



Where **high performance**
is the **standard**[®]

TuffCut[®] XM

XM2S 2 flute square end mill

XM2R 2 flute radius end mill

XM2B 2 flute ball end mill

XM4R 4 flute radius end mill



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TuffCut[®] XM

Series XM2S 2 Flute Square end mill

- Ideal for hardened steels up to 65 HRC, as well as a wide range of softer materials.
- Perfect for semi-finishing and finishing applications.
- High-precision diameter tolerance for exceptional consistency.
- Micro-grain carbide substrate combined with a high-performance coating for enhanced durability and efficiency.

Pages 3-5



TuffCut[®] XM

Series XM2R 2 Flute Radius end-mill

- High-precision radius type with corner radius tolerance of ± 0.005 mm.
- Ideal for hardened steels up to 65 HRC, as well as a wide range of softer materials.
- Perfect for semi-finishing and finishing applications.
- Micro-grain carbide substrate combined with a high-performance coating for enhanced durability and efficiency.

Pages 6-11



TuffCut[®] XM

Series XM2B 2 Flute Ball end mill

- High-precision radius type with corner radius tolerance of ± 0.005 mm.
- Ideal for hardened steels up to 65 HRC, as well as a wide range of softer materials.
- Perfect for semi-finishing and finishing applications.
- Micro-grain carbide substrate combined with a high-performance coating for enhanced durability and efficiency.

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TuffCut[®] XM

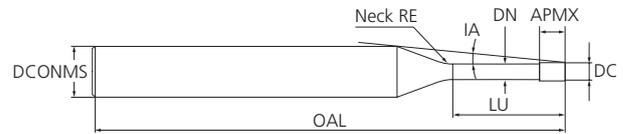
Series XM4R 4 Flute Radius end mill

- High-precision radius type with corner radius tolerance of ± 0.005 mm.
- Four-flute design increases feed rates, improves stability, and provides smoother cutting action.
- Ideal for hardened steels up to 65 HRC, as well as a wide range of softer materials.
- Perfect for semi-finishing and finishing applications.
- Micro-grain carbide substrate combined with a high-performance coating for enhanced durability and efficiency.

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TuffCut[®] XM Series XM2S



Tool No.	DC	LU	APMX	DN	OAL	DCNMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle				
									0.5°	1°	1.5°	2°	3°
									XM2S-001N0.3X	0.1	0.3	0.15	0.08
XM2S-001N0.5X	0.5	14.03°	0.52	0.55	0.58	0.60	0.65						
XM2S-001N1X	1.0	13.22°	1.05	1.09	1.13	1.18	1.27						
XM2S-002N0.5X	0.2	0.5	0.3	0.17	50.0	4.0	1.0	14.03°	0.52	0.54	0.57	0.59	0.64
XM2S-002N1X		1.0						13.2°	1.04	1.08	1.12	1.16	1.26
XM2S-002N1.5X		1.5						12.45°	1.56	1.62	1.67	1.74	1.88
XM2S-002N2X	0.3	2.0	0.45	0.27	50.0	4.0	2.0	11.79°	2.08	2.15	2.23	2.31	2.50
XM2S-002N3X		3.0						10.65°	3.11	3.22	3.34	3.46	3.74
XM2S-003N1X		1.0						13.06°	1.06	1.12	1.18	1.23	1.33
XM2S-003N1.5X	0.4	1.5	0.6	0.37	50.0	4.0	2.0	12.31°	1.59	1.67	1.74	1.81	1.95
XM2S-003N2X		2.0						11.65°	2.12	2.21	2.29	2.38	2.57
XM2S-003N2.5X		2.5						11.05°	2.64	2.75	2.85	2.96	3.20
XM2S-003N3X	0.5	3.0	0.75	0.47	50.0	4.0	2.0	10.51°	3.16	3.28	3.40	3.53	3.82
XM2S-004N1X		1.0						13.01°	1.06	1.12	1.18	1.23	1.33
XM2S-004N1.5X		1.5						12.25°	1.59	1.67	1.74	1.81	1.95
XM2S-004N2X	0.6	2.0	0.9	0.57	50.0	4.0	4.0	11.57°	2.12	2.21	2.29	2.38	2.57
XM2S-004N2.5X		2.5						10.97°	2.64	2.75	2.85	2.96	3.20
XM2S-004N3X		3.0						10.42°	3.16	3.28	3.40	3.53	3.82
XM2S-004N3.5X	0.7	3.5	1.05	0.67	50.0	4.0	4.0	9.92°	3.68	3.82	3.96	4.11	4.44
XM2S-004N4X		4.0						9.47°	4.20	4.35	4.51	4.68	5.06
XM2S-004N5X		5.0						8.68°	5.24	5.42	5.62	5.83	6.30
XM2S-004N6X	0.8	6.0	1.05	0.67	50.0	4.0	4.0	8.01°	6.27	6.49	6.73	6.98	7.55
XM2S-004N8X		8.0						6.94°	8.34	8.63	8.94	9.28	10.03
XM2S-004N10X		10.0						6.12°	10.41	10.77	11.16	11.58	12.52
XM2S-005N1X	0.9	1.0	1.05	0.67	50.0	4.0	4.0	12.96°	1.06	1.12	1.18	1.23	1.33
XM2S-005N1.5X		1.5						12.19°	1.59	1.67	1.74	1.81	1.95
XM2S-005N2X		2.0						11.5°	2.12	2.21	2.29	2.38	2.57
XM2S-005N2.5X	1.0	2.5	1.05	0.67	50.0	4.0	4.0	10.88°	2.64	2.75	2.85	2.96	3.20
XM2S-005N3X		3.0						10.33°	3.16	3.28	3.40	3.53	3.82
XM2S-005N4X		4.0						9.37°	4.20	4.35	4.51	4.68	5.06
XM2S-005N5X	1.1	5.0	1.05	0.67	50.0	4.0	4.0	8.58°	5.24	5.42	5.62	5.83	6.30
XM2S-005N6X		6.0						7.91°	6.27	6.49	6.73	6.98	7.55
XM2S-005N8X		8.0						6.84°	8.34	8.63	8.94	9.28	10.03
XM2S-005N10X	1.2	10.0	1.05	0.67	50.0	4.0	4.0	6.02°	10.41	10.77	11.16	11.58	12.52
XM2S-006N2X		2.0						11.21°	2.17	2.31	2.44	2.56	2.78
XM2S-006N3X		3.0						10.07°	3.24	3.42	3.58	3.72	4.02
XM2S-006N4X	1.3	4.0	1.05	0.67	50.0	4.0	4.0	9.13°	4.30	4.51	4.69	4.87	5.26
XM2S-006N5X		5.0						8.36°	5.35	5.59	5.80	6.02	6.50
XM2S-006N6X		6.0						14.39°	0.31	0.33	0.35	0.37	0.40
XM2S-006N7X	1.4	7.0	1.05	0.67	50.0	4.0	4.0	14.03°	0.52	0.55	0.58	0.60	0.65
XM2S-006N8X		8.0						13.22°	1.05	1.09	1.13	1.18	1.27
XM2S-006N9X		9.0						14.03°	0.52	0.54	0.57	0.59	0.64
XM2S-006N10X	1.5	10.0	1.05	0.67	50.0	4.0	4.0	13.2°	1.04	1.08	1.12	1.16	1.26
XM2S-007N2X		2.0						12.45°	1.56	1.62	1.67	1.74	1.88
XM2S-007N4X		4.0						11.79°	2.08	2.15	2.23	2.31	2.50
XM2S-007N6X	1.6	6.0	1.05	0.67	50.0	4.0	4.0	10.65°	3.11	3.22	3.34	3.46	3.74

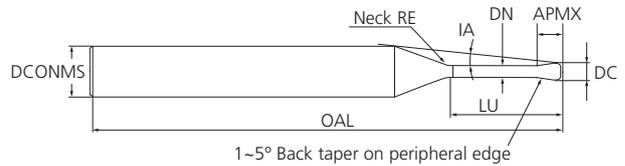
Series XM2S

Tool No.	DC	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle I α	Effective Under-Neck Length (LU) For Inclined Angle										
									0.5°	1°	1.5°	2°	3°						
XM2S-007N8X	0.7	8.0	1.05	0.67	50.0	4.0	4.0	13.06°	1.06	1.12	1.18	1.23	1.33						
XM2S-007N10X		10.0						12.31°	1.59	1.67	1.74	1.81	1.95						
XM2S-008N4X	0.8	4.0	1.20	0.76	50.0	4.0	4.0	11.65°	2.12	2.21	2.29	2.38	2.57						
XM2S-008N6X		6.0						11.05°	2.64	2.75	2.85	2.96	3.20						
XM2S-008N8X		8.0						10.51°	3.16	3.28	3.40	3.53	3.82						
XM2S-008N10X		10.0						13.01°	1.06	1.12	1.18	1.23	1.33						
XM2S-008N12X		12.0						12.25°	1.59	1.67	1.74	1.81	1.95						
XM2S-009N6X	0.9	6.0	1.35	0.86	50.0	4.0	4.0	11.57°	2.12	2.21	2.29	2.38	2.57						
XM2S-009N8X		8.0						10.97°	2.64	2.75	2.85	2.96	3.20						
XM2S-009N10X		10.0						10.42°	3.16	3.28	3.40	3.53	3.82						
XM2S-009N12X		12.0						9.92°	3.68	3.82	3.96	4.11	4.44						
XM2S-010N2X	1.0	2.0	1.5	0.96	50.0	4.0	4.0	9.47°	4.20	4.35	4.51	4.68	5.06						
XM2S-010N3X		3.0						8.68°	5.24	5.42	5.62	5.83	6.30						
XM2S-010N4X		4.0						8.01°	6.27	6.49	6.73	6.98	7.55						
XM2S-010N5X		5.0						6.94°	8.34	8.63	8.94	9.28	10.03						
XM2S-010N6X		6.0						6.12°	10.41	10.77	11.16	11.58	12.52						
XM2S-010N7X		7.0						12.96°	1.06	1.12	1.18	1.23	1.33						
XM2S-010N8X		8.0						12.19°	1.59	1.67	1.74	1.81	1.95						
XM2S-010N9X		9.0						11.5°	2.12	2.21	2.29	2.38	2.57						
XM2S-010N10X		10.0						10.88°	2.64	2.75	2.85	2.96	3.20						
XM2S-010N12X		12.0						10.33°	3.16	3.28	3.40	3.53	3.82						
XM2S-010N14X		14.0						9.37°	4.20	4.35	4.51	4.68	5.06						
XM2S-010N16X		16.0						8.58°	5.24	5.42	5.62	5.83	6.30						
XM2S-010N20X		20.0						7.91°	6.27	6.49	6.73	6.98	7.55						
XM2S-010N25X		25.0						-	8.34	8.63	8.94	9.28	10.03						
XM2S-012N6X		1.2						6.0	1.8	1.15	50.0	4.0	4.0	14.39°	0.31	0.33	0.35	0.37	0.40
XM2S-012N8X	8.0		14.03°	0.52	0.55	0.58	0.60	0.65											
XM2S-012N10X	10.0		13.22°	1.05	1.09	1.13	1.18	1.27											
XM2S-012N12X	12.0		14.03°	0.52	0.54	0.57	0.59	0.64											
XM2S-012N16X	16.0	13.2°	1.04	1.08	1.12	1.16	1.26												
XM2S-014N6X	1.4	6.0	2.1	1.34	50.0	4.0	4.0	12.45°	1.56	1.62	1.67	1.74	1.88						
XM2S-014N12X		12.0						11.79°	2.08	2.15	2.23	2.31	2.50						
XM2S-015N4X	1.5	4.0	2.25	1.44	50.0	4.0	4.0	10.65°	3.11	3.22	3.34	3.46	3.74						
XM2S-015N6X		6.0						13.06°	1.06	1.12	1.18	1.23	1.33						
XM2S-015N8X		8.0						12.31°	1.59	1.67	1.74	1.81	1.95						
XM2S-015N10X		10.0						11.65°	2.12	2.21	2.29	2.38	2.57						
XM2S-015N12X		12.0						11.05°	2.64	2.75	2.85	2.96	3.20						
XM2S-015N14X		14.0						10.51°	3.16	3.28	3.40	3.53	3.82						
XM2S-015N16X		16.0						13.01°	1.06	1.12	1.18	1.23	1.33						
XM2S-015N18X		18.0						4°	4.00	1.67	1.74	1.81	1.95						
XM2S-015N20X		20.0						11.57°	2.12	2.21	2.29	2.38	2.57						
XM2S-015N25X		25.0						10.97°	2.64	2.75	2.85	2.96	3.20						
XM2S-015N30X		30.0						10.42°	3.16	3.28	3.40	3.53	3.82						
XM2S-015N35X		35.0						9.92°	3.68	3.82	3.96	4.11	4.44						
XM2S-015N40X		40.0						9.47°	4.20	4.35	4.51	4.68	5.06						
XM2S-016N6X		1.6						6.0	2.4	1.54	50.0	4.0	4.0	8.68°	5.24	5.42	5.62	5.83	6.30
XM2S-016N8X								8.0						8.01°	6.27	6.49	6.73	6.98	7.55
XM2S-018N6X	1.8	6.0	2.7	1.73	50.0	4.0	4.0	6.94°	8.34	8.63	8.94	9.28	10.03						
XM2S-018N8X		8.0						6.12°	10.41	10.77	11.16	11.58	12.52						
XM2S-020N4X	2.0	4.0	3.0	1.92	50.0	4.0	4.0	12.96°	1.06	1.12	1.18	1.23	1.33						
XM2S-020N6X		6.0						12.19°	1.59	1.67	1.74	1.81	1.95						
XM2S-020N8X		8.0						11.5°	2.12	2.21	2.29	2.38	2.57						
XM2S-020N10X		10.0						10.88°	2.64	2.75	2.85	2.96	3.20						
XM2S-020N12X		12.0						10.33°	3.16	3.28	3.40	3.53	3.82						
XM2S-020N14X		14.0						9.37°	4.20	4.35	4.51	4.68	5.06						
XM2S-020N16X		16.0						8.58°	5.24	5.42	5.62	5.83	6.30						

Series XM2S

Tool No.	DC	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle				
									0.5°	1°	1.5°	2°	3°
XM2S-020N18X	2.0	18.0	3.0	1.92	60.0	4.0	4.0	7.91°	6.27	6.49	6.73	6.98	7.55
XM2S-020N20X		20.0						6.84°	8.34	8.63	8.94	9.28	10.03
XM2S-020N25X		25.0						6.02°	10.41	10.77	11.16	11.58	12.52
XM2S-020N30X		30.0						11.21°	2.17	2.31	2.44	2.56	2.78
XM2S-020N35X		35.0						10.07°	3.24	3.42	3.58	3.72	4.02
XM2S-020N40X		40.0						9.13°	4.30	4.51	4.69	4.87	5.26
XM2S-020N50X		50.0						8.36°	5.35	5.59	5.80	6.02	6.50
XM2S-025N8X	2.5	8.0	3.75	2.4	60.0	4.0	4.0	14.39°	0.31	0.33	0.35	0.37	0.40
XM2S-025N12X		12.0						14.03°	0.52	0.55	0.58	0.60	0.65
XM2S-025N16X		16.0						13.22°	1.05	1.09	1.13	1.18	1.27
XM2S-025N20X		20.0						14.03°	0.52	0.54	0.57	0.59	0.64
XM2S-025N30X		30.0						13.2°	1.04	1.08	1.12	1.16	1.26
XM2S-025N40X		40.0						12.45°	1.56	1.62	1.67	1.74	1.88
XM2S-025N50X		50.0						11.79°	2.08	2.15	2.23	2.31	2.50
XM2S-030N8X	3.0	8.0	4.5	2.88	60.0	6.0	4.0	10.65°	3.11	3.22	3.34	3.46	3.74
XM2S-030N12X		12.0						13.06°	1.06	1.12	1.18	1.23	1.33
XM2S-030N16X		16.0						12.31°	1.59	1.67	1.74	1.81	1.95
XM2S-030N20X		20.0						11.65°	2.12	2.21	2.29	2.38	2.57
XM2S-030N25X		25.0						11.05°	2.64	2.75	2.85	2.96	3.20
XM2S-030N30X		30.0						10.51°	3.16	3.28	3.40	3.53	3.82
XM2S-030N40X		40.0						13.01°	1.06	1.12	1.18	1.23	1.33
XM2S-030N50X	50.0	4°	4.00	1.67	1.74	1.81	1.95						
XM2S-040N12X	4.0	12.0	6.0	3.86	60.0	6.0	4.0	11.57°	2.12	2.21	2.29	2.38	2.57
XM2S-040N16X		16.0						10.97°	2.64	2.75	2.85	2.96	3.20
XM2S-040N20X		20.0						10.42°	3.16	3.28	3.40	3.53	3.82
XM2S-040N25X		25.0						9.92°	3.68	3.82	3.96	4.11	4.44
XM2S-040N30X		30.0						9.47°	4.20	4.35	4.51	4.68	5.06
XM2S-040N35X		35.0						8.68°	5.24	5.42	5.62	5.83	6.30
XM2S-040N40X		40.0						8.01°	6.27	6.49	6.73	6.98	7.55
XM2S-040N50X	50.0	6.94°	8.34	8.63	8.94	9.28	10.03						
XM2S-050N20X	5.0	20.0	7.5	4.85	70.0	6.0	4.0	6.12°	10.41	10.77	11.16	11.58	12.52
XM2S-050N25X		25.0						12.96°	1.06	1.12	1.18	1.23	1.33
XM2S-050N30X		30.0						12.19°	1.59	1.67	1.74	1.81	1.95
XM2S-050N40X		40.0						11.5°	2.12	2.21	2.29	2.38	2.57
XM2S-050N50X		50.0						10.88°	2.64	2.75	2.85	2.96	3.20
XM2S-060N20X	6.0	20.0	9.0	5.85	70.0	6.0	-	10.33°	3.16	3.28	3.40	3.53	3.82
XM2S-060N30X		30.0						9.37°	4.20	4.35	4.51	4.68	5.06
XM2S-060N40X		40.0						8.58°	5.24	5.42	5.62	5.83	6.30
XM2S-060N50X		50.0						7.91°	6.27	6.49	6.73	6.98	7.55

TuffCut[®] XM Series XM2R



Tool No.	DC	RE	LU	APMX	DN	OAL	DCNMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle				
										0.5°	1°	1.5°	2°	3°
										XM2R-002N0.5-0.02RX	0.2	0.02	0.5	0.16
XM2R-002N1-0.02RX	1.0	13.23°	1.04	1.08	1.12	1.16	1.25							
XM2R-002N2-0.02RX	2.0	11.82°	2.08	2.15	2.23	2.31	2.50							
XM2R-002N0.5-0.05RX	0.05	0.5	14.12°	0.52	0.54	0.56	0.58	0.62						
XM2R-002N1-0.05RX		1.0	13.28°	1.04	1.08	1.11	1.15	1.24						
XM2R-002N1.5-0.05RX		1.5	12.53°	1.56	1.61	1.67	1.73	1.87						
XM2R-002N2-0.05RX	2.0	11.85°	2.08	2.15	2.22	2.30	2.49							
XM2R-003N1-0.02RX	0.3	0.02	1.0	0.24	0.27	50.0	4.0	2.0	13.09°	1.06	1.12	1.17	1.23	1.33
XM2R-003N2-0.02RX			2.0						11.67°	2.11	2.21	2.29	2.38	2.57
XM2R-003N3-0.02RX			3.0						10.53°	3.16	3.28	3.40	3.53	3.81
XM2R-003N1-0.05RX		0.05	1.0						13.14°	1.06	1.12	1.17	1.22	1.32
XM2R-003N1.5-0.05RX			1.5						12.38°	1.59	1.66	1.73	1.80	1.94
XM2R-003N2-0.05RX			2.0						11.71°	2.11	2.21	2.29	2.37	2.56
XM2R-003N2.5-0.05RX	2.5	11.11°	2.64	2.75	2.84	2.95	3.18							
XM2R-003N3-0.05RX	3.0	10.56°	3.16	3.28	3.40	3.52	3.81							
XM2R-004N1-0.02RX	0.4	0.02	1.0	0.32	0.37	50.0	4.0	2.0	13.04°	1.06	1.12	1.17	1.23	1.33
XM2R-004N2-0.02RX			2.0						11.6°	2.11	2.21	2.29	2.38	2.57
XM2R-004N3-0.02RX			3.0						10.44°	3.16	3.28	3.40	3.53	3.81
XM2R-004N4-0.02RX		4.0	9.49°						4.20	4.35	4.51	4.68	5.06	
XM2R-004N1-0.05RX		0.05	1.0						13.09°	1.06	1.12	1.17	1.22	1.32
XM2R-004N1.5-0.05RX			1.5						12.32°	1.59	1.66	1.73	1.80	1.94
XM2R-004N2-0.05RX	2.0		11.64°	2.11	2.21	2.29	2.37	2.56						
XM2R-004N2.5-0.05RX	2.5	11.03°	2.64	2.75	2.84	2.95	3.18							
XM2R-004N3-0.05RX	3.0	10.47°	3.16	3.28	3.40	3.52	3.81							
XM2R-004N3.5-0.05RX	3.5	9.97°	3.68	3.82	3.95	4.10	4.43							
XM2R-004N4-0.05RX	4.0	9.52°	4.20	4.35	4.51	4.67	5.05							
XM2R-004N1-0.1RX	0.1	1.0	13.17°	1.06	1.11	1.16	1.21	1.31						
XM2R-004N2-0.1RX		2.0	11.7°	2.11	2.20	2.28	2.37	2.55						
XM2R-004N3-0.1RX		3.0	10.53°	3.16	3.28	3.39	3.52	3.79						
XM2R-004N4-0.1RX		4.0	9.56°	4.20	4.35	4.50	4.67	5.04						
XM2R-005N1-0.02RX	0.5	0.02	1.0	0.4	0.47	50.0	4.0	2.0	13°	1.06	1.12	1.17	1.23	1.33
XM2R-005N2-0.02RX			2.0						11.53°	2.11	2.21	2.29	2.38	2.57
XM2R-005N3-0.02RX			3.0						10.35°	3.16	3.28	3.40	3.53	3.81
XM2R-005N4-0.02RX		4.0	9.39°						4.20	4.35	4.51	4.68	5.06	
XM2R-005N6-0.02RX		6.0	7.92°						6.27	6.49	6.73	6.98	7.54	
XM2R-005N1-0.05RX		0.05	1.0						13.05°	1.06	1.12	1.17	1.22	1.32
XM2R-005N2-0.05RX	2.0		11.56°	2.11	2.21	2.29	2.37	2.56						
XM2R-005N3-0.05RX	3.0		10.38°	3.16	3.28	3.40	3.52	3.81						
XM2R-005N4-0.05RX	4.0	9.42°	4.20	4.35	4.51	4.67	5.05							
XM2R-005N5-0.05RX	5.0	8.62°	5.24	5.42	5.61	5.82	6.29							
XM2R-005N6-0.05RX	6.0	7.94°	6.27	6.49	6.72	6.97	7.53							
XM2R-005N1-0.1RX	0.1	1.0	13.13°	1.06	1.11	1.16	1.21	1.31						
XM2R-005N2-0.1RX		2.0	11.63°	2.11	2.20	2.28	2.37	2.55						
XM2R-005N3-0.1RX		3.0	10.44°	3.16	3.28	3.39	3.52	3.79						
XM2R-005N4-0.1RX		4.0	9.46°	4.20	4.35	4.50	4.67	5.04						
XM2R-005N5-0.1RX		5.0	8.65°	5.24	5.42	5.61	5.82	6.28						
XM2R-005N6-0.1RX		6.0	7.97°	6.27	6.49	6.72	6.97	7.52						

Series XM2R

Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle										
										0.5°	1°	1.5°	2°	3°						
										XM2R-006N2-0.02RX	0.6	0.02	2.0	0.48	0.57	50.0	4.0	4.0	11.24°	2.17
XM2R-006N4-0.02RX	4.0	9.15°	4.29	4.51	4.69	4.86	5.26													
XM2R-006N6-0.02RX	6.0	7.71°	6.40	6.66	6.90	7.16	7.74													
XM2R-006N2-0.05RX	0.05	2.0	11.27°	2.17	2.31	2.43	2.55	2.76												
XM2R-006N4-0.05RX		4.0	9.18°	4.29	4.51	4.68	4.86	5.25												
XM2R-006N6-0.05RX		6.0	7.73°	6.40	6.66	6.90	7.16	7.74												
XM2R-006N8-0.05RX	0.1	8.0	6.68°	8.49	8.80	9.12	9.46	10.22												
XM2R-006N10-0.05RX		10.0	5.88°	10.57	10.94	11.33	11.76	12.71												
XM2R-006N2-0.1RX		2.0	11.34°	2.16	2.30	2.43	2.54	2.75												
XM2R-006N4-0.1RX	0.8	0.02	4.0	0.64	0.76	50.0	4.0	4.0	9.22°	4.29		4.50	4.68						4.85	5.24
XM2R-006N6-0.1RX			6.0						7.76°	6.39		6.66	6.90						7.15	7.72
XM2R-006N8-0.1RX			8.0						6.7°	8.48		8.80	9.11						9.45	10.21
XM2R-006N10-0.1RX		10.0	5.89°						10.57	10.94		11.33	11.75						12.70	
XM2R-007N4-0.05RX		0.7	0.05						4.0	0.56		0.67	50.0						4.0	4.0
XM2R-007N6-0.05RX									6.0		7.62°			6.40	6.66	6.90	7.16	7.74		
XM2R-007N4-0.1RX	0.1		4.0	9.11°	4.29	4.50	4.68	4.85	5.24											
XM2R-007N6-0.1RX			6.0	7.65°	6.39	6.66	6.90	7.15	7.72											
XM2R-008N4-0.02RX	0.8	0.02	4.0	0.64	0.76	50.0	4.0	4.0	8.96°	4.27	4.47	4.65	4.82	5.21						
XM2R-008N6-0.02RX			6.0						7.51°	6.37	6.63	6.87	7.12	7.70						
XM2R-008N4-0.05RX		0.05	4.0						8.99°	4.27	4.47	4.65	4.82	5.21						
XM2R-008N6-0.05RX			6.0						7.52°	6.37	6.63	6.86	7.12	7.69						
XM2R-008N8-0.05RX			8.0						6.47°	8.45	8.76	9.08	9.42	10.18						
XM2R-008N12-0.05RX		0.1	12.0			5.05°			12.61	13.04	13.51	14.02	15.15							
XM2R-008N4-0.1RX			4.0			9.03°			4.26	4.47	4.64	4.81	5.19							
XM2R-008N6-0.1RX			6.0			7.55°			6.37	6.62	6.86	7.11	7.68							
XM2R-008N8-0.1RX		0.2	0.1			8.0			0.64	0.76	50.0	4.0	4.0	6.49°	8.45	8.76	9.07	9.41	10.17	
XM2R-008N12-0.1RX						12.0								5.06°	12.60	13.04	13.51	14.01	15.14	
XM2R-008N4-0.2RX	4.0			9.12°	4.26	4.46	4.63	4.80						5.17						
XM2R-008N6-0.2RX	6.0		7.62°	6.36	6.61	6.85	7.10	7.66												
XM2R-008N8-0.2RX	8.0		6.54°	8.45	8.75	9.06	9.40	10.14												
XM2R-008N12-0.2RX	12.0		5.09°	12.60	13.03	13.50	14.00	15.11												
XM2R-010N2-0.02RX	1.0	0.02	2.0	0.80	0.96	50.0	4.0	4.0	10.92°	2.15	2.28	2.40	2.52	2.73						
XM2R-010N4-0.02RX			4.0						8.72°	4.27	4.47	4.65	4.82	5.21						
XM2R-010N6-0.02RX			6.0						7.26°	6.37	6.63	6.87	7.12	7.70						
XM2R-010N8-0.02RX			8.0						6.22°	8.46	8.77	9.08	9.42	10.19						
XM2R-010N10-0.02RX			10.0						5.44°	10.53	10.91	11.30	11.72	12.67						
XM2R-010N12-0.02RX			12.0						4.83°	12.61	13.05	13.52	14.02	15.16						
XM2R-010N2-0.05RX		0.05	2.0			10.96°			2.15	2.28	2.40	2.51	2.72							
XM2R-010N3-0.05RX			3.0			9.73°			3.21	3.38	3.53	3.67	3.96							
XM2R-010N4-0.05RX			4.0			8.75°			4.27	4.47	4.65	4.82	5.21							
XM2R-010N5-0.05RX			5.0			7.95°			5.32	5.55	5.75	5.97	6.45							
XM2R-010N6-0.05RX			6.0			7.28°			6.37	6.63	6.86	7.12	7.69							
XM2R-010N8-0.05RX			8.0			6.23°			8.45	8.76	9.08	9.42	10.18							
XM2R-010N10-0.05RX			10.0			5.45°			10.53	10.90	11.30	11.72	12.67							
XM2R-010N12-0.05RX			12.0			4.84°			12.61	13.04	13.51	14.02	15.15							
XM2R-010N16-0.05RX			16.0			3.95°			16.74	17.32	17.95	18.62	20.12							
XM2R-010N20-0.05RX			20.0			3.34°			20.88	21.60	22.38	23.22	25.10							
XM2R-010N2-0.1RX			0.1			2.0			11.03°	2.14	2.27	2.39	2.50	2.71						
XM2R-010N3-0.1RX						3.0			9.79°	3.21	3.38	3.53	3.66	3.95						
XM2R-010N4-0.1RX		4.0				8.8°			4.26	4.47	4.64	4.81	5.19							
XM2R-010N5-0.1RX		5.0				7.99°			5.32	5.55	5.75	5.96	6.44							
XM2R-010N6-0.1RX		6.0				7.31°			6.37	6.62	6.86	7.11	7.68							
XM2R-010N8-0.1RX		8.0				6.25°			8.45	8.76	9.07	9.41	10.17							
XM2R-010N10-0.1RX		10.0				5.46°			10.53	10.90	11.29	11.71	12.65							
XM2R-010N12-0.1RX		12.0				4.85°			12.60	13.04	13.51	14.01	15.14							
XM2R-010N16-0.1RX		16.0				3.96°			16.74	17.32	17.94	18.61	20.11							
XM2R-010N20-0.1RX		20.0				3.35°			20.87	21.60	22.37	23.21	25.08							

Series XM2R

Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle					
										0.5°	1°	1.5°	2°	3°	
										XM2R-010N2-0.2RX	1.0	0.2	2.0	0.80	0.96
XM2R-010N3-0.2RX	3.0	9.9°	3.20	3.37	3.51	3.65	3.93								
XM2R-010N4-0.2RX	4.0	8.89°	4.26	4.46	4.63	4.80	5.17								
XM2R-010N5-0.2RX	5.0	8.06°	5.31	5.54	5.74	5.95	6.41								
XM2R-010N6-0.2RX	6.0	7.37°	6.36	6.61	6.85	7.10	7.66								
XM2R-010N8-0.2RX	8.0	6.3°	8.45	8.75	9.06	9.40	10.14								
XM2R-010N10-0.2RX	10.0	5.5°	10.53	10.89	11.28	11.70	12.63								
XM2R-010N12-0.2RX	12.0	4.88°	12.60	13.03	13.50	14.00	15.11								
XM2R-010N16-0.2RX	16.0	3.98°	16.74	17.31	17.93	18.59	20.09								
XM2R-010N20-0.2RX	20.0	3.36°	20.87	21.59	22.36	23.19	25.06								
XM2R-010N2-0.3RX	0.3	2.0	0.80	0.96	4.0	4.0	11.32°	2.13	2.25	2.36		2.47	2.66		
XM2R-010N3-0.3RX		3.0					10.01°	3.20	3.36	3.50		3.63	3.90		
XM2R-010N4-0.3RX		4.0					8.98°	4.25	4.45	4.62		4.78	5.15		
XM2R-010N5-0.3RX		5.0					8.14°	5.31	5.53	5.73		5.93	6.39		
XM2R-010N6-0.3RX		6.0					7.44°	6.36	6.61	6.84		7.08	7.63		
XM2R-010N8-0.3RX		8.0					6.35°	8.44	8.75	9.05		9.38	10.12		
XM2R-010N10-0.3RX		10.0					5.53°	10.52	10.89	11.27		11.68	12.60		
XM2R-010N12-0.3RX		12.0					4.9°	12.60	13.03	13.49		13.98	15.09		
XM2R-010N16-0.3RX		16.0					4°	16.73	17.30	17.92		18.58	20.06		
XM2R-010N20-0.3RX		20.0					3.37°	20.87	21.58	22.35		23.18	25.04		
XM2R-0125N5-0.1RX	1.25	0.1	5.0	1.0	1.2	50.0	4.0	4.0	7.68°	5.30	5.52	5.72	5.93	6.40	
XM2R-0125N10-0.1RX			10.0						5.17°	10.50	10.87	11.26	11.68	12.62	
XM2R-0125N15-0.1RX			15.0						3.9°	15.68	16.22	16.80	17.43	18.83	
XM2R-0125N20-0.1RX			20.0						3.13°	20.84	21.57	22.34	23.18	25.05	
XM2R-0125N5-0.2RX		0.2	5.0	1.0	1.2	50.0	4.0	4.0	7.75°	5.29	5.51	5.71	5.91	6.38	
XM2R-0125N10-0.2RX			10.0						5.21°	10.50	10.86	11.25	11.66	12.59	
XM2R-0125N15-0.2RX			15.0						3.92°	15.67	16.21	16.79	17.41	18.81	
XM2R-0125N20-0.2RX			20.0						3.14°	20.84	21.56	22.33	23.16	25.02	
XM2R-0125N5-0.3RX		0.3	5.0	1.0	1.2	50.0	4.0	4.0	7.83°	5.29	5.50	5.70	5.90	6.35	
XM2R-0125N10-0.3RX			10.0						5.24°	10.50	10.86	11.24	11.65	12.57	
XM2R-0125N15-0.3RX			15.0						3.94°	15.67	16.20	16.78	17.40	18.78	
XM2R-0125N20-0.3RX			20.0						3.15°	20.84	21.55	22.32	23.15	25.00	
XM2R-015N4-0.1RX		1.5	0.1	4.0	1.2	1.44	50.0	4.0	4.0	8.17°	4.23	4.42	4.58	4.75	5.13
XM2R-015N6-0.1RX				6.0						6.66°	6.32	6.57	6.80	7.05	7.62
XM2R-015N8-0.1RX				8.0						5.62°	8.41	8.71	9.02	9.35	10.10
XM2R-015N12-0.1RX				12.0						4.28°	12.55	12.98	13.45	13.95	15.07
XM2R-015N15-0.1RX				15.0						3.63°	15.65	16.19	16.77	17.40	18.80
XM2R-015N20-0.1RX				20.0						2.9°	20.82	21.54	22.32	23.15	-
XM2R-015N4-0.2RX				4.0						8.26°	4.23	4.41	4.57	4.74	5.10
XM2R-015N6-0.2RX				6.0						6.72°	6.32	6.56	6.79	7.04	7.59
XM2R-015N8-0.2RX	8.0		5.66°	8.40	8.70	9.01	9.34	10.08							
XM2R-015N12-0.2RX	12.0		4.31°	12.55	12.98	13.44	13.94	15.05							
XM2R-015N15-0.2RX	15.0		3.65°	15.65	16.19	16.76	17.38	18.78							
XM2R-015N20-0.2RX	20.0		2.91°	20.82	21.53	22.31	23.13	-							
XM2R-015N4-0.3RX	4.0		8.36°	4.22	4.40	4.56	4.72	5.08							
XM2R-015N6-0.3RX	6.0		6.78°	6.31	6.55	6.78	7.02	7.57							
XM2R-015N8-0.3RX	8.0		5.71°	8.40	8.69	8.99	9.32	10.05							
XM2R-015N12-0.3RX	12.0		4.33°	12.54	12.97	13.43	13.92	15.03							
XM2R-015N15-0.3RX	15.0		3.67°	15.64	16.18	16.75	17.37	18.76							
XM2R-015N20-0.3RX	20.0		2.92°	20.81	21.53	22.29	23.12	-							
XM2R-015N4-0.5RX	4.0		8.55°	4.21	4.39	4.54	4.69	5.03							
XM2R-015N6-0.5RX	6.0		6.91°	6.31	6.54	6.76	6.99	7.52							
XM2R-015N8-0.5RX	8.0	5.8°	8.39	8.68	8.97	9.29	10.00								
XM2R-015N12-0.5RX	12.0	4.39°	12.54	12.96	13.41	13.89	14.98								
XM2R-015N15-0.5RX	15.0	3.71°	15.64	16.17	16.73	17.34	18.71								
XM2R-015N20-0.5RX	20.0	2.95°	20.81	21.51	22.27	23.09	-								

Series XM2R

Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle																									
										0.5°	1°	1.5°	2°	3°																					
										XM2R-0175N5-0.1RX	1.75	0.1	5.0	1.4	1.68	50.0	4.0	4.0	6.96°	5.26	5.47	5.67	5.88	6.35											
XM2R-0175N10-0.1RX	10.0	4.53°	10.46	10.82	11.21	11.63	12.56																												
XM2R-0175N15-0.1RX	15.0	3.35°	15.63	16.17	16.75	17.38	18.78																												
XM2R-0175N20-0.1RX	20.0	2.66°	20.80	21.52	22.29	23.13	-																												
XM2R-0175N5-0.2RX	0.2	5.0	1.4	1.68	50.0	4.0	4.0	7.03°	5.26	5.47		5.66	5.86			6.32																			
XM2R-0175N10-0.2RX		10.0						4.56°	10.46	10.82		11.20	11.61			12.54																			
XM2R-0175N15-0.2RX		15.0						3.37°	15.63	16.16		16.74	17.36			18.75																			
XM2R-0175N20-0.2RX		20.0						2.67°	20.80	21.51		22.28	23.11			-																			
XM2R-0175N5-0.3RX	0.3	5.0			1.4			1.68	50.0	4.0		4.0	7.11°			5.25			5.46	5.65	5.85	6.30													
XM2R-0175N10-0.3RX		10.0											4.59°			10.45			10.81	11.19	11.60	12.51													
XM2R-0175N15-0.3RX		15.0											3.39°			15.62			16.16	16.73	17.35	18.73													
XM2R-0175N20-0.3RX		20.0											2.69°			20.79			21.51	22.27	23.10	-													
XM2R-020N4-0.1RX	2.0	0.1							4.0		1.60		1.92	50.0	4.0	4.0	7.36°	4.21	4.38	4.54	4.71	5.08													
XM2R-020N6-0.1RX									6.0								5.86°	6.29	6.53	6.76	7.01	7.57													
XM2R-020N8-0.1RX									8.0								4.87°	8.37	8.66	8.97	9.31	10.05													
XM2R-020N12-0.1RX									12.0								3.64°	12.51	12.94	13.41	13.91	15.03													
XM2R-020N16-0.1RX			16.0	2.9°		16.65	17.22		17.84					18.51			-																		
XM2R-020N20-0.1RX			20.0	2.42°		20.78	21.50		22.27					23.11			-																		
XM2R-020N25-0.1RX			25.0	2°		25.95	26.85		27.82					-			-																		
XM2R-020N30-0.1RX			30.0	1.7°		31.12	32.20		33.36					-			-																		
XM2R-020N4-0.2RX			0.2	4.0	1.60	1.92	50.0	4.0	4.0	7.46°		4.20		4.37			4.53	4.69	5.06																
XM2R-020N6-0.2RX				6.0						5.93°		6.29		6.52			6.75	6.99	7.54																
XM2R-020N8-0.2RX				8.0						4.91°		8.37		8.66			8.96	9.29	10.03																
XM2R-020N12-0.2RX				12.0						3.66°		12.51		12.94			13.40	13.89	15.00																
XM2R-020N16-0.2RX		16.0		2.92°			16.64			17.22		17.83		18.49			-																		
XM2R-020N20-0.2RX		20.0		2.43°			20.78			21.49		22.26		23.09			-																		
XM2R-020N25-0.2RX		25.0		2°			25.95			26.84		27.80		-			-																		
XM2R-020N30-0.2RX		30.0		1.71°			31.11			32.19		33.35		-			-																		
XM2R-020N4-0.3RX		0.3		4.0			1.60			1.92		50.0		4.0			4.0	7.56°	4.20	4.37	4.52	4.68	5.03												
XM2R-020N6-0.3RX				6.0														5.99°	6.28	6.51	6.74	6.98	7.52												
XM2R-020N8-0.3RX				8.0														4.96°	8.36	8.65	8.95	9.28	10.01												
XM2R-020N12-0.3RX				12.0														3.69°	12.50	12.93	13.39	13.88	14.98												
XM2R-020N16-0.3RX			16.0	2.93°								16.64						17.21	17.82	18.48	-														
XM2R-020N20-0.3RX			20.0	2.44°								20.77						21.49	22.25	23.08	-														
XM2R-020N25-0.3RX			25.0	2.01°								25.94						26.84	27.79	28.82	-														
XM2R-020N30-0.3RX			30.0	1.71°								31.11						32.18	33.34	-	-														
XM2R-020N6-0.5RX			0.5	6.0								1.60						1.92	50.0	4.0	4.0	6.11°	6.28	6.50	6.71	6.95	7.47								
XM2R-020N8-0.5RX				8.0																		5.04°	8.36	8.64	8.93	9.25	9.96								
XM2R-020N12-0.5RX				12.0																		3.73°	12.50	12.92	13.36	13.85	14.93								
XM2R-020N16-0.5RX				16.0																		2.96°	16.63	17.19	17.80	18.45	-								
XM2R-020N20-0.5RX		20.0		2.46°															20.77			21.47	22.23	23.05	-										
XM2R-020N25-0.5RX		25.0		2.03°															25.94			26.82	27.77	28.79	-										
XM2R-020N30-0.5RX		30.0		1.72°															31.10			32.17	33.31	-	-										
XM2R-020N6-0.8RX		0.8		6.0															1.60			1.92	50.0	4.0	4.0	6.31°	6.26	6.48	6.68	6.90	7.40				
XM2R-020N8-0.8RX				8.0																						5.18°	8.35	8.62	8.90	9.20	9.88				
XM2R-020N12-0.8RX				12.0																						3.81°	12.49	12.89	13.33	13.80	14.86				
XM2R-020N16-0.8RX				16.0																						3.01°	16.62	17.17	17.77	18.40	19.83				
XM2R-020N20-0.8RX				20.0																			2.49°			20.76	21.45	22.20	23.00	-					
XM2R-020N25-0.8RX	25.0		2.05°	25.93							26.80		27.74		28.75	-																			
XM2R-020N30-0.8RX	30.0		1.74°	31.09							32.15		33.28		-	-																			
XM2R-025N10-0.1RX	2.5		0.1	10.0							2.0		2.4		50.0	4.0							4.0			3.36°	10.41	10.77	11.16	11.57	12.50				
XM2R-025N20-0.1RX				20.0																						1.89°	20.75	21.47	22.24	-	-				
XM2R-025N30-0.1RX				30.0																						1.32°	31.09	32.17	-	-	-				
XM2R-025N10-0.2RX			0.2	10.0											2.0											2.4	50.0	4.0	4.0	3.39°	10.41	10.77	11.15	11.56	12.48
XM2R-025N20-0.2RX				20.0																										1.9°	20.75	21.46	22.23	-	-
XM2R-025N30-0.2RX		30.0		1.32°																										31.08	32.16	-	-	-	

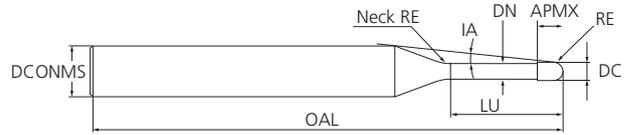
Series XM2R

Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle					
										0.5°	1°	1.5°	2°	3°	
										XM2R-025N10-0.3RX	2.5	0.3	10.0	2.0	2.40
XM2R-025N20-0.3RX	20.0	60.0	1.91°	20.74	21.46	22.22	-	-							
XM2R-025N30-0.3RX	30.0	70.0	1.32°	31.08	32.15	-	-	-							
XM2R-025N10-0.5RX	0.5	10.0	50.0	3.47°	10.40	10.75	11.12	11.51	12.41						
XM2R-025N20-0.5RX		20.0	60.0	1.92°	20.74	21.44	22.20	-	-						
XM2R-025N30-0.5RX		30.0	70.0	1.33°	31.07	32.14	-	-	-						
XM2R-030N6-0.1RX	3.0	0.1	6.0	2.4	2.88	50.0	6.0	4.0	7.4°	6.25	6.47	6.70	6.95	7.50	
XM2R-030N8-0.1RX			8.0			55.0			6.32°	8.32	8.61	8.92	9.25	9.99	
XM2R-030N12-0.1RX			12.0			60.0			4.89°	12.46	12.89	13.35	13.85	14.96	
XM2R-030N16-0.1RX			16.0			65.0			3.99°	16.59	17.17	17.78	18.45	19.94	
XM2R-030N18-0.1RX			18.0			65.0			3.65°	18.66	19.31	20.00	20.75	22.42	
XM2R-030N20-0.1RX			20.0			75.0			3.36°	20.73	21.45	22.22	23.05	24.91	
XM2R-030N30-0.1RX			30.0			80.0			2.42°	31.06	32.14	33.30	34.55	-	
XM2R-030N35-0.1RX			35.0			80.0			2.12°	36.23	37.49	38.84	40.29	-	
XM2R-030N6-0.2RX			0.2			6.0			50.0	7.46°	6.25	6.46	6.69	6.93	7.48
XM2R-030N8-0.2RX						8.0			55.0	6.36°	8.32	8.60	8.91	9.23	9.97
XM2R-030N12-0.2RX		12.0				60.0			4.92°	12.45	12.88	13.34	13.83	14.94	
XM2R-030N16-0.2RX		16.0				65.0			4°	16.59	17.16	17.77	18.43	19.91	
XM2R-030N18-0.2RX		18.0				65.0			3.66°	18.66	19.30	19.99	20.73	22.40	
XM2R-030N20-0.2RX		20.0				75.0			3.38°	20.72	21.44	22.21	23.03	24.88	
XM2R-030N30-0.2RX		30.0				80.0			2.43°	31.06	32.14	33.29	34.53	-	
XM2R-030N35-0.2RX		35.0				80.0			2.13°	36.23	37.48	38.83	40.28	-	
XM2R-030N6-0.3RX		0.3				6.0			50.0	7.53°	6.24	6.46	6.68	6.92	7.46
XM2R-030N8-0.3RX						8.0			55.0	6.41°	8.32	8.60	8.90	9.22	9.94
XM2R-030N12-0.3RX			12.0			60.0			4.94°	12.45	12.87	13.33	13.82	14.91	
XM2R-030N16-0.3RX			16.0			65.0			4.02°	16.59	17.15	17.76	18.42	19.89	
XM2R-030N18-0.3RX			18.0			65.0			3.68°	18.65	19.29	19.98	20.72	22.37	
XM2R-030N20-0.3RX			20.0			75.0			3.39°	20.72	21.43	22.20	23.02	24.86	
XM2R-030N30-0.3RX			30.0			80.0			2.43°	31.06	32.13	33.28	34.52	-	
XM2R-030N35-0.3RX			35.0			80.0			2.13°	36.23	37.48	38.82	40.26	-	
XM2R-030N8-0.5RX			0.5			8.0			55.0	6.51°	8.31	8.58	8.87	9.19	9.89
XM2R-030N12-0.5RX						12.0			60.0	5°	12.44	12.86	13.31	13.79	14.87
XM2R-030N16-0.5RX		16.0				65.0			4.06°	16.58	17.14	17.74	18.39	19.84	
XM2R-030N18-0.5RX		18.0				65.0			3.71°	18.65	19.28	19.96	20.69	22.33	
XM2R-030N20-0.5RX		20.0				75.0			3.42°	20.71	21.42	22.17	22.99	24.81	
XM2R-030N30-0.5RX		30.0				80.0			2.45°	31.05	32.12	33.26	34.49	-	
XM2R-030N35-0.5RX	35.0	80.0		2.14°	36.22	37.46	38.80	40.23	-						
XM2R-030N8-1.0RX	1.0	8.0		55.0	6.76°	8.29	8.55	8.82	9.11	9.77					
XM2R-030N12-1.0RX		12.0		60.0	5.15°	12.43	12.83	13.25	13.71	14.74					
XM2R-030N16-1.0RX		16.0		65.0	4.16°	16.56	17.10	17.69	18.31	19.72					
XM2R-030N18-1.0RX		18.0	65.0	3.79°	18.63	19.24	19.90	20.61	22.20						
XM2R-030N20-1.0RX		20.0	75.0	3.49°	20.70	21.38	22.12	22.91	24.69						
XM2R-030N30-1.0RX		30.0	80.0	2.48°	31.03	32.08	33.20	34.41	-						
XM2R-030N35-1.0RX		35.0	80.0	2.17°	36.20	37.43	38.74	40.16	-						
XM2R-040N8-0.1RX		4.0	0.1	8.0	3.2	3.86	55.0	6.0	4.0	4.9°	8.31	8.59	8.90	9.23	9.97
XM2R-040N12-0.1RX				12.0			60.0			3.66°	12.44	12.87	13.33	13.83	14.94
XM2R-040N16-0.1RX				16.0			65.0			2.91°	16.57	17.15	17.76	18.43	-
XM2R-040N20-0.1RX	20.0			75.0			2.42°			20.71	21.43	22.20	23.03	-	
XM2R-040N30-0.1RX	30.0			80.0			1.71°			31.05	32.12	33.28	-	-	
XM2R-040N35-0.1RX	35.0		80.0	1.49°			36.21			37.47	-	-	-		
XM2R-040N45-0.1RX	45.0		90.0	1.18°			46.55			48.17	-	-	-		
XM2R-040N8-0.2RX	0.2		8.0	55.0			4.94°			8.30	8.58	8.89	9.21	9.94	
XM2R-040N12-0.2RX			12.0	60.0			3.68°			12.44	12.86	13.32	13.81	14.92	
XM2R-040N16-0.2RX			16.0	65.0			2.93°			16.57	17.14	17.75	18.41	-	
XM2R-040N20-0.2RX		20.0	75.0	2.43°	20.71	21.42	22.19	23.01	-						
XM2R-040N30-0.2RX		30.0	75.0	1.71°	31.04	32.12	33.27	-	-						

Series XM2R

Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle					
										0.5°	1°	1.5°	2°	3°	
										XM2R-040N35-0.2RX	4.0	0.2	35.0	3.2	3.86
XM2R-040N45-0.2RX	45.0	90.0	1.18°	46.55	48.16	-	-	-							
XM2R-040N8-0.3RX	0.3	8.0	55.0	4.99°	8.30	8.58	8.88	9.20	9.92						
XM2R-040N12-0.3RX		12.0	60.0	3.7°	12.43	12.86	13.31	13.80	14.89						
XM2R-040N16-0.3RX		16.0	65.0	2.94°	16.57	17.13	17.74	18.40	-						
XM2R-040N20-0.3RX		20.0	75.0	2.44°	20.70	21.41	22.18	23.00	-						
XM2R-040N30-0.3RX		30.0	80.0	1.72°	31.04	32.11	33.26	-	-						
XM2R-040N35-0.3RX		35.0	90.0	1.49°	36.21	37.46	-	-	-						
XM2R-040N45-0.3RX		45.0	60.0	1.19°	46.54	48.16	-	-	-						
XM2R-040N12-0.5RX		0.5	12.0	65.0	3.75°	12.43	12.84	13.29	13.77	14.84					
XM2R-040N16-0.5RX	16.0		75.0	2.97°	16.56	17.12	17.72	18.37	-						
XM2R-040N20-0.5RX	20.0		80.0	2.47°	20.70	21.40	22.15	22.97	-						
XM2R-040N30-0.5RX	30.0		90.0	1.73°	31.03	32.10	33.24	-	-						
XM2R-040N35-0.5RX	35.0		60.0	1.5°	36.20	37.44	-	-	-						
XM2R-040N45-0.5RX	45.0		75.0	1.19°	46.54	48.14	-	-	-						
XM2R-040N12-1.0RX	1.0		12.0	80.0	3.88°	12.41	12.81	13.23	13.69	14.72					
XM2R-040N16-1.0RX			16.0	90.0	3.05°	16.54	17.09	17.67	18.29	19.70					
XM2R-040N20-1.0RX		20.0	65.0	2.52°	20.68	21.36	22.10	22.89	-						
XM2R-040N30-1.0RX		30.0	75.0	1.75°	31.02	32.06	33.18	-	-						
XM2R-040N35-1.0RX		35.0	80.0	1.52°	36.18	37.41	38.73	-	-						
XM2R-040N45-1.0RX		45.0	90.0	1.2°	46.52	48.11	-	-	-						
XM2R-050N20-0.1RX		5.0	0.1	20.0	4.0	4.85	65.0	6.0	4.0	1.32°	20.7	21.42	-	-	-
XM2R-050N40-0.1RX				40.0			85.0			0.69°	41.38	-	-	-	-
XM2R-050N20-0.2RX	0.2		20.0	65.0			1.32°			20.7	21.41	-	-	-	
XM2R-050N40-0.2RX			40.0	85.0			0.69°			41.37	-	-	-	-	
XM2R-050N20-0.3RX	0.3		20.0	65.0			1.33°			20.69	21.41	-	-	-	
XM2R-050N40-0.3RX			40.0	85.0			0.69°			41.37	-	-	-	-	
XM2R-050N20-0.5RX	0.5		20.0	65.0			1.34°			20.69	21.39	-	-	-	
XM2R-050N40-0.5RX			40.0	85.0			0.7°			41.36	-	-	-	-	
XM2R-050N20-1.0RX	1.0		20.0	65.0			1.38°			20.67	21.36	-	-	-	
XM2R-050N40-1.0RX			40.0	85.0			0.71°			41.35	-	-	-	-	
XM2R-060N12-0.1RX	6.0	0.1	12.0	4.8	5.85	50.0	6.0	-	-	-	-	-	-	-	
XM2R-060N18-0.1RX			18.0			60.0			-	-	-	-	-		
XM2R-060N24-0.1RX			24.0			70.0			-	-	-	-	-		
XM2R-060N35-0.1RX			35.0			80.0			-	-	-	-	-		
XM2R-060N55-0.1RX			55.0			100.0			-	-	-	-	-		
XM2R-060N12-0.2RX			0.2			12.0			50.0	-	-	-	-	-	
XM2R-060N18-0.2RX		18.0				60.0			-	-	-	-	-		
XM2R-060N24-0.2RX		24.0				70.0			-	-	-	-	-		
XM2R-060N35-0.2RX		35.0				80.0			-	-	-	-	-		
XM2R-060N55-0.2RX		55.0				100.0			-	-	-	-	-		
XM2R-060N12-0.3RX		0.3				12.0			50.0	-	-	-	-	-	
XM2R-060N18-0.3RX			18.0			60.0			-	-	-	-	-		
XM2R-060N24-0.3RX			24.0			70.0			-	-	-	-	-		
XM2R-060N35-0.3RX			35.0			80.0			-	-	-	-	-		
XM2R-060N55-0.3RX			55.0			100.0			-	-	-	-	-		
XM2R-060N18-0.5RX			0.5			18.0			60.0	-	-	-	-	-	
XM2R-060N24-0.5RX		24.0				70.0			-	-	-	-	-		
XM2R-060N35-0.5RX		35.0				80.0			-	-	-	-	-		
XM2R-060N55-0.5RX		55.0				100.0			-	-	-	-	-		
XM2R-060N18-1.0RX		1.0				18.0			60.0	-	-	-	-	-	
XM2R-060N24-1.0RX						24.0			70.0	-	-	-	-	-	
XM2R-060N35-1.0RX			35.0			80.0			-	-	-	-	-		
XM2R-060N55-1.0RX			55.0			100.0			-	-	-	-	-		

TuffCut[®] XM Series XM2B



Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle				
										0.5°	1°	1.5°	2°	3°
XM2B-001N0.2X			0.2						14.66°	0.20	0.21	0.22	0.24	0.26
XM2B-001N0.3X	0.1	0.05	0.3	0.08	0.08	50.0	4.0	1.0	14.48°	0.31	0.33	0.34	0.36	0.39
XM2B-001N0.5X			0.5						14.12°	0.52	0.55	0.57	0.59	0.64
XM2B-002N0.5X			0.5						14.21°	0.51	0.53	0.55	0.57	0.61
XM2B-002N0.75X			0.75						13.77°	0.78	0.80	0.83	0.86	0.92
XM2B-002N1X			1.0						13.36°	1.04	1.07	1.11	1.15	1.23
XM2B-002N1.25X	0.2	0.1	1.25	0.16	0.17	50.0	4.0	1.0	12.97°	1.30	1.34	1.39	1.43	1.54
XM2B-002N1.5X			1.5						12.6°	1.56	1.61	1.66	1.72	1.85
XM2B-002N2X			2.0						11.92°	2.07	2.14	2.22	2.30	2.48
XM2B-002N2.5X			2.5						11.31°	2.59	2.68	2.77	2.87	3.10
XM2B-002N3X			3.0						10.76°	3.11	3.21	3.33	3.45	3.72
XM2B-003N0.5X			0.5						14.17°	0.52	0.55	0.57	0.60	0.66
XM2B-003N0.75X			0.75						13.72°	0.79	0.83	0.87	0.91	0.98
XM2B-003N1X			1.0						13.3°	1.05	1.11	1.16	1.20	1.29
XM2B-003N1.25X	0.3	0.15	1.25	0.24	0.27	50.0	4.0	2.0	12.9°	1.32	1.38	1.44	1.50	1.61
XM2B-003N1.5X			1.5						12.53°	1.58	1.66	1.72	1.78	1.92
XM2B-003N2X			2.0						11.84°	2.11	2.20	2.28	2.36	2.54
XM2B-003N2.5X			2.5						11.22°	2.63	2.74	2.83	2.93	3.16
XM2B-003N3X			3.0						10.66°	3.15	3.27	3.39	3.51	3.78
XM2B-004N0.75X			0.75						13.78°	0.78	0.82	0.86	0.90	0.97
XM2B-004N1X			1.0						13.34°	1.05	1.10	1.15	1.19	1.28
XM2B-004N1.5X			1.5						12.55°	1.58	1.65	1.72	1.78	1.90
XM2B-004N2X			2.0						11.84°	2.11	2.19	2.27	2.35	2.53
XM2B-004N2.5X	0.4	0.2	2.5	0.32	0.37	50.0	4.0	2.0	11.2°	2.63	2.73	2.83	2.93	3.15
XM2B-004N3X			3.0						10.63°	3.15	3.27	3.38	3.50	3.77
XM2B-004N3.5X			3.5						10.12°	3.67	3.80	3.94	4.08	4.39
XM2B-004N4X			4.0						9.65°	4.19	4.34	4.49	4.65	5.01
XM2B-004N4.5X			4.5						9.22°	4.71	4.87	5.04	5.23	5.63
XM2B-005N1X			1.0						13.39°	1.05	1.09	1.14	1.19	1.27
XM2B-005N1.5X			1.5						12.56°	1.58	1.65	1.71	1.77	1.89
XM2B-005N2X			2.0						11.83°	2.10	2.19	2.27	2.34	2.51
XM2B-005N2.5X			2.5						11.18°	2.63	2.73	2.82	2.92	3.14
XM2B-005N3X	0.5	0.25	3.0	0.4	0.47	50.0	4.0	2.0	10.6°	3.15	3.27	3.38	3.49	3.76
XM2B-005N4X			4.0						9.6°	4.19	4.34	4.48	4.64	5.00
XM2B-005N5X			5.0						8.77°	5.23	5.41	5.59	5.79	6.24
XM2B-005N5.5X			5.5						8.4°	5.75	5.94	6.15	6.37	6.86
XM2B-005N6X			6.0						8.07°	6.27	6.48	6.70	6.94	7.49
XM2B-005N8X			8.0						6.96°	8.33	8.62	8.92	9.24	9.97
XM2B-006N1X			1.0						13.15°	1.07	1.14	1.20	1.27	1.41
XM2B-006N2X			2.0						11.61°	2.15	2.28	2.39	2.50	2.70
XM2B-006N2.5X			2.5						10.96°	2.68	2.84	2.97	3.09	3.32
XM2B-006N3X	0.6	0.3	3.0	0.48	0.57	50.0	4.0	4.0	10.38°	3.22	3.39	3.54	3.67	3.95
XM2B-006N3.5X			3.5						9.86°	3.75	3.94	4.10	4.25	4.57
XM2B-006N4X			4.0						9.39°	4.28	4.48	4.66	4.82	5.19
XM2B-006N4.5X			4.5						8.97°	4.81	5.03	5.21	5.40	5.81

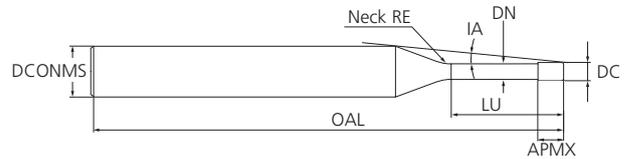
Series XM2B

Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle											
										0.5°	1°	1.5°	2°	3°							
XM2B-006N5X	0.6	0.3	5.0	0.48	0.57	50.0	4.0	4.0	8.57°	5.33	5.57	5.77	5.97	6.43							
XM2B-006N5.5X			5.5						8.22°	5.86	6.11	6.32	6.55	7.05							
XM2B-006N6X			6.0						7.89°	6.38	6.64	6.87	7.12	7.67							
XM2B-006N7X			7.0						7.3°	7.43	7.71	7.98	8.27	8.92							
XM2B-006N8X			8.0						6.79°	8.48	8.78	9.09	9.42	10.16							
XM2B-006N9X			9.0						6.35°	9.52	9.85	10.20	10.57	11.40							
XM2B-006N10X			10.0						5.97°	10.56	10.92	11.31	11.72	12.65							
XM2B-006N12X			12.0						5.32°	12.63	13.06	13.52	14.02	15.13							
XM2B-007N2X	0.7	0.35	2.0	0.56	0.67	50.0	4.0	4.0	11.6°	2.14	2.27	2.39	2.49	2.69							
XM2B-007N4X			4.0						9.33°	4.27	4.48	4.65	4.81	5.18							
XM2B-007N6X			6.0						7.81°	6.38	6.64	6.87	7.11	7.66							
XM2B-007N8X			8.0						6.71°	8.47	8.78	9.09	9.41	10.15							
XM2B-008N2X	0.8	0.4	2.0	0.64	0.76	50.0	4.0	4.0	11.64°	2.12	2.24	2.35	2.45	2.63							
XM2B-008N4X			4.0						9.3°	4.25	4.44	4.61	4.77	5.12							
XM2B-008N5X			5.0						8.45°	5.30	5.53	5.72	5.92	6.36							
XM2B-008N6X			6.0						7.74°	6.35	6.60	6.83	7.07	7.61							
XM2B-008N8X			8.0						6.63°	8.44	8.74	9.04	9.37	10.09							
XM2B-008N10X			10.0						5.8°	10.52	10.88	11.26	11.67	12.58							
XM2B-009N2X			0.9						0.45	2.0	0.72	0.86	50.0	4.0	4.0	11.63°	2.12	2.23	2.34	2.44	2.62
XM2B-009N4X										4.0						9.24°	4.25	4.44	4.60	4.76	5.11
XM2B-009N6X	6.0	7.66°		6.35	6.60	6.82	7.06	7.60													
XM2B-009N8X	8.0	6.54°		8.44	8.74	9.04	9.36	10.08													
XM2B-010N2X	1.0	0.5	2.0	0.8	0.96	50.0	4.0	4.0	11.62°	2.12	2.23	2.33	2.43	2.61							
XM2B-010N3X			3.0						10.25°	3.18	3.34	3.48	3.60	3.85							
XM2B-010N4X			4.0						9.17°	4.24	4.43	4.60	4.75	5.10							
XM2B-010N5X			5.0						8.29°	5.30	5.52	5.71	5.90	6.34							
XM2B-010N6X			6.0						7.57°	6.35	6.59	6.81	7.05	7.58							
XM2B-010N7X			7.0						6.96°	7.39	7.66	7.92	8.20	8.83							
XM2B-010N8X			8.0			6.44°			8.44	8.73	9.03	9.35	10.07								
XM2B-010N9X			9.0			5.99°			9.48	9.80	10.14	10.50	11.31								
XM2B-010N10X			10.0			5.6°			10.52	10.87	11.25	11.65	12.56								
XM2B-010N12X			12.0			4.96°			12.59	13.01	13.46	13.95	15.04								
XM2B-010N13X			13.0			4.69°			13.62	14.08	14.57	15.10	16.29								
XM2B-010N14X			14.0			4.45°			14.66	15.15	15.68	16.25	17.53								
XM2B-010N16X	16.0	4.03°	16.73	17.29	17.90	18.55	20.01														
XM2B-010N18X	18.0	3.69°	18.79	19.43	20.11	20.85	22.50														
XM2B-010N20X	20.0	3.4°	20.86	21.57	22.33	23.15	24.99														
XM2B-011N2X	1.1	0.55	2.0	0.88	1.06	50.0	4.0	4.0	11.61°	2.11	2.22	2.32	2.42	2.60							
XM2B-011N4X			4.0						9.09°	4.24	4.43	4.59	4.74	5.08							
XM2B-011N6X			6.0						7.47°	6.34	6.59	6.81	7.04	7.57							
XM2B-011N8X			8.0						6.34°	8.43	8.73	9.03	9.34	10.06							
XM2B-011N10X			10.0						5.5°	10.51	10.87	11.24	11.64	12.54							
XM2B-012N4X	1.2	0.6	4.0	0.96	1.15	50.0	4.0	4.0	9.05°	4.22	4.40	4.55	4.70	5.04							
XM2B-012N8X			8.0						6.25°	8.41	8.70	8.99	9.30	10.01							
XM2B-012N10X			10.0			5.41°			10.49	10.84	11.21	11.60	12.50								
XM2B-012N12X			12.0			4.77°			12.56	12.97	13.42	13.90	14.98								
XM2B-014N8X	1.4	0.7	8.0	1.12	1.34	50.0	4.0	4.0	6.04°	8.38	8.66	8.95	9.26	9.96							
XM2B-014N12X			12.0			4.56°			12.53	12.94	13.38	13.86	14.93								
XM2B-014N16X			16.0			3.67°			16.66	17.22	17.82	18.46	19.90								
XM2B-015N4X	1.5	0.75	4.0	1.2	1.44	50.0	4.0	4.0	8.82°	4.20	4.36	4.51	4.65	4.97							
XM2B-015N6X			6.0						7.08°	6.29	6.52	6.73	6.95	7.46							
XM2B-015N8X			8.0						5.92°	8.38	8.66	8.95	9.25	9.94							
XM2B-015N10X			10.0						5.08°	10.46	10.80	11.16	11.55	12.43							
XM2B-015N12X			12.0						4.45°	12.53	12.94	13.38	13.85	14.92							
XM2B-015N14X			14.0			3.96°			14.60	15.08	15.60	16.15	17.40								
XM2B-015N16X			16.0			3.57°			16.66	17.22	17.81	18.45	19.89								
XM2B-015N18X			18.0			3.25°			18.73	19.36	20.03	20.75	22.38								
XM2B-015N20X			20.0			2.98°			20.80	21.50	22.25	23.05	-								

Series XM2B

Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle				
										0.5°	1°	1.5°	2°	3°
										XM2B-016N8X	1.6	0.8	8.0	1.28
XM2B-016N12X	12.0	55.0	4.34°	12.53	12.94	13.37	13.85	14.90						
XM2B-016N16X	16.0	60.0	3.47°	16.66	17.21	17.81	18.44	19.88						
XM2B-016N20X	20.0	60.0	2.89°	20.80	21.49	22.24	23.04	-						
XM2B-018N8X	1.8	0.90	8.0	1.44	1.73	50.0	4.0	4.0	5.55°	8.36	8.63	8.91	9.21	9.88
XM2B-018N12X			8.0			55.0			4.11°	12.50	12.91	13.34	13.81	14.85
XM2B-018N16X			16.0			60.0			3.26°	16.64	17.19	17.77	18.41	19.83
XM2B-018N20X			20.0			60.0			2.7°	20.77	21.46	22.21	23.01	-
XM2B-020N3X	2.0	1.0	3.0	1.6	1.92	50.0	4.0	4.0	9.72°	3.11	3.22	3.32	3.42	3.62
XM2B-020N4X			4.0						8.32°	4.16	4.31	4.44	4.57	4.86
XM2B-020N6X			6.0						6.46°	6.26	6.46	6.66	6.87	7.35
XM2B-020N8X			8.0						5.27°	8.34	8.60	8.88	9.17	9.84
XM2B-020N10X			10.0						4.46°	10.41	10.74	11.09	11.47	12.32
XM2B-020N12X			12.0						3.86°	12.48	12.88	13.31	13.77	14.81
XM2B-020N13X			13.0						3.62°	13.51	13.95	14.42	14.92	16.05
XM2B-020N14X			14.0						3.4°	14.55	15.02	15.53	16.07	17.29
XM2B-020N16X			16.0			3.04°			16.62	17.16	17.74	18.37	19.78	
XM2B-020N18X			18.0			2.75°			18.68	19.30	19.96	20.67	-	
XM2B-020N20X			20.0			2.51°			20.75	21.44	22.18	22.97	-	
XM2B-020N22X			22.0			2.31°			22.82	23.58	24.39	25.27	-	
XM2B-020N25X			25.0			2.06°			25.92	26.79	27.72	28.72	-	
XM2B-020N30X			30.0			1.75°			31.09	32.14	33.26	-	-	
XM2B-020N35X			35.0			1.52°			36.26	37.48	38.80	-	-	
XM2B-020N40X			40.0			1.34°			41.42	42.83	-	-	-	
XM2B-025N6X	2.5	1.25	6.0	2.0	2.4	50.0	4.0	4.0	5.62°	6.22	6.41	6.60	6.80	7.25
XM2B-025N10X			10.0			3.69°			10.37	10.69	11.03	11.40	12.23	
XM2B-025N15X			15.0			2.59°			15.54	16.04	16.58	17.15	-	
XM2B-025N20X			20.0			1.99°			20.71	21.39	22.12	-	-	
XM2B-025N25X			25.0			1.62°			25.88	26.74	27.66	-	-	
XM2B-025N30X			30.0			1.36°			31.05	32.09	-	-	-	
XM2B-030N8X	3.0	1.5	8.0	2.4	2.88	55.0	6.0	4.0	7.04°	8.27	8.51	8.77	9.04	9.65
XM2B-030N10X			10.0			6.05°			10.34	10.65	10.98	11.34	12.14	
XM2B-030N13X			13.0			5°			13.44	13.86	14.31	14.79	15.87	
XM2B-030N16X			16.0			4.26°			16.55	17.07	17.63	18.24	19.60	
XM2B-030N20X			20.0			3.56°			20.68	21.35	22.07	22.84	24.57	
XM2B-030N25X			25.0			2.95°			25.85	26.70	27.61	28.59	-	
XM2B-030N30X			30.0			2.52°			31.02	32.05	33.15	34.34	-	
XM2B-030N35X			35.0			2.2°			36.19	37.39	38.69	40.08	-	
XM2B-035N15X	3.5	1.75	15.0	2.8	3.36	60.0	6.0	4.0	3.99°	15.49	15.96	16.48	17.03	18.27
XM2B-035N25X			25.0			2.56°			25.82	26.66	27.56	28.53	-	
XM2B-035N35X			35.0			1.89°			36.16	37.36	38.64	-	-	
XM2B-035N45X			45.0			1.5°			46.50	48.05	-	-	-	
XM2B-040N10X	4.0	2.0	10.0	3.2	3.86	55.0	6.0	4.0	4.86°	10.31	10.60	10.91	11.24	11.99
XM2B-040N13X			13.0			3.88°			13.41	13.81	14.23	14.69	15.72	
XM2B-040N16X			16.0			3.23°			16.51	17.02	17.56	18.14	19.45	
XM2B-040N20X			20.0			2.63°			20.65	21.30	21.99	22.74	-	
XM2B-040N25X			25.0			2.14°			25.81	26.64	27.53	28.49	-	
XM2B-040N30X			30.0			1.81°			30.98	31.99	33.08	-	-	
XM2B-040N35X			35.0			1.56°			36.15	37.34	38.62	-	-	
XM2B-040N40X			40.0			1.38°			41.32	42.69	-	-	-	
XM2B-040N45X	45.0	1.23°	46.49	48.04	-	-	-							
XM2B-040N50X	50.0	1.11°	51.66	53.39	-	-	-							
XM2B-050N20X	5.0	2.5	20.0	4.0	4.85	65.0	6.0	4.0	1.48°	20.62	21.25	-	-	-
XM2B-050N25X			25.0			1.18°			25.79	26.60	-	-	-	
XM2B-050N30X			30.0			0.98°			30.96	-	-	-	-	
XM2B-050N40X			40.0			0.73°			41.29	-	-	-	-	
XM2B-060N12X	6.0	3.0	12.0	6.0	5.85	60.0	6.0	-	-	-	-	-	-	-
XM2B-060N20X			20.0			-			-	-	-	-	-	
XM2B-060N30X			30.0			-			-	-	-	-	-	
XM2B-060N50X			50.0			-			-	-	-	-	-	

TuffCut[®] XM Series XM4R



Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle					
										0.5°	1°	1.5°	2°	3°	
										XM4R-010N4-0.05RX	1.0	0.05	4.0	0.8	0.96
XM4R-010N6-0.05RX	6.0	7.28°	6.37	6.63	6.86	7.12	7.69								
XM4R-010N8-0.05RX	8.0	6.23°	8.45	8.76	9.08	9.42	10.18								
XM4R-010N10-0.05RX	10.0	5.45°	10.53	10.90	11.30	11.72	12.67								
XM4R-010N12-0.05RX	12.0	4.84°	12.61	13.04	13.51	14.02	15.15								
XM4R-010N16-0.05RX	16.0	3.95°	16.74	17.32	17.95	18.62	20.12								
XM4R-010N20-0.05RX	20.0	3.34°	20.88	21.60	22.38	23.22	25.10								
XM4R-010N4-0.1RX	0.1	0.1	4.0	1.2	1.44	50.0	4.0	4.0	8.8°	4.26		4.47	4.64	4.81	5.19
XM4R-010N6-0.1RX			6.0						7.31°	6.37		6.62	6.86	7.11	7.68
XM4R-010N8-0.1RX			8.0						6.25°	8.45		8.76	9.07	9.41	10.17
XM4R-010N10-0.1RX			10.0						5.46°	10.53		10.90	11.29	11.71	12.65
XM4R-010N12-0.1RX			12.0						4.85°	12.60		13.04	13.51	14.01	15.14
XM4R-010N16-0.1RX			16.0						3.96°	16.74	17.32	17.94	18.61	20.11	
XM4R-010N20-0.1RX	20.0	3.35°	20.87	21.60	22.37	23.21	25.08								
XM4R-015N4-0.05RX	1.5	0.05	4.0	1.6	1.92	50.0	4.0	4.0	8.12°	4.23	4.42	4.59	4.76	5.14	
XM4R-015N8-0.05RX			8.0						5.6°	8.41	8.71	9.02	9.36	10.11	
XM4R-015N12-0.05RX			12.0						4.27°	12.55	12.99	13.46	13.96	15.09	
XM4R-015N15-0.05RX			15.0						3.62°	15.65	16.20	16.78	17.41	18.82	
XM4R-015N20-0.05RX			20.0						2.89°	20.82	21.55	22.32	23.16	-	
XM4R-015N4-0.1RX			0.1						0.1	4.0	1.6	1.92	60.0	4.0	4.0
XM4R-015N8-0.1RX		8.0		5.62°	8.41	8.71	9.02	9.35		10.10					
XM4R-015N12-0.1RX		12.0		4.28°	12.55	12.98	13.45	13.95		15.07					
XM4R-015N15-0.1RX		15.0		3.63°	15.65	16.19	16.77	17.40		18.80					
XM4R-015N20-0.1RX		20.0		2.9°	20.82	21.54	22.32	23.15		-					
XM4R-020N4-0.05RX		2.0		0.05	4.0	1.6	1.92	50.0		4.0					
XM4R-020N6-0.05RX			6.0		7.28°				6.37		6.63	6.86	7.12	7.69	
XM4R-020N8-0.05RX	8.0		6.23°		8.45				8.76		9.08	9.42	10.18		
XM4R-020N12-0.05RX	12.0		5.45°		10.53				10.90		11.30	11.72	12.67		
XM4R-020N16-0.05RX	16.0		4.84°		12.61				13.04		13.51	14.02	15.15		
XM4R-020N20-0.05RX	20.0		3.95°		16.74				17.32		17.95	18.62	20.12		
XM4R-020N4-0.1RX	0.1		0.1	4.0	1.6	1.92	60.0	4.0	4.0	3.34°	20.88	21.60	22.38	23.22	25.10
XM4R-020N6-0.1RX				6.0						8.8°	4.26	4.47	4.64	4.81	5.19
XM4R-020N8-0.1RX				8.0						7.31°	6.37	6.62	6.86	7.11	7.68
XM4R-020N12-0.1RX				12.0						6.25°	8.45	8.76	9.07	9.41	10.17
XM4R-020N16-0.1RX				16.0						5.46°	10.53	10.90	11.29	11.71	12.65
XM4R-020N20-0.1RX				20.0						4.85°	12.60	13.04	13.51	14.01	15.14
XM4R-020N4-0.2RX	0.2	0.2	4.0	1.6	1.92	50.0	4.0	4.0	3.96°	16.74	17.32	17.94	18.61	20.11	
XM4R-020N6-0.2RX			6.0						3.35°	20.87	21.60	22.37	23.21	25.08	
XM4R-020N8-0.2RX			8.0						8.12°	4.23	4.42	4.59	4.76	5.14	
XM4R-020N12-0.2RX			12.0						5.6°	8.41	8.71	9.02	9.36	10.11	
XM4R-020N16-0.2RX			16.0						4.27°	12.55	12.99	13.46	13.96	15.09	
XM4R-020N20-0.2RX			20.0						3.62°	15.65	16.20	16.78	17.41	18.82	
XM4R-020N25-0.2RX	0.3	0.3	25.0	1.6	1.92	70.0	4.0	4.0	2.89°	20.82	21.55	22.32	23.16	-	
XM4R-020N30-0.2RX			30.0						8.17°	4.23	4.42	4.58	4.75	5.13	
XM4R-020N4-0.3RX			4.0						5.62°	8.41	8.71	9.02	9.35	10.10	
XM4R-020N8-0.3RX	8.0	4.28°	12.55	12.98	13.45	13.95	15.07								

Series XM4R

Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle				
										0.5°	1°	1.5°	2°	3°
										XM4R-020N12-0.3RX	2.0	0.3	12.0	1.6
XM4R-020N16-0.3RX	16.0	2.9°	20.82	21.54	22.32	23.15	-							
XM4R-020N20-0.3RX	20.0	2.44°	20.77	21.49	22.25	23.08	-							
XM4R-020N4-0.5RX	0.5	4.0	50.0	7.76°	4.19	4.35	4.50	4.65	4.98					
XM4R-020N6-0.5RX		6.0		6.11°	6.28	6.50	6.71	6.95	7.47					
XM4R-020N8-0.5RX		8.0		5.04°	8.36	8.64	8.93	9.25	9.96					
XM4R-020N12-0.5RX		12.0		3.73°	12.50	12.92	13.36	13.85	14.93					
XM4R-020N16-0.5RX		16.0		2.96°	16.63	17.19	17.80	18.45	-					
XM4R-020N20-0.5RX		20.0		2.46°	20.77	21.47	22.23	23.05	-					
XM4R-020N25-0.5RX		25.0		2.03°	25.94	26.82	27.77	28.79	-					
XM4R-020N30-0.5RX	30.0	1.72°	31.10	32.17	33.31	-	-							
XM4R-025N8-0.1RX	2.50	0.1	8.0	2.0	2.4	50.0	4.0	4.0	3.98°	8.34	8.63	8.94	9.27	10.02
XM4R-025N16-0.1RX			16.0						2.29°	16.62	17.19	17.81	18.47	-
XM4R-025N20-0.1RX			20.0						1.89°	20.75	21.47	22.24	-	-
XM4R-025N8-0.2RX		0.2	8.0			60.0			4.02°	8.34	8.63	8.93	9.26	9.99
XM4R-025N16-0.2RX			16.0						2.3°	16.61	17.18	17.80	18.46	-
XM4R-025N20-0.2RX			20.0						1.9°	20.75	21.46	22.23	-	-
XM4R-025N12-0.3RX			0.3						12.0	50.0	2.95°	12.47	12.90	13.35
XM4R-025N20-0.3RX		20.0				1.91°			20.74		21.46	22.22	-	-
XM4R-025N12-0.5RX		0.5	12.0			60.0			2.99°	12.47	12.88	13.33	13.81	-
XM4R-025N20-0.5RX			20.0						1.92°	20.74	21.44	22.20	-	-
XM4R-030N8-0.1RX	3.0	0.1	8.0	2.44	2.88	50.0	6.0	4.0	6.32°	8.32	8.61	8.92	9.25	9.99
XM4R-030N16-0.1RX			16.0						3.99°	16.59	17.17	17.78	18.45	19.94
XM4R-030N25-0.1RX			25.0			2.82°			25.90	26.79	27.76	28.80	-	
XM4R-030N30-0.1RX			30.0			2.42°			31.06	32.14	33.30	34.55	-	
XM4R-030N8-0.2RX		0.2	8.0			60.0			6.36°	8.32	8.60	8.91	9.23	9.97
XM4R-030N12-0.2RX			12.0						4.92°	12.45	12.88	13.34	13.83	14.94
XM4R-030N16-0.2RX			16.0						4°	16.59	17.16	17.77	18.43	19.91
XM4R-030N20-0.2RX			20.0						3.38°	20.72	21.44	22.21	23.03	24.88
XM4R-030N25-0.2RX			25.0						2.82°	25.89	26.79	27.75	28.78	-
XM4R-030N30-0.2RX			30.0						2.43°	31.06	32.14	33.29	34.53	-
XM4R-030N8-0.3RX	0.3	8.0	2.44	2.88	60.0	6.0	4.0	6.41°	8.32	8.60	8.90	9.22	9.94	
XM4R-030N16-0.3RX		16.0						4.02°	16.59	17.15	17.76	18.42	19.89	
XM4R-030N20-0.3RX		20.0			3.39°			20.72	21.43	22.20	23.02	24.86		
XM4R-030N25-0.3RX		25.0			2.83°			25.89	26.78	27.74	28.77	-		
XM4R-030N30-0.3RX		30.0			2.43°			31.06	32.13	33.28	34.52	-		
XM4R-030N8-0.5RX		0.5			8.0			60.0	6.51°	8.31	8.58	8.87	9.19	9.89
XM4R-030N12-0.5RX					12.0				5°	12.44	12.86	13.31	13.79	14.87
XM4R-030N16-0.5RX					16.0				4.06°	16.58	17.14	17.74	18.39	19.84
XM4R-030N20-0.5RX					20.0				3.42°	20.71	21.42	22.17	22.99	24.81
XM4R-030N25-0.5RX					25.0				2.85°	25.88	26.77	27.72	28.74	-
XM4R-030N30-0.5RX	30.0		2.45°	31.05	32.12	33.26	34.49		-					
XM4R-030N35-0.5RX	35.0		2.14°	36.22	37.46	38.80	40.23		-					
XM4R-040N12-0.1RX	4.0		0.1	12.0	3.2	3.86	60.0		6.0	4.0	3.66°	12.44	12.87	13.33
XM4R-040N20-0.1RX		20.0		2.42°				20.71			21.43	22.20	23.03	-
XM4R-040N30-0.1RX		30.0		1.71°			31.05	32.12			33.28	-	-	
XM4R-040N40-0.1RX		40.0		1.32°			41.38	42.82			-	-	-	
XM4R-040N12-0.2RX		0.2	12.0	60.0			3.68°	12.44			12.86	13.32	13.81	14.92
XM4R-040N20-0.2RX			20.0				2.43°	20.71			21.42	22.19	23.01	-
XM4R-040N30-0.2RX			30.0				1.71°	31.04			32.12	33.27	-	-
XM4R-040N40-0.2RX			40.0				1.32°	41.38			42.81	-	-	-
XM4R-040N12-0.3RX		0.3	12.0	60.0			3.7°	12.43			12.86	13.31	13.80	14.89
XM4R-040N20-0.3RX			20.0				2.44°	20.70			21.41	22.18	23.00	-
XM4R-040N30-0.3RX	30.0		1.72°		31.04	32.11	33.26	-	-					
XM4R-040N40-0.3RX	40.0		1.32°		41.38	42.81	-	-	-					
XM4R-040N12-0.5RX	0.5		12.0		60.0	3.75°	12.43	12.84	13.29	13.77	14.84			
XM4R-040N12-0.5RX	12.0		3.75°			12.43	12.84	13.29	13.77	14.84				

Series XM4R

Tool No.	DC	RE	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	Effective Under-Neck Length (LU) For Inclined Angle									
										0.5°	1°	1.5°	2°	3°					
XM4R-040N20-0.5RX	4.0	0.5	20.0	3.2	3.86	60.0	6.0	4.0	2.47°	20.70	21.40	22.15	22.97	-					
XM4R-040N30-0.5RX			30.0			80.0			1.73°	31.03	32.10	33.24	-	-					
XM4R-040N40-0.5RX			40.0			80.0			1.33°	41.37	42.79	-	-	-					
XM4R-050N20-0.1RX	5.0	0.1	20.0	4.0	4.85	70.0	6.0	4.0	1.32°	20.70	21.42	-	-	-					
XM4R-050N40-0.1RX			40.0			90.0			0.69°	41.38	-	-	-	-					
XM4R-050N20-0.2RX		0.2	20.0			70.0			1.32°	20.70	21.41	-	-	-					
XM4R-050N40-0.2RX			40.0			90.0			0.69°	41.37	-	-	-	-					
XM4R-050N20-0.3RX		0.3	20.0			70.0			1.33°	20.69	21.41	-	-	-					
XM4R-050N40-0.3RX			40.0			90.0			0.69°	41.37	-	-	-	-					
XM4R-050N20-0.5RX		0.5	20.0			70.0			1.34°	20.69	21.39	-	-	-					
XM4R-050N40-0.5RX			40.0			90.0			0.7°	41.36	-	-	-	-					
XM4R-050N20-1.0RX		1.0	20.0			70.0			1.38°	20.67	21.36	-	-	-					
XM4R-050N40-1.0RX			40.0			90.0			0.71°	41.34	-	-	-	-					
XM4R-060N30-0.2RX		6.0	0.2			30.0			4.8	5.85	80.0	6.0	4.0	-	-	-	-	-	-
XM4R-060N54-0.2RX						54.0					100.0			-	-	-	-	-	
XM4R-060N72-0.2RX						72.0					120.0			-	-	-	-	-	
XM4R-060N30-0.3RX			0.3			30.0					80.0			-	-	-	-	-	
XM4R-060N54-0.3RX	54.0			100.0	-	-	-	-			-								
XM4R-060N72-0.3RX	72.0			120.0	-	-	-	-			-								
XM4R-060N30-0.5RX	0.5		30.0	80.0	-	-	-	-			-								
XM4R-060N54-0.5RX			54.0	100.0	-	-	-	-			-								
XM4R-060N72-0.5RX			72.0	120.0	-	-	-	-			-								
XM4R-060N30-1.0RX	1.0		30.0	80.0	-	-	-	-			-								
XM4R-060N54-1.0RX			54.0	100.0	-	-	-	-			-								
XM4R-060N72-1.0RX			72.0	120.0	-	-	-	-			-								

TuffCut[®] XM Series XM2S High-Speed Milling

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

3xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	 ADOC (Ap)	 RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.085	0.45	95	0.0048	0.0072	0.0096	0.0120	0.0144
Die / Tool Steels		•	•	o	2D/3D HSC	0.077	0.40	85	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.077	0.40	85	0.0042	0.0063	0.0084	0.0105	0.0126
High Temp Alloys	S	•	x	x	2D/3D HSC	0.034	0.20	50	0.0032	0.0048	0.0064	0.0080	0.0096
Titanium Alloys		•	x	x	2D/3D HSC	0.055	0.30	85	0.0037	0.0056	0.0074	0.0093	0.0111
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
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.043	0.30	70	0.0040	0.0060	0.0080	0.0100	0.0120
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.038	0.20	65	0.0038	0.0057	0.0076	0.0095	0.0114

5xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	 ADOC (Ap)	 RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.055	0.45	95	0.0046	0.0069	0.0092	0.0115	0.0138
Die / Tool Steels		•	•	o	2D/3D HSC	0.050	0.40	85	0.0040	0.0060	0.0080	0.0100	0.0120
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.050	0.40	85	0.0040	0.0060	0.0080	0.0100	0.0120
High Temp Alloys	S	•	x	x	2D/3D HSC	0.022	0.20	50	0.0030	0.0045	0.0060	0.0075	0.0090
Titanium Alloys		•	x	x	2D/3D HSC	0.036	0.30	85	0.0036	0.0054	0.0072	0.0090	0.0108
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
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.028	0.30	70	0.0038	0.0057	0.0076	0.0095	0.0114
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.025	0.20	65	0.0036	0.0054	0.0072	0.0090	0.0108

8xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	 ADOC (Ap)	 RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.040	0.35	85	0.0044	0.0066	0.0088	0.0110	0.0132
Die / Tool Steels		•	•	o	2D/3D HSC	0.036	0.35	75	0.0038	0.0057	0.0076	0.0095	0.0114
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.036	0.35	75	0.0038	0.0057	0.0076	0.0095	0.0114
High Temp Alloys	S	•	x	x	2D/3D HSC	0.016	0.15	45	0.0030	0.0045	0.0060	0.0075	0.0090
Titanium Alloys		•	x	x	2D/3D HSC	0.026	0.25	75	0.0034	0.0051	0.0068	0.0085	0.0102
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
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.020	0.30	60	0.0038	0.0057	0.0076	0.0095	0.0114
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.018	0.15	60	0.0036	0.0054	0.0072	0.0090	0.0108

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 × 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 × tool Ø is a good starting point.

3xD Neck Length												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960	
0.0130	0.0148	0.0185	0.0231	0.0278	0.0324	0.0370	0.0463	0.0555	0.0740	0.0925	0.1110	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.09200	0.11500	0.13800	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.08000	0.10000	0.12000	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200	
0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900	
0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0154	0.0176	0.0220	0.0275	0.0330	0.0385	0.0440	0.0550	0.0660	0.08800	0.11000	0.13200	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.07600	0.09500	0.11400	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900	
0.0119	0.0136	0.0170	0.0213	0.0255	0.0298	0.0340	0.0425	0.0510	0.0680	0.0850	0.1020	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080	

- 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 Milling

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

10xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	 ADOC (Ap)	 RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	●	●	○	2D/3D HSC	0.026	0.35	85	0.0036	0.0054	0.0072	0.0090	0.0108
Die / Tool Steels		●	●	○	2D/3D HSC	0.023	0.30	75	0.0032	0.0048	0.0064	0.0080	0.0096
Austenitic Stainless Steels	M	●	X	○	2D/3D HSC	0.023	0.30	75	0.0032	0.0048	0.0064	0.0080	0.0096
High Temp Alloys	S	●	X	X	2D/3D HSC	0.010	0.15	45	0.0024	0.0036	0.0048	0.0060	0.0072
Titanium Alloys		●	X	X	2D/3D HSC	0.017	0.25	75	0.0028	0.0042	0.0056	0.0070	0.0084
Pre-Hardened Steel 35-45 HRC	H	○	●	●	2D/3D HSC	0.018	0.25	70	0.0032	0.0048	0.0064	0.0080	0.0096
Hardened Steel 45-55 HRC		X	●	●	2D/3D HSC	0.013	0.25	60	0.0030	0.0045	0.0060	0.0075	0.0090
Hardened Steel 55-65 HRC		X	●	●	2D/3D HSC	0.011	0.15	60	0.0028	0.0042	0.0056	0.0070	0.0084

12xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	 ADOC (Ap)	 RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	●	●	○	2D/3D HSC	0.026	0.25	75	0.0032	0.0048	0.0064	0.0080	0.0096
Die / Tool Steels		●	●	○	2D/3D HSC	0.023	0.25	65	0.0028	0.0042	0.0056	0.0070	0.0084
Austenitic Stainless Steels	M	●	X	○	2D/3D HSC	0.023	0.25	65	0.0028	0.0042	0.0056	0.0070	0.0084
High Temp Alloys	S	●	X	X	2D/3D HSC	0.010	0.10	40	0.0020	0.0030	0.0040	0.0050	0.0060
Titanium Alloys		●	X	X	2D/3D HSC	0.017	0.20	65	0.0024	0.0036	0.0048	0.0060	0.0072
Pre-Hardened Steel 35-45 HRC	H	○	●	●	2D/3D HSC	0.018	0.20	60	0.0028	0.0042	0.0056	0.0070	0.0084
Hardened Steel 45-55 HRC		X	●	●	2D/3D HSC	0.013	0.20	55	0.0026	0.0039	0.0052	0.0065	0.0078
Hardened Steel 55-65 HRC		X	●	●	2D/3D HSC	0.011	0.10	50	0.0024	0.0036	0.0048	0.0060	0.0072

15xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	 ADOC (Ap)	 RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	●	●	○	2D/3D HSC	0.015	0.25	75	0.0028	0.0042	0.0056	0.0070	0.0084
Die / Tool Steels		●	●	○	2D/3D HSC	0.014	0.20	65	0.0026	0.0039	0.0052	0.0065	0.0078
Austenitic Stainless Steels	M	●	X	○	2D/3D HSC	0.014	0.20	65	0.0026	0.0039	0.0052	0.0065	0.0078
High Temp Alloys	S	●	X	X	2D/3D HSC	0.006	0.10	40	0.0020	0.0030	0.0040	0.0050	0.0060
Titanium Alloys		●	X	X	2D/3D HSC	0.010	0.15	65	0.0022	0.0033	0.0044	0.0055	0.0066
Pre-Hardened Steel 35-45 HRC	H	○	●	●	2D/3D HSC	0.011	0.20	60	0.0026	0.0039	0.0052	0.0065	0.0078
Hardened Steel 45-55 HRC		X	●	●	2D/3D HSC	0.008	0.15	55	0.0024	0.0036	0.0048	0.0060	0.0072
Hardened Steel 55-65 HRC		X	●	●	2D/3D HSC	0.007	0.10	50	0.0022	0.0033	0.0044	0.0055	0.0066

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 × 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 × tool Ø is a good starting point.

10xD Neck Length												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.07200	0.09000	0.10800	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.06400	0.08000	0.09600	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960	
0.0084	0.0096	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0360	0.0480	0.0600	0.0720	
0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960	
0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.06400	0.08000	0.09600	
0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.05600	0.07000	0.08400	
0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840	
0.0070	0.0080	0.0100	0.0125	0.0150	0.0175	0.0200	0.0250	0.0300	0.0400	0.0500	0.0600	
0.0084	0.0096	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0360	0.0480	0.0600	0.0720	
0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840	
0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.05600	0.07000	0.08400	
0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.05200	0.06500	0.07800	
0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780	
0.0070	0.0080	0.0100	0.0125	0.0150	0.0175	0.0200	0.0250	0.0300	0.0400	0.0500	0.0600	
0.0077	0.0088	0.0110	0.0138	0.0165	0.0193	0.0220	0.0275	0.0330	0.0440	0.0550	0.0660	
0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780	
0.0084	0.0096	0.0120	0.0150	0.0180	0.0210	0.0240	0.0300	0.0360	0.0480	0.0600	0.0720	
0.0077	0.0088	0.0110	0.0138	0.0165	0.0193	0.0220	0.0275	0.0330	0.0440	0.0550	0.0660	

- 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 Milling

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

3xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	 ADOC (Ap)	 RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.050	0.45	130	0.0048	0.0072	0.0096	0.0120	0.0144
Die / Tool Steels		•	•	o	2D/3D HSC	0.045	0.40	110	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.045	0.40	110	0.0042	0.0063	0.0084	0.0105	0.0126
High Temp Alloys	S	•	x	x	2D/3D HSC	0.030	0.20	50	0.0032	0.0048	0.0064	0.0080	0.0096
Titanium Alloys		•	x	x	2D/3D HSC	0.033	0.30	110	0.0037	0.0056	0.0074	0.0093	0.0111
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
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.033	0.30	95	0.0040	0.0060	0.0080	0.0100	0.0120
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.030	0.20	90	0.0038	0.0057	0.0076	0.0095	0.0114

5xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	 ADOC (Ap)	 RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.030	0.45	105	0.0048	0.0072	0.0096	0.0120	0.0144
Die / Tool Steels		•	•	o	2D/3D HSC	0.027	0.40	90	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.027	0.40	90	0.0042	0.0063	0.0084	0.0105	0.0126
High Temp Alloys	S	•	x	x	2D/3D HSC	0.018	0.20	40	0.0032	0.0048	0.0064	0.0080	0.0096
Titanium Alloys		•	x	x	2D/3D HSC	0.020	0.30	90	0.0038	0.0057	0.0076	0.0095	0.0114
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
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.020	0.30	80	0.0040	0.0060	0.0080	0.0100	0.0120
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.018	0.20	75	0.0038	0.0057	0.0076	0.0095	0.0114

8xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	 ADOC (Ap)	 RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.024	0.35	85	0.0048	0.0072	0.0096	0.0120	0.0144
Die / Tool Steels		•	•	o	2D/3D HSC	0.022	0.30	75	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.022	0.30	75	0.0042	0.0063	0.0084	0.0105	0.0126
High Temp Alloys	S	•	x	x	2D/3D HSC	0.014	0.15	35	0.0032	0.0048	0.0064	0.0080	0.0096
Titanium Alloys		•	x	x	2D/3D HSC	0.016	0.25	75	0.0038	0.0057	0.0076	0.0095	0.0114
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
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.016	0.25	65	0.0040	0.0060	0.0080	0.0100	0.0120
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.014	0.15	60	0.0038	0.0057	0.0076	0.0095	0.0114

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: $Feed = Max\ RPM \times Fz \times \text{number of teeth}$
- 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.

3xD Neck Length												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960	
0.0130	0.0148	0.0185	0.0231	0.0278	0.0324	0.0370	0.0463	0.0555	0.0740	0.0925	0.1110	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.09600	0.12000	0.14400	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.09600	0.12000	0.14400	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	

- 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 Milling

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

10xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	●	●	○	2D/3D HSC	0.015	0.35	80	0.0048	0.0072	0.0096	0.0120	0.0144
Die / Tool Steels		●	●	○	2D/3D HSC	0.014	0.30	70	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	●	X	○	2D/3D HSC	0.014	0.30	70	0.0042	0.0063	0.0084	0.0105	0.0126
High Temp Alloys	S	●	X	X	2D/3D HSC	0.009	0.15	30	0.0032	0.0048	0.0064	0.0080	0.0096
Titanium Alloys		●	X	X	2D/3D HSC	0.010	0.25	70	0.0038	0.0057	0.0076	0.0095	0.0114
Pre-Hardened Steel 35-45 HRC	H	○	●	●	2D/3D HSC	0.012	0.25	65	0.0042	0.0063	0.0084	0.0105	0.0126
Hardened Steel 45-55 HRC		X	●	●	2D/3D HSC	0.010	0.25	60	0.0040	0.0060	0.0080	0.0100	0.0120
Hardened Steel 55-65 HRC		X	●	●	2D/3D HSC	0.009	0.15	55	0.0038	0.0057	0.0076	0.0095	0.0114

12xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	●	●	○	2D/3D HSC	0.015	0.25	65	0.0040	0.0060	0.0080	0.0100	0.0120
Die / Tool Steels		●	●	○	2D/3D HSC	0.014	0.25	55	0.0036	0.0054	0.0072	0.0090	0.0108
Austenitic Stainless Steels	M	●	X	○	2D/3D HSC	0.014	0.25	55	0.0036	0.0054	0.0072	0.0090	0.0108
High Temp Alloys	S	●	X	X	2D/3D HSC	0.009	0.10	25	0.0028	0.0042	0.0056	0.0070	0.0084
Titanium Alloys		●	X	X	2D/3D HSC	0.010	0.20	55	0.0032	0.0048	0.0064	0.0080	0.0096
Pre-Hardened Steel 35-45 HRC	H	○	●	●	2D/3D HSC	0.012	0.20	55	0.0036	0.0054	0.0072	0.0090	0.0108
Hardened Steel 45-55 HRC		X	●	●	2D/3D HSC	0.010	0.20	50	0.0034	0.0051	0.0068	0.0085	0.0102
Hardened Steel 55-65 HRC		X	●	●	2D/3D HSC	0.009	0.10	45	0.0032	0.0048	0.0064	0.0080	0.0096

15xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	●	●	○	2D/3D HSC	0.009	0.25	65	0.0034	0.0051	0.0068	0.0085	0.0102
Die / Tool Steels		●	●	○	2D/3D HSC	0.008	0.20	55	0.0030	0.0045	0.0060	0.0075	0.0090
Austenitic Stainless Steels	M	●	X	○	2D/3D HSC	0.008	0.20	55	0.0030	0.0045	0.0060	0.0075	0.0090
High Temp Alloys	S	●	X	X	2D/3D HSC	0.005	0.10	25	0.0022	0.0033	0.0044	0.0055	0.0066
Titanium Alloys		●	X	X	2D/3D HSC	0.006	0.15	55	0.0026	0.0039	0.0052	0.0065	0.0078
Pre-Hardened Steel 35-45 HRC	H	○	●	●	2D/3D HSC	0.007	0.20	55	0.0030	0.0045	0.0060	0.0075	0.0090
Hardened Steel 45-55 HRC		X	●	●	2D/3D HSC	0.006	0.15	50	0.0028	0.0042	0.0056	0.0070	0.0084
Hardened Steel 55-65 HRC		X	●	●	2D/3D HSC	0.005	0.10	45	0.0026	0.0039	0.0052	0.0065	0.0078

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: $Feed = Max\ RPM \times Fz \times \text{number of teeth}$
- 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.

10xD Neck Length												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.09600	0.12000	0.14400	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.08000	0.10000	0.12000	
0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.07200	0.09000	0.10800	
0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080	
0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960	
0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080	
0.0119	0.0136	0.0170	0.0213	0.0255	0.0298	0.0340	0.0425	0.0510	0.0680	0.0850	0.1020	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0119	0.0136	0.0170	0.0213	0.0255	0.0298	0.0340	0.0425	0.0510	0.06800	0.08500	0.10200	
0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.06000	0.07500	0.09000	
0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900	
0.0077	0.0088	0.0110	0.0138	0.0165	0.0193	0.0220	0.0275	0.0330	0.0440	0.0550	0.0660	
0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780	
0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900	
0.0098	0.0112	0.0140	0.0175	0.0210	0.0245	0.0280	0.0350	0.0420	0.0560	0.0700	0.0840	
0.0091	0.0104	0.0130	0.0163	0.0195	0.0228	0.0260	0.0325	0.0390	0.0520	0.0650	0.0780	

- 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 Milling

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

3xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.100	0.30	155	0.0070	0.0105	0.0140	0.0175	0.0210
Die / Tool Steels		•	•	o	2D/3D HSC	0.090	0.30	150	0.0064	0.0096	0.0128	0.0160	0.0192
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.090	0.30	150	0.0064	0.0096	0.0128	0.0160	0.0192
High Temp Alloys	S	•	x	x	2D/3D HSC	0.060	0.20	50	0.0050	0.0075	0.0100	0.0125	0.0150
Titanium Alloys		•	x	x	2D/3D HSC	0.065	0.25	130	0.0060	0.0090	0.0120	0.0150	0.0180
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
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.065	0.30	135	0.0060	0.0090	0.0120	0.0150	0.0180
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.060	0.20	110	0.0050	0.0075	0.0100	0.0125	0.0150

5xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	ADOC (Ap)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.060	0.18	135	0.0066	0.0099	0.0132	0.0165	0.0198
Die / Tool Steels		•	•	o	2D/3D HSC	0.054	0.18	130	0.0060	0.0090	0.0120	0.0150	0.0180
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.054	0.18	130	0.0060	0.0090	0.0120	0.0150	0.0180
High Temp Alloys	S	•	x	x	2D/3D HSC	0.036	0.12	45	0.0048	0.0072	0.0096	0.0120	0.0144
Titanium Alloys		•	x	x	2D/3D HSC	0.039	0.15	115	0.0058	0.0087	0.0116	0.0145	0.0174
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
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.039	0.18	115	0.0058	0.0087	0.0116	0.0145	0.0174
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.036	0.12	95	0.0048	0.0072	0.0096	0.0120	0.0144

8xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	•	•	o	2D/3D HSC	0.040	0.12	120	0.0064	0.0096	0.0128	0.0160	0.0192
Die / Tool Steels		•	•	o	2D/3D HSC	0.036	0.12	115	0.0060	0.0090	0.0120	0.0150	0.0180
Austenitic Stainless Steels	M	•	x	o	2D/3D HSC	0.036	0.12	115	0.0060	0.0090	0.0120	0.0150	0.0180
High Temp Alloys	S	•	x	x	2D/3D HSC	0.024	0.08	40	0.0046	0.0069	0.0092	0.0115	0.0138
Titanium Alloys		•	x	x	2D/3D HSC	0.026	0.10	100	0.0056	0.0084	0.0112	0.0140	0.0168
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
Hardened Steel 45-55 HRC		x	•	•	2D/3D HSC	0.026	0.12	105	0.0056	0.0084	0.0112	0.0140	0.0168
Hardened Steel 55-65 HRC		x	•	•	2D/3D HSC	0.024	0.08	85	0.0046	0.0069	0.0092	0.0115	0.0138

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: $Feed = Max\ RPM \times Fz \times \text{number of teeth}$
- 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.

3xD Neck Length												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0245	0.0280	0.0350	0.0438	0.0525	0.0613	0.0700	0.0875	0.1050	0.1400	0.1750	0.2100	
0.0224	0.0256	0.0320	0.0400	0.0480	0.0560	0.0640	0.0800	0.0960	0.1280	0.1600	0.1920	
0.0224	0.0256	0.0320	0.0400	0.0480	0.0560	0.0640	0.0800	0.0960	0.1280	0.1600	0.1920	
0.0175	0.0200	0.0250	0.0313	0.0375	0.0438	0.0500	0.0625	0.0750	0.1000	0.1250	0.1500	
0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800	
0.0224	0.0256	0.0320	0.0400	0.0480	0.0560	0.0640	0.0800	0.0960	0.1280	0.1600	0.1920	
0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0231	0.0264	0.0330	0.0413	0.0495	0.0578	0.0660	0.0825	0.0990	0.13200	0.16500	0.19800	
0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.12000	0.15000	0.18000	
0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800	
0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440	
0.0203	0.0232	0.0290	0.0363	0.0435	0.0508	0.0580	0.0725	0.0870	0.1160	0.1450	0.1740	
0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800	
0.0203	0.0232	0.0290	0.0363	0.0435	0.0508	0.0580	0.0725	0.0870	0.1160	0.1450	0.1740	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0224	0.0256	0.0320	0.0400	0.0480	0.0560	0.0640	0.0800	0.0960	0.12800	0.16000	0.19200	
0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.12000	0.15000	0.18000	
0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800	
0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.0920	0.1150	0.1380	
0.0196	0.0224	0.0280	0.0350	0.0420	0.0490	0.0560	0.0700	0.0840	0.1120	0.1400	0.1680	
0.0210	0.0240	0.0300	0.0375	0.0450	0.0525	0.0600	0.0750	0.0900	0.1200	0.1500	0.1800	
0.0196	0.0224	0.0280	0.0350	0.0420	0.0490	0.0560	0.0700	0.0840	0.1120	0.1400	0.1680	
0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.0920	0.1150	0.1380	

- 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 Milling

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

10xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	●	●	○	2D/3D HSC	0.025	0.08	120	0.0052	0.0078	0.0104	0.0130	0.0156
Die / Tool Steels		●	●	○	2D/3D HSC	0.023	0.08	115	0.0048	0.0072	0.0096	0.0120	0.0144
Austenitic Stainless Steels	M	●	X	○	2D/3D HSC	0.023	0.08	115	0.0048	0.0072	0.0096	0.0120	0.0144
High Temp Alloys	S	●	X	X	2D/3D HSC	0.015	0.05	40	0.0038	0.0057	0.0076	0.0095	0.0114
Titanium Alloys		●	X	X	2D/3D HSC	0.016	0.06	100	0.0046	0.0069	0.0092	0.0115	0.0138
Pre-Hardened Steel 35-45 HRC	H	○	●	●	2D/3D HSC	0.020	0.08	110	0.0048	0.0072	0.0096	0.0120	0.0144
Hardened Steel 45-55 HRC		X	●	●	2D/3D HSC	0.016	0.08	105	0.0046	0.0069	0.0092	0.0115	0.0138
Hardened Steel 55-65 HRC		X	●	●	2D/3D HSC	0.015	0.05	85	0.0038	0.0057	0.0076	0.0095	0.0114

12xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	●	●	○	2D/3D HSC	0.025	0.08	90	0.0046	0.0069	0.0092	0.0115	0.0138
Die / Tool Steels		●	●	○	2D/3D HSC	0.023	0.08	85	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	●	X	○	2D/3D HSC	0.023	0.08	85	0.0042	0.0063	0.0084	0.0105	0.0126
High Temp Alloys	S	●	X	X	2D/3D HSC	0.015	0.05	30	0.0032	0.0048	0.0064	0.0080	0.0096
Titanium Alloys		●	X	X	2D/3D HSC	0.016	0.06	75	0.0040	0.0060	0.0080	0.0100	0.0120
Pre-Hardened Steel 35-45 HRC	H	○	●	●	2D/3D HSC	0.020	0.08	80	0.0042	0.0063	0.0084	0.0105	0.0126
Hardened Steel 45-55 HRC		X	●	●	2D/3D HSC	0.016	0.08	75	0.0040	0.0060	0.0080	0.0100	0.0120
Hardened Steel 55-65 HRC		X	●	●	2D/3D HSC	0.015	0.05	65	0.0032	0.0048	0.0064	0.0080	0.0096

15xD Neck Length													
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)				
		Emulsion	Air	MQL					0.2	0.3	0.4	0.5	0.6
		Multiply tool Ø by this factor to calculate depths of cut							fz - mm/tooth				
Medium Carbon Steels	P	●	●	○	2D/3D HSC	0.015	0.05	90	0.0042	0.0063	0.0084	0.0105	0.0126
Die / Tool Steels		●	●	○	2D/3D HSC	0.014	0.05	85	0.0038	0.0057	0.0076	0.0095	0.0114
Austenitic Stainless Steels	M	●	X	○	2D/3D HSC	0.014	0.05	85	0.0038	0.0057	0.0076	0.0095	0.0114
High Temp Alloys	S	●	X	X	2D/3D HSC	0.009	0.03	30	0.0030	0.0045	0.0060	0.0075	0.0090
Titanium Alloys		●	X	X	2D/3D HSC	0.010	0.04	75	0.0036	0.0054	0.0072	0.0090	0.0108
Pre-Hardened Steel 35-45 HRC	H	○	●	●	2D/3D HSC	0.012	0.05	80	0.0038	0.0057	0.0076	0.0095	0.0114
Hardened Steel 45-55 HRC		X	●	●	2D/3D HSC	0.010	0.05	75	0.0036	0.0054	0.0072	0.0090	0.0108
Hardened Steel 55-65 HRC		X	●	●	2D/3D HSC	0.009	0.03	65	0.0030	0.0045	0.0060	0.0075	0.0090

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.

10xD Neck Length												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0182	0.0208	0.0260	0.0325	0.0390	0.0455	0.0520	0.0650	0.0780	0.10400	0.13000	0.15600	
0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.09600	0.12000	0.14400	
0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.0920	0.1150	0.1380	
0.0168	0.0192	0.0240	0.0300	0.0360	0.0420	0.0480	0.0600	0.0720	0.0960	0.1200	0.1440	
0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.0920	0.1150	0.1380	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0161	0.0184	0.0230	0.0288	0.0345	0.0403	0.0460	0.0575	0.0690	0.09200	0.11500	0.13800	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0112	0.0128	0.0160	0.0200	0.0240	0.0280	0.0320	0.0400	0.0480	0.0640	0.0800	0.0960	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200	
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.0840	0.1050	0.1260	
0.0140	0.0160	0.0200	0.0250	0.0300	0.0350	0.0400	0.0500	0.0600	0.0800	0.1000	0.1200	
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												
End Mill Diameter (mm)												
0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0147	0.0168	0.0210	0.0263	0.0315	0.0368	0.0420	0.0525	0.0630	0.08400	0.10500	0.12600	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.07600	0.09500	0.11400	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900	
0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080	
0.0133	0.0152	0.0190	0.0238	0.0285	0.0333	0.0380	0.0475	0.0570	0.0760	0.0950	0.1140	
0.0126	0.0144	0.0180	0.0225	0.0270	0.0315	0.0360	0.0450	0.0540	0.0720	0.0900	0.1080	
0.0105	0.0120	0.0150	0.0188	0.0225	0.0263	0.0300	0.0375	0.0450	0.0600	0.0750	0.0900	

- 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 Slotting & Profile Milling

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

3xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	
							Multiply tool Ø by this factor to calculate depths of cut					fz - mm/tooth		
Medium Carbon Steels	P	●	●	○	Slotting	0.5	-	95	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.1	200	0.0007	0.0013	0.0020	0.0026	0.0033	
Die / Tool Steels	P	●	●	○	Slotting	0.5	-	80	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.1	170	0.0007	0.0013	0.0020	0.0026	0.0033	
Austenitic Stainless Steels	M	●	X	○	Slotting	0.5	-	75	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.1	150	0.0007	0.0013	0.0020	0.0026	0.0033	
Duplex & Super Duplex	M	●	X	○	Slotting	0.5	-	65	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.1	100	0.0007	0.0013	0.0020	0.0026	0.0033	
High Temp Alloys	S	●	X	X	Slotting	0.5	-	30	0.0002	0.0004	0.0006	0.0008	0.0010	
					Profiling	1.0	0.05	45	0.0006	0.0011	0.0017	0.0022	0.0028	
Titanium Alloys	S	●	X	X	Slotting	0.5	-	75	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.1	107	0.0004	0.0008	0.0012	0.0016	0.0020	

5xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	
							Multiply tool Ø by this factor to calculate depths of cut					fz - mm/tooth		
Medium Carbon Steels	P	●	●	○	Slotting	0.3	-	95	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.08	200	0.0007	0.0013	0.0020	0.0026	0.0033	
Die / Tool Steels	P	●	●	○	Slotting	0.3	-	80	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.08	170	0.0007	0.0013	0.0020	0.0026	0.0033	
Austenitic Stainless Steels	M	●	X	○	Slotting	0.3	-	75	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.08	150	0.0007	0.0013	0.0020	0.0026	0.0033	
Duplex & Super Duplex	M	●	X	○	Slotting	0.3	-	65	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.08	100	0.0007	0.0013	0.0020	0.0026	0.0033	
High Temp Alloys	S	●	X	X	Slotting	0.3	-	30	0.0002	0.0004	0.0006	0.0008	0.0010	
					Profiling	1.0	0.05	45	0.0006	0.0011	0.0017	0.0022	0.0028	
Titanium Alloys	S	●	X	X	Slotting	0.3	-	75	0.0002	0.0005	0.0007	0.0010	0.0012	
					Profiling	1.0	0.08	110	0.0004	0.0008	0.0012	0.0016	0.0020	

8xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	
							Multiply tool Ø by this factor to calculate depths of cut					fz - mm/tooth		
Medium Carbon Steels	P	●	●	○	Slotting	0.2	-	85	0.0002	0.0004	0.0007	0.0009	0.0011	
					Profiling	0.75	0.05	180	0.0006	0.0012	0.0018	0.0024	0.0030	
Die / Tool Steels	P	●	●	○	Slotting	0.2	-	75	0.0002	0.0004	0.0007	0.0009	0.0011	
					Profiling	0.75	0.05	155	0.0006	0.0012	0.0018	0.0024	0.0030	
Austenitic Stainless Steels	M	●	X	○	Slotting	0.2	-	70	0.0002	0.0004	0.0007	0.0009	0.0011	
					Profiling	0.75	0.05	135	0.0006	0.0012	0.0018	0.0024	0.0030	
Duplex & Super Duplex	M	●	X	○	Slotting	0.2	-	60	0.0002	0.0004	0.0007	0.0009	0.0011	
					Profiling	0.75	0.05	90	0.0006	0.0012	0.0018	0.0024	0.0030	
High Temp Alloys	S	●	X	X	Slotting	0.2	-	28	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.75	0.05	40	0.0005	0.0010	0.0015	0.0020	0.0025	
Titanium Alloys	S	●	X	X	Slotting	0.2	-	68	0.0002	0.0004	0.0007	0.0009	0.0011	
					Profiling	0.75	0.05	95	0.0004	0.0007	0.0011	0.0014	0.0018	

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: $Feed = Max\ RPM \times Fz \times \text{number of teeth}$.
- 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.

3xD Neck Length												
End Mill Diameter (mm)												
0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.00960	0.01200	0.01440	
0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.02640	0.03300	0.03960	
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.00960	0.01200	0.01440	
0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.02640	0.03300	0.03960	
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144	
0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396	
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144	
0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396	
0.0012	0.0014	0.0016	0.0018	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080	0.0100	0.0120	
0.0034	0.0039	0.0045	0.0050	0.0056	0.0084	0.0112	0.0140	0.0168	0.0224	0.0280	0.0336	
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144	
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												
End Mill Diameter (mm)												
0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.00960	0.01200	0.01440	
0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.02640	0.03300	0.03960	
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.00960	0.01200	0.01440	
0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.02640	0.03300	0.03960	
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144	
0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396	
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144	
0.0040	0.0046	0.0053	0.0059	0.0066	0.0099	0.0132	0.0165	0.0198	0.0264	0.0330	0.0396	
0.0012	0.0014	0.0016	0.0018	0.0020	0.0030	0.0040	0.0050	0.0060	0.0080	0.0100	0.0120	
0.0034	0.0039	0.0045	0.0050	0.0056	0.0084	0.0112	0.0140	0.0168	0.0224	0.0280	0.0336	
0.0014	0.0017	0.0019	0.0022	0.0024	0.0036	0.0048	0.0060	0.0072	0.0096	0.0120	0.0144	
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												
End Mill Diameter (mm)												
0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.00880	0.01100	0.01320	
0.0035	0.0041	0.0047	0.0053	0.0059	0.0089	0.0118	0.0148	0.0177	0.02360	0.02950	0.03540	
0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.00880	0.01100	0.01320	
0.0035	0.0041	0.0047	0.0053	0.0059	0.0089	0.0118	0.0148	0.0177	0.02360	0.02950	0.03540	
0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.0088	0.0110	0.0132	
0.0035	0.0041	0.0047	0.0053	0.0059	0.0089	0.0118	0.0148	0.0177	0.0236	0.0295	0.0354	
0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.0088	0.0110	0.0132	
0.0035	0.0041	0.0047	0.0053	0.0059	0.0089	0.0118	0.0148	0.0177	0.0236	0.0295	0.0354	
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300	
0.0013	0.0015	0.0018	0.0020	0.0022	0.0033	0.0044	0.0055	0.0066	0.0088	0.0110	0.0132	
0.0022	0.0025	0.0029	0.0032	0.0036	0.0054	0.0072	0.0090	0.0108	0.0144	0.0180	0.0216	

- 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 Slotting & Profile Milling

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

10xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	
							Multiply tool Ø by this factor to calculate depths of cut					fz - mm/tooth		
Medium Carbon Steels	P	●	●	○	Slotting	0.15	-	75	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.5	0.035	160	0.0005	0.0010	0.0015	0.0020	0.0025	
Die / Tool Steels	P	●	●	○	Slotting	0.15	-	65	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.5	0.035	135	0.0005	0.0010	0.0015	0.0020	0.0025	
Austenitic Stainless Steels	M	●	X	○	Slotting	0.15	-	60	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.5	0.035	120	0.0005	0.0010	0.0015	0.0020	0.0025	
Duplex & Super Duplex	M	●	X	○	Slotting	0.15	-	55	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.5	0.035	80	0.0005	0.0010	0.0015	0.0020	0.0025	
High Temp Alloys	S	●	X	X	Slotting	0.15	-	25	0.0002	0.0003	0.0005	0.0006	0.0008	
					Profiling	0.5	0.035	35	0.0004	0.0008	0.0013	0.0017	0.0021	
Titanium Alloys	S	●	X	X	Slotting	0.15	-	60	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.5	0.035	85	0.0003	0.0006	0.0009	0.0012	0.0015	

12xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	
							Multiply tool Ø by this factor to calculate depths of cut					fz - mm/tooth		
Medium Carbon Steels	P	●	●	○	Slotting	0.125	-	70	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.4	0.03	150	0.0005	0.0010	0.0015	0.0020	0.0025	
Die / Tool Steels	P	●	●	○	Slotting	0.125	-	60	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.4	0.03	130	0.0005	0.0010	0.0015	0.0020	0.0025	
Austenitic Stainless Steels	M	●	X	○	Slotting	0.125	-	55	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.4	0.03	110	0.0005	0.0010	0.0015	0.0020	0.0025	
Duplex & Super Duplex	M	●	X	○	Slotting	0.125	-	50	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.4	0.03	75	0.0005	0.0010	0.0015	0.0020	0.0025	
High Temp Alloys	S	●	X	X	Slotting	0.125	-	22	0.0002	0.0003	0.0005	0.0006	0.0008	
					Profiling	0.4	0.03	32	0.0004	0.0008	0.0013	0.0017	0.0021	
Titanium Alloys	S	●	X	X	Slotting	0.125	-	55	0.0002	0.0004	0.0005	0.0007	0.0009	
					Profiling	0.4	0.03	75	0.0003	0.0006	0.0009	0.0012	0.0015	

15xD Neck Length														
Workpiece Material Group	ISO	Coolant			Application	ADOC (Ap)	RWOC (Ae)	Vc - M/Min	End Mill Diameter (mm)					
		Emulsion	Air	MQL					0.1	0.2	0.3	0.4	0.5	
							Multiply tool Ø by this factor to calculate depths of cut					fz - mm/tooth		
Medium Carbon Steels	P	●	●	○	Slotting	0.1	-	60	0.0002	0.0003	0.0005	0.0007	0.0009	
					Profiling	0.3	0.025	125	0.0005	0.0009	0.0014	0.0018	0.0023	
Die / Tool Steels	P	●	●	○	Slotting	0.1	-	50	0.0002	0.0003	0.0005	0.0007	0.0009	
					Profiling	0.3	0.025	110	0.0005	0.0009	0.0014	0.0018	0.0023	
Austenitic Stainless Steels	M	●	X	○	Slotting	0.1	-	50	0.0002	0.0003	0.0005	0.0007	0.0009	
					Profiling	0.3	0.025	95	0.0005	0.0009	0.0014	0.0018	0.0023	
Duplex & Super Duplex	M	●	X	○	Slotting	0.1	-	40	0.0002	0.0003	0.0005	0.0007	0.0009	
					Profiling	0.3	0.025	65	0.0005	0.0009	0.0014	0.0018	0.0023	
High Temp Alloys	S	●	X	X	Slotting	0.1	-	20	0.0001	0.0003	0.0004	0.0006	0.0007	
					Profiling	0.3	0.025	30	0.0004	0.0008	0.0012	0.0016	0.0020	
Titanium Alloys	S	●	X	X	Slotting	0.1	-	50	0.0002	0.0003	0.0005	0.0007	0.0009	
					Profiling	0.3	0.025	65	0.0003	0.0006	0.0008	0.0011	0.0014	

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.

10xD Neck Length												
End Mill Diameter (mm)												
0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.00720	0.00900	0.01080	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.02000	0.02500	0.03000	
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.00720	0.00900	0.01080	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.02000	0.02500	0.03000	
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300	
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300	
0.0009	0.0011	0.0012	0.0014	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	0.0075	0.0090	
0.0025	0.0029	0.0034	0.0038	0.0042	0.0063	0.0084	0.0105	0.0126	0.0168	0.0210	0.0252	
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108	
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												
End Mill Diameter (mm)												
0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.00720	0.00900	0.01080	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.02000	0.02500	0.03000	
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.00720	0.00900	0.01080	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.02000	0.02500	0.03000	
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300	
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	0.0250	0.0300	
0.0009	0.0011	0.0012	0.0014	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	0.0075	0.0090	
0.0025	0.0029	0.0034	0.0038	0.0042	0.0063	0.0084	0.0105	0.0126	0.0168	0.0210	0.0252	
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.0072	0.0090	0.0108	
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												
End Mill Diameter (mm)												
0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.00680	0.00850	0.01020	
0.0028	0.0032	0.0037	0.0041	0.0046	0.0069	0.0092	0.0115	0.0138	0.01840	0.02300	0.02760	
0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.00680	0.00850	0.01020	
0.0028	0.0032	0.0037	0.0041	0.0046	0.0069	0.0092	0.0115	0.0138	0.01840	0.02300	0.02760	
0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.0068	0.0085	0.0102	
0.0028	0.0032	0.0037	0.0041	0.0046	0.0069	0.0092	0.0115	0.0138	0.0184	0.0230	0.0276	
0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.0068	0.0085	0.0102	
0.0028	0.0032	0.0037	0.0041	0.0046	0.0069	0.0092	0.0115	0.0138	0.0184	0.0230	0.0276	
0.0008	0.0010	0.0011	0.0013	0.0014	0.0021	0.0028	0.0035	0.0042	0.0056	0.0070	0.0084	
0.0023	0.0027	0.0031	0.0035	0.0039	0.0059	0.0078	0.0098	0.0117	0.0156	0.0195	0.0234	
0.0010	0.0012	0.0014	0.0015	0.0017	0.0026	0.0034	0.0043	0.0051	0.0068	0.0085	0.0102	
0.0017	0.0020	0.0022	0.0025	0.0028	0.0042	0.0056	0.0070	0.0084	0.0112	0.0140	0.0168	

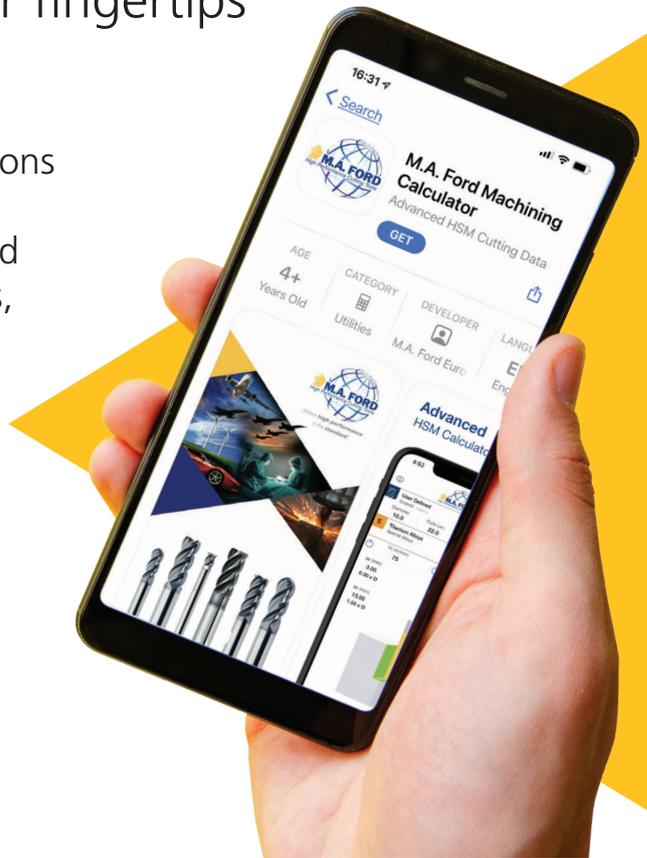
- Use the shortest overhang possible and minimise tool runout by utilising an accurate chucking system.
- It is recommended to use radius tools for roughing and square-end tools for finishing.
- **Please note that these cutting conditions are for guidance only and may need to be adjusted depending on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

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