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Recommended Cutting Conditions - External Turning (Positive Insert)

[D.O.C. Indicates Radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Application	Recommended Chipbreaker	Recommended Grade	Corner-R (rε)	Lower Limit - **Recommendation** - Upper Limit		
								Vc (sfm)	D.O.C. (in)	Feed Rate f (ipr)
※P	Low-carbon Steel Low-carbon Alloy 1010, 4115, 5115 etc.	HB ≦ 300	Precision Finishing	Continuous	F	PR1425	0.002	325 - **500** - 650	0.002 - **0.003** - 0.006	0.001 - **0.002** - 0.004
				Interrupted		PR1425	0.008	250 - **400** - 525	0.002 - **0.004** - 0.008	0.001 - **0.004** - 0.006
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1425	0.008	325 - **500** - 650	0.001 - **0.002** - 0.004	0.001 - **0.002** - 0.005
			Finishing	Continuous	GF	PR1425	0.008	325 - **450** - 600	0.008 - **0.020** - 0.039	0.002 - **0.004** - 0.008
				Interrupted		PR1425	0.016	250 - **400** - 525	0.008 - **0.020** - 0.039	0.002 - **0.004** - 0.008
			Finishing-Medium	Continuous	GQ	PR1425	0.008	250 - **400** - 525	0.031 - **0.118** - 0.197	0.001 - **0.002** - 0.004
				Interrupted		PR1425	0.016	200 - **325** - 450	0.031 - **0.079** - 0.118	0.001 - **0.002** - 0.004
			Low Feed & Large D.O.C.	Continuous	J , U	PR1425	0.008	250 - **325** - 450	0.020 - **0.079** - 0.138	0.001 - **0.002** - 0.004
	Medium-carbon Steel Medium-carbon Alloy 1045, 4137 etc.	HB ≦ 330	Precision Finishing	Continuous	F	PR1425	0.002	325 - **500** - 650	0.002 - **0.003** - 0.006	0.001 - **0.002** - 0.004
				Interrupted		PR1425	0.008	250 - **400** - 525	0.002 - **0.004** - 0.008	0.001 - **0.004** - 0.006
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1425	0.008	325 - **500** - 650	0.001 - **0.002** - 0.004	0.001 - **0.002** - 0.005
			Finishing	Continuous	GF	PR1425	0.008	325 - **450** - 600	0.008 - **0.020** - 0.039	0.002 - **0.004** - 0.008
				Interrupted		PR1425	0.016	250 - **400** - 525	0.008 - **0.020** - 0.039	0.002 - **0.004** - 0.008
			Finishing-Medium	Continuous	GQ	PR1425	0.008	250 - **400** - 525	0.031 - **0.118** - 0.197	0.001 - **0.002** - 0.004
				Interrupted		PR1425	0.016	200 - **325** - 450	0.031 - **0.079** - 0.118	0.001 - **0.002** - 0.004
			Low Feed & Large D.O.C.	Continuous	J , U	PR1425	0.008	250 - **325** - 450	0.020 - **0.079** - 0.138	0.001 - **0.002** - 0.004
	High-carbon Alloy D2, H13 etc.	HB ≦ 280	Precision Finishing	Continuous	F	PR1425	0.002	325 - **500** - 650	0.002 - **0.003** - 0.006	0.001 - **0.002** - 0.004
				Interrupted		PR1425	0.008	250 - **400** - 525	0.002 - **0.004** - 0.008	0.001 - **0.004** - 0.006
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1425	0.008	325 - **500** - 650	0.001 - **0.002** - 0.004	0.001 - **0.002** - 0.005
			Finishing	Continuous	GF	PR1425	0.008	325 - **450** - 600	0.008 - **0.020** - 0.039	0.002 - **0.004** - 0.008
				Interrupted		PR1425	0.016	250 - **400** - 525	0.008 - **0.020** - 0.039	0.002 - **0.004** - 0.008
			Finishing-Medium	Continuous	GQ	PR1425	0.008	250 - **400** - 525	0.012 - **0.059** - 0.118	0.001 - **0.002** - 0.004
				Interrupted		PR1425	0.016	200 - **325** - 450	0.012 - **0.039** - 0.079	0.001 - **0.002** - 0.004
			Low Feed & Large D.O.C.	Continuous	J , U	PR1425	0.008	250 - **325** - 450	0.020 - **0.079** - 0.138	0.001 - **0.002** - 0.004
M	Stainless Steel 303, 304, 316, 420 etc.	HB ≦ 220	Finishing	Continuous	GF	PR1225	0.008	250 - **325** - 400	0.004 - **0.012** - 0.020	0.001 - **0.002** - 0.004
				Interrupted		PR1535	0.016	200 - **250** - 325	0.012 - **0.020** - 0.039	0.002 - **0.004** - 0.006
			Medium	Continuous	GQ	PR1225	0.008	250 - **325** - 400	0.020 - **0.059** - 0.118	0.001 - **0.003** - 0.005
				Interrupted		PR1535	0.016	200 - **250** - 325	0.020 - **0.039** - 0.079	0.002 - **0.004** - 0.006
	Stainless Steel S17400 etc.	HB ≦ 300	Finishing	Continuous	GF	PR1225	0.008	125 - **200** - 250	0.004 - **0.012** - 0.020	0.001 - **0.002** - 0.004
				Interrupted		PR1535	0.016	100 - **175** - 225	0.012 - **0.020** - 0.039	0.002 - **0.004** - 0.006
			Medium	Continuous	GQ	PR1225	0.008	125 - **200** - 250	0.020 - **0.039** - 0.079	0.001 - **0.003** - 0.005
				Interrupted		PR1535	0.016	100 - **175** - 225	0.020 - **0.039** - 0.059	0.002 - **0.004** - 0.006
K	Gray Cast Iron NO.35 NO.45 NO.50 etc.	HB ≦ 250	Finishing	Continuous	Conventional	CA4505	0.016	325 - **400** - 500	0.008 - **0.020** - 0.039	0.004 - **0.006** - 0.008
				Interrupted		CA4505	0.016	250 - **325** - 400	0.008 - **0.020** - 0.039	0.002 - **0.004** - 0.006
			Medium	Continuous	Conventional	CA4505	0.016	325 - **400** - 500	0.020 - **0.039** - 0.079	0.004 - **0.006** - 0.008
				Interrupted		CA4505	0.031	250 - **325** - 400	0.020 - **0.039** - 0.079	0.002 - **0.004** - 0.006
	Nodular Cast Iron 65-45-12 80-60-03 etc.	HB ≦ 270	Finishing	Continuous	Conventional	CA4515	0.016	250 - **325** - 400	0.008 - **0.020** - 0.039	0.004 - **0.006** - 0.008
				Interrupted		CA4515	0.016	200 - **250** - 325	0.008 - **0.020** - 0.039	0.002 - **0.004** - 0.006
			Medium	Continuous	Conventional	CA4515	0.016	250 - **325** - 400	0.020 - **0.039** - 0.079	0.004 - **0.006** - 0.008
				Interrupted		CA4515	0.031	200 - **250** - 325	0.020 - **0.039** - 0.079	0.002 - **0.004** - 0.006
N	Non-ferrous Metals Copper Alloy Aluminum Alloy (Si 10% Under) etc.	HB ≦ 100	High Speed Finishing (Rainbow Colored Finish)	Continuous	Without Chipbreaker	KPD001	0.008	500 - **825** - 1150	0.002 - **0.004** - 0.012	0.002 - **0.004** - 0.006
			Finishing (Long Tool Life)	Continuous	F , FSF	PDL025	0.008	325 - **500** - 650	0.002 - **0.012** - 0.020	0.001 - **0.003** - 0.004
				Interrupted		PDL025	0.016	325 - **500** - 650	0.002 - **0.012** - 0.020	0.001 - **0.003** - 0.004
			Finishing	Continuous	F , FSF	KW10	0.008	325 - **500** - 650	0.002 - **0.012** - 0.020	0.001 - **0.003** - 0.004
				Interrupted		KW10	0.016	325 - **500** - 650	0.002 - **0.012** - 0.020	0.001 - **0.003** - 0.004
			Medium	Continuous	U , USF	KW10	0.008	325 - **500** - 650	0.008 - **0.020** - 0.059	0.001 - **0.004** - 0.008
				Interrupted		KW10	0.016	325 - **500** - 650	0.008 - **0.020** - 0.059	0.001 - **0.004** - 0.008
S	Titanium Alloy Ti-6Al-4V etc.	HB ≦ 400	Precision Finishing (Rainbow Colored Finish)	Continuous	Without Chipbreaker	KPD001	0.008	325 - **400** - 500	0.002 - **0.004** - 0.012	0.001 - **0.003** - 0.004
				Interrupted		KPD001	0.016	225 - **325** - 400	0.002 - **0.004** - 0.012	0.001 - **0.003** - 0.004
			Medium	Continuous	FSF , USF	KW10	0.016	100 - **175** - 225	0.004 - **0.020** - 0.039	0.001 - **0.004** - 0.008
				Interrupted		KW10	0.016	100 - **175** - 225	0.004 - **0.020** - 0.039	0.001 - **0.004** - 0.008
	Heat-restistant Alloys Inconel 625 Inconel 718	HB ≦ 350	Finishing	Continuous	F , U Without Chipbreaker	KW10	0.016	25 - **100** - 175	0.004 - **0.012** - 0.020	0.001 - **0.002** - 0.004
				Interrupted		KW10	0.031	25 - **100** - 175	0.008 - **0.020** - 0.028	0.001 - **0.002** - 0.004
			Finishing	Continuous	MQ	PR1310	0.016	125 - **200** - 250	0.004 - **0.012** - 0.020	0.001 - **0.002** - 0.004
				Interrupted		PR1310	0.031	125 - **200** - 250	0.004 - **0.012** - 0.020	0.001 - **0.002** - 0.004
H	Hardened Steel Hard Materials D2, H13 etc.	40 ~ 50 HRC	Finishing	Continuous	GK	PR1425	0.008	125 - **200** - 250	0.004 - **0.012** - 0.020	0.001 - **0.003** - 0.004
				Interrupted		PR1425	0.016	125 - **200** - 250	0.004 - **0.012** - 0.020	0.001 - **0.003** - 0.004
		50 ~ 68 HRC	Finishing	Continuous	ME MET	KBN05M	0.008	250 - **400** - 500	0.004 - **0.012** - 0.020	0.001 - **0.003** - 0.004
				Interrupted		KBN05M	0.016	200 - **325** - 400	0.004 - **0.012** - 0.020	0.001 - **0.003** - 0.004

※ For machining free-cutting steels, use PR1005 at Vc=650sfm or less. For D.O.C. and feed rate (f), refer to specs for low carbon steels.

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