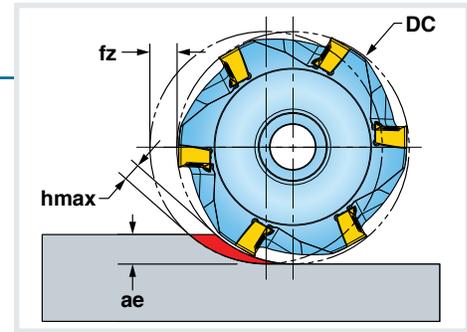


## 11 mm • Operating Guidelines

### CHIP THINNING

Ingersoll Cutting Tools' **Chip Thinning Calculator** is recommended to ensure  $h_{max}$  is greater than .002".



Materials				Vc Cutting Speed SFM	fz* Feed/Tooth (inch)	Harder «-----» Tougher						Coolant
						PCD	CBN	Cermet	Carbide			
ISO	Mat'l Group #VDI 3323	Type	Examples			IN90D	IN80B	IN0560	IN045	IN2504 IN4004	IN2036	
<b>P</b>	1-5	Non-alloy steel	1018, A36, 1045, A572, 1070	800-1650	.003 - .004			1				No
				650-800					1			
	6-9	Low-alloy steel	4140, 4340, P20, 8620, 300M	650-800				1				
				525-650					1			
10, 11	High-alloy steel	H13, A2, D2, M2, T1	525-600				1					
			350-425					1				
<b>M</b>	12, 13	Stainless steel (ferritic and martensitic)	410, 416, 440	250-425	.003 - .006						1	Yes
	14	Stainless steel (austenitic)	303, 304, 316, 15-5, 17-4									
<b>K</b>	15, 16	Gray cast iron	CLS. 20, 30, 45	600-800	.003 - .006					1		No
				1800-3000			1					
	17-18	Nodular cast iron	60-40-18, 100-70-03	450-700						1		
<b>N</b>	21-30	Aluminum	7075, 6061	1000-5000	.002 - .006	1			1			Yes
<b>S</b>	31-35	High-temp alloys	Inconel, Hastelloy, Monel	80-150	0.003						1	Yes
	36, 37	Titanium alloys	6Al-4V, 5Al-5Mo-5V-3Cr	100-200								
<b>H</b>	38	Hardened Steel <54 HRC	Hardox 400, 500, W1	200-350	0.003		1			2		No
	39	Hardened Steel <63 HRC	HSS, 90 MnV8	150-250								

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.