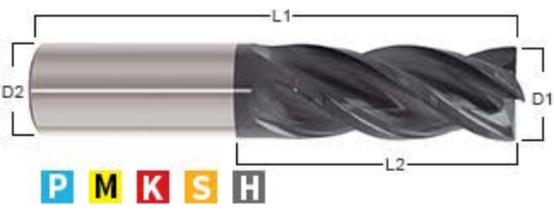


451 SERIES



Variable Design Allows for Chatter Free Machining at Higher Speed and Feeds. Ideal for Heavy Profile and Slotting Applications.

4 Flute Endmill

- Variable Helix
- Primary and Secondary

Available Upon Request:

- Add Flats
- Radii
- Whistle Notch
- Firm Hold Shank



Varianta® Supral Provides a low coefficient of friction, reducing tool wear and resulting in a longer tool life. Ideal for materials below 45Rc.

P1	Low-Carbon Steel - 1000 Series (>25 HRc)	K1	Gray Cast Iron
P2	Low-Carbon Steel - 1000 Series (<25 HRc)	K2	Ductile Iron (<28 HRc)
P3	Alloy Tool Steels - 1300, 2000, 3000 (≤35 HRc)	K3	Ductile Iron (<38 HRc)
P4	Alloy Tool Steels - 1300, 2000, 3000 (36-48 HRc)	S1	Iron-Based, Heat-Resistant Alloys - Incoloy 800-802, A-286, N-155
P5	Ferritic, Martensitic & PH Stainless Steels - 400's, PH Types (≤35 HRc)	S2	Nickel-Based, Cobalt-Based, Heat-Resistant Alloys - Haynes 188, Haynes 21, Hastelloy, Waspaloy, Inconel 625/718 (≤48HRc)
P6	Ferritic, Martensitic & PH Stainless Steels - 400's, PH Types (36-48 HRc)	S4	Titanium Alloys - Commercially Pure, 6Al-AV, ASTM 1/2/3, Ti-6Al-2SN-4Zr-2Mo (≤48 HRc)
M1	Austenitic Stainless Steel - Inox, 200 Series, 300 Series		
M2	Austenitic Stainless Steel & Cast Stainless Steel - 310, 314, 316 (<25 HRc)		
M3	Duplex Steel (Austenitic & Ferritic) - 323, 329, F55, 2205		

Slotting

	SFM (Vc)	Chipload Per Tooth Recommendations (CPT)										Profiling Radial		Slotting Axial
		1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"	ADC	RDC	ADC
P1	400	.001	.001	.001	.001	.001	.002	.002	.002	.003	.004	N/A	N/A	.6-1.25xD
P2	400	.001	.001	.001	.001	.001	.002	.002	.002	.003	.004	N/A	N/A	.6-1.25xD
P3	350	.001	.001	.001	.001	.001	.002	.002	.002	.003	.004	N/A	N/A	.6-1.25xD
P4	200	.000	.001	.001	.001	.001	.001	.001	.001	.002	.003	N/A	N/A	.6-1.25xD
P5	300	.001	.001	.001	.001	.002	.002	.002	.003	.003	.004	N/A	N/A	.6-1.25xD
P6	300	.001	.001	.001	.001	.002	.002	.002	.003	.003	.004	N/A	N/A	.6-1.25xD
M1	175-250	.001	.001	.001	.001	.001	.002	.002	.002	.003	.004	N/A	N/A	.6-1.25xD
M2	175-250	.001	.001	.001	.001	.001	.002	.002	.002	.003	.004	N/A	N/A	.6-1.25xD
M3	120-225	.000	.001	.001	.001	.001	.001	.001	.002	.002	.003	N/A	N/A	.6-1.25xD
K1	350-450	.001	.001	.002	.002	.003	.003	.004	.005	.006	.008	N/A	N/A	.6-1.25xD
K2	275	.001	.001	.001	.001	.001	.001	.002	.002	.003	.004	N/A	N/A	.6-1.25xD
K3	275	.001	.001	.001	.001	.001	.001	.002	.002	.003	.004	N/A	N/A	.6-1.25xD
S1	90-175	.001	.001	.001	.001	.001	.001	.002	.002	.003	.004	N/A	N/A	.6-1.25xD
S2	90-175	.001	.001	.001	.001	.001	.001	.002	.002	.003	.004	N/A	N/A	.6-1.25xD
S4	140-200	.000	.001	.001	.001	.001	.001	.002	.002	.003	.004	N/A	N/A	.6-1.25xD

Heavy Peripheral

	SFM (Vc)	Chipload Per Tooth Recommendations (CPT)										Profiling Radial		Slotting Axial
		1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"	ADC	RDC	ADC
P1	400	.001	.001	.001	.001	.002	.002	.003	.003	.004	.005	.75-1.5xD	.25-.4xD	N/A
P2	400	.001	.001	.001	.001	.002	.002	.003	.003	.004	.005	.75-1.5xD	.25-.4xD	N/A
P3	350	.0006	.001	.001	.001	.002	.002	.002	.003	.003	.005	.75-1.5xD	.25-.4xD	N/A
P4	200	.0004	.0007	.001	.001	.001	.001	.002	.002	.003	.003	.75-1.5xD	.25-.4xD	N/A
P5	300	.0007	.001	.001	.002	.002	.002	.003	.004	.004	.006	.75-1.5xD	.25-.4xD	N/A
P6	300	.0007	.001	.001	.002	.002	.002	.003	.004	.004	.006	.75-1.5xD	.25-.4xD	N/A
M1	175-250	.0005	.0007	.001	.001	.001	.002	.002	.002	.003	.004	.75-1.5xD	.25-.4xD	N/A
M2	175-250	.0005	.0007	.001	.001	.001	.002	.002	.002	.003	.004	.75-1.5xD	.25-.4xD	N/A
M3	120-225	.0005	.0007	.001	.001	.001	.001	.002	.002	.003	.004	.75-1.5xD	.25-.4xD	N/A
K1	350-450	.001	.001	.001	.002	.003	.003	.004	.005	.006	.008	.75-1.5xD	.25-.4xD	N/A
K2	275	.0006	.001	.001	.001	.002	.002	.002	.003	.004	.005	.75-1.5xD	.25-.4xD	N/A
K3	275	.0006	.001	.001	.001	.002	.002	.002	.003	.004	.005	.75-1.5xD	.25-.4xD	N/A
S1	90-175	.0007	.001	.001	.001	.002	.002	.003	.003	.004	.005	.75-1.5xD	.25-.4xD	N/A
S2	90-175	.0007	.001	.001	.001	.002	.002	.003	.003	.004	.005	.75-1.5xD	.25-.4xD	N/A
S4	140-200	.0006	.001	.001	.001	.002	.002	.002	.002	.003	.004	.75-1.5xD	.25-.4xD	N/A

Light Peripheral

	SFM (Vc)	Chipload Per Tooth Recommendations (CPT)										Profiling Radial		Slotting Axial
		1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"	ADC	RDC	ADC
P1	400	.0005	.0008	.001	.001	.001	.001	.002	.002	.002	.003	1xD	.05xD	N/A
P2	400	.0005	.0008	.001	.001	.001	.001	.002	.002	.002	.003	1xD	.05xD	N/A
P3	350	.0005	.0007	.001	.001	.001	.001	.002	.002	.003	.004	1xD	.05xD	N/A
P4	200	.0003	.0004	.0005	.0006	.0008	.0009	.001	.001	.001	.002	1xD	.05xD	N/A
P5	300	.0004	.0007	.001	.001	.001	.001	.002	.002	.003	.003	1xD	.05xD	N/A
P6	300	.0004	.0007	.001	.001	.001	.001	.002	.002	.003	.003	1xD	.05xD	N/A
M1	175-250	.0004	.0005	.0007	.001	.001	.001	.001	.001	.002	.003	1xD	.05xD	N/A
M2	175-250	.0004	.0005	.0007	.001	.001	.001	.001	.001	.002	.003	1xD	.05xD	N/A
M3	120-225	.0003	.0004	.0005	.0006	.0008	.001	.001	.001	.001	.002	1xD	.05xD	N/A
K1	350-450	.001	.001	.002	.002	.003	.003	.003	.004	.005	.007	1xD	.05xD	N/A
K2	275	.0004	.0006	.0008	.001	.001	.001	.001	.002	.002	.003	1xD	.05xD	N/A
K3	275	.0004	.0006	.0008	.001	.001	.001	.001	.002	.002	.003	1xD	.05xD	N/A
S1	90-175	.0003	.0004	.0006	.0007	.0008	.001	.001	.001	.002	.002	1xD	.05xD	N/A
S2	90-175	.0003	.0004	.0006	.0007	.0008	.001	.001	.001	.002	.002	1xD	.05xD	N/A
S4	140-200	.0003	.0004	.0006	.0007	.001	.001	.001	.001	.002	.002	1xD	.05xD	N/A