Operating Guidelines • Series LPA Tips (General Purpose)

ISO	Material		Condition	Tensile Strength RM (N/mm^2)	Hardness HB	Matl. Group No.	Cutting Speed Vc (SFM)	Feed vs. Drill Diameter – IPR (inches/rev)*		
								Ø20–29.9 mm (.7874–1.1772")	Ø30–34.9 mm (1.1811–1.3740")	Ø35–41.9 mm (1.3800–1.6496")
P	Non-alloy steel and cast steel, free cutting steel	<0.25%C	Annealed	420	125	1	260–460	.012–.020	.012–.020	.014–.022
		≥0.25%C	Annealed	650	190	2	260–430			
		<0.55%C	Quenched/Tempered	850	250	3	260–400			
		≥0.55%C	Annealed	750	220	4	230–360			
			Quenched/Tempered	1000	300	5	165–300			
	Low alloy steel and cast steel (less than 5% alloying elements)		Annealed	600	200	6	260–400	.010–.018	.010–.018	.012–.020
			Quenched/Tempered	930	275	7	230–360			
				1000	300	8	165–300			
				1200	350	9	135–230			
	High alloy steel, cast steel, and tool steel		Annealed	680	200	10	165–300	.010–.014	.010–.014	.012–.016
			Quenched/Tempered	1100	325	11	130–265			
M	Stainless steel and cast stainless steel		Ferritic/Martensitic	680	200	12	130–230	.006–.012	.006–.012	.008–.014
			Martensitic	820	240	13	130–230			
			Austenitic	600	180	14	100–230			
K	Grey cast iron (GG)		Ferritic	–	160	15	300–600	.014–.022	.014–.022	.016–.024
			Pearlitic	–	250	16	265–460			
	Cast iron nodular (GGG)		Ferritic	–	180	17	300–600			
			Pearlitic	–	260	18	265–460			
	Malleable cast iron		Ferritic	–	130	19	300–525			
			Pearlitic	–	230	20	265–460			
N	Aluminum - wrought alloy		Not Cureable	–	60	21	300–725	.016–.024	.016–.024	.020–.028
			Cured	–	100	22	300–725			
	Aluminum-cast, alloyed	≤12% Si	Not Cureable	–	75	23	300–725			
			Cured	–	90	24	300–725			
		>12% Si	High Temperature	–	130	25	265–525			
	Copper alloys	>1% Pb	Free Cutting	–	110	26	300–725			
			Brass	–	90	27	300–725			
			Electrolitic Copper	–	100	28	300–725			
	Non-metallic		Duro/Fiber Plastics	–	-	29	-	-	-	-
			Hard Rubber	–	-	30	-			
S	High temp alloys	Fe based	Annealed	–	200	31	100–200	.004–.008	.006–.010	.006–.010
			Cured	–	280	32	70–165			
		Ni or Co based	Annealed	–	250	33	70–165			
			Cured	–	350	34	70–165			
			Cast	–	320	35	70–165			
	Titanium, Ti alloys		-	Rm 400	-	36	70–165			
			Alpha+Beta Alloys Cured	Rm 1050	-	37	70–165			
H	Hardened steel		Hardened	–	55 HRC	38	70–165	.004–.008	.006–.010	.006–.010
			Hardened	–	60 HRC	39	70–165			
	Chilled cast iron		Cast	–	400	40	-	-	-	-
	Cast iron nodular		Hardened	–	55 HRC	41	-			

*Feed rates are based on two effective - DO NOT DOUBLE