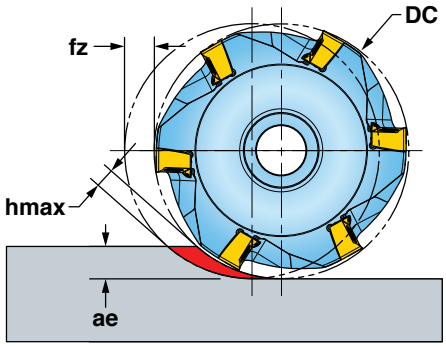
HiPOS+™ OPERATING GUIDELINES: SERIES 22J3P

Chip Thinning



* When ae is less than 25% DC, recommend use of Chip Thinning Calculator to ensure hmax falls within fz range.

Materials				V_c Cutting Speed SFM	f_z Feed/Tooth (inch)	Harder <----------> Tougher										Coolant
						PCD	Cermet	Carbide								
ISO	Mat'l Group #VDI 3323	Type	Examples			IN90D	IN0560	IN2504	IN10K	IN2010	IN2540	IN2505 IN2005	IN4030 IN2530	IN2036	IN6537	
P	1 thru 5	Non-alloy Steel	1018, A36, 1045, A572, 1070	300-600	.003-.005						4	2	1		3	NO
				450-900			1									
	6 thru 9	Low-alloy Steel	4140, 4340, P20, 8620, 300M	250-500							4	2	1		3	
				350-700			1									
	10, 11	High-alloy Steel	H13, A2, D2, M2, T1	250-450							4	2	1		3	
				350-650			1									
M	12 thru 13	Stainless Steel (Ferritic & Martensitic)	410, 416, 440	300-500	.003-.004							3	2	1		YES
	14	Stainless Steel (Austenitic)	303, 304, 316, 15-5, 17-4	250-450												May not be required at high speeds
K	15 thru 16	Gray Cast Iron	CLS. 20, 30, 45	300-600	.003-.005			2		1		4			3	NO
	17 thru 20	Nodular Cast Iron	60-40-18, 100-70-03	300-500												
N	21 thru 30	Aluminum	7075, 6061	800-1500	.003-.006	1			1							YES
S	31 thru 35	High-Temp Alloys	Inconel, Hastelloy, Nimonic, Monel	50-120	.003-.004						2		3	1		YES
	36 thru 37	Titanium Alloys	6AL-4V, 5Al-5Mo-5V-3Cr	60-130							3		2	1		

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.