

# SPEEDS & FEEDS

# HTPR-4

## Tapered End Mill - 4 Flute - Ball - Variable Pitch

HTPR-4													
Material Guide		Hardness	SFM	Inches Per Tooth (IPT)									
				1/8		3/16		1/4		3/8		1/2	
				Rgh	Fin	Rgh	Fin	Rgh	Fin	Rgh	Fin	Rgh	Fin
CARBON STEEL	10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	< 75 HRB	455	.0012	.0016	.0018	.0019	.0024	.0021	.0036	.0024	.0047	.0028
		75 - 98 HRB	445	.0009	.0014	.0013	.0016	.0018	.0018	.0026	.0021	.0034	.0024
		21 - 36 HRC	400	.0006	.0011	.0009	.0013	.0011	.0014	.0017	.0017	.0022	.0019
LOW ALLOY STEEL	13XX, 41XX, 43XX, 51XX, 86XX, 93XX	75 - 98 HRB	390	.0008	.0013	.0011	.0015	.0015	.0017	.0023	.0019	.0030	.0023
		21 - 36 HRC	340	.0006	.0011	.0009	.0013	.0012	.0014	.0017	.0017	.0022	.0019
		36 - 50 HRC	260	.0005	.0011	.0007	.0012	.0010	.0013	.0015	.0016	.0019	.0018
		> 50 HRC	155	.0004	.0009	.0006	.0010	.0008	.0012	.0012	.0014	.0015	.0016
TOOL STEEL	A2, H13, L6, P20, S7	75 - 98 HRB	340	.0008	.0013	.0011	.0015	.0015	.0017	.0023	.0019	.0030	.0023
		21 - 36 HRC	250	.0006	.0012	.0009	.0013	.0012	.0015	.0018	.0017	.0024	.0020
		36 - 50 HRC	145	.0005	.0010	.0007	.0012	.0010	.0013	.0014	.0015	.0019	.0018
		> 50 HRC	85	.0004	.0009	.0006	.0010	.0008	.0012	.0012	.0014	.0015	.0016
SPECIALTY STEEL	300M, Invar 36, Kovar, Maraging 200, Maraging 250, Maraging 300, Maraging 350	< 75 HRB	290	.0010	.0015	.0015	.0017	.0020	.0019	.0030	.0022	.0039	.0026
		75 - 98 HRB	255	.0007	.0012	.0010	.0014	.0014	.0016	.0021	.0018	.0027	.0021
		21 - 36 HRC	175	.0006	.0012	.0009	.0013	.0012	.0015	.0018	.0017	.0024	.0020
		36 - 50 HRC	150	.0006	.0011	.0008	.0012	.0011	.0014	.0016	.0016	.0021	.0019
		> 50 HRC	55	.0004	.0009	.0005	.0010	.0007	.0011	.0010	.0013	.0013	.0015
AUSTENITIC STAINLESS STEEL	Nitronic 50, Nitronic 60, 301, 303, 304, 304L, Incoloy 27-7MO, 316, 316L, 321, 347	75 - 98 HRB	265	.0008	.0013	.0011	.0015	.0015	.0017	.0022	.0019	.0029	.0022
		21 - 36 HRC	225	.0007	.0012	.0010	.0014	.0014	.0016	.0020	.0018	.0026	.0021
		36 - 50 HRC	180	.0006	.0011	.0008	.0012	.0011	.0014	.0016	.0016	.0021	.0019
MARTENSITIC & FERRITIC STAINLESS STEEL	403, 410, 416, 420, 440, 430, 446	75 - 98 HRB	300	.0008	.0013	.0011	.0015	.0016	.0017	.0023	.0019	.0030	.0023
		21 - 36 HRC	280	.0007	.0012	.0010	.0014	.0013	.0016	.0020	.0018	.0026	.0021
PH STAINLESS STEEL	15-5, 17-4, Carpenter 450, Carpenter 465	21 - 36 HRC	200	.0006	.0011	.0008	.0012	.0011	.0014	.0017	.0016	.0022	.0019
		36 - 50 HRC	145	.0005	.0011	.0007	.0012	.0010	.0014	.0014	.0015	.0019	.0018
GRAY CAST IRON	SAE J431, ASTM A48	75 - 98 HRB	410	.0013	.0017	.0019	.0019	.0025	.0021	.0037	.0025	.0048	.0029
		21 - 36 HRC	370	.0007	.0012	.0010	.0014	.0013	.0016	.0020	.0018	.0026	.0021
MALLEABLE CAST IRON	ASTM A47, ASTM A220, ASTM A602	75 - 98 HRB	345	.0008	.0013	.0012	.0015	.0016	.0017	.0023	.0019	.0031	.0023
		21 - 36 HRC	335	.0007	.0012	.0010	.0014	.0014	.0016	.0020	.0018	.0026	.0021
NODULAR (DUCTILE) CAST IRON	ASTM A536, ASTM 897	75 - 98 HRB	310	.0008	.0014	.0012	.0015	.0016	.0017	.0024	.0020	.0032	.0023
		21 - 36 HRC	260	.0006	.0011	.0008	.0012	.0011	.0014	.0016	.0016	.0021	.0019
		36 - 50 HRC	135	.0004	.0009	.0005	.0010	.0007	.0011	.0010	.0013	.0013	.0015
PURE NICKEL	Nickel 200, Nickel 201	< 75 HRB	285	.0011	.0015	.0016	.0017	.0021	.0020	.0031	.0023	.0041	.0026
		75 - 98 HRB	250	.0009	.0014	.0013	.0016	.0018	.0018	.0026	.0021	.0034	.0024
NICKEL ALLOY	Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoloy 20	75 - 98 HRB	80	.0005	.0011	.0008	.0012	.0011	.0014	.0016	.0016	.0021	.0019
		21 - 36 HRC	75	.0005	.0011	.0008	.0012	.0010	.0014	.0015	.0016	.0020	.0018
		36 - 50 HRC	70	.0005	.0010	.0007	.0011	.0009	.0013	.0013	.0015	.0017	.0017
PURE TITANIUM	Ti Grade 1, Ti Grade 2, Ti Grade 3, Ti Grade 4, Ti Grade 7, Ti Grade 12	< 75 HRB	300	.0015	.0018	.0022	.0020	.0029	.0023	.0043	.0027	.0057	.0031
		75 - 98 HRB	275	.0012	.0017	.0018	.0019	.0024	.0021	.0036	.0024	.0047	.0028
		21 - 36 HRC	250	.0009	.0014	.0014	.0016	.0018	.0018	.0027	.0021	.0036	.0025
TITANIUM ALLOY	Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al	21 - 36 HRC	180	.0007	.0013	.0011	.0014	.0014	.0016	.0021	.0019	.0028	.0022
		36 - 50 HRC	160	.0007	.0012	.0010	.0014	.0013	.0016	.0020	.0018	.0026	.0021
COBALT ALLOY	ASTM F562, ASTM F90, ASTM F75, ASTM F799	75 - 98 HRB	210	.0006	.0012	.0009	.0013	.0012	.0015	.0018	.0017	.0024	.0020
		21 - 36 HRC	170	.0006	.0011	.0009	.0013	.0012	.0015	.0017	.0017	.0023	.0020
		36 - 50 HRC	65	.0004	.0009	.0006	.0011	.0008	.0012	.0012	.0014	.0016	.0016

Milling Process	Hardness	ADOC	RDOC
Rgh (Traditional Roughing)	< 35 HRC	Up to Max LOC	30%-40% Diameter
	≥ 35 HRC	Up to Max LOC	25%-35% Diameter
Fin (Finishing)	< 35 HRC	Up to Max LOC	4%-6% Diameter
	≥ 35 HRC	Up to Max LOC	4%-6% Diameter

Note: Speed (SFM) and feed (IPT) numbers shown in table above are considered to be average values. Use a tolerance of +/-25% as needed.

Effective cutter diameter should be used to select the proper chipload per tooth.