

TuffCut[®] XM

Microfraises haute performance

Usinage de précision à des prix sensationnels

Micro Tools

- compact
- précis
- performant

Examinez cela de plus près

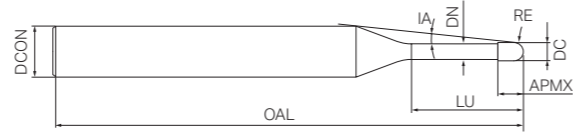
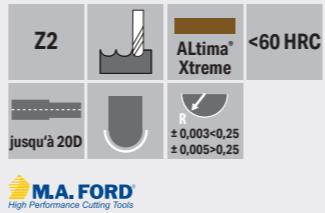


XM2B série

TuffCut® XM

Fraise sphérique

2-lèvres
détaillées



N° d'art.	DC	RE	LU	APMX	DN	OAL	DCON	Angle d'interférence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs. -5%	dès 5 pcs. -10%	dès 10 pcs. -15%	dès 20 pcs. -20%
									0.5°	1°	1.5°	2°	3°				
XM2B-01N0.2X	0.1	0.05	0.2	0.08	0.08	50.0	4.0	14.66°	0.20	0.21	0.22	0.24	0.26				
XM2B-01N0.3X			14.48°					0.31	0.33	0.34	0.36	0.39					
XM2B-01N0.5X	14.12°	0.52	0.55	0.57	0.59	0.64											
XM2B-02N0.5X	14.21°	0.51	0.53	0.55	0.57	0.61											
XM2B-02N0.75X	13.77°	0.78	0.80	0.83	0.86	0.92											
XM2B-02N1X	13.36°	1.04	1.07	1.11	1.15	1.23											
XM2B-02N1.25X	12.97°	1.30	1.34	1.39	1.43	1.54											
XM2B-02N1.5X	12.6°	1.56	1.61	1.66	1.72	1.85											
XM2B-02N2X	11.92°	2.07	2.14	2.22	2.30	2.48											
XM2B-02N2.5X	11.31°	2.59	2.68	2.77	2.87	3.10											
XM2B-02N3X	10.76°	3.11	3.21	3.33	3.45	3.72											
XM2B-03N0.5X	14.17°	0.52	0.55	0.57	0.60	0.66											
XM2B-03N0.75X	13.72°	0.79	0.83	0.87	0.91	0.98											
XM2B-03N1X	13.3°	1.05	1.11	1.16	1.20	1.29											
XM2B-03N1.25X	12.9°	1.32	1.38	1.44	1.50	1.61											
XM2B-03N1.5X	12.53°	1.58	1.66	1.72	1.78	1.92											
XM2B-03N2X	11.84°	2.11	2.20	2.28	2.36	2.54											
XM2B-03N2.5X	11.22°	2.63	2.74	2.83	2.93	3.16											
XM2B-03N3X	10.66°	3.15	3.27	3.39	3.51	3.78											
XM2B-04N0.75X	13.78°	0.78	0.82	0.86	0.90	0.97											
XM2B-04N1X	13.34°	1.05	1.10	1.15	1.19	1.28											
XM2B-04N1.5X	12.55°	1.58	1.65	1.72	1.78	1.90											
XM2B-04N2X	11.84°	2.11	2.19	2.27	2.35	2.53											
XM2B-04N2.5X	11.2°	2.63	2.73	2.83	2.93	3.15											
XM2B-04N3X	10.63°	3.15	3.27	3.38	3.50	3.77											
XM2B-04N3.5X	10.12°	3.67	3.80	3.94	4.08	4.39											
XM2B-04N4X	9.65°	4.19	4.34	4.49	4.65	5.01											
XM2B-04N4.5X	9.22°	4.71	4.87	5.04	5.23	5.63											
XM2B-05N1X	13.39°	1.05	1.09	1.14	1.19	1.27											
XM2B-05N1.5X	12.56°	1.58	1.65	1.71	1.77	1.89											
XM2B-05N2X	11.83°	2.10	2.19	2.27	2.34	2.51											
XM2B-05N2.5X	11.18°	2.63	2.73	2.82	2.92	3.14											
XM2B-05N3X	10.6°	3.15	3.27	3.38	3.49	3.76											
XM2B-05N4X	9.6°	4.19	4.34	4.48	4.64	5.00											
XM2B-05N5X	8.77°	5.23	5.41	5.59	5.79	6.24											
XM2B-05N5.5X	8.4°	5.75	5.94	6.15	6.37	6.86											
XM2B-05N6X	8.07°	6.27	6.48	6.70	6.94	7.49											
XM2B-05N8X	6.96°	8.33	8.62	8.92	9.24	9.97											
XM2B-06N1X	13.15°	1.07	1.14	1.20	1.27	1.41											
XM2B-06N2X	11.61°	2.15	2.28	2.39	2.50	2.70											
XM2B-06N2.5X	10.96°	2.68	2.84	2.97	3.09	3.32											
XM2B-06N3X	10.38°	3.22	3.39	3.54	3.67	3.95											
XM2B-06N3.5X	9.86°	3.75	3.94	4.10	4.25	4.57											
XM2B-06N4X	9.39°	4.28	4.48	4.66	4.82	5.19											
XM2B-06N4.5X	8.97°	4.81	5.03	5.21	5.40	5.81											
XM2B-06N5X	8.57°	5.33	5.57	5.77	5.97	6.43											
XM2B-06N5.5X	8.22°	5.86	6.11	6.32	6.55	7.05											
XM2B-06N6X	7.89°	6.38	6.64	6.87	7.12	7.67											
XM2B-06N7X	7.3°	7.43	7.71	7.98	8.27	8.92											
XM2B-06N8X	6.79°	8.48	8.78	9.09	9.42	10.16											
XM2B-06N9X	6.35°	9.52	9.85	10.20	10.57	11.40											
XM2B-06N10X	5.97°	10.56	10.92	11.31	11.72	12.65											
XM2B-06N12X	5.32°	12.63	13.06	13.52	14.02	15.13											
XM2B-07N2X	11.6°	2.14	2.27	2.39	2.49	2.69											
XM2B-07N4X	9.33°	4.27	4.48	4.65	4.81	5.18											
XM2B-07N6X	7.81°	6.38	6.64	6.87	7.11	7.66											
XM2B-07N8X	6.71°	8.47	8.78	9.09	9.41	10.15											
XM2B-08N2X	11.64°	2.12	2.24	2.35	2.45	2.63											
XM2B-08N4X	9.3°	4.25	4.44	4.61	4.77	5.12											
XM2B-08N5X	8.45°	5.30	5.53	5.72	5.92	6.36											
XM2B-08N6X	7.74°	6.35	6.60	6.83	7.07	7.61											
XM2B-08N8X	6.63°	8.44	8.74	9.04	9.37	10.09											
XM2B-08N10X	5.8°	10.52	10.88	11.26	11.67	12.58											
XM2B-09N2X	11.63°	2.12	2.23	2.34	2.44	2.62											
XM2B-09N4X	9.24°	4.25	4.44	4.60	4.76	5.11											
XM2B-09N6X	7.66°	6.35	6.60	6.82	7.06	7.60											
XM2B-09N8X	6.54°	8.44	8.74	9.04	9.36	10.08											
XM2B-10N2X	11.62°	2.12	2.23	2.33	2.43	2.61											
XM2B-10N3X	10.25°	3.18	3.34	3.48	3.60	3.85											
XM2B-10N4X	9.17°	4.24	4.43	4.60	4.75	5.10											
XM2B-10N5X	8.29°	5.30	5.52	5.71	5.90	6.34											



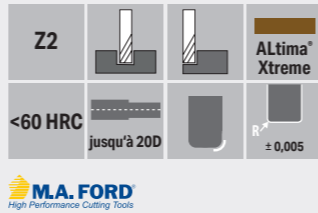
N° d'art.	DC	RE	LU	APMX	DN	OAL	DCON	Angle d'interférence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs. -5%	dès 5 pcs. -10%	dès 10 pcs. -15%	dès 20 pcs. -20%								
									0.5°	1°	1.5°	2°	3°												
XM2B-10N6X	1.0	0.5	6.0	0.8	0.96	50.0	4.0	7.57°	6.35	6.59	6.81	7.05	7.58												
XM2B-10N7X			6.96°					7.39	7.66	7.92	8.20	8.83													
XM2B-10N8X			6.44°					8.44	8.73	9.03	9.35	10.07													
XM2B-10N9X			5.99°					9.48	9.80	10.14	10.50	11.31													
XM2B-10N10X			5.6°					10.52	10.87	11.25	11.65	12.56													
XM2B-10N12X			4.96°					12.59	13.01	13.46	13.95	15.04													
XM2B-10N13X			4.69°					13.62	14.08	14.57	15.10	16.29													
XM2B-10N14X			4.45°					14.66	15.15	15.68	16.25	17.53													
XM2B-10N16X			4.03°					16.73	17.29	17.90	18.55	20.01													
XM2B-10N18X			3.69°					18.79	19.43	20.11	20.85	22.50													
XM2B-10N20X	3.4°	20.86	21.57	22.33	23.15	24.99																			
XM2B-11N2X	1.1	0.55	2.0	0.88	1.06	50.0	4.0	11.61°	2.11	2.22	2.32	2.42	2.60												
XM2B-11N4X			9.09°					4.24	4.43	4.59	4.74	5.08													
XM2B-11N6X			7.47°					6.34	6.59	6.81	7.04	7.57													
XM2B-11N8X			6.34°					8.43	8.73	9.03	9.34	10.06													
XM2B-11N10X			5.5°					10.51	10.87	11.24	11.64	12.54													
XM2B-12N4X			9.05°					4.22	4.40	4.55	4.70	5.04													
XM2B-12N8X	6.25°	8.41	8.70	8.99	9.30	10.01																			
XM2B-12N10X	5.41°	10.49	10.84	11.21	11.60	12.50																			
XM2B-12N12X	4.77°	12.56	12.97	13.42	13.90	14.98																			
XM2B-14N8X	1.4	0.7	8.0	0.96	1.15	50.0	4.0	6.04°	8.38	8.66	8.95	9.26	9.96												
XM2B-14N12X			4.56°					12.53	12.94	13.38	13.86	14.93													
XM2B-14N16X			3.67°					16.66	17.22	17.82	18.46	19.90													
XM2B-15N4X			8.82°					4.20	4.36	4.51	4.65	4.97													
XM2B-15N6X	7.08°	6.29	6.52	6.73	6.95	7.46																			
XM2B-15N8X	5.92°	8.38	8.66	8.95	9.25	9.94																			
XM2B-15N10X	5.08°	10.46	10.80	11.16	11.55	12.43																			
XM2B-15N12X	4.45°	12.53	12.94	13.38	13.85	14.92																			
XM2B-15N14X	3.96°	14.60	15.08	15.60	16.15	17.40																			
XM2B-15N16X	3.57°	16.66	17.22	17.81	18.45	19.89																			
XM2B-15N18X	3.25°	18.73	19.36	20.03	20.75	22.38																			
XM2B-15N20X	2.98°	20.80	21.50	22.25	23.05	-																			
XM2B-16N8X	1.6	0.8	8.0	1.28	1.54	50.0	4.0	5.8°	8.38	8.66	8.94	9.25	9.93												
XM2B-16N12X			4.34°					12.53	12.94	13.37	13.85	14.90													
XM2B-16N16X			3.47°					16.66	17.21	17.81	18.44	19.88													
XM2B-16N20X			2.89°					20.80	21.49	22.24	23.04	-													
XM2B-18N8X	1.8	0.90	8.00	1.44	1.73	50.0	4.0	5.55°	8.36	8.63	8.91	9.21	9.88												
XM2B-18N12X			4.11°					12.50	12.91	13.34	13.81	14.85													
XM2B-18N16X			3.26°					16.64	17.19	17.77	18.41	19.83													
XM2B-18N20X			2.7°					20.77	21.46	22.21	23.01	-													
XM2B-20N3X	2.0	1.0	3.0	1.6	1.92	50.0	4.0	9.72°	3.11	3.22	3.32	3.42	3.62												
XM2B-20N4X			8.32°					4.16	4.31	4.44	4.57	4.86													
XM2B-20N6X			6.46°					6.26	6.46	6.66	6.87	7.35													
XM2B-20N8X			5.27°					8.34	8.60	8.88	9.17	9.84													
XM2B-20N10X			4.46°					10.41	10.74	11.09	11.47	12.32													
XM2B-20N12X			3.86°					12.48	12.88	13.31	13.77	14.81													
XM2B-20N13X			3.62°					13.51	13.95	14.42	14.92	16.05													
XM2B-20N14X			3.4°					14.55	15.02	15.53	16.07	17.29													
XM2B-20N16X			3.04°					16.62	17.16	17.74	18.37	19.78													
XM2B-20N18X			2.75°					18.68	19.30	19.96	20.67	-													
XM2B-20N20X	2.51°	20.75	21.44	22.18	22.97	-																			
XM2B-20N22X	2.31°	22.82	23.58	24.39	25.27	-																			
XM2B-20N25X	2.06°	25.92	26.79	27.72	28.72	-																			
XM2B-20N30X	1.75°	31.09	32.14	33.26	-	-																			
XM2B-20N35X	1.52°	36.26	37.48	38.80	-	-																			
XM2B-20N40X	1.34°	41.42	42.83	-	-	-																			
XM2B-25N6X	2.5	1.25	6.0	2.0	2.4	50.0	4.0	5.62°	6.22	6.41	6.60	6.80	7.25												
XM2B-25N10X			3.69°					10.37	10.69	11.03	11.40	12.23													
XM2B-25N15X			2.59°					15.54	16.04	16.58	17.15	-													
XM2B-25N20X			1.99°					20.71	21.39	22.12	-	-													
XM2B-25N25X			1.62°					25.88	26.74	27.66	-	-													
XM2B-25N30X			1.36°					31.05	32.09	-	-	-													
XM2B-30N8X	3.0	1.5	8.0	2.4	2.88	60.0	6.0	7.04°	8.27	8.51	8.77	9.04	9.65												
XM2B-30N10X			6.05°					10.34	10.65	10.98	11.34	12.14													
XM2B-30N13X			5°					13.44	13.86	14.31	14.79	15.87													

XM2R série

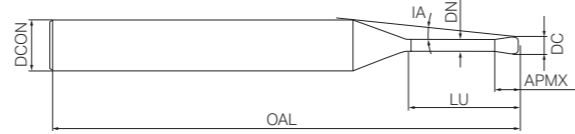
TuffCut® XM

Fraise en bout torique

2-lèvres
détalonnées



M.A. FORD
High Performance Cutting Tools



N° d'art.	DC	RE	LU	APMX	DN	OAL	DCON	Angle d'interfé- rence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs. -5%	dès 5 pcs. -10%	dès 10 pcs. -15%	dès 20 pcs. -20%
									0.5°	1°	1.5°	2°	3°				
									XM2R-02N05-002	0.2	0.02	0.5	0.16				
XM2R-02N1-002	1.0	1.04	1.08	1.12	1.16	1.25											
XM2R-02N2-002	2.0	2.08	2.15	2.23	2.31	2.50											
XM2R-02N05-005	0.5	0.52	0.54	0.56	0.58	0.62											
XM2R-02N1-005	1.0	1.04	1.08	1.11	1.15	1.24											
XM2R-02N15-005	1.5	1.56	1.61	1.67	1.73	1.87											
XM2R-02N2-005	2.0	2.08	2.15	2.22	2.30	2.49											
XM2R-03N1-002	1.0	1.06	1.12	1.17	1.23	1.33											
XM2R-03N2-002	2.0	2.11	2.21	2.29	2.38	2.57											
XM2R-03N3-002	3.0	3.16	3.28	3.40	3.53	3.81											
XM2R-03N1-005	0.3	0.05	1.0	0.24	0.27	50.0	4.0	13.14°	1.06	1.12	1.17	1.22	1.32				
XM2R-03N15-005			1.5					1.59	1.66	1.73	1.80	1.94					
XM2R-03N2-005			2.0					2.11	2.21	2.29	2.37	2.56					
XM2R-03N25-005			2.5					2.64	2.75	2.84	2.95	3.18					
XM2R-03N3-005			3.0					3.16	3.28	3.40	3.52	3.81					
XM2R-04N1-002	0.4	0.02	1.0	0.32	0.37	50.0	4.0	13.04°	1.06	1.12	1.17	1.23	1.33				
XM2R-04N2-002			2.0					2.11	2.21	2.29	2.38	2.57					
XM2R-04N3-002			3.0					3.16	3.28	3.40	3.53	3.81					
XM2R-04N4-002			4.0					4.20	4.35	4.51	4.68	5.06					
XM2R-04N1-005			1.0					1.06	1.12	1.17	1.22	1.32					
XM2R-04N15-005	1.5	1.56	1.66	1.73	1.80	1.94											
XM2R-04N2-005	2.0	2.11	2.21	2.29	2.37	2.56											
XM2R-04N25-005	2.5	2.64	2.75	2.84	2.95	3.18											
XM2R-04N3-005	3.0	3.16	3.28	3.40	3.52	3.81											
XM2R-04N35-005	3.5	3.68	3.82	3.95	4.10	4.43											
XM2R-04N4-005	4.0	4.20	4.35	4.51	4.67	5.05											
XM2R-04N1-01	0.1	0.05	1.0	0.32	0.37	50.0	4.0	13.17°	1.06	1.11	1.16	1.21	1.31				
XM2R-04N2-01			2.0					2.11	2.20	2.28	2.37	2.55					
XM2R-04N3-01			3.0					3.16	3.28	3.39	3.52	3.79					
XM2R-04N4-01			4.0					4.20	4.35	4.50	4.67	5.04					
XM2R-05N1-002			1.0					1.06	1.12	1.17	1.23	1.33					
XM2R-05N2-002	2.0	1.13°	2.11	2.21	2.29	2.38	2.57										
XM2R-05N3-002	3.0	10.35°	3.16	3.28	3.40	3.53	3.81										
XM2R-05N4-002	4.0	9.39°	4.20	4.35	4.51	4.68	5.06										
XM2R-05N6-002	6.0	7.92°	6.27	6.49	6.73	6.98	7.54										
XM2R-05N1-005	0.5	0.05	1.0	0.4	0.47	50.0	4.0	13.05°	1.06	1.12	1.17	1.22	1.32				
XM2R-05N2-005			2.0					11.56°	2.11	2.21	2.29	2.37	2.56				
XM2R-05N3-005			3.0					10.38°	3.16	3.28	3.40	3.52	3.81				
XM2R-05N4-005			4.0					9.42°	4.20	4.35	4.51	4.67	5.05				
XM2R-05N5-005			5.0					8.62°	5.24	5.42	5.61	5.82	6.29				
XM2R-05N6-005	6.0	7.94°	6.27	6.49	6.72	6.97	7.53										
XM2R-05N1-01	0.1	0.05	1.0	0.4	0.47	50.0	4.0	13.13°	1.06	1.11	1.16	1.21	1.31				
XM2R-05N2-01			2.0					11.63°	2.11	2.20	2.28	2.37	2.55				
XM2R-05N3-01			3.0					10.44°	3.16	3.28	3.39	3.52	3.79				
XM2R-05N4-01			4.0					9.46°	4.20	4.35	4.50	4.67	5.04				
XM2R-05N5-01			5.0					8.65°	5.24	5.42	5.61	5.82	6.28				
XM2R-05N6-01	6.0	7.97°	6.27	6.49	6.72	6.97	7.52										
XM2R-06N2-002	0.6	0.02	2.0	0.48	0.57	50.0	4.0	11.24°	2.17	2.31	2.44	2.55	2.77				
XM2R-06N4-002			4.0					9.15°	4.29	4.51	4.69	4.86	5.26				
XM2R-06N6-002			6.0					7.71°	6.40	6.66	6.90	7.16	7.74				
XM2R-06N2-005			2.0					11.27°	2.17	2.31	2.43	2.55	2.76				
XM2R-06N4-005			4.0					9.18°	4.29	4.51	4.68	4.86	5.25				
XM2R-06N6-005	6.0	7.73°	6.40	6.66	6.90	7.16	7.74										
XM2R-06N8-005	8.0	6.68°	8.49	8.80	9.12	9.46	10.22										
XM2R-06N10-005	10.0	5.88°	10.57	10.94	11.33	11.76	12.71										
XM2R-06N2-01	2.0	11.34°	2.16	2.30	2.43	2.54	2.75										
XM2R-06N4-01	4.0	9.22°	4.29	4.50	4.68	4.85	5.24										
XM2R-06N6-01	6.0	7.76°	6.39	6.66	6.90	7.15	7.72										
XM2R-06N8-01	8.0	6.7°	8.48	8.80	9.11	9.45	10.21										
XM2R-06N10-01	10.0	5.89°	10.57	10.94	11.33	11.75	12.70										
XM2R-07N4-005	0.7	0.05	4.0	0.56	0.67	50.0	4.0	9.07°	4.29	4.51	4.68	4.86	5.25				
XM2R-07N6-005			6.0					7.62°	6.40	6.66	6.90	7.16	7.74				
XM2R-07N4-01			4.0					9.11°	4.29	4.50	4.68	4.85	5.24				
XM2R-07N6-01			6.0					7.65°	6.39	6.66	6.90	7.15	7.72				
XM2R-08N4-002			0.8					0.02	4.0	0.64	0.76	50.0	4.0				
XM2R-08N6-002	6.0	7.51°		6.37	6.63	6.87	7.12		7.70								
XM2R-08N4-005	4.0	8.99°		4.27	4.47	4.65	4.82		5.21								
XM2R-08N6-005	6.0	7.52°		6.37	6.63	6.86	7.12		7.69								
XM2R-08N8-005	8.0	6.47°		8.45	8.76	9.08	9.42		10.18								
XM2R-08N12-005	12.0	5.05°	12.61	13.04	13.51	14.02	15.15										



N° d'art.	DC	RE	LU	APMX	DN	OAL	DCON	Angle d'interfé- rence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs. -5%	dès 5 pcs. -10%	dès 10 pcs. -15%	dès 20 pcs. -20%
									0.5°	1°	1.5°	2°	3°				
									XM2R-08N4-01	0.8	0.1	4.0	0.64				
XM2R-08N6-01	6.0	7.55°	6.37	6.62	6.86	7.11	7.68										
XM2R-08N8-01	8.0	6.49°	8.45	8.76	9.07	9.41	10.17										
XM2R-08N12-01	12.0	5.06°	12.60	13.04	13.51	14.01	15.14										
XM2R-08N4-02	4.0	9.12°	4.26	4.46	4.63	4.80	5.17										
XM2R-08N6-02	6.0	7.62°	6.36	6.61	6.85	7.10	7.66										
XM2R-08N8-02	8.0	6.54°	8.45	8.75	9.06	9.40	10.14										
XM2R-08N12-02	12.0	5.09°	12.60	13.03	13.50	14.00	15.11										
XM2R-10N2-002	2.00	10.92°	2.15	2.28	2.40	2.52	2.73										
XM2R-10N4-002	4.00	8.72°	4.27	4.47	4.65	4.82	5.21										
XM2R-10N6-002	6.00	7.26°	6.37	6.63	6.87	7.12	7.70										
XM2R-10N8-002	8.00	6.22°	8.46	8.77	9.08	9.42	10.19										
XM2R-10N10-002	10.00	5.44°	10.53	10.91	11.30	11.72	12.67										
XM2R-10N12-002	12.00	4.83°	12.61	13.05	13.52	14.02	15.16										
XM2R-10N2-005	2.00	10.96°	2.15	2.28	2.40	2.51	2.72										
XM2R-10N3-005	3.00	9.73°	3.21	3.38	3.53	3.67	3.96										
XM2R-10N4-005	4.00	8.75°	4.27	4.47	4.65	4.82	5.21										
XM2R-10N5-005	5.00	7.95°	5.32	5.55	5.75	5.97	6.45										
XM2R-10N6-005	6.00	7.28°	6.37	6.63	6.86	7.12	7.69										
XM2R-10N8-005	8.00	6.23°	8.45	8.76	9.08	9.42	10.18										
XM2R-10N10-005	10.00	5.45°	10.53	10.90	11.30	11.72	12.67										
XM2R-10N12-005	12.00	4.84°	12.61	13.04	13.51	14.01	15.15										
XM2R-10N16-005	16.00	3.95°	16.74	17.32	17.95	18.62	20.12										
XM2R-10N20-005	20.00	3.34°	20.88	21.60	22.38	23.22	25.10										
XM2R-10N2-01	2.0	11.03°	2.14	2.27	2.39	2.50	2.71										
XM2R-10N3-01	3.0	9.79°	3.21	3.38	3.53	3.66	3.95										
XM2R-10N4-01	4.0	8.8°	4.26	4.47	4.64	4.81	5.19										
XM2R-10N5-01	5.0	7.99°	5.32	5.55	5.75	5.96	6.44										
XM2R-10N6-01	6.0	7.31°	6.37	6.62	6.86	7.11	7.68										
XM2R-10N8-01	8.0	6.25°	8.45	8.76	9.07	9.41	10.17										
XM2R-10N10-01	10.0	5.46°	10.53	10.90	11.29	11.71	12.65										
XM2R-10N12-01	12.0	4.85°	12.60	13.04	13.51	14.01	15.14										
XM2R-10N16-01	16.0	3.96°	16.74	17.32	17.94	18.61	20.11										

N° d'art.	DC	RE	LU	APMX	DN	OAL	DCON	Angle d'interférence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs.	dès 5 pcs.	dès 10 pcs.	dès 20 pcs.
									0.5°	1°	1.5°	2°	3°	-5%	-10%	-15%	-20%
XM2R-175N10-02	1.75	0.2	10.0	1.40	1.68	50.0	4.0	4.56°	10.46	10.82	11.20	11.61	12.54				
XM2R-175N15-02			15.0			15.63		16.16	16.74	17.36	18.75						
XM2R-175N20-02			20.0			20.80		21.51	22.28	23.11	-						
XM2R-175N5-03		0.3	5.0			7.11°		5.25	5.46	5.65	5.85	6.30					
XM2R-175N10-03			10.0			4.59°		10.45	10.81	11.19	11.60	12.51					
XM2R-175N15-03			15.0			3.39°		15.62	16.16	16.73	17.35	18.73					
XM2R-175N20-03	20.0	2.69°	20.79	21.51	22.27	23.10	-										
XM2R-20N4-01	2.0	0.1	4.0	1.60	1.92	50.0	4.0	7.36°	4.21	4.38	4.54	4.71	5.08				
XM2R-20N6-01			6.0			5.86°		6.29	6.53	6.76	7.01	7.57					
XM2R-20N8-01			8.0			4.87°		8.37	8.66	8.97	9.31	10.05					
XM2R-20N12-01			12.0			3.64°		12.51	12.94	13.41	13.91	15.03					
XM2R-20N16-01			16.0			2.9°		16.65	17.22	17.84	18.51	-					
XM2R-20N20-01			20.0			2.42°		20.78	21.50	22.27	23.11	-					
XM2R-20N25-01		25.0	2°			25.95		26.85	27.82	-	-						
XM2R-20N30-01		30.0	1.7°			31.12		32.20	33.36	-	-						
XM2R-20N4-02		4.0	7.46°			4.20		4.37	4.53	4.69	5.06						
XM2R-20N6-02		6.0	5.93°			6.29		6.52	6.75	6.99	7.54						
XM2R-20N8-02		8.0	4.91°			8.37		8.66	8.96	9.29	10.03						
XM2R-20N12-02		12.0	3.66°			12.51		12.94	13.40	13.89	15.00						
XM2R-20N16-02	16.0	2.92°	16.64	17.22	17.83	18.49	-										
XM2R-20N20-02	20.0	2.43°	20.78	21.49	22.26	23.09	-										
XM2R-20N25-02	25.0	2°	25.95	26.84	27.80	-	-										
XM2R-20N30-02	30.0	1.71°	31.11	32.19	33.35	-	-										
XM2R-20N4-03	4.0	7.56°	4.20	4.37	4.52	4.68	5.03										
XM2R-20N6-03	6.0	5.99°	6.28	6.51	6.74	6.98	7.52										
XM2R-20N8-03	8.0	4.96°	8.36	8.65	8.95	9.28	10.01										
XM2R-20N12-03	12.0	3.69°	12.50	12.93	13.39	13.88	14.98										
XM2R-20N16-03	16.0	2.93°	16.64	17.21	17.82	18.48	-										
XM2R-20N20-03	20.0	2.44°	20.77	21.49	22.25	23.08	-										
XM2R-20N25-03	25.0	2.01°	25.94	26.84	27.79	28.82	-										
XM2R-20N30-03	30.0	1.71°	31.11	32.18	33.34	-	-										
XM2R-20N6-05	6.0	6.11°	6.28	6.50	6.71	6.95	7.47										
XM2R-20N8-05	8.0	5.04°	8.36	8.64	8.93	9.25	9.96										
XM2R-20N12-05	12.0	3.73°	12.50	12.92	13.36	13.85	14.93										
XM2R-20N16-05	16.0	2.96°	16.63	17.19	17.80	18.45	-										
XM2R-20N20-05	20.0	2.46°	20.77	21.47	22.23	23.05	-										
XM2R-20N25-05	25.0	2.03°	25.94	26.82	27.77	28.79	-										
XM2R-20N30-05	30.0	1.72°	31.10	32.17	33.31	-	-										
XM2R-20N6-08	6.0	6.31°	6.26	6.48	6.68	6.90	7.40										
XM2R-20N8-08	8.0	5.18°	8.35	8.62	8.90	9.20	9.88										
XM2R-20N12-08	12.0	3.81°	12.49	12.89	13.33	13.80	14.86										
XM2R-20N16-08	16.0	3.01°	16.62	17.17	17.77	18.40	19.83										
XM2R-20N20-08	20.0	2.49°	20.76	21.45	22.20	23.00	-										
XM2R-20N25-08	25.0	2.05°	25.93	26.80	27.74	28.75	-										
XM2R-20N30-08	30.0	1.74°	31.09	32.15	33.28	-	-										
XM2R-25N10-01	2.5	0.1	10.0	2.0	2.40	50.0	4.0	3.36°	10.41	10.77	11.16	11.57	12.50				
XM2R-25N20-01			20.0			1.89°		20.75	21.47	22.24	-	-					
XM2R-25N30-01			30.0			1.32°		31.09	32.17	-	-	-					
XM2R-25N10-02			10.0			3.39°		10.41	10.77	11.15	11.56	12.48					
XM2R-25N20-02			20.0			1.9°		20.75	21.46	22.23	-	-					
XM2R-25N30-02			30.0			1.32°		31.08	32.16	-	-	-					
XM2R-25N10-03		10.0	3.42°			10.41		10.76	11.14	11.54	12.46						
XM2R-25N20-03		20.0	1.91°			20.74		21.46	22.22	-	-						
XM2R-25N30-03		30.0	1.32°			31.08		32.15	-	-	-						
XM2R-25N10-05		10.0	3.47°			10.40		10.75	11.12	11.51	12.41						
XM2R-25N20-05		20.0	1.92°			20.74		21.44	22.20	-	-						
XM2R-25N30-05		30.0	1.33°			31.07		32.14	-	-	-						
XM2R-30N6-01	3.0	0.1	6.0	2.4	2.88	50.0	6.0	7.4°	6.25	6.47	6.70	6.95	7.50				
XM2R-30N8-01			8.0			6.32°		8.32	8.61	8.92	9.25	9.99					
XM2R-30N12-01			12.0			4.89°		12.46	12.89	13.35	13.85	14.96					
XM2R-30N16-01			16.0			3.99°		16.59	17.17	17.78	18.45	19.94					
XM2R-30N18-01			18.0			3.65°		18.66	19.31	20.00	20.75	22.42					
XM2R-30N20-01			20.0			3.36°		20.73	21.45	22.22	23.05	24.91					
XM2R-30N30-01			30.0			2.42°		31.06	32.14	33.30	34.55	-					
XM2R-30N35-01			35.0			2.12°		36.23	37.49	38.84	40.29	-					
XM2R-30N6-02			6.0			7.46°		6.25	6.46	6.69	6.93	7.48					
XM2R-30N8-02			8.0			6.36°		8.32	8.60	8.91	9.23	9.97					
XM2R-30N12-02		12.0	4.92°			12.45		12.88	13.34	13.83	14.94						
XM2R-30N16-02		16.0	4°			16.59		17.16	17.77	18.43	19.91						
XM2R-30N18-02		18.0	3.66°			18.66		19.30	19.99	20.73	22.40						
XM2R-30N20-02		20.0	3.38°			20.72		21.44	22.21	23.03	24.88						
XM2R-30N30-02		30.0	2.43°			31.06		32.14	33.29	34.53	-						
XM2R-30N35-02		35.0	2.13°			36.23		37.48	38.83	40.28	-						
XM2R-30N6-03		6.0	7.53°			6.24		6.46	6.68	6.92	7.46						
XM2R-30N8-03		8.0	6.41°			8.32		8.60	8.90	9.22	9.94						
XM2R-30N12-03		12.0	4.94°			12.45		12.87	13.33	13.82	14.91						
XM2R-30N16-03		16.0	4.02°			16.59		17.15	17.76	18.42	19.89						
XM2R-30N18-03		18.0	3.68°			18.65		19.29	19.98	20.72	22.37						
XM2R-30N20-03		20.0	3.39°			20.72		21.43	22.20	23.02	24.86						
XM2R-30N30-03		30.0	2.43°			31.06		32.13	33.28	34.52	-						
XM2R-30N35-03		35.0	2.13°			36.23		37.48	38.82	40.26	-						
XM2R-30N8-05		8.0	6.51°			8.31		8.58	8.87	9.19	9.89						
XM2R-30N12-05		12.0	5°			12.44		12.86	13.31	13.79	14.87						
XM2R-30N16-05		16.0	4.06°			16.58		17.14	17.74	18.39	19.84						
XM2R-30N18-05		18.0	3.71°			18.65		19.28	19.96	20.69	22.33						
XM2R-30N20-05		20.0	3.42°			20.71		21.42	22.17	22.99	24.81						
XM2R-30N30-05		30.0	2.45°			31.05		32.12	33.26	34.49	-						
XM2R-30N35-05	35.0	2.14°	36.22	37.46	38.80	40.23	-										
XM2R-30N8-10	8.0	6.76°	8.29	8.55	8.82	9.11	9.77										
XM2R-30N12-10	12.0	5.15°	12.43	12.83	13.25	13.71	14.74										
XM2R-30N16-10	16.0	4.16°	16.56	17.10	17.69	18.31	19.72										
XM2R-30N18-10	18.0	3.79°	18.63	19.24	19.90	20.61	22.20										
XM2R-30N20-10	20.0	3.49°	20.70	21.38	22.12	22.91	24.69										
XM2R-30N30-10	30.0	2.48°	31.03	32.08	33.20	34.41	-										
XM2R-30N35-10	35.0	2.17°	36.20	37.43	38.74	40.16	-										



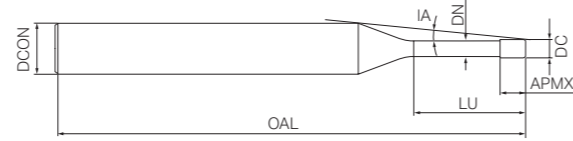
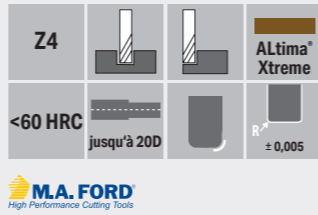
N° d'art.	DC	RE	LU	APMX	DN	OAL	DCON	Angle d'interférence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs.	dès 5 pcs.	dès 10 pcs.	dès 20 pcs.
									0.5°	1°	1.5°	2°	3°	-5%	-10%	-15%	-20%
XM2R-40N8-01	4.0	0.1	8.0	3.2	3.86	55.0	6.0	4.9°	8.31	8.59	8.90	9.23	9.97				
XM2R-40N12-01			12.0			3.66°		12.44	12.87	13.33	13.83	14.94					
XM2R-40N16-01			16.0			2.91°		16.57	17.15	17.76	18.43	-					
XM2R-40N20-01			20.0			2.42°		20.71	21.43	22.20	23.03	-					
XM2R-40N30-01			30.0			1.71°		31.05	32.12	33.28	-	-					
XM2R-40N35-01			35.0			1.49°		36.21	37.47	-	-	-					
XM2R-40N45-01			45.0			1.18°		46.55	48.17	-	-	-					
XM2R-40N8-02			8.0			4.94°		8.30	8.58	8.89	9.21	9.94					
XM2R-40N12-02			12.0			3.68°		12.44	12.86	13.32	13.81	14.92					
XM2R-40N16-02			16.0			2.93°		16.57	17.14	17.75	18.41	-					
XM2R-40N20-02			20.0			2.43°		20.71	21.42	22.19	23.01	-					
XM2R-40N30-02			30.0			1.71°		31.04	32.12	33.27	-	-					
XM2R-40N35-02			35.0			1.49°		36.21	37.47	-	-	-					
XM2R-40N45-02			45.0			1.18°		46.55	48.16	-	-	-					
XM2R-40N8-03			8.0			4.99°		8.30	8.58	8.88	9.20	9.92					
XM2R-40N12-03		12.0	3.7°			12.43		12.86	13.31	13.80	14.89						
XM2R-40N16-03		16.0	2.94°			16.57		17.13	17.74	18.40	-						
XM2R-40N20-03		20.0	2.44°			20.70		21.41	22.18	23.00	-						
XM2R-40N30-03		30.0	1.72°			31.04		32.11	33.26	-	-						
XM2R-40N35-03		35.0	1.49°			36.21		37.46	-	-	-						
XM2R-40N45-03		45.0	1.19°			46.54		48.16	-	-	-						
XM2R-40N12-05		12.0	3.75°			12.43		12.84	13.29	13.77	14.84						
XM2R-40N16-05		16.0	2.97°			16.56		17.12	17.72	18.37	-						
XM2R-40N20-05		20.0	2.47°			20.70		21.40	22.15	22.97	-						
XM2R-40N30-05		30.0	1.73°			31.03		32.10	33.24	-	-						
XM2R-40N35-05		35.0	1.5°			36.20		37.44	-	-	-						
XM2R-40N45-05		45.0	1.19°			46.54		48.14	-	-	-						
XM2R-40N12-10		12.0	3.88°			12.41		12.81	13.23	13.69	14.72						
XM2R-40N16-10		16.0	3.05°			16.54		17.09	17.67	18.29	19.70						
XM2R-40N20-10		20.0	2.52°			20.68		21.36	22.10	22.89	-						
XM2R-40N30-10	30.0	1.75°	31.02	32.06	33.18	-	-										
XM2R-40N35-10	35.0	1.52°	36.18	37.41	38.73	-	-										
XM2R-40N45-10	45.0	1.2°	46.52	48.11	-	-	-										
XM2R-50N20-01	5.0	0.1	20.0	4.0	4.85	65.0	6.0	1.32°	20.7	21.42	-	-	-				
XM2R-50N40-01			40.0			0.69°		41.38	-	-	-	-					
XM2R-50N2																	

XM4R série

TuffCut® XM

Fraise en bout torique

4-lèvres
détalonnées



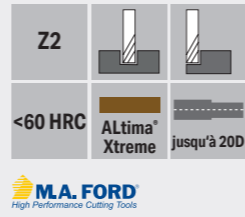
N° d'art.	DC	RE	LU	APMX	DN	OAL	DCON	Angle d'interférence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs. -5%	dès 5 pcs. -10%	dès 10 pcs. -15%	dès 20 pcs. -20%										
									0.5°	1°	1.5°	2°	3°														
									XM4R-10N4-005	1.0	0.05	4.0	0.8					0.96	50.0	4.0	8.75°	4.27	4.47	4.65	4.82	5.21	-
XM4R-10N6-005	6.0	7.28°	6.37	6.63	6.86	7.12	7.69																				
XM4R-10N8-005	8.0	6.23°	8.45	8.76	9.08	9.42	10.18																				
XM4R-10N10-005	10.0	5.45°	10.53	10.90	11.30	11.72	12.67																				
XM4R-10N12-005	12.0	4.84°	12.61	13.04	13.51	14.02	15.15																				
XM4R-10N16-005	16.0	3.95°	16.74	17.32	17.95	18.62	20.12																				
XM4R-10N20-005	20.0	3.34°	20.88	21.60	22.38	23.22	25.10																				
XM4R-10N4-01	4.0	8.8°	4.26	4.47	4.64	4.81	5.19																				
XM4R-10N6-01	6.0	7.31°	6.37	6.62	6.86	7.11	7.68																				
XM4R-10N8-01	8.0	6.25°	8.45	8.76	9.07	9.41	10.17																				
XM4R-10N10-01	10.0	5.46°	10.53	10.90	11.29	11.71	12.65																				
XM4R-10N12-01	12.0	4.85°	12.60	13.04	13.51	14.01	15.14																				
XM4R-10N16-01	16.0	3.96°	16.74	17.32	17.94	18.61	20.11																				
XM4R-10N20-01	20.0	3.35°	20.87	21.60	22.37	23.21	25.08																				
XM4R-15N4-005	1.5	0.05	4.0	1.2	1.44	50.0	4.0	8.12°	4.23			4.42		4.59	4.76	5.14	-				-	-	-				
XM4R-15N6-005			6.0					5.6°	8.41			8.71		9.02	9.36	10.11											
XM4R-15N8-005			8.0					4.27°	12.55			12.99		13.46	13.96	15.09											
XM4R-15N10-005			10.0					3.62°	15.65			16.20		16.78	17.41	18.82											
XM4R-15N12-005			12.0					2.89°	20.82			21.55		22.32	23.16	-											
XM4R-15N16-005			16.0					2.9°	20.82			21.54		22.32	23.15	-											
XM4R-15N20-005			20.0					8.17°	4.23			4.42		4.58	4.75	5.13											
XM4R-15N4-01			4.0					5.62°	8.41			8.71		9.02	9.35	10.10											
XM4R-15N6-01			6.0					4.28°	12.55			12.98		13.45	13.95	15.07											
XM4R-15N8-01			8.0					3.63°	15.65			16.19		16.77	17.40	18.80											
XM4R-15N10-01			10.0					2.9°	20.82	21.54	22.32	23.15	-														
XM4R-15N12-01			12.0					8.17°	4.23	4.42	4.58	4.75	5.13														
XM4R-15N16-01			16.0					5.62°	8.41	8.71	9.02	9.35	10.10														
XM4R-15N20-01			20.0					4.28°	12.55	12.98	13.45	13.95	15.07														
XM4R-20N4-005			2.0					0.05	4.0	1.6	1.92	50.0	4.0	8.75°	4.27	4.47		4.65	4.82	5.21				-	-	-	-
XM4R-20N6-005									6.0					7.28°	6.37	6.63		6.86	7.12	7.69							
XM4R-20N8-005									8.0					6.23°	8.45	8.76		9.08	9.42	10.18							
XM4R-20N10-005									10.0					5.45°	10.53	10.90		11.30	11.72	12.67							
XM4R-20N12-005									12.0					4.84°	12.61	13.04		13.51	14.02	15.15							
XM4R-20N16-005									16.0					3.95°	16.74	17.32		17.95	18.62	20.12							
XM4R-20N20-005									20.0					3.34°	20.88	21.60		22.38	23.22	25.10							
XM4R-20N4-01									4.0					8.8°	4.26	4.47		4.64	4.81	5.19							
XM4R-20N6-01									6.0					7.31°	6.37	6.62		6.86	7.11	7.68							
XM4R-20N8-01									8.0					6.25°	8.45	8.76		9.07	9.41	10.17							
XM4R-20N10-01	10.0	5.46°		10.53	10.90	11.29	11.71		12.65																		
XM4R-20N12-01	12.0	4.85°		12.60	13.04	13.51	14.01		15.14																		
XM4R-20N16-01	16.0	3.96°		16.74	17.32	17.94	18.61		20.11																		
XM4R-20N20-01	20.0	3.35°		20.87	21.60	22.37	23.21		25.08																		
XM4R-20N4-02	4.0	8.12°		4.23	4.42	4.59	4.76		5.14																		
XM4R-20N6-02	6.0	5.6°		8.41	8.71	9.02	9.36		10.11																		
XM4R-20N8-02	8.0	4.27°		12.55	12.99	13.46	13.96		15.09																		
XM4R-20N10-02	10.0	3.62°		15.65	16.20	16.78	17.41		18.82																		
XM4R-20N12-02	12.0	2.89°		20.82	21.55	22.32	23.16		-																		
XM4R-20N16-02	16.0	2.9°		20.82	21.54	22.32	23.15		-																		
XM4R-20N20-02	20.0	8.17°		4.23	4.42	4.58	4.75		5.13																		
XM4R-20N25-02	25.0	5.62°		8.41	8.71	9.02	9.35		10.10																		
XM4R-20N30-02	30.0	4.28°		12.55	12.98	13.45	13.95		15.07																		
XM4R-20N4-03	4.0	3.63°		15.65	16.19	16.77	17.40		18.80																		
XM4R-20N6-03	6.0	2.9°	20.82	21.54	22.32	23.15	-																				
XM4R-20N8-03	8.0	2.44°	20.77	21.49	22.25	23.08	-																				
XM4R-20N10-03	10.0	7.76°	4.19	4.35	4.50	4.65	4.98																				
XM4R-20N12-03	12.0	6.11°	6.28	6.50	6.71	6.95	7.47																				
XM4R-20N16-03	16.0	5.04°	8.36	8.64	8.93	9.25	9.96																				
XM4R-20N20-03	20.0	3.73°	12.50	12.92	13.36	13.85	14.93																				
XM4R-20N25-03	25.0	2.96°	16.63	17.19	17.80	18.45	-																				
XM4R-20N30-03	30.0	2.46°	20.77	21.47	22.23	23.05	-																				
XM4R-25N8-01	2.50	0.10	8.0	2.0	2.4	50.0	4.0	3.98°	8.34	8.63	8.94	9.27	10.02	-	-	-	-										
XM4R-25N16-01			16.0					2.29°	16.62	17.19	17.81	18.47	-														
XM4R-25N20-01			20.0					1.89°	20.75	21.47	22.24	-	-														
XM4R-25N8-02			8.0					4.02°	8.34	8.63	8.93	9.26	9.99														
XM4R-25N16-02			16.0					2.3°	16.61	17.18	17.80	18.46	-														
XM4R-25N20-02			20.0					1.9°	20.75	21.46	22.23	-	-														
XM4R-25N12-03			12.0					2.95°	12.47	12.90	13.35	13.84	-														
XM4R-25N20-03			20.0					1.91°	20.74	21.46	22.22	-	-														
XM4R-25N12-05			12.0					2.99°	12.47	12.88	13.33	13.81	-														
XM4R-25N20-05			20.0					1.92°	20.74	21.44	22.20	-	-														



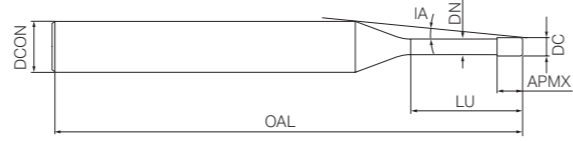
N° d'art.	DC	RE	LU	APMX	DN	OAL	DCON	Angle d'interférence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs. -5%	dès 5 pcs. -10%	dès 10 pcs. -15%	dès 20 pcs. -20%										
									0.5°	1°	1.5°	2°	3°														
									XM4R-30N8-01	3.0	0.1	8.0	2.44					2.88	50.0	6.0	6.32°	8.32	8.61	8.92	9.25	9.99	-
XM4R-30N16-01	16.0	3.99°	16.59	17.17	17.78	18.45	19.94																				
XM4R-30N25-01	25.0	2.82°	25.90	26.79	27.76	28.80	-																				
XM4R-30N30-01	30.0	2.42°	31.06	32.14	33.30	34.55	-																				
XM4R-30N8-02	8.0	6.36°	8.32	8.60	8.91	9.23	9.97																				
XM4R-30N12-02	12.0	4.92°	12.45	12.88	13.34	13.83	14.94																				
XM4R-30N16-02	16.0	4°	16.59	17.16	17.77	18.43	19.91																				
XM4R-30N20-02	20.0	3.38°	20.72	21.44	22.21	23.03	24.88																				
XM4R-30N25-02	25.0	2.82°	25.89	26.79	27.75	28.78	-																				
XM4R-30N30-02	30.0	2.43°	31.06	32.14	33.29	34.53	-																				
XM4R-30N8-03	8.0	6.41°	8.32	8.60	8.90	9.22	9.94																				
XM4R-30N16-03	16.0	4.02°	16.59	17.15	17.76	18.42	19.89																				
XM4R-30N20-03	20.0	3.39°	20.72	21.43	22.20	23.02	24.86																				
XM4R-30N25-03	25.0	2.83°	25.89	26.78	27.74	28.77	-																				
XM4R-30N30-03	30.0	2.43°	31.06	32.13	33.28	34.52	-																				
XM4R-30N8-05	8.0	6.51°	8.31	8.58	8.87	9.19	9.89																				
XM4R-30N12-05	12.0	5°	12.44	12.86	13.31	13.79	14.87																				
XM4R-30N16-05	16.0	4.06°	16.58	17.14	17.74	18.39	19.84																				
XM4R-30N20-05	20.0	3.42°	20.71	21.42	22.17	22.99	24.81																				
XM4R-30N25-05	25.0	2.85°	25.88	26.77	27.72	28.74	-																				
XM4R-30N30-05	30.0	2.45°	31.05	32.12	33.26	34.49	-																				
XM4R-30N35-05	35.0	2.14°	36.22	37.46	38.80	40.23	-																				
XM4R-40N12-01	4.0	0.1	12.0	3.2	3.86	60.0	6.0	3.66°	12.44			12.87		13.33	13.83	14.94	-				-	-	-				
XM4R-40N20-01			20.0					2.42°	20.71			21.43		22.20	23.03	-											
XM4R-40N30-01			30.0					1.71°	31.05	32.12	33.28	-	-														
XM4R-40N40-01			40.0					1.32°	41.38	42.82	-	-	-														
XM4R-40N12-02			12.0					3.68°	12.44	12.86	13.32	13.81	14.92														
XM4R-40N20-02			20.0					2.43°	20.71	21.42	22.19	23.01	-														
XM4R-40N30-02			30.0					1.71°	31.04	32.12	33.27	-	-														
XM4R-40N40-02			40.0					1.32°	41.38	42.81	-	-	-														
XM4R-40N12-03			12.0					3.7°	12.43	12.86	13.31	13.80	14.89														
XM4R-40N20-03			20.0					2.44°	20.70	21.41	22.18	23.00	-														
XM4R-40N30-03			30.0					1.72°	31.04	32.11	33.26	-	-														
XM4R-40N40-03			40.0					1.32°	41.38	42.81	-	-	-														
XM4R-40N12-05			12.0					3.75°	12.43	12.84	13.29	13.77	14.84														
XM4R-40N20-05			20.0					2.47°	20.70	21.40	22.15	22.97	-														
XM4R-40N30-05			30.0					1.73°	31.03	32.10	33.24	-	-														
XM4R-40N40-05			40.0					1.33°	41.37	42.79	-	-	-														
XM4R-50N20-01			5.0					0.1	20.0	4.0	4.85	70.0	6.0	1.32°	20.70	21.42		-	-	-							

XM2S série
TuffCut® XM
Fraise en bout
 2-lèbres
 détalonnées

P M K N S H



M.A. FORD
 High Performance Cutting Tools



N° d'art.	DC	LU	APMX	DN	OAL	DCON	Angle d'interférence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs. -5%	dès 5 pcs. -10%	dès 10 pcs. -15%	dès 20 pcs. -20%
								0.5°	1°	1.5°	2°	3°				
XM2S-01N0.3X	0.1	0.3	0.15	0.08	50.0	4.0	14.39°	0.31	0.33	0.35	0.37	0.40				
XM2S-01N0.5X		14.03°					0.52	0.55	0.58	0.60	0.65					
XM2S-01N1X		13.22°					1.05	1.09	1.13	1.18	1.27					
XM2S-02N0.5X	0.2	0.5	0.3	0.17	50.0	4.0	14.03°	0.52	0.54	0.57	0.59	0.64				
XM2S-02N1X		13.2°					1.04	1.08	1.12	1.16	1.26					
XM2S-02N1.5X		12.45°					1.56	1.62	1.67	1.74	1.88					
XM2S-02N2X	0.3	2.0	0.45	0.27	50.0	4.0	11.79°	2.08	2.15	2.23	2.31	2.50				
XM2S-02N3X		10.65°					3.11	3.22	3.34	3.46	3.74					
XM2S-03N1X		13.06°					1.06	1.12	1.18	1.23	1.33					
XM2S-03N1.5X	0.4	1.5	0.6	0.37	50.0	4.0	12.31°	1.59	1.67	1.74	1.81	1.95				
XM2S-03N2.5X		11.65°					2.12	2.21	2.29	2.38	2.57					
XM2S-03N3X		11.05°					2.64	2.75	2.85	2.96	3.20					
XM2S-04N1X	0.5	1.0	0.75	0.47	50.0	4.0	10.51°	3.16	3.28	3.40	3.53	3.82				
XM2S-04N1.5X		13.01°					1.06	1.12	1.18	1.23	1.33					
XM2S-04N2X		12.25°					1.59	1.67	1.74	1.81	1.95					
XM2S-04N2.5X	0.6	2.0	0.9	0.57	50.0	4.0	11.57°	2.12	2.21	2.29	2.38	2.57				
XM2S-04N3X		10.97°					2.64	2.75	2.85	2.96	3.20					
XM2S-04N3.5X		10.42°					3.16	3.28	3.40	3.53	3.82					
XM2S-04N4X	0.7	4.0	1.05	0.67	50.0	4.0	9.92°	3.68	3.82	3.96	4.11	4.44				
XM2S-04N5X		9.47°					4.20	4.35	4.51	4.68	5.06					
XM2S-04N6X		8.68°					5.24	5.42	5.62	5.83	6.30					
XM2S-04N8X	0.8	6.0	1.20	0.76	50.0	4.0	8.01°	6.27	6.49	6.73	6.98	7.55				
XM2S-04N10X		6.94°					8.34	8.63	8.94	9.28	10.03					
XM2S-05N1X		6.12°					10.41	10.77	11.16	11.58	12.52					
XM2S-05N1.5X	0.9	1.0	1.35	0.86	50.0	4.0	12.96°	1.06	1.12	1.18	1.23	1.33				
XM2S-05N2X		12.19°					1.59	1.67	1.74	1.81	1.95					
XM2S-05N2.5X		11.5°					2.12	2.21	2.29	2.38	2.57					
XM2S-05N3X	1.0	2.0	1.5	0.96	50.0	4.0	10.88°	2.64	2.75	2.85	2.96	3.20				
XM2S-05N4X		10.33°					3.16	3.28	3.40	3.53	3.82					
XM2S-05N5X		9.37°					4.20	4.35	4.51	4.68	5.06					
XM2S-05N6X	1.1	4.0	1.65	0.96	50.0	4.0	8.58°	5.24	5.42	5.62	5.83	6.30				
XM2S-05N8X		7.91°					6.27	6.49	6.73	6.98	7.55					
XM2S-05N10X		6.84°					8.34	8.63	8.94	9.28	10.03					
XM2S-06N2X	1.2	2.0	1.8	0.96	50.0	4.0	6.02°	10.41	10.77	11.16	11.58	12.52				
XM2S-06N3X		11.21°					2.17	2.31	2.44	2.56	2.78					
XM2S-06N4X		10.07°					3.24	3.42	3.58	3.72	4.02					
XM2S-06N5X	1.3	4.0	2.4	0.96	50.0	4.0	9.13°	4.30	4.51	4.69	4.87	5.26				
XM2S-06N6X		8.36°					5.35	5.59	5.80	6.02	6.50					
XM2S-06N7X		14.39°					0.31	0.33	0.35	0.37	0.40					
XM2S-06N8X	1.4	7.0	2.7	0.96	50.0	4.0	14.03°	0.52	0.55	0.58	0.60	0.65				
XM2S-06N9X		13.22°					1.05	1.09	1.13	1.18	1.27					
XM2S-06N10X		14.03°					0.52	0.54	0.57	0.59	0.64					
XM2S-07N2X	1.5	2.0	3.0	0.96	50.0	4.0	14.03°	0.52	0.54	0.57	0.59	0.64				
XM2S-07N4X		13.2°					1.04	1.08	1.12	1.16	1.26					
XM2S-07N6X		12.45°					1.56	1.62	1.67	1.74	1.88					
XM2S-07N8X	1.6	4.0	3.6	0.96	50.0	4.0	11.79°	2.08	2.15	2.23	2.31	2.50				
XM2S-07N10X		10.65°					3.11	3.22	3.34	3.46	3.74					
XM2S-08N4X		13.06°					1.06	1.12	1.18	1.23	1.33					
XM2S-08N6X	1.7	6.0	4.2	0.96	50.0	4.0	12.31°	1.59	1.67	1.74	1.81	1.95				
XM2S-08N8X		11.65°					2.12	2.21	2.29	2.38	2.57					
XM2S-08N10X		11.05°					2.64	2.75	2.85	2.96	3.20					
XM2S-08N12X	1.8	8.0	4.8	0.96	50.0	4.0	10.51°	3.16	3.28	3.40	3.53	3.82				
XM2S-09N6X		13.01°					1.06	1.12	1.18	1.23	1.33					
XM2S-09N8X		12.25°					1.59	1.67	1.74	1.81	1.95					
XM2S-09N10X	1.9	10.0	5.4	0.96	50.0	4.0	11.57°	2.12	2.21	2.29	2.38	2.57				
XM2S-09N12X		10.97°					2.64	2.75	2.85	2.96	3.20					
XM2S-10N2X		10.42°					3.16	3.28	3.40	3.53	3.82					
XM2S-10N3X	2.0	2.0	6.0	0.96	50.0	4.0	9.92°	3.68	3.82	3.96	4.11	4.44				
XM2S-10N4X		9.47°					4.20	4.35	4.51	4.68	5.06					
XM2S-10N5X		8.68°					5.24	5.42	5.62	5.83	6.30					
XM2S-10N6X	2.1	4.0	6.6	0.96	50.0	4.0	8.01°	6.27	6.49	6.73	6.98	7.55				
XM2S-10N7X		6.94°					8.34	8.63	8.94	9.28	10.03					
XM2S-10N8X		6.12°					10.41	10.77	11.16	11.58	12.52					
XM2S-10N9X	2.2	6.0	7.2	0.96	50.0	4.0	12.96°	1.06	1.12	1.18	1.23	1.33				
XM2S-10N10X		12.19°					1.59	1.67	1.74	1.81	1.95					
XM2S-10N12X		11.5°					2.12	2.21	2.29	2.38	2.57					
XM2S-10N14X	2.3	8.0	7.8	0.96	50.0	4.0	10.88°	2.64	2.75	2.85	2.96	3.20				
XM2S-10N16X		10.33°					3.16	3.28	3.40	3.53	3.82					
XM2S-10N20X		9.37°					4.20	4.35	4.51	4.68	5.06					
XM2S-10N25X	2.4	10.0	8.4	0.96	50.0	4.0	8.58°	5.24	5.42	5.62	5.83	6.30				
XM2S-11N2X		7.91°					6.27	6.49	6.73	6.98	7.55					
XM2S-11N3X		6.84°					8.34	8.63	8.94	9.28	10.03					



N° d'art.	DC	LU	APMX	DN	OAL	DCON	Angle d'interférence IA	Longueur effective (LU) suivant l'angle incliné					dès 3 pcs. -5%	dès 5 pcs. -10%	dès 10 pcs. -15%	dès 20 pcs. -20%	
								0.5°	1°	1.5°	2°	3°					
XM2S-12N6X	1.2	6.0	1.8	1.15	50.0	4.0	14.39°	0.31	0.33	0.35	0.37	0.40					
XM2S-12N8X		14.03°					0.52	0.55	0.58	0.60	0.65						
XM2S-12N10X		13.22°					1.05	1.09	1.13	1.18	1.27						
XM2S-12N12X		14.03°					0.52	0.54	0.57	0.59	0.64						
XM2S-12N16X		13.2°					1.04	1.08	1.12	1.16	1.26						
XM2S-14N6X	1.4	6.0	2.1	1.34	50.0	4.0	12.45°	1.56	1.62	1.67	1.74	1.88					
XM2S-14N12X		11.79°					2.08	2.15	2.23	2.31	2.50						
XM2S-15N4X	1.5	4.0	2.25	1.44	50.0	4.0	10.65°	3.11	3.22	3.34	3.46	3.74					
XM2S-15N6X		13.06°					1.06	1.12	1.18	1.23	1.33						
XM2S-15N8X		12.31°					1.59	1.67	1.74	1.81	1.95						
XM2S-15N10X		11.65°					2.12	2.21	2.29	2.38	2.57						
XM2S-15N12X		11.05°					2.64	2.75	2.85	2.96	3.20						
XM2S-15N14X		10.51°					3.16	3.28	3.40	3.53	3.82						
XM2S-15N16X		13.01°					1.06	1.12	1.18	1.23	1.33						
XM2S-15N18X		4°					4.00	1.67	1.74	1.81	1.95						
XM2S-15N20X		11.57°					2.12	2.21	2.29	2.38	2.57						
XM2S-15N25X		10.97°					2.64	2.75	2.85	2.96	3.20						
XM2S-15N30X	1.6	30.0	2.4	1.54	50.0	4.0	10.42°	3.16	3.28	3.40	3.53	3.82					
XM2S-15N35X		35.0					7.50	3.68	3.82	3.96	4.11	4.44					
XM2S-15N40X		40.0					8.00	9.92°	4.20	4.35	4.51	4.68					5.06
XM2S-16N6X		6.0					6.0	8.68°	5.24	5.42	5.62	5.83					6.30
XM2S-16N8X	1.8	8.0	2.7	1.73	50.0	4.0	8.01°	6.27	6.49	6.73	6.98	7.55					
XM2S-18N6X		6.0					6.94°	8.34	8.63	8.94	9.28	10.03					
XM2S-18N8X	8.0	6.12°	10.41	10.77	11.16	11.58	12.52										
XM2S-20N4X	2.0	4.0	3.0	1.92	50.0	4.0	12.96°	1.06	1.12	1.18	1.23	1.33					
XM2S-20N6X		12.19°					1.59	1.67	1.74	1.81	1.95						
XM2S-20N8X		11.5°					2.12	2.21	2.29	2.38	2.57						
XM2S-20N10X		10.88°					2.64	2.75	2.85	2.96	3.20						
XM2S-20N12X		10.33°					3.16	3.28	3.40	3.53	3.82						
XM2S-20N14X	2.0	14.0	3.0	1.92	50.0	4.0	9.37°	4.20	4.35	4.51	4.68	5.06					
XM2S-20N16X		16.0					8.58°	5.24	5.42	5.62	5.83	6.30					
XM2S-20N18X	2.5	18.0	3.75	2.4	60.0	4.0	7.91°	6.27	6.49	6.73	6.98	7.55					
XM2S-20N20X		20.0					6.84°	8.34	8.63	8.94	9.28	10.03					
XM2S-20N25X		25.0					6.02°	10.41	10.77	11.16	11.58	12.52					
XM2S-20N30X		30.0					11.21°	2.17	2.31	2.44	2.56	2.78					
XM2S-20N35X		35.0					10.07°	3.24	3.42	3.58	3.72	4.02					
XM2S-20N40X	3.0	40.0	4.5	2.88	70.0	6.0	9.13°	4.30	4.51</								

TuffCut[®] XM Series XM2B High Speed Cutting

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccordati | Zalecane Parametry

3xD Neck Length													3xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut													Multiply tool Ø by this factor to calculate depths of cut												
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.100	0.30	155	0.0070	0.0105	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0438	0.0525	0.0613	0.0700	0.0875	0.1050	0.1400	0.1750	0.2100
Die / Tool Steels	P	•	•	o	2D/3D HSC	0.090	0.30	150	0.0064	0.0096	0.0128	0.0160	0.0192	0.0224	0.0256	0.0320	0.0400	0.0480	0.0560	0.0640	0.0800	0.0960	0.1280	0.1600	0.1920
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.090	0.30	150	0.0064	0.0096	0.0128	0.0160	0.0192	0.0224	0.0256	0.0320	0.0400	0.0480	0.0560	0.0640	0.0800	0.0960	0.1280	0.1600	0.1920
High Temp Alloys	S	•	x	x	2D/3D HSC	0.060	0.20	50	0.0050	0.0075	0.0100	0.0125	0.0150	0.0175	0.0200	0.0250	0.0313	0.0375	0.0438	0.0500	0.0625	0.0750	0.1000	0.1250	0.1500
Titanium Alloys	S	•	x	x	2D/3D HSC	0.065	0.25	130	0.0060	0.0090	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.080	0.30	145	0.0064	0.0096	0.0128	0.0160	0.0192	0.0224	0.0256	0.0320	0.0400	0.0480	0.0560	0.0640	0.0800	0.0960	0.1280	0.1600	0.1920
Hardened Steel 45-55 HRC	H	x	•	•	2D/3D HSC	0.065	0.30	135	0.0060	0.0090	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800
Hardened Steel 55-65 HRC	H	x	•	•	2D/3D HSC	0.060	0.20	110	0.0050	0.0075	0.0100	0.0125	0.0150	0.0175	0.0200	0.0250	0.0313	0.0375	0.0438	0.0500	0.0625	0.0750	0.1000	0.1250	0.1500

5xD Neck Length													5xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	ADOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut													Multiply tool Ø by this factor to calculate depths of cut												
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.060	0.18	135	0.0066	0.0099	0.0132	0.0165	0.0198	0.0231	0.0264	0.0330	0.0413	0.0495	0.0578	0.0660	0.0825	0.0990	0.13200	0.16500	0.19800
Die / Tool Steels	P	•	•	o	2D/3D HSC	0.054	0.18	130	0.0060	0.0090	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.12000	0.15000	0.18000
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.054	0.18	130	0.0060	0.0090	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800
High Temp Alloys	S	•	x	x	2D/3D HSC	0.036	0.12	45	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440
Titanium Alloys	S	•	x	x	2D/3D HSC	0.039	0.15	115	0.0058	0.0087	0.0116	0.0145	0.0174	0.0203	0.0232	0.0290	0.0363	0.0435	0.0508	0.0580	0.0725	0.0870	0.1160	0.1450	0.1740
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.048	0.18	125	0.0060	0.0090	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800
Hardened Steel 45-55 HRC	H	x	•	•	2D/3D HSC	0.039	0.18	115	0.0058	0.0087	0.0116	0.0145	0.0174	0.0203	0.0232	0.0290	0.0363	0.0435	0.0508	0.0580	0.0725	0.0870	0.1160	0.1450	0.1740
Hardened Steel 55-65 HRC	H	x	•	•	2D/3D HSC	0.036	0.12	95	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440

8xD Neck Length													8xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut													Multiply tool Ø by this factor to calculate depths of cut												
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.040	0.12	120	0.0064	0.0096	0.0128	0.0160	0.0192	0.0224	0.0256	0.0320	0.0400	0.0480	0.0560	0.0640	0.0800	0.0960	0.12800	0.16000	0.19200
Die / Tool Steels	P	•	•	o	2D/3D HSC	0.036	0.12	115	0.0060	0.0090	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.12000	0.15000	0.18000
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.036	0.12	115	0.0060	0.0090	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800
High Temp Alloys	S	•	x	x	2D/3D HSC	0.024	0.08	40	0.0046	0.0069	0.0092	0.0115	0.0138	0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.0920	0.1150	0.1380
Titanium Alloys	S	•	x	x	2D/3D HSC	0.026	0.10	100	0.0056	0.0084	0.0112	0.0140	0.0168	0.0196	0.0224	0.0280	0.0350	0.0420	0.0490	0.0560	0.0700	0.0840	0.1120	0.1400	0.1680
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.032	0.12	110	0.0060	0.0090	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800
Hardened Steel 45-55 HRC	H	x	•	•	2D/3D HSC	0.026	0.12	105	0.0056	0.0084	0.0112	0.0140	0.0168	0.0196	0.0224	0.0280	0.0350	0.0420	0.0490	0.0560	0.0700	0.0840	0.1120	0.1400	0.1680
Hardened Steel 55-65 HRC	H	x	•	•	2D/3D HSC	0.024	0.08	85	0.0046	0.0069	0.0092	0.0115	0.0138	0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.0920	0.1150	0.1380

Notes

- If the required RPM for the specified Vc is not achievable due to machine limitations, use the machine's maximum RPM and calculate feed using:
Feed = Max RPM x Fz x number of teeth
- The above cutting conditions are for roughing. For semi-finishing, reduce both Ap (axial depth of cut) and Ae (radial width of cut) accordingly.
- For finishing operations, adjust Ap to material stock allowance or 0.05 to 0.01 x tool Ø, depending on neck length. Reduce Vc by 10-15% and Fz by 15-20%.
- Ae should be adjusted surface finish requirements. As a guide, 0.02 to 0.03 x tool Ø is a good starting point.

- Always use helical or straight ramping for entry. Avoid direct plunge in-feed to minimise tool stress and potential damage.
- Use the shortest overhang possible and minimise tool runout by utilising an accurate chucking system.
- **Please note that these cutting conditions are for guidance only and may need to be adjusted depending on the application, specific material, and surface finish requirements.**

TuffCut[®] XM Series XM2B High Speed Cutting

Recommended cutting data : Conditions de coupe recommandées : Empfohlene Schnittdaten : Dati di taglio Raccomandati : Zalecane Parametry

10xD Neck Length											10xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut																									
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.025	0.08	120	0.0052	0.0078	0.0104	0.0130	0.0156	0.0182	0.0208	0.0260	0.0325	0.0390	0.0455	0.0520	0.0650	0.0780	0.10400	0.13000	0.15600
Die / Tool Steels	P	•	•	o	2D/3D HSC	0.023	0.08	115	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.09600	0.12000	0.14400
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.023	0.08	115	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440
High Temp Alloys	S	•	x	x	2D/3D HSC	0.015	0.05	40	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
Titanium Alloys	S	•	x	x	2D/3D HSC	0.016	0.06	100	0.0046	0.0069	0.0092	0.0115	0.0138	0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.0920	0.1150	0.1380
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.020	0.08	110	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440
Hardened Steel 45-55 HRC	H	x	•	•	2D/3D HSC	0.016	0.08	105	0.0046	0.0069	0.0092	0.0115	0.0138	0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.0920	0.1150	0.1380
Hardened Steel 55-65 HRC	H	x	•	•	2D/3D HSC	0.015	0.05	85	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140

12xD Neck Length											12xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut																									
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.025	0.08	90	0.0046	0.0069	0.0092	0.0115	0.0138	0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.09200	0.11500	0.13800
Die / Tool Steels	P	•	•	o	2D/3D HSC	0.023	0.08	85	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.023	0.08	85	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
High Temp Alloys	S	•	x	x	2D/3D HSC	0.015	0.05	30	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960
Titanium Alloys	S	•	x	x	2D/3D HSC	0.016	0.06	75	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.020	0.08	80	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
Hardened Steel 45-55 HRC	H	x	•	•	2D/3D HSC	0.016	0.08	75	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200
Hardened Steel 55-65 HRC	H	x	•	•	2D/3D HSC	0.015	0.05	65	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960

15xD Neck Length											15xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut																									
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.015	0.05	90	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600
Die / Tool Steels	P	•	•	o	2D/3D HSC	0.014	0.05	85	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.07600	0.09500	0.11400
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.014	0.05	85	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
High Temp Alloys	S	•	x	x	2D/3D HSC	0.009	0.03	30	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900
Titanium Alloys	S	•	x	x	2D/3D HSC	0.010	0.04	75	0.0036	0.0054	0.0072	0.0090	0.0108	0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.012	0.05	80	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
Hardened Steel 45-55 HRC	H	x	•	•	2D/3D HSC	0.010	0.05	75	0.0036	0.0054	0.0072	0.0090	0.0108	0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080
Hardened Steel 55-65 HRC	H	x	•	•	2D/3D HSC	0.009	0.03	65	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900

Notes

- If the required RPM for the specified Vc is not achievable due to machine limitations, use the machine's maximum RPM and calculate feed using:
Feed = Max RPM × Fz × number of teeth
- The above cutting conditions are for roughing. For semi-finishing, reduce both Ap (axial depth of cut) and Ae (radial width of cut) accordingly.
- For finishing operations, adjust Ap to material stock allowance or 0.05 to 0.01 x tool Ø, depending on neck length. Reduce Vc by 10-15% and Fz by 15-20%.
- Ae should be adjusted surface finish requirements. As a guide, 0.02 to 0.03 x tool Ø is a good starting point.

- Always use helical or straight ramping for entry. Avoid direct plunge in-feed to minimise tool stress and potential damage.
- Use the shortest overhang possible and minimise tool runout by utilising an accurate chucking system.
- **Please note that these cutting conditions are for guidance only and may need to be adjusted depending on the application, specific material, and surface finish requirements.**

TuffCut[®] XM Series XM2R & XM4R High Speed Cutting

Recommended cutting data : Conditions de coupe recommandées : Empfohlene Schnittdaten : Dati di taglio Raccomandati : Zalecane Parametry

3xD Neck Length											3xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.050	0.45	130	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440
Die / Tool Steels		•	•	o	2D/3D HSC	0.045	0.40	110	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.045	0.40	110	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
High Temp Alloys	S	•	x	x	2D/3D HSC	0.030	0.20	50	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960
Titanium Alloys		•	x	x	2D/3D HSC	0.033	0.30	110	0.0037	0.0056	0.0074	0.0093	0.0111	0.0130	0.0148	0.0185	0.0231	0.0278	0.0324	0.0370	0.0463	0.0555	0.0740	0.0925	0.1110
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.040	0.35	105	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.033	0.30	95	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.030	0.20	90	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140

5xD Neck Length											5xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.030	0.45	105	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.09600	0.12000	0.14400
Die / Tool Steels		•	•	o	2D/3D HSC	0.027	0.40	90	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.027	0.40	90	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
High Temp Alloys	S	•	x	x	2D/3D HSC	0.018	0.20	40	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960
Titanium Alloys		•	x	x	2D/3D HSC	0.020	0.30	90	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.024	0.35	85	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.020	0.30	80	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.018	0.20	75	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140

8xD Neck Length											8xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.024	0.35	85	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.09600	0.12000	0.14400
Die / Tool Steels		•	•	o	2D/3D HSC	0.022	0.30	75	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.022	0.30	75	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
High Temp Alloys	S	•	x	x	2D/3D HSC	0.014	0.15	35	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960
Titanium Alloys		•	x	x	2D/3D HSC	0.016	0.25	75	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.019	0.25	70	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.016	0.25	65	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.014	0.15	60	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140

Notes

- If the required RPM for the specified Vc is not achievable due to machine limitations, use the machine's maximum RPM and calculate feed using:
Feed = Max RPM x Fz x number of teeth
- The above cutting conditions are for roughing. For semi-finishing, reduce both Ap (axial depth of cut) and Ae (radial width of cut) accordingly.
- For finishing operations, adjust Ap to material stock allowance or 0.05 to 0.01 x tool Ø, depending on neck length. Reduce Vc by 10-15% and Fz by 15-20%.
- Ae should be adjusted surface finish requirements. As a guide, 0.02 to 0.03 x tool Ø is a good starting point.

- Always use helical or straight ramping for entry. Avoid direct plunge in-feed to minimise tool stress and potential damage.
- Use the shortest overhang possible and minimise tool runout by utilising an accurate chucking system.
- **Please note that these cutting conditions are for guidance only and may need to be adjusted depending on the application, specific material, and surface finish requirements.**

TuffCut[®] XM Series XM2R & XM4R High Speed Cutting

Recommended cutting data : Conditions de coupe recommandées : Empfohlene Schnittdaten : Dati di taglio Raccomandati : Zalecane Parametry

10xD Neck Length													10xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.015	0.35	80	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.09600	0.12000	0.14400
Die / Tool Steels		•	•	o	2D/3D HSC	0.014	0.30	70	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.014	0.30	70	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
High Temp Alloys	S	•	x	x	2D/3D HSC	0.009	0.15	30	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960
Titanium Alloys		•	x	x	2D/3D HSC	0.010	0.25	70	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.012	0.25	65	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.010	0.25	60	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.009	0.15	55	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140

12xD Neck Length													12xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.015	0.25	65	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.08000	0.10000	0.12000
Die / Tool Steels		•	•	o	2D/3D HSC	0.014	0.25	55	0.0036	0.0054	0.0072	0.0090	0.0108	0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.07200	0.09000	0.10800
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.014	0.25	55	0.0036	0.0054	0.0072	0.0090	0.0108	0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080
High Temp Alloys	S	•	x	x	2D/3D HSC	0.009	0.10	25	0.0028	0.0042	0.0056	0.0070	0.0084	0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840
Titanium Alloys		•	x	x	2D/3D HSC	0.010	0.20	55	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.012	0.20	55	0.0036	0.0054	0.0072	0.0090	0.0108	0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.010	0.20	50	0.0034	0.0051	0.0068	0.0085	0.0102	0.0119	0.0136	0.0170	0.0213	0.0255	0.0298	0.0340	0.0425	0.0510	0.0680	0.0850	0.1020
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.009	0.10	45	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960

15xD Neck Length													15xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.009	0.25	65	0.0034	0.0051	0.0068	0.0085	0.0102	0.0119	0.0136	0.0170	0.0213	0.0255	0.0298	0.0340	0.0425	0.0510	0.06800	0.08500	0.10200
Die / Tool Steels		•	•	o	2D/3D HSC	0.008	0.20	55	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.06000	0.07500	0.09000
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.008	0.20	55	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900
High Temp Alloys	S	•	x	x	2D/3D HSC	0.005	0.10	25	0.0022	0.0033	0.0044	0.0055	0.0066	0.0077	0.0088	0.0110	0.0138	0.0165	0.0193	0.0220	0.0275	0.0330	0.0440	0.0550	0.0660
Titanium Alloys		•	x	x	2D/3D HSC	0.006	0.15	55	0.0026	0.0039	0.0052	0.0065	0.0078	0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.007	0.20	55	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.006	0.15	50	0.0028	0.0042	0.0056	0.0070	0.0084	0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.005	0.10	45	0.0026	0.0039	0.0052	0.0065	0.0078	0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780

Notes

- If the required RPM for the specified Vc is not achievable due to machine limitations, use the machine's maximum RPM and calculate feed using:
Feed = Max RPM × Fz × number of teeth
- The above cutting conditions are for roughing. For semi-finishing, reduce both Ap (axial depth of cut) and Ae (radial width of cut) accordingly.
- For finishing operations, adjust Ap to material stock allowance or 0.05 to 0.01 x tool Ø, depending on neck length. Reduce Vc by 10-15% and Fz by 15-20%.
- Ae should be adjusted surface finish requirements. As a guide, 0.02 to 0.03 x tool Ø is a good starting point.

- Always use helical or straight ramping for entry. Avoid direct plunge in-feed to minimise tool stress and potential damage.
- Use the shortest overhang possible and minimise tool runout by utilising an accurate chucking system.
- **Please note that these cutting conditions are for guidance only and may need to be adjusted depending on the application, specific material, and surface finish requirements.**

TuffCut[®] XM Series XM2S High Speed Cutting

Recommended cutting data : Conditions de coupe recommandées : Empfohlene Schnittdaten : Dati di taglio Raccomandati : Zalecane Parametry

3xD Neck Length											3xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.085	0.45	95	0.0048	0.0072	0.0096	0.0120	0.0144	0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440
Die / Tool Steels		•	•	o	2D/3D HSC	0.077	0.40	85	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.077	0.40	85	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
High Temp Alloys	S	•	x	x	2D/3D HSC	0.034	0.20	50	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960
Titanium Alloys		•	x	x	2D/3D HSC	0.055	0.30	85	0.0037	0.0056	0.0074	0.0093	0.0111	0.0130	0.0148	0.0185	0.0231	0.0278	0.0324	0.0370	0.0463	0.0555	0.0740	0.0925	0.1110
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.060	0.35	80	0.0042	0.0063	0.0084	0.0105	0.0126	0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.043	0.30	70	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.038	0.20	65	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140

5xD Neck Length											5xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.055	0.45	95	0.0046	0.0069	0.0092	0.0115	0.0138	0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.09200	0.11500	0.13800
Die / Tool Steels		•	•	o	2D/3D HSC	0.050	0.40	85	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.08000	0.10000	0.12000
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.050	0.40	85	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200
High Temp Alloys	S	•	x	x	2D/3D HSC	0.022	0.20	50	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900
Titanium Alloys		•	x	x	2D/3D HSC	0.036	0.30	85	0.0036	0.0054	0.0072	0.0090	0.0108	0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.039	0.35	80	0.0040	0.0060	0.0080	0.0100	0.0120	0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.028	0.30	70	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.025	0.20	65	0.0036	0.0054	0.0072	0.0090	0.0108	0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080

8xD Neck Length											8xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.040	0.35	85	0.0044	0.0066	0.0088	0.0110	0.0132	0.0154	0.0176	0.0220	0.0275	0.0330	0.0385	0.0440	0.0550	0.0660	0.08800	0.11000	0.13200
Die / Tool Steels		•	•	o	2D/3D HSC	0.036	0.35	75	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.07600	0.09500	0.11400
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.036	0.35	75	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
High Temp Alloys	S	•	x	x	2D/3D HSC	0.016	0.15	45	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900
Titanium Alloys		•	x	x	2D/3D HSC	0.026	0.25	75	0.0034	0.0051	0.0068	0.0085	0.0102	0.0119	0.0136	0.0170	0.0213	0.0255	0.0298	0.0340	0.0425	0.0510	0.0680	0.0850	0.1020
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.028	0.35	70	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.020	0.30	60	0.0038	0.0057	0.0076	0.0095	0.0114	0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.018	0.15	60	0.0036	0.0054	0.0072	0.0090	0.0108	0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080

Notes

- If the required RPM for the specified Vc is not achievable due to machine limitations, use the machine's maximum RPM and calculate feed using:
Feed = Max RPM x Fz x number of teeth
- The above cutting conditions are for roughing. For semi-finishing, reduce both Ap (axial depth of cut) and Ae (radial width of cut) accordingly.
- For finishing operations, adjust Ap to material stock allowance or 0.05 to 0.01 x tool Ø, depending on neck length. Reduce Vc by 10-15% and Fz by 15-20%.
- Ae should be adjusted surface finish requirements. As a guide, 0.02 to 0.03 x tool Ø is a good starting point.

- Always use helical or straight ramping for entry. Avoid direct plunge in-feed to minimise tool stress and potential damage.
- Use the shortest overhang possible and minimise tool runout by utilising an accurate chucking system.
- **Please note that these cutting conditions are for guidance only and may need to be adjusted depending on the application, specific material, and surface finish requirements.**

TuffCut[®] XM Series XM2S High Speed Cutting

Recommended cutting data : Conditions de coupe recommandées : Empfohlene Schnittdaten : Dati di taglio Raccomandati : Zalecane Parametry

10xD Neck Length												10xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut																									
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.026	0.35	85	0.0036	0.0054	0.0072	0.0090	0.0108	0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.07200	0.09000	0.10800
Die / Tool Steels	P	•	•	o	2D/3D HSC	0.023	0.30	75	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.06400	0.08000	0.09600
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.023	0.30	75	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960
High Temp Alloys	S	•	x	x	2D/3D HSC	0.010	0.15	45	0.0024	0.0036	0.0048	0.0060	0.0072	0.0084	0.0096	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0360	0.0480	0.0600	0.0720
Titanium Alloys	S	•	x	x	2D/3D HSC	0.017	0.25	75	0.0028	0.0042	0.0056	0.0070	0.0084	0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.018	0.25	70	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960
Hardened Steel 45-55 HRC	H	x	•	•	2D/3D HSC	0.013	0.25	60	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900
Hardened Steel 55-65 HRC	H	x	•	•	2D/3D HSC	0.011	0.15	60	0.0028	0.0042	0.0056	0.0070	0.0084	0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840

12xD Neck Length												12xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut																									
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.026	0.25	75	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.06400	0.08000	0.09600
Die / Tool Steels	P	•	•	o	2D/3D HSC	0.023	0.25	65	0.0028	0.0042	0.0056	0.0070	0.0084	0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.05600	0.07000	0.08400
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.023	0.25	65	0.0028	0.0042	0.0056	0.0070	0.0084	0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840
High Temp Alloys	S	•	x	x	2D/3D HSC	0.010	0.10	40	0.0020	0.0030	0.0040	0.0050	0.0060	0.0070	0.0080	0.0100	0.0125	0.0150	0.0175	0.0200	0.0250	0.0300	0.0400	0.0500	0.0600
Titanium Alloys	S	•	x	x	2D/3D HSC	0.017	0.20	65	0.0024	0.0036	0.0048	0.0060	0.0072	0.0084	0.0096	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0360	0.0480	0.0600	0.0720
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.018	0.20	60	0.0028	0.0042	0.0056	0.0070	0.0084	0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840
Hardened Steel 45-55 HRC	H	x	•	•	2D/3D HSC	0.013	0.20	55	0.0026	0.0039	0.0052	0.0065	0.0078	0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780
Hardened Steel 55-65 HRC	H	x	•	•	2D/3D HSC	0.011	0.10	50	0.0024	0.0036	0.0048	0.0060	0.0072	0.0084	0.0096	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0360	0.0480	0.0600	0.0720

15xD Neck Length												15xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut																									
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.015	0.25	75	0.0028	0.0042	0.0056	0.0070	0.0084	0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.05600	0.07000	0.08400
Die / Tool Steels	P	•	•	o	2D/3D HSC	0.014	0.20	65	0.0026	0.0039	0.0052	0.0065	0.0078	0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.05200	0.06500	0.07800
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.014	0.20	65	0.0026	0.0039	0.0052	0.0065	0.0078	0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780
High Temp Alloys	S	•	x	x	2D/3D HSC	0.006	0.10	40	0.0020	0.0030	0.0040	0.0050	0.0060	0.0070	0.0080	0.0100	0.0125	0.0150	0.0175	0.0200	0.0250	0.0300	0.0400	0.0500	0.0600
Titanium Alloys	S	•	x	x	2D/3D HSC	0.010	0.15	65	0.0022	0.0033	0.0044	0.0055	0.0066	0.0077	0.0088	0.0110	0.0138	0.0165	0.0193	0.0220	0.0275	0.0330	0.0440	0.0550	0.0660
Pre-Hardened Steel 35-45 HRC	H	o	•	•	2D/3D HSC	0.011	0.20	60	0.0026	0.0039	0.0052	0.0065	0.0078	0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780
Hardened Steel 45-55 HRC	H	x	•	•	2D/3D HSC	0.008	0.15	55	0.0024	0.0036	0.0048	0.0060	0.0072	0.0084	0.0096	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0360	0.0480	0.0600	0.0720
Hardened Steel 55-65 HRC	H	x	•	•	2D/3D HSC	0.007	0.10	50	0.0022	0.0033	0.0044	0.0055	0.0066	0.0077	0.0088	0.0110	0.0138	0.0165	0.0193	0.0220	0.0275	0.0330	0.0440	0.0550	0.0660

Notes

- If the required RPM for the specified Vc is not achievable due to machine limitations, use the machine's maximum RPM and calculate feed using:
Feed = Max RPM × Fz × number of teeth
- The above cutting conditions are for roughing. For semi-finishing, reduce both Ap (axial depth of cut) and Ae (radial width of cut) accordingly.
- For finishing operations, adjust Ap to material stock allowance or 0.05 to 0.01 x tool Ø, depending on neck length. Reduce Vc by 10-15% and Fz by 15-20%.
- Ae should be adjusted surface finish requirements. As a guide, 0.02 to 0.03 x tool Ø is a good starting point.

- Always use helical or straight ramping for entry. Avoid direct plunge in-feed to minimise tool stress and potential damage.
- Use the shortest overhang possible and minimise tool runout by utilising an accurate chucking system.
- **Please note that these cutting conditions are for guidance only and may need to be adjusted depending on the application, specific material, and surface finish requirements.**

TuffCut[®] XM Series XM2S, XM2R & XM4R General Cutting

Recommended cutting data Conditions de coupe recommandées Empfohlene Schnittdaten Dati di taglio Raccomandati Zalecane Parametry

3xD Neck Length													3xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut																									
Medium Carbon Steels	P	●	●	○	Slotting	0.5	-	95	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.1	200	0.0007	0.0013	0.0020	0.0026	0.0033	0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396
Die / Tool Steels	P	●	●	○	Slotting	0.5	-	80	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.1	170	0.0007	0.0013	0.0020	0.0026	0.0033	0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396
Austenitic Stainless Steels	M	●	x	○	Slotting	0.5	-	75	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.1	150	0.0007	0.0013	0.0020	0.0026	0.0033	0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396
Duplex & Super Duplex	M	●	x	○	Slotting	0.5	-	65	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.1	100	0.0007	0.0013	0.0020	0.0026	0.0033	0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396
High Temp Alloys	S	●	x	x	Slotting	0.5	-	30	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080	0.0100	0.0120
					Profiling	1.0	0.05	45	0.0006	0.0011	0.0017	0.0022	0.0028	0.0034	0.0039	0.0045	0.0050	0.0056	0.0084	0.0112	0.0140	0.0168	0.0224	0.0280	0.0336
Titanium Alloys	S	●	x	x	Slotting	0.5	-	75	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.1	107	0.0004	0.0008	0.0012	0.0016	0.0020	0.0024	0.0028	0.0032	0.0036	0.0040	0.0060	0.0080	0.0100	0.0120	0.0160	0.0200	0.0240

5xD Neck Length													5xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut																									
Medium Carbon Steels	P	●	●	○	Slotting	0.3	-	95	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.08	200	0.0007	0.0013	0.0020	0.0026	0.0033	0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396
Die / Tool Steels	P	●	●	○	Slotting	0.3	-	80	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.08	170	0.0007	0.0013	0.0020	0.0026	0.0033	0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396
Austenitic Stainless Steels	M	●	x	○	Slotting	0.3	-	75	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.08	150	0.0007	0.0013	0.0020	0.0026	0.0033	0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396
Duplex & Super Duplex	M	●	x	○	Slotting	0.3	-	65	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.08	100	0.0007	0.0013	0.0020	0.0026	0.0033	0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396
High Temp Alloys	S	●	x	x	Slotting	0.3	-	30	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080	0.0100	0.0120
					Profiling	1.0	0.05	45	0.0006	0.0011	0.0017	0.0022	0.0028	0.0034	0.0039	0.0045	0.0050	0.0056	0.0084	0.0112	0.0140	0.0168	0.0224	0.0280	0.0336
Titanium Alloys	S	●	x	x	Slotting	0.3	-	75	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144
					Profiling	1.0	0.08	110	0.0004	0.0008	0.0012	0.0016	0.0020	0.0024	0.0028	0.0032	0.0036	0.0040	0.0060	0.0080	0.0100	0.0120	0.0160	0.0200	0.0240

8xD Neck Length													8xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0
Multiply tool Ø by this factor to calculate depths of cut																									
Medium Carbon Steels	P	●	●	○	Slotting	0.2	-	85	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.0088	0.0110	0.0132
					Profiling	0.75	0.05	180	0.0006	0.0012	0.0018	0.0024	0.0030	0.0035	0.0041	0.0047	0.0053	0.0059	0.0089	0.0118	0.0148	0.0177	0.0236	0.0295	0.0354
Die / Tool Steels	P	●	●	○	Slotting	0.2	-	75	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.0088	0.0110	0.0132
					Profiling	0.75	0.05	155	0.0006	0.0012	0.0018	0.0024	0.0030	0.0035	0.0041	0.0047	0.0053	0.0059	0.0089	0.0118	0.0148	0.0177	0.0236	0.0295	0.0354
Austenitic Stainless Steels	M	●	x	○	Slotting	0.2	-	70	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.0088	0.0110	0.0132
					Profiling	0.75	0.05	135	0.0006	0.0012	0.0018	0.0024	0.0030	0.0035	0.0041	0.0047	0.0053	0.0059	0.0089	0.0118	0.0148	0.0177	0.0236	0.0295	0.0354
Duplex & Super Duplex	M	●	x	○	Slotting	0.2	-	60	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.0088	0.0110	0.0132
					Profiling	0.75	0.05	90	0.0006	0.0012	0.0018	0.0024	0.0030	0.0035	0.0041	0.0047	0.0053	0.0059	0.0089	0.0118	0.0148	0.0177	0.0236	0.0295	0.0354
High Temp Alloys	S	●	x	x	Slotting	0.2	-	28	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108
					Profiling	0.75	0.05	40	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300
Titanium Alloys	S	●	x	x	Slotting	0.2	-	68	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.0088	0.0110	0.0132
					Profiling	0.75	0.05	95	0.0004	0.0007	0.0011	0.0014	0.0018	0.0022	0.0025	0.0029	0.0032	0.0036	0.0054	0.0072	0.0090	0.0108	0.0144	0.0180	0.0216

Notes

- If the required RPM for the specified Vc is not achievable due to machine limitations, use the machine's maximum RPM and calculate feed using:
Feed = Max RPM × Fz × number of teeth.
- The above cutting conditions are for roughing. For semi-finishing, reduce both Ap (axial depth of cut) and Ae (radial width of cut) accordingly.
- For finishing operations, adjust Ap to material stock allowance, depending on neck length. Reduce Vc by 10-15% and Fz by 15-20%.
- Always use helical or straight ramping for entry. Avoid direct plunge in-feed to minimise tool stress and potential damage.

- Use the shortest overhang possible and minimise tool runout by utilising an accurate chucking system.
- It is recommended to use radius tools for roughing and square-end tools for finishing.
- **Please note that these cutting conditions are for guidance only and may need to be adjusted depending on the application, specific material, and surface finish requirements.**

TuffCut[®] XM Series XM2S, XM2R & XM4R General Cutting

Recommended cutting data : Conditions de coupe recommandées : Empfohlene Schnittdaten : Dati di taglio Raccomandati : Zalecane Parametry

10xD Neck Length													10xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	Slotting	0.15	-	75	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.00720	0.00900	0.01080
					Profiling	0.5	0.035	160	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.02000	0.02500	0.03000
Die / Tool Steels	P	•	•	o	Slotting	0.15	-	65	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.00720	0.00900	0.01080
					Profiling	0.5	0.035	135	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.02000	0.02500	0.03000
Austenitic Stainless Steels	M	•	x	o	Slotting	0.15	-	60	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108
					Profiling	0.5	0.035	120	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300
Duplex & Super Duplex	M	•	x	o	Slotting	0.15	-	55	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108
					Profiling	0.5	0.035	80	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300
High Temp Alloys	S	•	x	x	Slotting	0.15	-	25	0.0002	0.0003	0.0005	0.0006	0.0008	0.0009	0.0011	0.0012	0.0014	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	0.0075	0.0090
					Profiling	0.5	0.035	35	0.0004	0.0008	0.0013	0.0017	0.0021	0.0025	0.0029	0.0034	0.0038	0.0042	0.0063	0.0084	0.0105	0.0126	0.0168	0.0210	0.0252
Titanium Alloys	S	•	x	x	Slotting	0.15	-	60	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108
					Profiling	0.5	0.035	85	0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	0.0027	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120	0.0150	0.0180

12xD Neck Length													12xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	Slotting	0.125	-	70	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.00720	0.00900	0.01080
					Profiling	0.4	0.03	150	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.02000	0.02500	0.03000
Die / Tool Steels	P	•	•	o	Slotting	0.125	-	60	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.00720	0.00900	0.01080
					Profiling	0.4	0.03	130	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.02000	0.02500	0.03000
Austenitic Stainless Steels	M	•	x	o	Slotting	0.125	-	55	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108
					Profiling	0.4	0.03	110	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300
Duplex & Super Duplex	M	•	x	o	Slotting	0.125	-	50	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108
					Profiling	0.4	0.03	75	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300
High Temp Alloys	S	•	x	x	Slotting	0.125	-	22	0.0002	0.0003	0.0005	0.0006	0.0008	0.0009	0.0011	0.0012	0.0014	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	0.0075	0.0090
					Profiling	0.4	0.03	32	0.0004	0.0008	0.0013	0.0017	0.0021	0.0025	0.0029	0.0034	0.0038	0.0042	0.0063	0.0084	0.0105	0.0126	0.0168	0.0210	0.0252
Titanium Alloys	S	•	x	x	Slotting	0.125	-	55	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108
					Profiling	0.4	0.03	75	0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	0.0027	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120	0.0150	0.0180

15xD Neck Length													15xD Neck Length												
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					End Mill Diameter (mm)											
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0
Medium Carbon Steels	P	•	•	o	Slotting	0.1	-	60	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.00680	0.00850	0.01020
					Profiling	0.3	0.025	125	0.0005	0.0009	0.0014	0.0018	0.0023	0.0028	0.0032	0.0037	0.0041	0.0046	0.0069	0.0092	0.0115	0.0138	0.01840	0.02300	0.02760
Die / Tool Steels	P	•	•	o	Slotting	0.1	-	50	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.00680	0.00850	0.01020
					Profiling	0.3	0.025	110	0.0005	0.0009	0.0014	0.0018	0.0023	0.0028	0.0032	0.0037	0.0041	0.0046	0.0069	0.0092	0.0115	0.0138	0.01840	0.02300	0.02760
Austenitic Stainless Steels	M	•	x	o	Slotting	0.1	-	50	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.0068	0.0085	0.0102
					Profiling	0.3	0.025	95	0.0005	0.0009	0.0014	0.0018	0.0023	0.0028	0.0032	0.0037	0.0041	0.0046	0.0069	0.0092	0.0115	0.0138	0.0184	0.0230	0.0276
Duplex & Super Duplex	M	•	x	o	Slotting	0.1	-	40	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.0068	0.0085	0.0102
					Profiling	0.3	0.025	65	0.0005	0.0009	0.0014	0.0018	0.0023	0.0028	0.0032	0.0037	0.0041	0.0046	0.0069	0.0092	0.0115	0.0138	0.0184	0.0230	0.0276
High Temp Alloys	S	•	x	x	Slotting	0.1	-	20	0.0001	0.0003	0.0004	0.0006	0.0007	0.0008	0.0010	0.0011	0.0013	0.0014	0.0021	0.0028	0.0035	0.0042	0.0056	0.0070	0.0084
					Profiling	0.3	0.025	30	0.0004	0.0008	0.0012	0.0016	0.0020	0.0023	0.0027	0.0031	0.0035	0.0039	0.0059	0.0078	0.0098	0.0117	0.0156	0.0195	0.0234
Titanium Alloys	S	•	x	x	Slotting	0.1	-	50	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.0068	0.0085	0.0102
					Profiling	0.3	0.025	65	0.0003	0.0006	0.0008	0.0011	0.0014	0.0017	0.0020	0.0022	0.0025	0.0028	0.0042	0.0056	0.0070	0.0084	0.0112	0.0140	0.0168

Notes

- If the required RPM for the specified Vc is not achievable due to machine limitations, use the machine's maximum RPM and calculate feed using:
Feed = Max RPM × Fz × number of teeth.
- The above cutting conditions are for roughing. For semi-finishing, reduce both Ap (axial depth of cut) and Ae (radial width of cut) accordingly.
- For finishing operations, adjust Ap to material stock allowance, depending on neck length. Reduce Vc by 10-15% and Fz by 15-20%.
- Always use helical or straight ramping for entry. Avoid direct plunge in-feed to minimise tool stress and potential damage.

- Use the shortest overhang possible and minimise tool runout by utilising an accurate chucking system.
- It is recommended to use radius tools for roughing and square-end tools for finishing.
- **Please note that these cutting conditions are for guidance only and may need to be adjusted depending on the application, specific material, and surface finish requirements.**

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Technologie d'application intégrale

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