STEEL - FREE MACHINING	100-275	450-1800	350-1200	DRILL	-	100-220	-	-	-	.005	-	.006	-	.007	-	.008	-	.010	-	.012	-	-	-			
			.008-.012	.003-.006	REAM	65-100	90-135	.005	-	.008	.010	.010	.012	.015	.018	.017	.020	.018	.022	.022	.025	.025	.027	.027	.030		
	LOW AND MEDIUM CARBON ALLOY STEEL	85-375	325-1200	300-650	DRILL	-	100-150	-	-	-	.005	-	.006	-	.007	-	.008	-	.010	-	.012	-	-	-			
			.004-.010	.002-.004	REAM	40-85	65-100	.005	-	.010	.012	.012	.015	.015	.018	.018	.022	.020	.024	.025	.028	.027	.030	.030	.033		
	STAINLESS STEEL - 400 SERIES	135-325	300-1200	275-800	DRILL	-	110-150	-	-	-	.004	-	.005	-	.006	-	.007	-	.008	-	.010	-	-	-			
			.004-.009	.002-.005	REAM	40-90	50-100	.003	-	.005	.007	.006	.007	.007	.008	.008	.009	.008	.009	.010	.012	.011	.014	.012	.015		
	STAINLESS STEEL - 400 SERIES FREE MACHINING	135-275	350-1500	300-825	DRILL	100-150	125-190	.002	-	.004	.004	.005	.005	.006	.006	.007	.007	.008	.007	.010	.008	.012	-	.014	-		
			.005-.010	.003-.006	REAM	65-100	90-135	.004	-	.006	.008	.007	.009	.008	.010	.009	.011	.009	.012	.010	.013	.011	.013	.012	.014		
HIGH STRENGTH STEELS	HIGH STRENGTH STEEL - WROUGHT & TOOL STEEL	175-400	180-600	125-275	DRILL	-	100-150	-	-	-	.004	-	.006	-	.007	-	.008	-	.010	-	.012	-	-	-			
			.005-.012	.002-.003	REAM	35-70	50-100	.004	-	.006	.007	.008	.008	.009	.009	.011	.010	.012	.011	.014	.012	.015	.013	.016			
HIGH TEMP. ALLOYS	HIGH TEMP ALLOYS NICKEL & IRON BASE ALLOY	140-300	100-300	150-500	DRILL	-	60-115	-	-	-	.002	-	.003	-	.004	-	.005	-	.006	-	.007	-	-	-			
			.003-.007	.001-.003	REAM	15-85	20-115	.003	-	.005	.006	.005	.007	.005	.007	.006	.008	.007	.008	.008	.010	.010	.012	.012	.015		
	STAINLESS STEEL - 300 SERIES	135-375	450-1200	400-850	DRILL	-	70-105	-	-	-	.003	-	.004	-	.005	-	.006	-	.007	-	.008	-	-	-			
			.004-.010	.003-.006	REAM	40-75	60-90	.003	-	.004	.006	.005	.007	.006	.008	.006	.008	.007	.009	.008	.010	.009	.011	.010	.012		
	STAINLESS STEEL - PH SERIES	150-440	375-750	250-450</																							