



Workpiece Material (Category)	Insert Grade	Machining Parameters		
		Finishing	Medium Machining	Roughing
		Feed .002"-.012" IPR DOC .005"-.060"	Feed .010"-.020" IPR DOC .040"-.200"	Feed .015"-.035" IPR DOC .200"+
		Cutting Speed Range (SFM) (recommended starting value in bold)		
Low Carbon (<0.3% C) and Free-Machining Steel P1	AN3015	600- 1300 -1600	500- 700 -1200	-
	AN2020	600- 900 -1200	500- 750 -1000	-
	AN2025	-	500- 900 -1200	-
	AN3025	-	500- 900 -1200	300- 450 -750
	C5CVAL	-	400- 700 -1000	-
	AN6	500- 700 -1000	-	100- 200 -350
	AN2035	-	450- 730 -1000	280- 430 -600
	AN3035	-	400- 630 -950	300- 550 -850
	AN4045	-	300- 450 -600	200- 350 -500
Medium and High Carbon Steel (>0.3% C) P2	AN3015	600- 800 -1200	500- 600 -1050	-
	AN2020	600- 680 -950	500- 600 -800	-
	AN2025	-	500- 700 -1050	-
	AN3025	-	500- 700 -1050	300- 350 -850
	C5CVAL	-	400- 550 -800	-
	AN6	400- 500 -800	-	80- 150 -300
	AN2035	-	480- 600 -900	350- 400 -540
	AN3035	-	520- 680 -850	400- 500 -750
	AN4045	-	320- 380 -550	280- 300 -450
Low Alloy Steels P3	AN3015	500- 650 -800	450- 480 -750	-
	AN2020	500- 580 -730	450- 450 -650	-
	AN2025	-	450- 500 -750	-
	AN3025	-	450- 500 -750	270- 300 -500
	C5CVAL	-	350- 400 -650	-
	AN6	350- 420 -550	-	70- 130 -250
	AN2035	-	350- 420 -650	270- 320 -450
	AN3035	-	400- 500 -600	300- 400 -500
	AN4045	-	250- 300 -400	200- 250 -350
High Alloy Steels and Tool Steels P4	AN3015	300- 450 -650	250- 300 -600	-
	AN2020	300- 380 -600	250- 300 -500	-
	AN2025	-	250- 350 -600	-
	AN3025	-	250- 350 -600	150- 180 -370
	C5CVAL	-	230- 280 -500	-
	AN6	190- 220 -400	-	50- 70 -150
	AN2035	-	120- 300 -500	100- 220 -340
	AN3035	-	180- 380 -500	130- 330 -420
	AN4045	-	100- 250 -370	80- 180 -250
Chip Control	Negative Rake	P2, xNGM	P3, GM, VM, MM	P4, P5, LR, GR, XR
	Positive Rake	GF, xPGR	FM, MG, GP, HF, xCMT	-



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		Cutting Speed Range (SFM) (recommended starting value in bold)		
Austenitic Stainless Steel (200 and 300 Series) M1	AN6105	500- 670 -830	400- 630 -830	400- 540 -730
	AN6120	600- 800 -950	500- 750 -950	500- 600 -800
	AN2025	450- 550 -650	300- 500 -800	300- 400 -600
Austenitic-Ferritic Stainless Steel (Duplex) M2	AN6105	500- 650 -850	400- 600 -850	400- 500 -730
	AN6120	600- 750 -1000	500- 700 -1000	500- 550 -800
	AN2025	500- 550 -650	400- 500 -800	400- 450 -600
Ferritic, Martensitic and PH Stainless Steel (400 and 500 Series and PH) M3	AN6105	430- 570 -900	350- 500 -900	350- 400 -700
	AN6120	500- 650 -1050	400- 600 -1050	400- 500 -750
	AN2025	450- 550 -700	350- 500 -850	350- 450 -600
Chip Control	Negative Rake	SF, xNGP	SG, MM	SR, xNMP
	Positive Rake	GF	FM, GP, xCMT	-

Gray Cast Iron K1	AN7005	800- 2500 -5000	600- 2200 -5000	-
	AN8005	1000- 1500 -3500	1000- 1500 -3500	1000- 1500 -3500
	AN7020	-	500- 2700 -5000	500- 2500 -5000
	AN3005	-	500- 800 -1200	-
	AN4010	400- 900 -1500	-	-
	AN4020	-	-	400- 900 -1450
	AN2	-	150- 200 -300	-
	C2VAL	-	150- 200 -300	-
Ductile, Compacted Graphite, and Malleable Cast Irons K2	AN7005	500- 1000 -2500	500- 900 -2200	-
	AN8005	800- 1200 -3000	800- 1200 -3000	800- 1200 -3000
	AN7020	-	500- 1200 -2200	500- 1000 -2000
	AN3005	-	400- 700 -1100	-
	AN4010	450- 850 -1200	-	-
	AN4020	-	-	400- 850 -1100
	AN2	-	-	-
	C2VAL	-	-	-
Nodular Iron K3	AN7005	500- 1000 -2500	500- 900 -2200	-
	AN8005	800- 1200 -3000	800- 1200 -3000	800- 1200 -3000
	AN7020	-	500- 1200 -2200	500- 1000 -2000
	AN3005	-	-	-
	AN3010	450- 700 -1150	-	400- 650 -1100
	AN4010	350- 500 -1000	-	-
Chip Control	Negative Rake	KR, CBNs, ceramics	VM, CBNs, ceramics xxGB/W, MG, HF, xCMT, CBNs, ceramics	KR, CBNs, ceramics
	Positive Rake	GF, CBNs, ceramics		CBNs, ceramics



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		Cutting Speed Range (SFM) (recommended starting value in bold)		
Free Machining Non-Ferrous Alloys and Low Silicon Aluminum Alloys (<12% Si) N1	AN9005	2000- 4500 -6000	2000- 4000 -6000	2000- 3000 -6000
	AN23	800- 2000 -3000	800- 1800 -2500	-
	AN2	-	700- 1000 -1200	-
	C2VAL	-	700- 1000 -1200	-
Non-Free Machining Non-Ferrous Alloys and High Silicon Aluminum Alloys (>12% Si) N2	AN9005	1000- 2000 -3000	1000- 1800 -2800	-
	AN9015	-	-	1000- 1500 -2000
	AN23	200- 1200 -1800	200- 1000 -1500	-
	AN2	-	200- 750 -1200	-
	C2VAL	-	200- 750 -1200	-
Copper, Copper Alloys, Bronze N3	AN9005	1000- 2000 -3200	900- 1700 -3200	800- 1500 -2800
	AN23	300- 950 -2000	300- 800 -1700	-
	AN2	-	300- 650 -1400	-
	C2VAL	-	300- 650 -1400	-
Plastics, Nylon, Rubbers, Phenolics, Resins and Graphite Composites N4	AN9005	1000- 2000 -5000	900- 1800 -3500	-
	AN9015	-	-	650- 1800 -2600
	AN23	300- 700 -1200	300- 600 -1000	-
	AN2	-	300- 450 -800	-
	C2VAL	-	300- 450 -800	-
Sintered Tungsten Carbide (<16% cobalt) N5	AN9015	50- 70 -100	-	-
Chip Control	Negative Rake	xNGP, PCDs	PCDs	PCDs
	Positive Rake	PCDs	HP, HF, PCDs	PCDs



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		Cutting Speed Range (SFM) (recommended starting value in bold)		
Iron-Based Heat-Resistant Alloys S1	AN8005	500- 700 -1000	500- 700 -1000	500- 600 -1000
	AN7015	700- 900 -1100	600- 750 -1000	500- 600 -800
	AN6105	100- 200 -400	80- 180 -400	-
	AN6120	80- 150 -300	70- 130 -300	70- 110 -250
	C2VAL	-	30- 80 -180	-
Cobalt-Based Heat-Resistant Alloys S2	AN8005	500- 700 -1000	500- 700 -1000	500- 600 -1000
	AN7015	700- 900 -1100	600- 750 -1000	500- 600 -800
	AN6105	100- 210 -420	80- 190 -420	-
	AN6120	80- 160 -320	70- 140 -320	70- 110 -260
	C2VAL	-	30- 80 -180	-
Nickel-Based Heat-Resistant Alloys S3	AN8005	500- 700 -1000	500- 700 -1000	500- 600 -1000
	AN7015	800- 1000 -1200	750- 900 -1100	700- 850 -1000
	AN6105	120- 240 -450	100- 220 -450	-
	AN6120	100- 180 -350	80- 160 -350	80- 120 -280
	C2VAL	-	50- 100 -190	-
Titanium and Titanium Alloys S4	AN6105	170- 260 -600	150- 240 -600	-
	AN6120	100- 200 -350	80- 180 -350	80- 140 -280
	C2VAL	-	60- 120 -230	-
Chip Control	Negative Rake	SF, xNGP, CBNs, ceramics	SG, VM, CBNs, ceramics	SR, xNMP, CBNs, ceramics
	Positive Rake	GF, CBNs, ceramics	FM, GP, HF, xCMT, CBNs, ceramics	CBNs, ceramics
Hardened Steels and Cast Irons H1	AN8010	250- 400 -600	-	-
	AN7010	200- 450 -700	-	-
	AN8015	250- 400 -600	200- 300 -500	200- 250 -450
	AN7015	350- 500 -700	350- 450 -600	300- 400 -500
	AN7020	-	250- 400 -600	200- 350 -500
Thermal Spray (Nickel and Cobalt-Based) and Powder Metal H2	AN8005	300- 600 -1000	200- 500 -900	200- 400 -800
Chip Control	Negative Rake	CBNs, ceramics	CBNs, ceramics	CBNs, ceramics
	Positive Rake	CBNs, ceramics	CBNs, ceramics	CBNs, ceramics