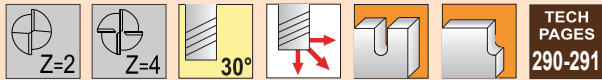


Series 180M, 190M, 980M, 990M



TOLERANCES

$d1$	$\leq .030"$	$+0.000" - .001" (+0.000 - .025mm)$
	$\geq 1/32"$	$+0.000" - .002" (+0.000 - .050mm)$
$d2$	h6	
ball radius	$+0.000" - .001" (+0.000 - .025mm)$	

TECH
PAGES
290-291

Stub Length - Ball End

Solid submicron grain carbide end mill - center cutting

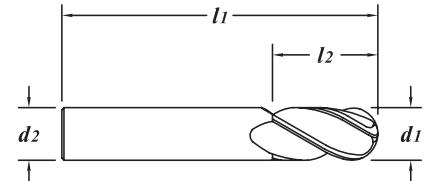
Shorter flute length for rigidity

Extremely versatile

TiAlN Coating - page 227

Standard Length - page 240

Extended length - page 259



MATERIAL HARDNESS (Rc)
70
35
0

(180M/980M) 2 Flute EDP#	(190M/990M) 4 Flute EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	LIST PRICE	
		Decimal	Metric					
03350	-	.0200	.0200"	0.508	1/8"	1-1/2"	.030"	21.79
03400	-	.0250	.0250"	0.635	1/8"	1-1/2"	.038"	21.05
03450	-	.0300	.0300"	0.762	1/8"	1-1/2"	.045"	18.14
03010	04010	.0312	1/32"	0.792	1/8"	1-1/2"	1/16"	13.45
03510	04510	.0394		1.000	3.0	38	2	14.13
03020	04020	.0469	3/64"	1.191	1/8"	1-1/2"	3/32"	13.45
03520	-	.0591		1.500	3.0	38	3	14.13
03030	04030	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"	9.92
03530	04530	.0787		2.000	3.0	38	4	10.43
03040	04040	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"	9.36
03540	04540	.0984		2.500	3.0	38	5	9.84
03550	04550	.1181		3.000	3.0	38	6	9.59
03050	04050	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	9.12
03560	04560	.1378		3.500	4.0	50	7	13.43
03060	04060	.1562	5/32"	3.967	3/16"	2"	5/16"	12.77
03570	04570	.1575		4.000	4.0	50	8	12.76
03580	04580	.1772		4.500	5.0	50	9.5	16.87
03070	04070	.1875	3/16"	4.763	3/16"	2"	3/8"	12.12
03590	04590	.1969		5.000	5.0	50	10	15.89
03080	04080	.2188	7/32"	5.558	1/4"	2"	7/16"	16.08
03600	04600	.2362		6.000	6.0	50	12	16.69
03090	04090	.2500	1/4"	6.350	1/4"	2"	1/2"	15.82
03610	04610	.2756		7.000	7.0	50	12	21.83
03100	04100	.3125	5/16"	7.938	5/16"	2"	1/2"	21.64
03620	04620	.3150		8.000	8.0	50	12	22.78
03630	04630	.3543		9.000	9.0	50	14	28.13
03110	04110	.3750	3/8"	9.525	3/8"	2"	5/8"	26.73
03640	04640	.3937		10.000	10.0	50	16	31.10
03120	04120	.4375	7/16"	11.113	7/16"	2-1/2"	5/8"	33.07
03660	04660	.4724		12.000	12.0	65	19	46.39
03130	04130	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	44.09
03150	04150	.7500	3/4"	19.050	3/4"	3"	1"	121.30