

# Modular End Mills

High-Performance DUO-LOCK® Modular End Mills • Roughing/AluSurf™

## 4U40 • Roughing

Material Group											Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
	Side Milling (A) and Slotting (B)			short		medium		long		D1 – Diameter											
	A		B	adaptor reach																	
				WS15PE		WS15PE		WS15PE													
	ap		ae	Cutting Speed – vc m/min		Cutting Speed – vc m/min		Cutting Speed – vc m/min		mm	10,0	12,0	16,0	20,0	25,0	32,0					
P	3	1,0 x D	0,5 x D	0,75 x D	120	–	160	108	–	144	108	–	144	fz	0,051	0,060	0,074	0,086	0,097	0,105	
	4	1,0 x D	0,3 x D	0,75 x D	90	–	150	81	–	135	81	–	135	fz	0,046	0,053	0,065	0,075	0,083	0,087	
	5	1,0 x D	0,5 x D	0,75 x D	60	–	100	51	–	85	48	–	80	fz	0,041	0,048	0,059	0,069	0,077	0,084	
M	1	1,0 x D	0,3 x D	0,30 x D	50	–	75	42,5	–	63,75	40	–	60	fz	0,034	0,040	0,048	0,055	0,060	0,062	
	2	1,0 x D	0,4 x D	0,75 x D	90	–	115	72	–	92	63	–	80,5	fz	0,051	0,060	0,074	0,086	0,097	0,105	
	3	1,0 x D	0,4 x D	0,75 x D	60	–	80	48	–	64	42	–	56	fz	0,041	0,048	0,059	0,069	0,077	0,084	
K	1	1,0 x D	0,4 x D	0,75 x D	60	–	70	48	–	56	42	–	49	fz	0,034	0,040	0,048	0,055	0,060	0,062	
	2	1,0 x D	0,5 x D	1 x D	120	–	150	108	–	135	108	–	135	fz	0,061	0,070	0,086	0,097	0,105	0,106	
	3	1,0 x D	0,5 x D	1 x D	110	–	140	99	–	126	99	–	126	fz	0,051	0,060	0,074	0,086	0,097	0,105	
S	1	1,0 x D	0,5 x D	1 x D	110	–	130	99	–	117	99	–	117	fz	0,041	0,048	0,059	0,069	0,077	0,084	
	2	1,0 x D	0,3 x D	0,75 x D	50	–	90	40	–	72	30	–	54	fz	0,051	0,060	0,074	0,086	0,097	0,105	
	3	1,0 x D	0,3 x D	0,75 x D	25	–	40	20	–	32	15	–	24	fz	0,027	0,032	0,039	0,046	0,052	0,057	
	4	1,0 x D	0,3 x D	0,75 x D	25	–	40	20	–	32	15	–	24	fz	0,027	0,032	0,039	0,046	0,052	0,057	
H	1	1,0 x D	0,4 x D	0,75 x D	50	–	60	40	–	48	30	–	36	fz	0,038	0,044	0,055	0,063	0,071	0,077	
	2	1,0 x D	0,3 x D	0,30 x D	80	–	140	64	–	112	48	–	84	fz	0,046	0,053	0,065	0,075	0,083	0,087	
	3	1,0 x D	0,2 x D	0,20 x D	70	–	120	56	–	96	42	–	72	fz	0,034	0,040	0,048	0,055	0,060	0,062	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. Please adjust parameters according to system's stability.  
For side milling with ap bigger than 1 x D reduce fz by 20%! Do not use cylindrical shank for full slotting!

## AluSurf • 5142 • 5143 • Aluminium

Material Group																				
	Side Milling (A) and Slotting (B)			short		medium		long		Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
	A		B	adaptor reach																
				UNCOATED		UNCOATED		UNCOATED												
	ap		ae	Cutting Speed – vc m/min		Cutting Speed – vc m/min		Cutting Speed – vc m/min		mm	10,0	12,0	16,0	20,0	25,0	32,0				
N	1	1,5 x D	0,3 x D	1,0 x D	500	–	2000	400	–	1200	300	–	1200	fz	0,077	0,092	0,122	0,153	0,191	0,245
	2	1,5 x D	0,3 x D	1,0 x D	500	–	1500	400	–	900	300	–	900	fz	0,069	0,083	0,110	0,138	0,172	0,220
	3	1,5 x D	0,3 x D	1,0 x D	500	–	1500	400	–	900	300	–	900	fz	0,054	0,064	0,086	0,107	0,134	0,171
	4	1,5 x D	0,3 x D	1,0 x D	400	–	750	320	–	450	240	–	450	fz	0,054	0,064	0,086	0,107	0,134	0,171
	5	1,5 x D	0,3 x D	1,0 x D	250	–	1000	200	–	600	150	–	600	fz	0,069	0,083	0,110	0,138	0,172	0,220

NOTE: ap for spindle with ceramic bearings multiply by 0.5.  
For better surface finish, reduce feed per tooth.  
Above parameters are based on ideal conditions. Please adjust parameters according to system's stability.  
For side milling with ap bigger than 1 x D, reduce fz by 20%! Do not use cylindrical shank for full slotting!