

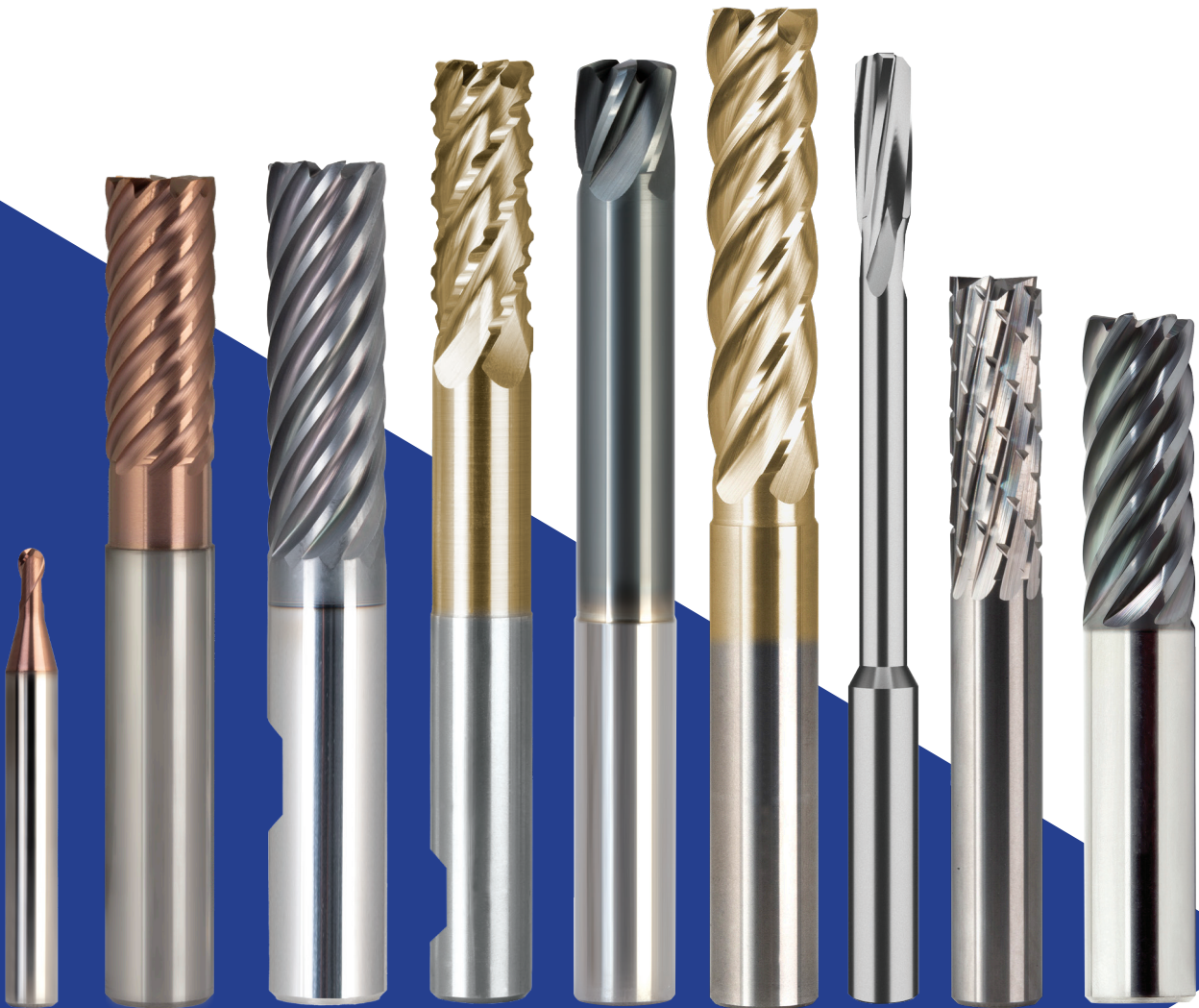
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New Product Supplement

2026



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TuffCut® XV

Series XV9

9 flute radius end mills

- 9 flute design for up to 28% higher feed potential vs 7-flute tools in profiling and dynamic milling operations
- Available in 2 flute versions, either chip breaker geometry for chip control or continuous flute geometry for edge strength.
- ALtima® Q coating provides optimal heat and wear resistance enabling increased tool life.
- 37° high helix angle for a smoother cutting action, reduced vibration and improved harmonics.

Page NP4



TuffCut® XM

Series XMH

8 flute radius end mills

- A high-hardness sub-micron substrate enhances wear resistance for extended tool life in hardened steels.
- ALtima® Xtreme coating provides high heat resistance for longer tool life, and superior finish in hardened steels.
- 8 flute design for up to 33% higher feed potential vs a 6-flute tool in stable machining conditions
- Negative radial geometry increases edge strength for short-chipping hardened steels.

Page NP7



TuffCut® X-AL

Series 137V5R

5 flute end mills Aluminium rougher

- Ripper-style roughing geometry for exceptional chip control and heavy stock removal.
- Engineered to reduce power requirements at high metal removal rates.
- Designed to reduce cutting noise compared to standard end mill types.
- Through-coolant design improves chip evacuation in deep pockets.
- Capable of finishing by reducing feed per tooth.
- Fordlube coating extends tool life in aluminium alloys.
- Special geometry ensures stability in long-reach applications.
- Weldon shank option prevents tool pull-out.

Page NP8



TuffCut® X-AL

Series 137TWF

5 flute end mills Aluminium thin wall finisher

- Special geometry reduces part deflection when machining thin-wall aluminium parts, minimising taper and maintaining accuracy.
- Suitable for aerospace structure machining and other precision thin-walled components.
- 5-flute anti-vibration design enables finishing at full flute length.
- Available in both sharp or corner-radius versions to improve edge strength and maintain precise component dimensions.
- Fordlube coating extends tool life in aluminium alloys.
- Through-coolant design improves chip evacuation in deep pockets.

Page NP12



TuffCut® XT

Series 278 3xD

5 flute square & radius end mills

- 5-flute design optimised for roughing and finishing operations
- 3xD cutting length for deeper axial engagement
- Variable helix and flute spacing to improve machining harmonics
- Universal application range for heavy roughing and dynamic tool paths
- ALtima® Blaze coating for higher heat resistance than TiAlN
- Centre cutting for ramping, slotting, and plunging
- Optimised flute geometry for efficient chip evacuation

Page NP14



M.A. FORD MAX RANGE

Series CGFR

Carbon & glass fibre routers

- Specially engineered for carbon, glass, and other fibre-reinforced materials.
- Optimised carbide substrate delivers extended tool life in abrasive composites.
- Chip-breaker geometry relieves cutting pressure and produces smaller dust and fibres.
- Positive rake design enhances surface finish and reduces delamination risk.
- End-cut geometry enables efficient plunging, ramping, and slotting.

Page NP16



TuffCut® HF

Page NP18

Series FHFP N3, N5 & N8 High-feed end mills

- Ideal for high-feed roughing of 3D shapes, long-reach applications, and shallow forms.
- ALtima® Q coating paired with a tough substrate ensures excellent performance on standard steels, stainless steels, titanium, and high temperature alloys like Inconel® 718.
- Available in three variant lengths, providing versatility for a range of machining depths.
- Through-coolant design enhances chip evacuation in deep applications, improving tool life under high-heat conditions.



TuffCut® XV

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Series XV7 7 flute radius end mills

- Centre-cutting geometry enables higher ramp angles and delivers improved floor finishes.
- 38° helix with variable pitch geometry ensures smooth cutting and reduces harmonics.
- Thick-core design provides added strength for machining difficult materials.
- Available in standard and chipbreaker versions, suitable for both roughing and finishing operations.
- ALtima® Q coating offers exceptional wear and heat resistance, extending tool life across a wide range of materials.
- Available in multiple length variants, offering versatility for machining at various depths.



TuffCut® XT9

Page NP30

Series 380 3xD 9 flute radius end mills

- Uneven 9-flute design enables high feed rates while reducing harmonics for stable machining.
- ALtima® Q coating provides exceptional wear and heat resistance, extending tool life across a wide range of materials.
- Available in standard and chipbreaker versions, suitable for both roughing and finishing operations.
- Staggered chipbreaker technology reduces cutting forces and improves chip management.
- Available in 3xD flute length for enhanced depth-of-cut capabilities.



TuffCut® XM

Page NP33

Series XM2S 2 flute square end mills

- 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.



TuffCut® XM

Page NP36

Series XM2R 2 flute radius end mills

- 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.



TuffCut® XM

Page NP42

Series XM2B 2 flute ball end mills

- 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.



TuffCut® XM

Series XM4R

4 flute radius end mills

- 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 XM2BH

2 flute high hardness ball nose end mills

- High-hard ball nose end mills designed for machining hardened steels up to 70 HRC.
- Short length ideal for roughing, semi-finishing, and finishing applications.
- Perfect for shrink-fit applications requiring short shank lengths.
- Micro-grain carbide substrate combined with a high-performance coating for superior durability and efficiency.

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TuffCut® XM

Series XM4SH

4 flute high hardness square end mills

- 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.

Page NP48



TrueSize® NC

Series 275

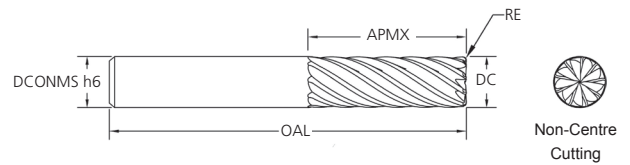
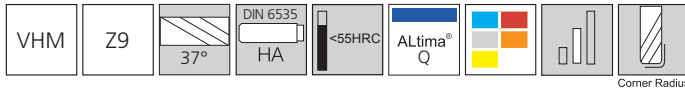
Common shank machine reamers

- Solid Carbide
- Recommended for CNC reaming applications.
- Common metric shanks for high-accuracy clamping.
- Extended reach for increased hole depths.
- RH Spiral / RH Cut design for both blind and through hole applications.
- Suitable for most materials.

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TuffCut® XV Series XV9

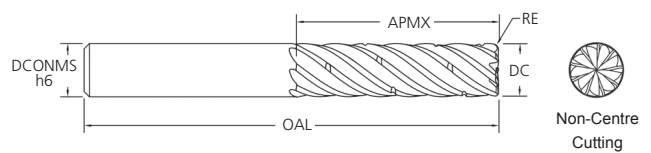


Tool No.	DC	DCONMS	OAL	APMX	RE
XV9M0800-R0.5AQ	8.0	8.0	63.0	22.0	0.5
XV9M1000-R0.5AQ	10.0	10.0	72.0	27.0	0.5
XV9M1000-R1.0AQ	10.0	10.0	72.0	27.0	1.0
XV9M1200-R0.5AQ	12.0	12.0	81.0	32.0	0.5
XV9M1200-R1.0AQ	12.0	12.0	81.0	32.0	1.0
XV9M1600-R1.0AQ	16.0	16.0	92.0	42.0	1.0

TuffCut® XV Series XV9CB

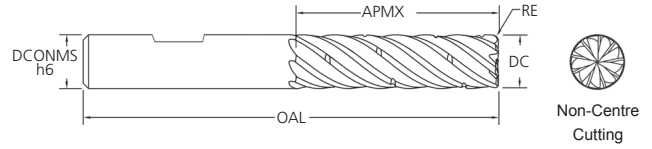
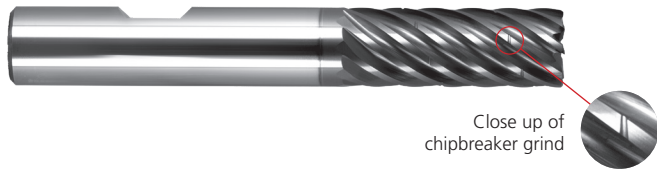


Close up of chipbreaker grind



Tool No.	DC	DCONMS	OAL	APMX	RE
XV9CBM0800-R0.5AQ	8.0	8.0	63.0	22.0	0.5
XV9CBM1000-R0.5AQ	10.0	10.0	72.0	27.0	0.5
XV9CBM1200-R0.5AQ	12.0	12.0	81.0	32.0	0.5
XV9CBM1600-R1.0AQ	16.0	16.0	92.0	42.0	1.0

TuffCut® XV Series XV9CB-W



Tool No.	DC	DCONMS	OAL	APMX	RE
XV9CBM1200-R0.5AQW	12.0	12.0	85.0	32.0	0.5

TuffCut® XV Series XV9 / XV9CB / XV9CB-W - Profile Milling with 4xD Cutting Length - Metric

Workpiece Material Group	ISO	Coolant			RWOC (Ae)		End Mill Diameter (mm)			
		Emulsion	Air	MQL	5%	10%	8	10	12	16
					2.3	1.67	← Multiply fz by this factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.			
					Vc - M/Min		fz - mm/tooth			
Low Carbon Steels	P	○	●	○	380	350	0.048	0.060	0.072	0.096
Medium Carbon Steels		○	●	○	270	260	0.048	0.060	0.072	0.096
Alloy Steels		○	●	○	260	240	0.048	0.060	0.072	0.096
Die / Tool Steels		○	●	○	220	200	0.048	0.060	0.072	0.096
Free Machining Stainless Steels	M	●	●	○	205	180	0.048	0.060	0.072	0.096
Austenitic Stainless Steels		●	x	○	160	140	0.040	0.050	0.060	0.080
Difficult Stainless Steels		●	x	○	110	90	0.032	0.040	0.048	0.064
PH Stainless Steels		●	●	○	160	140	0.032	0.040	0.048	0.064
Cobalt Chrome Alloys		●	x	○	120	100	0.032	0.040	0.048	0.064
Duplex (22%)		●	x	○	75	65	0.032	0.040	0.048	0.064
Super Duplex (25%)		●	x	○	70	60	0.032	0.040	0.048	0.064
High Temp Alloys		S	●	x	x	50	40	0.020	0.025	0.030
Titanium Alloys	●		x	x	120	90	0.032	0.040	0.048	0.064
Gray Cast Irons	K	●	○	○	360	350	0.048	0.060	0.072	0.096
Ductile Cast Irons		●	○	○	270	260	0.048	0.060	0.072	0.096
Hardened Steels 45-50 HRC	H	x	●	○	160	140	0.040	0.050	0.060	0.080
Hardened Steels 50-55 HRC		x	●	○	150	130	0.016	0.020	0.024	0.032

● Preferred ○ Possible x Not Possible

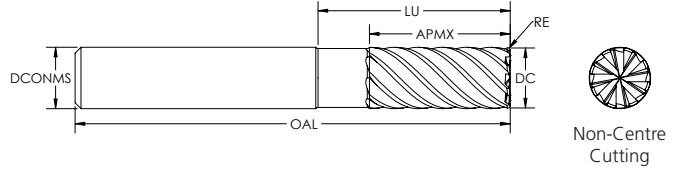
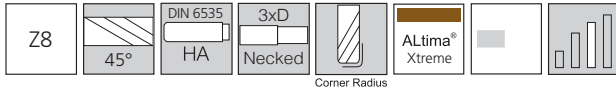
Notes:

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity, machine tool, etc.
- The XV9 / XV9CB should only be used in accurate tool holders with high gripping power. ER collet type holders are not recommended.
- For machining materials above 50 HRC, reduce stepover (Ae) to 2-3% of DC for optimal performance

RWOC (Ae)	Chip Thickness Compensation Factor
1%	5.00
2%	3.57
3%	2.93
5%	2.30
7%	1.96
8%	1.84
10%	1.67

During profile milling with a radial width of less than 50% of the cutter diameter, the actual chip thickness at the cutting edge is reduced relative to the programmed feed per tooth (fz). The accompanying table provides a factor that indicates how much the fz can be increased, depending on the radial width of the cut. To determine the correct feed rate, multiply the recommended fz from the table by the appropriate compensation factor.

TuffCut[®] XM Series XMH



Tool No.	DC	OAL	APMX	LU	RE
XMHM0602N3-R0.2AX	6.0	63.0	13.0	20.0	0.2
XMHM0602N3-R0.5AX	6.0	63.0	13.0	20.0	0.5
XMHM0802N3-R0.2AX	8.0	65.0	19.0	26.0	0.2
XMHM0802N3-R0.5AX	8.0	65.0	19.0	26.0	0.5
XMHM1002N3-R0.2AX	10.0	75.0	22.0	32.0	0.2
XMHM1002N3-R0.5AX	10.0	75.0	22.0	32.0	0.5
XMHM1202N3-R0.2AX	12.0	85.0	26.0	38.0	0.2
XMHM1202N3-R0.5AX	12.0	85.0	26.0	38.0	0.5
XMHM1602N3-R0.5AX	16.0	100.0	34.0	50.0	0.5

XMH Series Recommended Cutting Data - Profile Milling - Metric

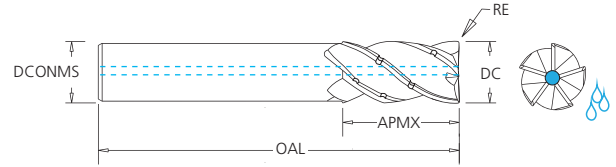
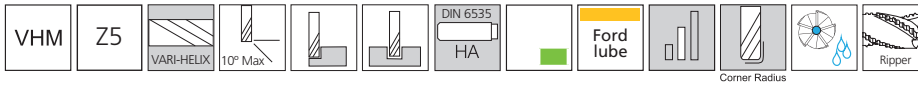
Workpiece Material Group	ISO	Coolant			RWOC (Ae)			End Mill Diameter (mm)				
		Emulsion	Air	MQL				6	8	10	12	16
					2%	3%	5%	← Multiply fz by this factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.				
					3.57	2.93	2.3					
Vc - M/Min			fz - mm/tooth									
Hardened Steels 45-50 HRC	H	○	●	○	250	230	150	0.018	0.024	0.030	0.036	0.048
Hardened Steels 50-55 HRC		x	●	○	230	200	120	0.016	0.022	0.027	0.032	0.043
Hardened Steels 55-60 HRC		x	●	○	180	150	80	0.012	0.016	0.020	0.024	0.032
Hardened Steels 60-65 HRC		x	●	○	150	120	60	0.012	0.016	0.020	0.024	0.032

● Preferred ○ Possible x Not Possible

Notes:

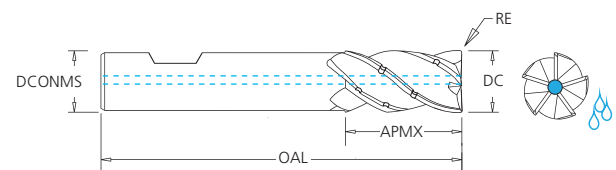
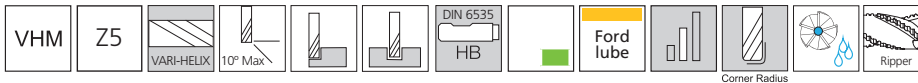
- Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.
- For extended tool life, or if chatter occurs, start by reducing the speed and feed by 20-30% simultaneously.
- Recommended guidelines for flat face machining:
 - Reduce cutting speed by 30-50% and feed at fz listed above in chart
 - Ae (RWOC) = 30-50% of the tool diameter, depending on tool stability and machine rigidity
 - For hardened steels ≤ 55 HRC, Ap (ADOC) = ≤ 2% of the tool diameter
 - For hardened steels > 55 HRC, Ap (ADOC) = ≤ 1% of the tool diameter
 - For finishing operations, Ap (ADOC) = 0.5% of the tool diameter

TuffCut® X-AL Series 137V5R



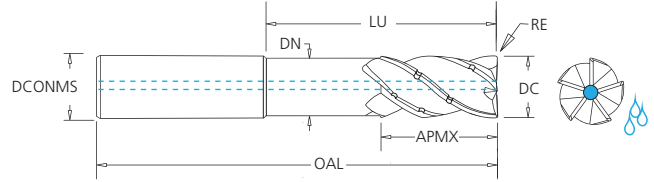
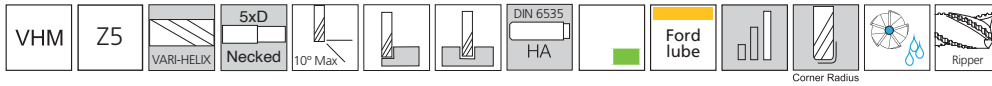
Tool No.	DC	DCONMS	OAL	APMX	RE
137V5R 1203-1.0RALC	12.0	12.0	87.0	38.0	1.0
137V5R 1203-3.0RALC	12.0	12.0	87.0	38.0	3.0
137V5R 1603-1.0RALC	16.0	16.0	104.0	50.0	1.0
137V5R 1603-3.0RALC	16.0	16.0	104.0	50.0	3.0

TuffCut® X-AL Series 137V5R-W



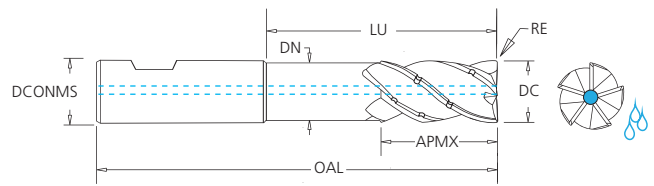
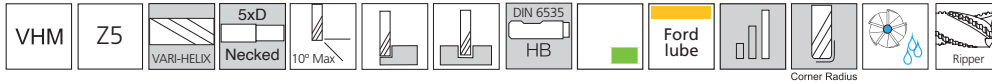
Tool No.	DC	DCONMS	OAL	APMX	RE
137V5R 1203-1.0RALCW	12.0	12.0	87.0	38.0	1.0
137V5R 1603-1.0RALCW	16.0	16.0	104.0	50.0	1.0

TuffCut® X-AL Series 137V5R N5



Tool No.	DC	DCONMS	OAL	APMX	LU	DN	RE
137V5R 12N5-1.0RALC	12.0	12.0	108.0	32.0	62.0	11.6	1.0
137V5R 16N5-1.0RALC	16.0	16.0	133.0	42.0	82.0	15.6	1.0

TuffCut® X-AL Series 137V5R N5-W



Tool No.	DC	DCONMS	OAL	APMX	LU	DN	RE
137V5R 12N5-1.0RALCW	12.0	12.0	108.0	32.0	62.0	11.6	1.0
137V5R 16N5-1.0RALCW	16.0	16.0	133.0	42.0	82.0	15.6	1.0

TuffCut® X-AL Series 137V5R - Slotting with 3xD APMX

Recommended Cutting Data :: Conditions de coupe recommandées :: Empfohlene Schnittdaten :: Dati di taglio Raccomandati :: Zalecane Parametry

Workpiece Material Group	ISO	Coolant			ADOC (Ap)			End Mill Diameter (mm)	
		Emulsion	Air	MQL				12	16
					50%	100%	200%	Consideration should be given to the axial depth of cut (ADOC) to avoid exceeding machine power limitations.	
Vc - M/Min					fz - mm/tooth				
Aluminium (≤ 10 Si)	N	•	x	o	300 - 2000			0.100	0.134
Aluminium (> 10 Si)		•	x	o	250 - 750			0.100	0.134
Aluminium Lithium		•	x	o	300 - 1500			0.100	0.134

- Preferred
- o Possible
- x Not Possible

TuffCut® X-AL Series 137V5R - Profile Milling with 3xD APMX

Recommended Cutting Data :: Conditions de coupe recommandées :: Empfohlene Schnittdaten :: Dati di taglio Raccomandati :: Zalecane Parametry

Workpiece Material Group	ISO	Coolant			RWOC (Ae)				End Mill Diameter (mm)	
		Emulsion	Air	MQL					12	16
					10%	20%	30%	40-60%	Multiply fz by this factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.	
Vc - M/Min					fz - mm/tooth					
Aluminium (≤ 10 Si)	N	•	o	•	300 - 2000				0.140	0.187
Aluminium (> 10 Si)		•	o	•	250 - 750				0.140	0.187
Aluminium Lithium		•	o	•	300 - 1500				0.140	0.187

- Preferred
- o Possible
- x Not Possible

Notes

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity, machine tool, etc.
- The 137V5R should only be used in accurate tool holders with high gripping power. ER collet type holders are not recommended.

Helical interpolation recommendations:

- Under optimal conditions, with proper through coolant flow, up to 10° helical ramp angles are achievable with the 137V5R.
Without through coolant max 5° to 2 x D depth
- A reduction of 30-50% in feed per tooth (fz) is recommended
- Recommended hole diameter = 1.9 x D
- To achieve a flat bottom, use a ramping diameter at least equal to tool diameter minus 2 x corner radius.

RWOC (ae)	Chip Thickness Compensation Factor
1%	5.00
2%	3.57
3%	2.93
5%	2.30
7%	1.96
8%	1.84

RWOC (ae)	Chip Thickness Compensation Factor
10%	1.67
13%	1.49
15%	1.40
20%	1.2
30%	1.1

During profile milling with a radial width of less than 50% of the cutter diameter, the actual chip thickness at the cutting edge is less than the programmed feed per tooth (fz). The accompanying table shows the increase in fz by given radial width percentage to adjust for chip thinning. Multiply your recommended fz by the appropriate feed factor to establish the correct feed rate.

TuffCut® X-AL Series 137V5R N5 - Slotting with 2.5xD APMX

Recommended Cutting Data · Conditions de coupe recommandées · Empfohlene Schnittdaten · Dati di taglio Raccomandati · Zalecane Parametry

Workpiece Material Group	ISO	Coolant			ADOC (Ap)			End Mill Diameter (mm)	
		Emulsion	Air	MQL				12	16
					50%	100%	150%	← Consideration should be given to the axial depth of cut (ADOC) to avoid exceeding machine power limitations.	
					Vc - M/Min			fz - mm/tooth	
Aluminium (≤ 10 Si)	N	•	x	o	300 - 2000			0.100	0.134
Aluminium (> 10 Si)		•	x	o	250 - 750			0.100	0.134
Aluminium Lithium		•	x	o	300 - 1500			0.100	0.134

• Preferred o Possible x Not Possible

TuffCut® X-AL Series 137V5R N5 - Profile Milling with 2.5xD APMX

Recommended Cutting Data · Conditions de coupe recommandées · Empfohlene Schnittdaten · Dati di taglio Raccomandati · Zalecane Parametry

Workpiece Material Group	ISO	Coolant			RWOC (Ae)				End Mill Diameter (mm)	
		Emulsion	Air	MQL					12	16
					10%	20%	30%	40-50%	← Multiply fz by this factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.	
					1.67	1.2	1.1	N/A	fz - mm/tooth	
Aluminium (≤ 10 Si)	N	•	o	•	300 - 2000				0.140	0.187
Aluminium (> 10 Si)		•	o	•	250 - 750				0.140	0.187
Aluminium Lithium		•	o	•	300 - 1500				0.140	0.187

• Preferred o Possible x Not Possible

Notes

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity, machine tool, etc.
- The 137V5R should only be used in accurate tool holders with high gripping power. ER collet type holders are not recommended.

Helical interpolation recommendations:

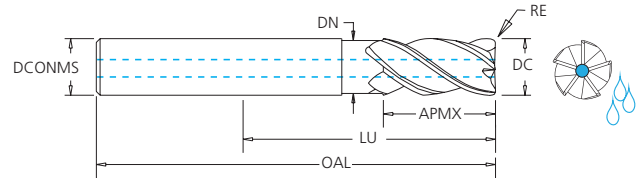
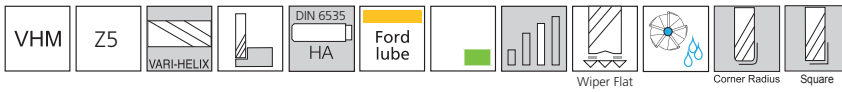
- Under optimal conditions, with proper through coolant flow, up to 10° helical ramp angles are achievable with the 137V5R.
Without through coolant max 5° to 2 x D depth
- A reduction of 30-50% in feed per tooth (fz) is recommended
- Recommended hole diameter = 1.9 x D
- To achieve a flat bottom, use a ramping diameter at least equal to tool diameter minus 2 x corner radius.

RWOC (ae)	Chip Thickness Compensation Factor
1%	5.00
2%	3.57
3%	2.93
5%	2.30
7%	1.96
8%	1.84

RWOC (ae)	Chip Thickness Compensation Factor
10%	1.67
13%	1.49
15%	1.40
20%	1.2
30%	1.1

During profile milling with a radial width of less than 50% of the cutter diameter, the actual chip thickness at the cutting edge is less than the programmed feed per tooth (fz). The accompanying table shows the increase in fz by given radial width percentage to adjust for chip thinning. Multiply your recommended fz by the appropriate feed factor to establish the correct feed rate.

TuffCut® X-AL Series 137TWF



Tool No.	DC	DCONMS	OAL	APMX	LU	DN	RE
137TWF 0604-ALCC	6.0	6.0	64.0	24.0	30.0	5.8	-
137TWF 0804-ALCC	8.0	8.0	80.0	32.0	40.0	7.8	-
137TWF 0804-2.0RALCC	8.0	8.0	80.0	32.0	40.0	7.8	2.0
137TWF 1004-ALCC	10.0	10.0	95.0	40.0	50.0	9.8	-
137TWF 1004-3.0RALCC	10.0	10.0	95.0	40.0	50.0	9.8	3.0
137TWF 1204-ALCC	12.0	12.0	108.0	48.0	54.0	11.6	-
137TWF 1204-3.0RALCC	12.0	12.0	108.0	48.0	54.0	11.6	3.0
137TWF 1604-ALCC	16.0	16.0	125.0	64.0	70.0	15.6	-
137TWF 1604-3.0RALCC	16.0	16.0	125.0	64.0	70.0	15.6	3.0
137TWF 1604-4.0RALCC	16.0	16.0	125.0	64.0	70.0	15.6	4.0

TuffCut® X-AL Series 137TWF - Profile Milling with 4xD APMX

Recommended Cutting Data · Conditions de coupe recommandées · Empfohlene Schnittdaten · Dati di taglio Raccomandati · Zalecane Parametry

Workpiece Material Group	ISO	Coolant			RWOC (Ae)	End Mill Diameter (mm)						
		Emulsion	Air	MQL		Finishing	5%	10%	6	8	10	12
					N/A	2.3	1.67	← Multiply fz by this factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.				
					Vc - M/Min			fz - mm/tooth				
Aluminium (≤ 10 Si)	N	•	o	•	300 - 2000	0.030	0.040	0.050	0.060	0.080		
Aluminium (> 10 Si)		•	o	•	250 - 1000	0.030	0.040	0.050	0.060	0.080		
Aluminium Lithium		•	o	•	300 - 1500	0.030	0.040	0.050	0.060	0.080		

- Preferred o Possible x Not Possible

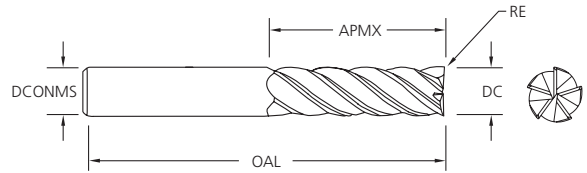
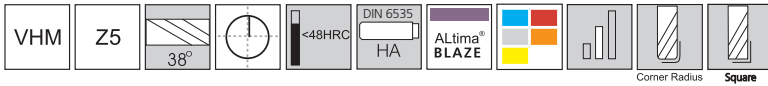
Notes

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity,
- The 137TWF should only be used in accurate tool holders with adequate gripping power. ER collet type holders are not recommended.
- When finishing at full feed rate into corners, care should be taken to ensure that the stock allowance is consistent, and the feature radius is at least 0.5mm larger than the tool radius to avoid over-engagement.
- Recommended stock allowance for finishing is 0.1 to 0.2mm
- This tool can also be used for light roughing, semi-finishing, and corner reduction operations. For these applications, please use the chip correction factor in the table shown below.

RWOC (ae)	Chip Thickness Compensation Factor
1%	5.00
2%	3.57
3%	2.93
5%	2.30
7%	1.96
8%	1.84
10%	1.67

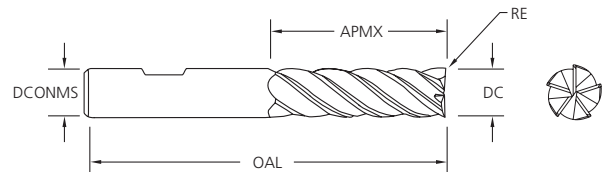
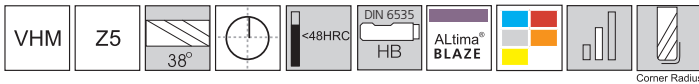
During profile milling with a radial width of less than 50% of the cutter diameter, the actual chip thickness at the cutting edge is less than the programmed feed per tooth (fz). The accompanying table shows the increase in fz by given radial width percentage to adjust for chip thinning. Multiply your recommended fz by the appropriate feed factor to establish the correct feed rate.

TuffCut® XT Series 278 3xD



Tool No.	DC	DCONMS	OAL	APMX	RE
278 0803-0.5RB	8.0	8.0	75.0	26.0	0.5
278 1003B	10.0	10.0	80.0	32.0	-
278 1003-1.0RB	10.0	10.0	80.0	32.0	1.0
278 1203B	12.0	12.0	89.0	38.0	-
278 1203-1.0RB	12.0	12.0	89.0	38.0	1.0
278 1603-1.0RB	16.0	16.0	105.0	50.0	1.0

TuffCut® XT Series 278 3xD-W



Tool No.	DC	DCONMS	OAL	APMX	RE
278 1203-1.0RBW	12.0	12.0	89.0	38.0	1.0
278 1203-3.0RBW	12.0	12.0	89.0	38.0	3.0
278 1603-1.0RBW	16.0	16.0	105.0	50.0	1.0
278 1603-3.0RBW	16.0	16.0	105.0	50.0	3.0

TuffCut® XT Series 278 - Profile Milling with 3xD APMX

Recommended Cutting Data · Conditions de coupe recommandées · Empfohlene Schnittdaten · Dati di taglio Raccomandati · Zalecane Parametry

Workpiece Material Group	ISO	Coolant			RWOC (Ae)			End Mill Diameter (mm)					
		Emulsion	Air	MQL	5%	10%	15%	8	10	12	16	20	
								← Multiply fz by this factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.					
					2.3	1.67	1.4	fz - mm/tooth					
			Vc - M/Min										
Low Carbon Steels	P	○	●	○	380	350	300	0.048	0.060	0.072	0.096	0.120	
Medium Carbon Steels		○	●	○	270	260	240	0.048	0.060	0.072	0.096	0.120	
Alloy Steels		○	●	○	260	240	220	0.048	0.060	0.072	0.096	0.120	
Die / Tool Steels		○	●	○	220	200	180	0.048	0.060	0.072	0.096	0.120	
Free Machining Stainless Steels	M	●	●	○	205	180	150	0.048	0.060	0.072	0.096	0.120	
Austenitic Stainless Steels		●	x	○	160	140	100	0.040	0.050	0.060	0.080	0.100	
Difficult Stainless Steels		●	x	○	110	90	70	0.032	0.040	0.048	0.064	0.080	
PH Stainless Steels		●	●	○	160	140	100	0.032	0.040	0.048	0.064	0.080	
Cobalt Chrome Alloys		●	x	○	120	100	80	0.032	0.040	0.048	0.064	0.080	
Duplex (22%)		●	x	○	75	65	60	0.032	0.040	0.048	0.064	0.080	
Super Duplex (25%)		●	x	○	70	60	55	0.032	0.040	0.048	0.064	0.080	
High Temp Alloys		S	●	x	x	45	38	-	0.032	0.040	0.048	0.064	0.080
Titanium Alloys			●	x	x	120	90	80	0.032	0.040	0.048	0.064	0.080
Gray Cast Irons		K	●	○	○	360	350	300	0.048	0.060	0.072	0.096	0.120
Ductile Cast Irons	●		○	○	270	260	240	0.048	0.060	0.072	0.096	0.120	
Malleable Cast Irons	●		○	○	160	150	140	0.048	0.060	0.072	0.096	0.120	
Hardened Steels 45-50 HRC	H	○	●	○	160	140	-	0.040	0.050	0.060	0.080	0.100	
Hardened Steels 50-55 HRC		○	●	○	150	130	-	0.032	0.040	0.048	0.064	0.080	

● Preferred ○ Possible x Not Possible

RWOC (ae)	Chip Thickness Compensation Factor
5%	2.30
7%	1.96
8%	1.84
10%	1.67
13%	1.49
15%	1.40
20%	1.2

During profile milling with a radial width of less than 50% of the cutter diameter, the actual chip thickness at the cutting edge is reduced relative to the programmed feed per tooth (fz). The accompanying table provides a factor that indicates how much the fz can be increased, depending on the radial width of the cut. To determine the correct feed rate, multiply the recommended fz from the table by the appropriate compensation factor.

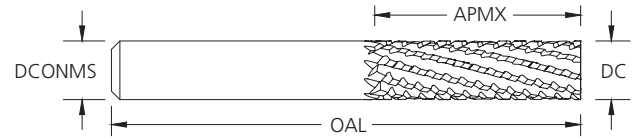
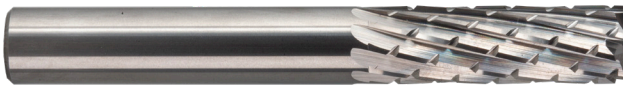
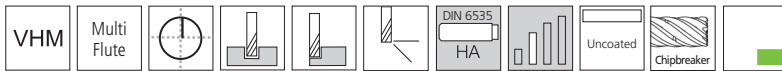
Notes

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity, machine tool, etc.
- The 278 3xD should only be used in accurate tool holders with high gripping power. ER collet type holders are not recommended.

Helical interpolation recommendations:

- Under optimal conditions, with proper coolant flow/air blast techniques, up to 2° helical ramp angles are achievable with the 278 3xD in most materials
- A reduction of 30-50% in feed per tooth (fz) is recommended
- Recommended hole diameter = 1.9 x D
- To achieve a flat bottom, use a ramping diameter at least equal to tool diameter - 2 x corner radius.

M.A. FORDMAX Series CGFR



Tool No.	DC	DCONMS	OAL	APMX	NOF
CGFR 0400	4.0	6.0	50.0	6.0	8
CGFR 0600	6.0	6.0	57.0	16.0	8
CGFR 0800	8.0	8.0	64.0	25.0	10
CGFR 1000	10.0	10.0	64.0	25.0	10
CGFR 1200	12.0	12.0	64.0	25.0	10
CGFR 1600	16.0	16.0	92.0	32.0	10
CGFR 2000	20.0	20.0	105.0	41.0	10

MA FORDMAX Series CGFR - Slotting with 2xD APMX

Recommended Cutting Data · Conditions de coupe recommandées · Empfohlene Schnittdaten · Dati di taglio Raccomandati · Zalcane Parametry

Workpiece Material Group	ISO	Coolant			ADOC (Ap)			End Mill Diameter (mm)						
		Emulsion	Air	MQL	25%	50%	100%	4	6	8	10	12	16	20
					Vc - M/Min			fz - mm/tooth						
					← Multiply fz by this factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.									
GFRP Soft	N	•	•	x	100	80	60	0.016	0.024	0.032	0.040	0.048	0.064	0.080
GFRP Hard		•	•	x	90	70	50	0.010	0.015	0.020	0.025	0.030	0.040	0.050
CFRP		•	•	x	140	120	100	0.016	0.024	0.032	0.040	0.048	0.064	0.080

• Preferred ◦ Possible x Not Possible

MA FORDMAX Series CGFR - Profile Milling with 2xD APMX

Recommended Cutting Data · Conditions de coupe recommandées · Empfohlene Schnittdaten · Dati di taglio Raccomandati · Zalcane Parametry

Workpiece Material Group	ISO	Coolant			RWOC (Ae)			End Mill Diameter (mm)						
		Emulsion	Air	MQL	10%	20%	30%	4	6	8	10	12	16	20
					1.67	1.2	1.1	← Multiply fz by this factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.						
					Vc - M/Min			fz - mm/tooth						
GFRP Soft	N	•	•	x	100	80	60	0.016	0.024	0.032	0.040	0.048	0.064	0.080
GFRP Hard		•	•	x	90	70	50	0.010	0.015	0.020	0.025	0.030	0.040	0.050
CFRP		•	•	x	140	120	100	0.016	0.024	0.032	0.040	0.048	0.064	0.080

• Preferred ◦ Possible x Not Possible

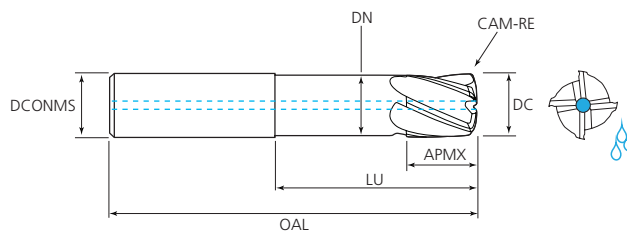
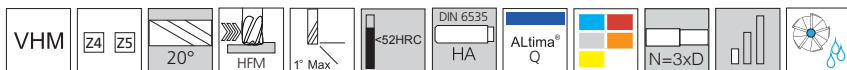
Notes

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity, machine tool, etc.
- The GFRP tool should only be used in precision tool holders with sufficient gripping force.
- Ensure adequate dust extraction is in place when dry machining.

RWOC (ae)	Chip Thickness Compensation Factor
10%	1.67
15%	1.40
20%	1.2
30%	1.1

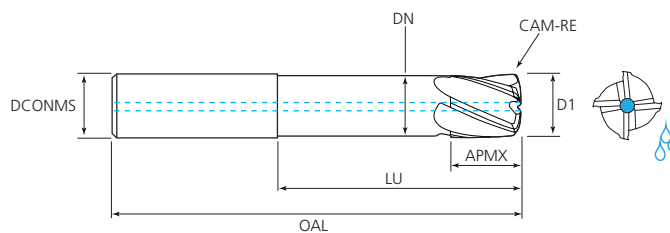
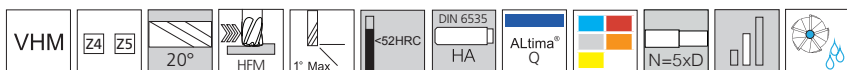
During profile milling with a radial width of less than 50% of the cutter diameter, the actual chip thickness at the cutting edge is less than the programmed feed per tooth (fz). The accompanying table shows the increase in fz by given radial width percentage to adjust for chip thinning. Multiply your recommended fz by the appropriate feed factor to establish the correct feed rate.

TuffCut® HF Series FHFP N3



Tool No.	DC	DCONMS	DN	OAL	APMX	LU	NOF	CAM-RE
FHFP 02N3-AQ	2.0	4.0	1.8	57.0	2.0	7.0	4	0.2
FHFP 03N3-AQ	3.0	6.0	2.8	57.0	3.0	10.0	4	0.3
FHFP 04N3-CCAQ	4.0	6.0	3.8	57.0	4.0	13.0	4	0.4
FHFP 05N3-CCAQ	5.0	6.0	4.8	57.0	5.0	16.0	4	0.5
FHFP 06N3-CCAQ	6.0	6.0	5.8	57.0	6.0	20.0	4	0.6
FHFP 08N3-CCAQ	8.0	8.0	7.8	63.0	8.0	26.0	4	0.8
FHFP 10N3-CCAQ	10.0	10.0	9.8	72.0	10.0	32.0	4	1.0
FHFP 12N3-CCAQ	12.0	12.0	11.8	83.0	12.0	38.0	5	1.2
FHFP 16N3-CCAQ	16.0	16.0	15.8	100.0	16.0	50.0	5	1.6

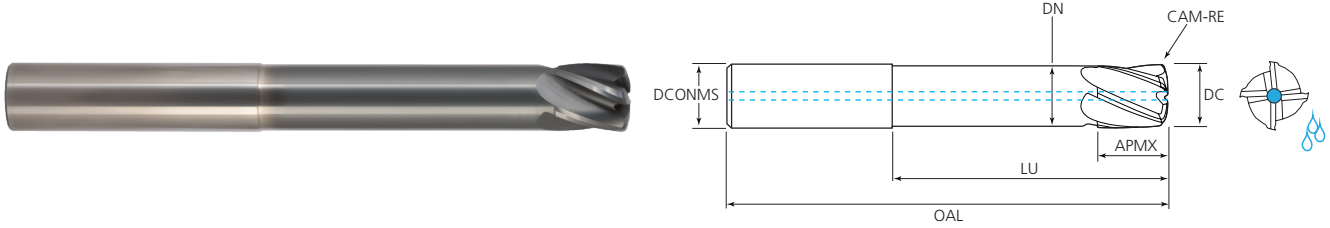
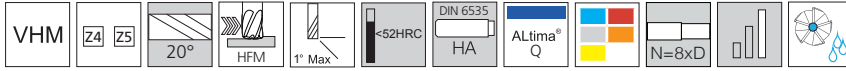
TuffCut® HF Series FHFP N5



Tool No.	DC	DCONMS	DN	OAL	APMX	LU	NOF	CAM-RE
FHFP 02N5-AQ	2.0	4.0	1.8	57.0	2.0	11.0	4	0.2
FHFP 03N5-AQ	3.0	6.0	2.8	57.0	3.0	16.0	4	0.3
FHFP 04N5-CCAQ	4.0	6.0	3.8	57.0	4.0	21.0	4	0.4
FHFP 05N5-CCAQ	5.0	6.0	4.8	64.0	5.0	26.0	4	0.5
FHFP 06N5-CCAQ	6.0	6.0	5.8	75.0	6.0	32.0	4	0.6
FHFP 08N5-CCAQ	8.0	8.0	7.8	83.0	8.0	42.0	4	0.8
FHFP 10N5-CCAQ	10.0	10.0	9.8	100.0	10.0	52.0	4	1.0
FHFP 12N5-CCAQ	12.0	12.0	11.8	110.0	12.0	62.0	5	1.2
FHFP 16N5-CCAQ	16.0	16.0	15.8	133.0	16.0	82.0	5	1.6

Note: The 2.0 and 3.0 tool diameters do not include a through-coolant feature.

TuffCut® HF Series FHFP N8



Tool No.	DC	DCONMS	DN	OAL	APMX	LU	NOF	CAM-RE
FHFP 02N8-AQ	2.0	4.0	1.8	57.0	2.0	17.0	4	0.2
FHFP 03N8-AQ	3.0	6.0	2.8	57.0	5.0	25.0	4	0.3
FHFP 04N8-CCAQ	4.0	6.0	3.8	64.0	4.0	33.0	4	0.4
FHFP 05N8-CCAQ	5.0	6.0	4.8	75.0	5.0	41.0	4	0.5
FHFP 06N8-CCAQ	6.0	6.0	5.8	90.0	6.0	50.0	4	0.6
FHFP 08N8-CCAQ	8.0	8.0	7.8	110.0	8.0	66.0	4	0.8
FHFP 10N8-CCAQ	10.0	10.0	9.8	130.0	10.0	82.0	4	1.0
FHFP 12N8-CCAQ	12.0	12.0	11.8	150.0	12.0	98.0	5	1.2
FHFP 16N8-CCAQ	16.0	16.0	15.8	190.0	16.0	126.0	5	1.6

Note: The 2.0 and 3.0 tool diameters do not include a through-coolant feature.

TuffCut® HF Series FHFP N3 - High-Feed Milling

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

Series FHFP - 3xD														
Workpiece Material Group	ISO	Coolant			Vc-m/min	End Mill Diameter and CAM-R								
		Max	Air	MMS		2mm x R0.2			3mm x R0.3			4mm x R0.4		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	300	0.10	1.5	0.13	0.15	2.3	0.20	0.20	3.0	0.26
Medium Carbon Steels		●	●	●	250	0.10	1.5	0.12	0.15	2.3	0.18	0.20	3.0	0.24
Alloy Steels		●	●	●	200	0.10	1.5	0.11	0.15	2.3	0.17	0.20	3.0	0.22
Die/Tool Steels		●	●	●	150	0.10	1.5	0.10	0.15	2.3	0.15	0.20	3.0	0.20
Austenitic Stainless Steels	M	●	X	○	120	0.08	1.2	0.08	0.12	1.8	0.12	0.16	2.4	0.16
Duplex (22%)		●	X	○	90	0.07	1.2	0.08	0.11	1.8	0.12	0.14	2.4	0.16
Super Duplex (25%)		●	X	○	75	0.06	0.8	0.08	0.09	1.2	0.12	0.12	1.6	0.16
Titanium Alloys	S	●	X	X	100	0.06	0.8	0.08	0.09	1.2	0.12	0.12	1.6	0.16
High Temp Alloys		●	X	X	30	0.05	0.6	0.05	0.08	0.9	0.08	0.10	1.2	0.11
Hardened Steels 45 - 50HRC	H	●	X	X	90	0.09	1.5	0.09	0.14	2.3	0.14	0.18	3.0	0.18
Hardened Steels 50 - 55HRC		●	X	X	80	0.08	1.2	0.07	0.12	1.8	0.11	0.16	2.4	0.14

Series FHFP - 3xD														
Workpiece Material Group	ISO	Coolant			Vc-m/min	End Mill Diameter and CAM-R								
		Max	Air	MMS		5mm x R0.5			6mm x R0.6			8mm x R0.8		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	300	0.25	3.8	0.33	0.30	4.5	0.39	0.40	6.0	0.52
Medium Carbon Steels		●	●	●	250	0.25	3.8	0.30	0.30	4.5	0.36	0.40	6.0	0.48
Alloy Steels		●	●	●	200	0.25	3.8	0.28	0.30	4.5	0.33	0.40	6.0	0.44
Die/Tool Steels		●	●	●	150	0.25	3.8	0.25	0.30	4.5	0.30	0.40	6.0	0.40
Austenitic Stainless Steels	M	●	X	○	120	0.20	3.0	0.20	0.24	3.6	0.24	0.32	4.8	0.32
Duplex (22%)		●	X	○	90	0.18	3.0	0.20	0.21	3.6	0.24	0.28	4.8	0.32
Super Duplex (25%)		●	X	○	75	0.15	2.0	0.20	0.18	2.4	0.24	0.24	3.2	0.32
Titanium Alloys	S	●	X	X	100	0.15	2.0	0.20	0.18	2.4	0.24	0.24	3.2	0.32
High Temp Alloys		●	X	X	30	0.13	1.5	0.14	0.15	1.8	0.16	0.20	2.4	0.22
Hardened Steels 45 - 50HRC	H	●	X	X	90	0.23	3.8	0.23	0.27	4.5	0.27	0.36	6.0	0.36
Hardened Steels 50 - 55HRC		●	X	X	80	0.20	3.0	0.18	0.24	3.6	0.21	0.32	4.8	0.28

Series FHFP - 3xD														
Workpiece Material Group	ISO	Coolant			Vc-m/min	End Mill Diameter and CAM-R								
		Max	Air	MMS		10mm x R1.0			12mm x R1.2			16mm x R1.6		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	300	0.50	7.5	0.65	0.60	9.0	0.78	0.70	12.0	1.04
Medium Carbon Steels		●	●	●	250	0.50	7.5	0.60	0.60	9.0	0.72	0.70	12.0	0.96
Alloy Steels		●	●	●	200	0.50	7.5	0.55	0.60	9.0	0.66	0.70	12.0	0.88
Die/Tool Steels		●	●	●	150	0.50	7.5	0.50	0.60	9.0	0.60	0.70	12.0	0.80
Austenitic Stainless Steels	M	●	X	○	120	0.40	6.0	0.40	0.48	7.2	0.48	0.56	9.6	0.64
Duplex (22%)		●	X	○	90	0.35	6.0	0.40	0.42	7.2	0.48	0.49	9.6	0.64
Super Duplex (25%)		●	X	○	75	0.30	4.0	0.40	0.36	4.8	0.48	0.42	6.4	0.64
Titanium Alloys	S	●	X	X	100	0.30	4.0	0.40	0.36	4.8	0.48	0.42	6.4	0.64
High Temp Alloys		●	X	X	30	0.25	3.0	0.27	0.30	3.6	0.32	0.35	4.8	0.43
Hardened Steels 45 - 50HRC	H	●	X	X	90	0.45	7.5	0.45	0.54	9.0	0.54	0.63	12.0	0.72
Hardened Steels 50 - 55HRC		●	X	X	80	0.40	6.0	0.35	0.48	7.2	0.42	0.56	9.6	0.56

● Preferred ○ Possible X Not Possible

Note: If the calculated feed cannot be achieved due to limitations such as machine capability or component size, adjust the cutting speed (RPM) to achieve the required feed per tooth (fz). For full slotting a reduction in Ap may be required to maintain an effective cutting strategy.

TuffCut® HF Series FHFP N5 - High-Feed Milling

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

Series FHFP - 5xD														
Workpiece Material Group	ISO	Coolant			Vc-m/min	End Mill Diameter and CAM-R								
		Max	Air	MMS		2mm x R0.2			3mm x R0.3			4mm x R0.4		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	270	0.08	1.5	0.13	0.12	2.3	0.20	0.16	3.0	0.26
Medium Carbon Steels		●	●	●	225	0.08	1.5	0.12	0.12	2.3	0.18	0.16	3.0	0.24
Alloy Steels		●	●	●	180	0.08	1.5	0.11	0.12	2.3	0.17	0.16	3.0	0.22
Die/Tool Steels		●	●	●	135	0.08	1.5	0.10	0.12	2.3	0.15	0.16	3.0	0.20
Austenitic Stainless Steels	M	●	X	○	110	0.06	1.2	0.08	0.10	1.8	0.12	0.13	2.4	0.16
Duplex (22%)		●	X	○	80	0.06	1.2	0.08	0.09	1.8	0.12	0.11	2.4	0.16
Super Duplex (25%)		●	X	○	70	0.05	0.8	0.08	0.07	1.2	0.12	0.10	1.6	0.16
Titanium Alloys	S	●	X	X	90	0.05	0.8	0.08	0.07	1.2	0.12	0.10	1.6	0.16
High Temp Alloys		●	X	X	30	0.04	0.6	0.05	0.06	0.9	0.08	0.08	1.2	0.11
Hardened Steels 45 - 50HRC	H	●	X	X	80	0.07	1.5	0.09	0.11	2.3	0.14	0.15	3.0	0.18
Hardened Steels 50 - 55HRC		●	X	X	70	0.06	1.2	0.07	0.10	1.8	0.11	0.13	2.4	0.14

Series FHFP - 5xD														
Workpiece Material Group	ISO	Coolant			Vc-m/min	End Mill Diameter and CAM-R								
		Max	Air	MMS		5mm x R0.5			6mm x R0.6			8mm x R0.8		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	270	0.20	0.3	0.33	0.24	4.5	0.39	0.32	6.0	0.52
Medium Carbon Steels		●	●	●	225	0.20	0.3	0.30	0.24	4.5	0.36	0.32	6.0	0.48
Alloy Steels		●	●	●	180	0.20	0.3	0.28	0.24	4.5	0.33	0.32	6.0	0.44
Die/Tool Steels		●	●	●	135	0.20	0.3	0.25	0.24	4.5	0.3	0.32	6.0	0.4
Austenitic Stainless Steels	M	●	X	○	110	0.16	0.2	0.20	0.19	3.6	0.24	0.26	4.8	0.32
Duplex (22%)		●	X	○	80	0.14	0.2	0.20	0.17	3.6	0.24	0.22	4.8	0.32
Super Duplex (25%)		●	X	○	70	0.12	0.2	0.20	0.14	2.4	0.24	0.19	3.2	0.32
Titanium Alloys	S	●	X	X	90	0.12	0.2	0.20	0.14	2.4	0.24	0.19	3.2	0.32
High Temp Alloys		●	X	X	30	0.10	0.1	0.14	0.12	1.8	0.16	0.16	2.4	0.22
Hardened Steels 45 - 50HRC	H	●	X	X	80	0.18	0.2	0.23	0.22	4.5	0.27	0.29	6.0	0.36
Hardened Steels 50 - 55HRC		●	X	X	70	0.16	0.2	0.18	0.19	3.6	0.21	0.26	4.8	0.28

Series FHFP - 5xD														
Workpiece Material Group	ISO	Coolant			Vc-m/min	End Mill Diameter and CAM-R								
		Max	Air	MMS		10mm x R1.0			12mm x R1.2			16mm x R1.6		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	270	0.4	7.5	0.65	0.48	9.0	0.78	0.56	12.0	1.04
Medium Carbon Steels		●	●	●	225	0.4	7.5	0.6	0.48	9.0	0.72	0.56	12.0	0.96
Alloy Steels		●	●	●	180	0.4	7.5	0.55	0.48	9.0	0.66	0.56	12.0	0.88
Die/Tool Steels		●	●	●	135	0.4	7.5	0.5	0.48	9.0	0.6	0.56	12.0	0.8
Austenitic Stainless Steels	M	●	X	○	110	0.32	6.0	0.4	0.38	7.2	0.48	0.45	9.6	0.64
Duplex (22%)		●	X	○	80	0.28	6.0	0.4	0.34	7.2	0.48	0.39	9.6	0.64
Super Duplex (25%)		●	X	○	70	0.24	4.0	0.4	0.29	4.8	0.48	0.34	6.4	0.64
Titanium Alloys	S	●	X	X	90	0.24	4.0	0.4	0.29	4.8	0.48	0.34	6.4	0.64
High Temp Alloys		●	X	X	30	0.2	3.0	0.27	0.24	3.6	0.32	0.28	4.8	0.43
Hardened Steels 45 - 50HRC	H	●	X	X	80	0.36	7.5	0.45	0.43	9.0	0.54	0.5	12.0	0.72
Hardened Steels 50 - 55HRC		●	X	X	70	0.32	6.0	0.35	0.38	7.2	0.42	0.45	9.6	0.56

● Preferred ○ Possible X Not Possible

Note: If the calculated feed cannot be achieved due to limitations such as machine capability or component size, adjust the cutting speed (RPM) to achieve the required feed per tooth (fz). For full slotting a reduction in Ap may be required to maintain an effective cutting strategy.

TuffCut® HF Series FHFP N8 - High-Feed Milling

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

Series FHFP - 8xD																	
Workpiece Material Group	ISO	Coolant			Vc-m/min	End Mill Diameter and CAM-R											
		Max	Air	MMS		2mm x R0.2			3mm x R0.3			4mm x R0.4			5mm x R0.5		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	245	0.06	1.2	0.13	0.09	1.8	0.20	0.12	2.4	0.26	0.15	3.0	0.33
Medium Carbon Steels		●	●	●	205	0.06	1.2	0.12	0.09	1.8	0.18	0.12	2.4	0.24	0.15	3.0	0.30
Alloy Steels		●	●	●	160	0.06	1.2	0.11	0.09	1.8	0.17	0.12	2.4	0.22	0.15	3.0	0.28
Die/Tool Steels		●	●	●	120	0.06	1.2	0.10	0.09	1.8	0.15	0.12	2.4	0.20	0.15	3.0	0.25
Austenitic Stainless Steels	M	●	X	○	100	0.05	1.2	0.08	0.07	1.8	0.12	0.10	2.4	0.16	0.12	3.0	0.20
Duplex (22%)		●	X	○	70	0.04	0.8	0.08	0.07	1.2	0.12	0.09	1.6	0.16	0.11	2.0	0.20
Super Duplex (25%)		●	X	○	65	0.04	0.8	0.08	0.06	1.2	0.12	0.07	1.6	0.16	0.09	2.0	0.20
Titanium Alloys	S	●	X	X	80	0.04	0.8	0.08	0.06	1.2	0.12	0.07	1.6	0.16	0.09	2.0	0.20
High Temp Alloys		●	X	X	30	0.03	0.6	0.05	0.05	0.9	0.08	0.06	1.2	0.11	0.08	1.5	0.14
Hardened Steels 45 - 50HRC	H	●	X	X	70	0.05	1.2	0.09	0.08	1.8	0.14	0.11	2.4	0.18	0.14	3.0	0.23
Hardened Steels 50 - 55HRC		●	X	X	65	0.05	0.8	0.07	0.07	1.2	0.11	0.10	1.6	0.14	0.12	2.0	0.18

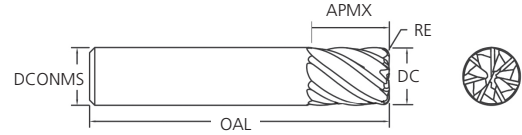
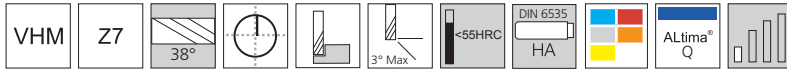
Series FHFP - 8xD														
Workpiece Material Group	ISO	Coolant			Vc-m/min	End Mill Diameter and CAM-R								
		Max	Air	MMS		6mm x R0.6			8mm x R0.8			10mm x R1.0		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	150	0.18	3.6	0.39	0.24	4.8	0.52	0.3	6.0	0.65
Medium Carbon Steels		●	●	●	120	0.18	3.6	0.36	0.24	4.8	0.48	0.3	6.0	0.6
Alloy Steels		●	●	●	100	0.18	3.6	0.33	0.24	4.8	0.44	0.3	6.0	0.55
Die/Tool Steels		●	●	●	100	0.18	3.6	0.3	0.24	4.8	0.4	0.3	6.0	0.5
Austenitic Stainless Steels	M	●	X	○	80	0.14	3.6	0.24	0.19	4.8	0.32	0.24	6.0	0.4
Duplex (22%)		●	X	○	60	0.13	2.4	0.24	0.17	3.2	0.32	0.21	4.0	0.4
Super Duplex (25%)		●	X	○	50	0.11	2.4	0.24	0.14	3.2	0.32	0.18	4.0	0.4
Titanium Alloys	S	●	X	X	70	0.11	2.4	0.24	0.14	3.2	0.32	0.18	4.0	0.4
High Temp Alloys		●	X	X	20	0.09	1.8	0.16	0.12	2.4	0.22	0.15	3.0	0.27
Hardened Steels 45 - 50HRC	H	●	X	X	60	0.16	3.6	0.27	0.22	4.8	0.36	0.27	6.0	0.45
Hardened Steels 50 - 55HRC		●	X	X	50	0.14	2.4	0.21	0.19	3.2	0.28	0.24	4.0	0.35

Series FHFP - 8xD											
Workpiece Material Group	ISO	Coolant			Vc-m/min	End Mill Diameter and CAM-R					
		Max	Air	MMS		12mm x R1.2			16mm x R1.6		
						Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	150	0.36	7.2	0.78	0.42	9.6	1.04
Medium Carbon Steels		●	●	●	120	0.36	7.2	0.72	0.42	9.6	0.96
Alloy Steels		●	●	●	100	0.36	7.2	0.66	0.42	9.6	0.88
Die/Tool Steels		●	●	●	100	0.36	7.2	0.6	0.42	9.6	0.8
Austenitic Stainless Steels	M	●	X	○	80	0.29	7.2	0.48	0.34	9.6	0.64
Duplex (22%)		●	X	○	60	0.25	4.8	0.48	0.29	6.4	0.64
Super Duplex (25%)		●	X	○	50	0.22	4.8	0.48	0.25	6.4	0.64
Titanium Alloys	S	●	X	X	70	0.22	4.8	0.48	0.25	6.4	0.64
High Temp Alloys		●	X	X	20	0.18	3.6	0.32	0.21	4.8	0.43
Hardened Steels 45 - 50HRC	H	●	X	X	60	0.32	7.2	0.54	0.38	9.6	0.72
Hardened Steels 50 - 55HRC		●	X	X	50	0.29	4.8	0.42	0.34	6.4	0.56

● Preferred ○ Possible X Not Possible

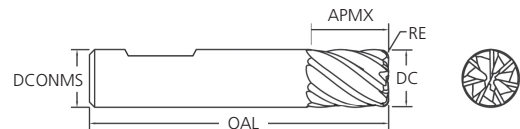
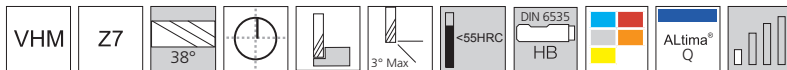
Note: If the calculated feed cannot be achieved due to limitations such as machine capability or component size, adjust the cutting speed (RPM) to achieve the required feed per tooth (fz). For full slotting a reduction in Ap may be required to maintain an effective cutting strategy.

TuffCut® XV Series XV7 1xD



Tool No.	DC	DCONMS	OAL	APMX	RE
XV7M1001AQ	10.0	10.0	51.0	12.0	
XV7M1001-R0.5AQ	10.0	10.0	51.0	12.0	0.5

TuffCut® XV Series XV7 1xD-W



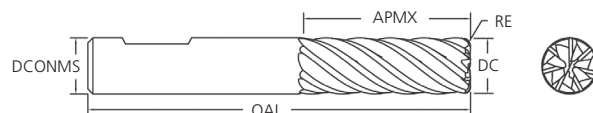
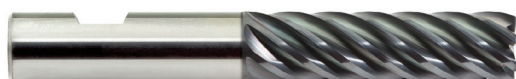
Tool No.	DC	DCONMS	OAL	APMX	RE
XV7M1201AQW	12.0	12.0	63.0	14.0	
XV7M1201-R0.5AQW	12.0	12.0	63.0	14.0	0.5
XV7M1601AQW	16.0	16.0	75.0	18.0	
XV7M1601-R0.5AQW	16.0	16.0	75.0	18.0	0.5

TuffCut® XV Series XV7 3xD



Tool No.	DC	DCONMS	OAL	APMX	RE
XV7M0603-R0.25AQ	6.0	6.0	63.0	21.0	0.25
XV7M0803-R0.5AQ	8.0	8.0	72.0	27.0	0.5
XV7M1003-R0.5AQ	10.0	10.0	80.0	33.0	0.5

TuffCut® XV Series XV7 3xD-W



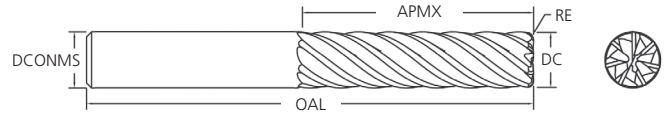
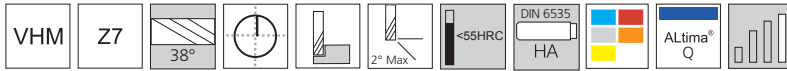
Tool No.	DC	DCONMS	OAL	APMX	RE
XV7M1203-R0.5AQW	12.0	12.0	93.0	40.0	0.5
XV7M1203-R1.0AQW	12.0	12.0	93.0	40.0	1.0
XV7M1203-R3.0AQW	12.0	12.0	93.0	40.0	3.0
XV7M1603-R1.0AQW	16.0	16.0	110.0	54.0	1.0
XV7M1603-R3.0AQW	16.0	16.0	110.0	54.0	3.0

TuffCut® XV Series XV7CB 3xD-W



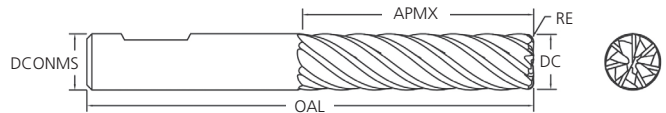
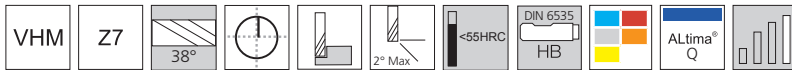
Tool No.	DC	DCONMS	OAL	APMX	RE
XV7CBM1003-R0.5AQW	10.0	10.0	80.0	33.0	0.5
XV7CBM1203-R0.5AQW	12.0	12.0	93.0	40.0	0.5
XV7CBM1603-R1.0AQW	16.0	16.0	110.0	54.0	1.0

TuffCut® XV Series XV7 4xD



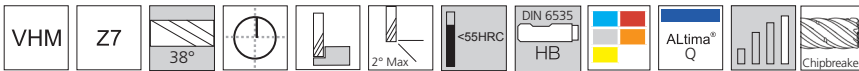
Tool No.	DC	DCONMS	OAL	APMX	RE
XV7M0604-R0.25AQ	6.0	6.0	63.0	25.0	0.25
XV7M0804-R0.5AQ	8.0	8.0	75.0	33.0	0.5
XV7M1004-R0.5AQ	10.0	10.0	90.0	43.0	0.5

TuffCut® XV Series XV7 4xD-W



Tool No.	DC	DCONMS	OAL	APMX	RE
XV7M1204-R0.5AQW	12.0	12.0	104.0	51.0	0.5
XV7M1204-R3.0AQW	12.0	12.0	104.0	51.0	3.0
XV7M1604-R1.0AQW	16.0	16.0	123.0	67.0	1.0
XV7M1604-R3.0AQW	16.0	16.0	123.0	67.0	3.0

TuffCut® XV Series XV7CB 4xD-W



Close up of
chipbreaker grind



Tool No.	DC	DCONMS	OAL	APMX	RE
XV7CBM1004-R0.5AQW	10.0	10.0	90.0	43.0	0.5
XV7CBM1204-R0.5AQW	12.0	12.0	104.0	51.0	0.5
XV7CBM1604-R1.0AQW	16.0	16.0	125.0	67.0	1.0

TuffCut® XV XV7CB - Profile Milling with 1xD APMX

Recommended Cutting Data :: Conditions de coupe recommandées :: Empfohlene Schnittdaten :: Dati di taglio Raccomandati :: Zalecane Parametry

Workpiece Material Group	ISO	Coolant			RWOC (Ae)				End Mill Diameter (mm)					
		Emulsion	Air	MQL					6	8	10	12	16	20
					5%	10%	15%	20%	← Multiply fz by this Factor based on Ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.					
					2.3	1.67	1.4	1.2						
				Vc - M/Min				fz - mm/tooth						
Low Carbon Steels	P	o	•	o	380	350	300	290	0.036	0.048	0.060	0.072	0.096	0.120
Medium Carbon Steels		o	•	o	270	260	240	230	0.036	0.048	0.060	0.072	0.096	0.120
Alloy Steels		o	•	o	260	240	220	210	0.036	0.048	0.060	0.072	0.096	0.120
Die / Tool Steels		o	•	o	220	200	180	170	0.036	0.048	0.060	0.072	0.096	0.120
Free Machining Stainless Steels	M	•	•	o	205	180	150	140	0.036	0.048	0.060	0.072	0.096	0.120
Austenitic Stainless Steels		•	x	o	160	140	100	90	0.030	0.040	0.050	0.060	0.080	0.100
Difficult Stainless Steels		•	x	o	110	90	70	65	0.024	0.032	0.040	0.048	0.064	0.080
PH Stainless Steels		•	•	o	160	140	100	90	0.024	0.032	0.040	0.048	0.064	0.080
Cobalt Chrome Alloys		•	x	o	120	100	80	75	0.024	0.032	0.040	0.048	0.064	0.080
Duplex (22%)		•	x	o	75	65	60	55	0.024	0.032	0.040	0.048	0.064	0.080
Super Duplex (25%)		•	x	o	70	60	55	50	0.024	0.032	0.040	0.048	0.064	0.080
High Temp Alloys		•	x	x	50	40	-	-	0.024	0.032	0.040	0.048	0.064	0.080
Titanium Alloys	•	x	x	120	90	80	75	0.024	0.032	0.040	0.048	0.064	0.080	
Gray Cast Irons	K	•	o	o	360	350	300	290	0.036	0.048	0.060	0.072	0.096	0.120
Ductile Cast Irons		•	o	o	270	260	240	230	0.036	0.048	0.060	0.072	0.096	0.120
Malleable Cast Irons		•	o	o	160	150	140	130	0.036	0.048	0.060	0.072	0.096	0.120
Hardened Steels 45-50 HRC	H	o	•	o	160	140	130	110	0.030	0.040	0.050	0.060	0.080	0.100
Hardened Steels 50-55 HRC		o	•	o	150	130	115	100	0.024	0.032	0.040	0.048	0.064	0.080

• Preferred o Possible x Not Possible

Notes

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity, machine tool, etc.
- The XV7 / XV7CB should only be used in accurate tool holders with high gripping power. ER collet type holders are not recommended.

Helical interpolation recommendations:

- Under optimal conditions, with proper coolant flow/air blast techniques, up to 3° helical ramp angles are achievable with the XV7 / XV7CB in most materials
- A reduction of 30-50% in feed per tooth (fz) are recommended
- Recommended hole diameter = 1.9 x D

TuffCut® XV XV7 & XV7CB - Profile Milling with 3xD APMX

Recommended Cutting Data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

Workpiece Material Group	ISO	Coolant			RWOC (Ae)		End Mill Diameter (mm)					
		Emulsion	Air	MQL	5%	10%	6	8	10	12	16	20
					2.3	1.67	Multiply fz by this Factor based on Ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.					
					Vc - M/Min							
Low Carbon Steels	P	o	•	o	380	350	0.036	0.048	0.060	0.072	0.096	0.120
Medium Carbon Steels		o	•	o	270	260	0.036	0.048	0.060	0.072	0.096	0.120
Alloy Steels		o	•	o	260	240	0.036	0.048	0.060	0.072	0.096	0.120
Die / Tool Steels		o	•	o	220	200	0.036	0.048	0.060	0.072	0.096	0.120
Free Machining Stainless Steels	M	•	•	o	205	180	0.036	0.048	0.060	0.072	0.096	0.120
Austenitic Stainless Steels		•	x	o	160	140	0.030	0.040	0.050	0.060	0.080	0.100
Difficult Stainless Steels		•	x	o	110	90	0.024	0.032	0.040	0.048	0.064	0.080
PH Stainless Steels		•	•	o	160	140	0.024	0.032	0.040	0.048	0.064	0.080
Cobalt Chrome Alloys		•	x	o	120	100	0.024	0.032	0.040	0.048	0.064	0.080
Duplex (22%)		•	x	o	75	65	0.024	0.032	0.040	0.048	0.064	0.080
Super Duplex (25%)		•	x	o	70	60	0.024	0.032	0.040	0.048	0.064	0.080
High Temp Alloys	S	•	x	x	45	38	0.024	0.032	0.040	0.048	0.064	0.080
Titanium Alloys		•	x	x	120	90	0.024	0.032	0.040	0.048	0.064	0.080
Gray Cast Irons	K	•	o	o	360	350	0.036	0.048	0.060	0.072	0.096	0.120
Ductile Cast Irons		•	o	o	270	260	0.036	0.048	0.060	0.072	0.096	0.120
Malleable Cast Irons		•	o	o	160	150	0.036	0.048	0.060	0.072	0.096	0.120
Hardened Steels 45-50 HRC	H	o	•	o	160	140	0.030	0.040	0.050	0.060	0.080	0.100
Hardened Steels 50-55 HRC		o	•	o	150	130	0.024	0.032	0.040	0.048	0.064	0.080

• Preferred o Possible x Not Possible

Notes

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity, machine tool, etc.
- The XV7 / XV7CB should only be used in accurate tool holders with high gripping power. ER collet type holders are not recommended.

Helical interpolation recommendations:

- Under optimal conditions, with proper coolant flow/air blast techniques, up to 3° helical ramp angles are achievable with the XV7 / XV7CB in most materials
- A reduction of 30-50% in feed per tooth (fz) are recommended
- Recommended hole diameter = 1.9 x D

TuffCut® XV XV7 & XV7CB - Profile Milling with 4xD APMX

Recommended Cutting Data · Conditions de coupe recommandées · Empfohlene Schnittdaten · Dati di taglio Raccomandati · Zalecane Parametry

Workpiece Material Group	ISO	Coolant			RWOC (Ae)		End Mill Diameter (mm)					
		Emulsion	Air	MQL	3%	5%	6	8	10	12	16	20
					2.93	2.3	← Multiply fz by this Factor based on Ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.					
					Vc - M/Min		fz - mm/tooth					
Low Carbon Steels	P	o	•	o	320	300	0.024	0.032	0.040	0.048	0.064	0.080
Medium Carbon Steels		o	•	o	250	240	0.024	0.032	0.040	0.048	0.064	0.080
Alloy Steels		o	•	o	230	220	0.024	0.032	0.040	0.048	0.064	0.080
Die / Tool Steels		o	•	o	210	200	0.024	0.032	0.040	0.048	0.064	0.080
Free Machining Stainless Steels	M	•	•	o	200	180	0.024	0.032	0.040	0.048	0.064	0.080
Austenitic Stainless Steels		•	x	o	150	140	0.018	0.024	0.030	0.036	0.048	0.060
Difficult Stainless Steels		•	x	o	100	90	0.015	0.020	0.025	0.030	0.040	0.050
PH Stainless Steels		•	•	o	150	140	0.015	0.020	0.025	0.030	0.040	0.050
Cobalt Chrome Alloys		•	x	o	90	80	0.015	0.020	0.025	0.030	0.040	0.050
Duplex (22%)		•	x	o	75	65	0.015	0.020	0.025	0.030	0.040	0.050
Super Duplex (25%)		•	x	o	55	45	0.015	0.020	0.025	0.030	0.040	0.050
High Temp Alloys	S	•	x	x	40	35	0.012	0.016	0.020	0.024	0.032	0.040
Titanium Alloys		•	x	x	90	80	0.015	0.020	0.025	0.030	0.040	0.050
Gray Cast Irons	K	•	o	o	300	290	0.024	0.032	0.040	0.048	0.064	0.080
Ductile Cast Irons		•	o	o	230	215	0.024	0.032	0.040	0.048	0.064	0.080
Malleable Cast Irons		•	o	o	140	120	0.024	0.032	0.040	0.048	0.064	0.080
Hardened Steels 45-50 HRC	H	o	•	o	140	130	0.024	0.032	0.040	0.048	0.064	0.080
Hardened Steels 50-55 HRC		o	•	o	120	110	0.012	0.016	0.020	0.024	0.032	0.040

• Preferred o Possible x Not Possible

Notes

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity, machine tool, etc.
- The XV7 / XV7CB should only be used in accurate tool holders with high gripping power. ER collet type holders are not recommended.

Helical interpolation recommendations:

- Under optimal conditions, with proper coolant flow/air blast techniques, up to 3° helical ramp angles are achievable with the XV7 / XV7CB in most materials
- A reduction of 30-50% in feed per tooth (fz) are recommended
- Recommended hole diameter = 1.9 x D



New Products

Nouveaux Produits · Neue Produkte · Nuovi Prodotti · Nowe Produkty

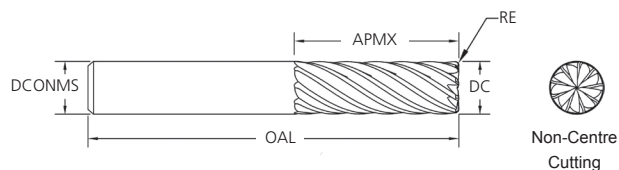
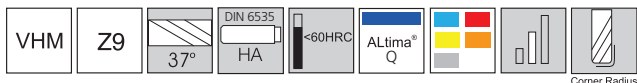
TuffCut® XV XV7 / XV7CB Series - Chip Thickness Compensation Factors - Metric

RWOC (Ae)	Chip Thickness Compensation Factor
5%	2.30
7%	1.96
8%	1.84
10%	1.67
13%	1.49
15%	1.40
20%	1.20

During profile milling with a radial width of less than 50% of the cutter diameter, the actual chip thickness at the cutting edge is reduced relative to the programmed feed per tooth (fz).

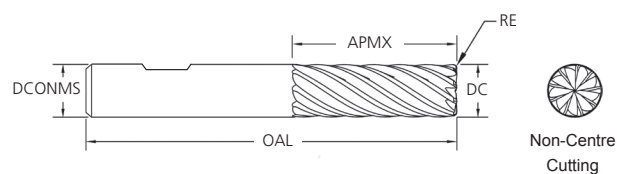
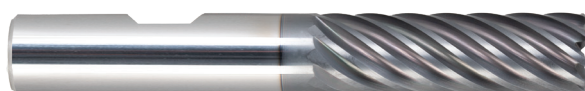
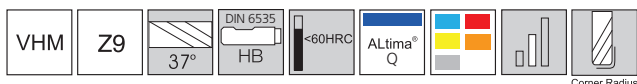
The accompanying table provides a factor that indicates how much the fz can be increased, depending on the radial width of the cut. To determine the correct feed rate, multiply the recommended fz from the table by the appropriate compensation factor.

TuffCut® XT9 Series 380 3xD



Tool No.	DC	DCONMS	OAL	APMX	RE
380M0803-0.5RAQ	8.0	8.0	75.0	26.0	0.5
380M1003-0.5RAQ	10.0	10.0	80.0	32.0	0.5
380M1003-1.0RAQ	10.0	10.0	80.0	32.0	1.0

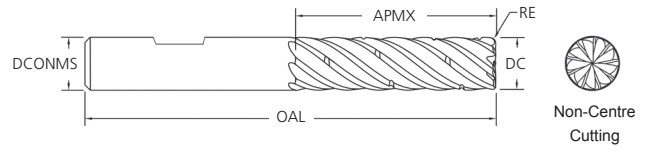
TuffCut® XT9 Series 380 3xD-W



Tool No.	DC	DCONMS	OAL	APMX	RE
380M1003-0.5RAQW	10.0	10.0	80.0	32.0	0.5
380M1003-1.0RAQW	10.0	10.0	80.0	32.0	1.0
380M1203-0.5RAQW	12.0	12.0	84.0	38.0	0.5
380M1203-1.0RAQW	12.0	12.0	84.0	38.0	1.0
380M1603-0.5RAQW	16.0	16.0	105.0	50.0	0.5
380M1603-1.0RAQW	16.0	16.0	105.0	50.0	1.0
380M2003-0.5RAQW	20.0	20.0	120.0	62.0	0.5
380M2003-1.0RAQW	20.0	20.0	120.0	62.0	1.0

Please note: Due to manufacturing specification changes, the future OAL dimension of this tool will be subject to modification.

TuffCut® XT9 Series 380CB 3xD-W



Tool No.	DC	DCONMS	OAL	APMX	RE
380CBM1003-0.5RAQW	10.0	10.0	80.0	32.0	0.5
380CBM1003-1.0RAQW	10.0	10.0	80.0	32.0	1.0
380CBM1203-0.5RAQW	12.0	12.0	84.0	38.0	0.5
380CBM1203-1.0RAQW	12.0	12.0	84.0	38.0	1.0
380CBM1603-0.5RAQW	16.0	16.0	105.0	50.0	0.5
380CBM1603-1.0RAQW	16.0	16.0	105.0	50.0	1.0
380CBM2003-0.5RAQW	20.0	20.0	120.0	62.0	0.5
380CBM2003-1.0RAQW	20.0	20.0	120.0	62.0	1.0

Please note: Due to manufacturing specification changes, the future OAL dimension of this tool will be subject to modification.

TuffCut® XT9 Series 380 & 380CB 3xD - Profile Milling with 3xD APMX

Recommended Cutting Data · Conditions de coupe recommandées · Empfohlene Schnittdaten · Dati di taglio Raccomandati · Zalecane Parametry

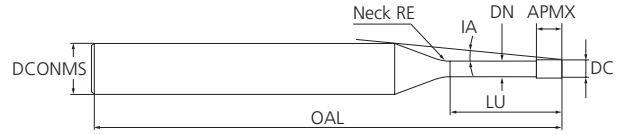
380 & 380CB Series - Profile Milling with 3xD APMX										
Workpiece Material Group	ISO	Coolant			RWOC (Ae)		End Mill Diameter (mm)			
		Emulsion	Air	MQL	5%	10%	10	12	16	20
					2.3	1.67	← Multiply fz by this Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.			
					Vc - M/Min					
Low Carbon Steels	P	o	•	o	370	340	0.060	0.072	0.096	0.120
Medium Carbon Steels		o	•	o	260	250	0.060	0.072	0.096	0.120
Alloy Steels		o	•	o	250	230	0.060	0.072	0.096	0.120
Die / Tool Steels		o	•	o	210	190	0.060	0.072	0.096	0.120
Free Machining Stainless Steels	M	•	•	o	195	175	0.060	0.072	0.096	0.120
Austenitic Stainless Steels		•	x	o	155	135	0.050	0.060	0.080	0.100
Difficult Stainless Steels		•	x	o	105	90	0.040	0.048	0.064	0.080
PH Stainless Steels		•	•	o	155	135	0.040	0.048	0.064	0.080
Cobalt Chrome Alloys		•	x	o	115	95	0.040	0.048	0.064	0.080
Duplex (22%)		•	x	o	75	65	0.040	0.048	0.064	0.080
Super Duplex (25%)		•	x	o	70	60	0.040	0.048	0.064	0.080
High Temp Alloys	S	•	x	x	50	40	0.025	0.030	0.040	0.050
Titanium Alloys	S	•	x	x	115	90	0.040	0.048	0.064	0.080
Gray Cast Irons	K	•	o	o	345	335	0.060	0.072	0.096	0.120
Ductile Cast Irons		•	o	o	260	250	0.060	0.072	0.096	0.120
Hardened Steels 45-50 HRC	H	o	•	o	145	125	0.050	0.060	0.080	0.100
Hardened Steels 50-55 HRC		o	•	o	95	-	0.035	0.042	0.056	0.070
Hardened Steels 55-60 HRC		o	•	o	95	-	0.020	0.024	0.032	0.040

● Preferred o Possible X Not Possible

Notes

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application, workpiece rigidity, machine tool, etc.
- The 380 & 380CB should only be used in accurate tool holders with high gripping power. ER collet type holders are not recommended.
- For machining materials above 50 HRC, reduce stepover (Ae) to 2-3% of DC for optimal performance

TuffCut[®] XM 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-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	0.3	1.5	0.45	0.27	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	0.4	3.0	0.6	0.37	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	0.4	2.0	0.6	0.37	50.0	4.0	2.0	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	0.4	3.5	0.6	0.37	50.0	4.0	2.0	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	0.5	6.0	0.75	0.47	50.0	4.0	2.0	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	0.5	1.0	0.75	0.47	50.0	4.0	2.0	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	0.6	2.5	0.9	0.57	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	0.6	5.0	0.9	0.57	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	0.7	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	0.6	4.0	0.9	0.57	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	0.7	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	0.7	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	0.7	6.0	1.05	0.67	50.0	4.0	4.0	10.65°	3.11	3.22	3.34	3.46	3.74

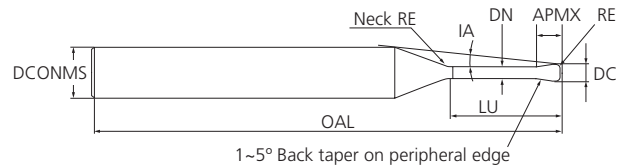
Series XM2S

Tool No.	DC	LU	APMX	DN	OAL	DCONMS	Neck RE	Interference Angle IA	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			55.0			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						65.0					-	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			55.0			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	50.0	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	55.0	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	DCONMS	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	0.17	50.0	4.0	1.0	14.07°	0.52
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	0.4	0.1	1.0	0.32	0.37	50.0	4.0	2.0	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	0.5	0.1	1.0	0.4	0.47	50.0	4.0	2.0	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	0.1	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	0.7	0.05	10.0	0.56	0.67	50.0	4.0	4.0	5.89°	10.57		10.94	11.33						11.75	12.70
XM2R-007N4-0.05RX			4.0						9.07°	4.29		4.51	4.68						4.86	5.25
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	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	12.0		5.05°	12.61			13.04			13.51	14.02	15.15								
XM2R-008N4-0.1RX	0.1		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			8.0	6.49°			8.45			8.76	9.07	9.41	10.17							
XM2R-008N12-0.1RX	0.8		0.2	12.0			0.64			0.76	50.0	4.0	4.0	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	55.0	60.0	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			5.0						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		5.0	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											60.0											1.89°	20.75	21.47	22.24	-	-
XM2R-025N30-0.1RX			30.0	70.0											1.32°											31.09	32.17	-	-	-	
XM2R-025N10-0.2RX			0.2	10.0											50.0											3.39°	10.41	10.77	11.15	11.56	12.48
XM2R-025N20-0.2RX				20.0											60.0											1.9°	20.75	21.46	22.23	-	-
XM2R-025N30-0.2RX		30.0		70.0											1.32°											31.08	32.16	-	-	-	

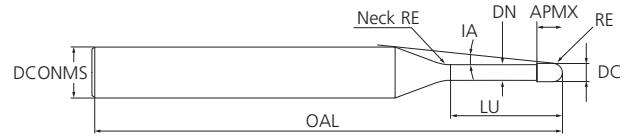
Series XM2R

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						3.65°	18.66	19.31	20.00	20.75	22.42	
XM2R-030N20-0.1RX			20.0						3.36°	20.73	21.45	22.22	23.05	24.91	
XM2R-030N30-0.1RX			30.0			75.0			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				3.66°				18.66	19.30	19.99	20.73	22.40	
XM2R-030N20-0.2RX		20.0				3.38°				20.72	21.44	22.21	23.03	24.88	
XM2R-030N30-0.2RX		30.0				75.0			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			3.68°				18.65	19.29	19.98	20.72	22.37	
XM2R-030N20-0.3RX			20.0			3.39°				20.72	21.43	22.20	23.02	24.86	
XM2R-030N30-0.3RX			30.0			75.0			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				3.71°	18.65	19.28	19.96	20.69	22.33
XM2R-030N20-0.5RX		20.0				3.42°				20.71	21.42	22.17	22.99	24.81	
XM2R-030N30-0.5RX		30.0				75.0			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				3.79°	18.63	19.24	19.90	20.61	22.20
XM2R-030N20-1.0RX						20.0				3.49°	20.70	21.38	22.12	22.91	24.69
XM2R-030N30-1.0RX	30.0		75.0	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						2.42°	20.71	21.43	22.20	23.03	-
XM2R-040N30-0.1RX				30.0						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				2.43°			20.71	21.42	22.19	23.01	-	
XM2R-040N30-0.2RX			30.0				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	80.0	6.0	4.0	1.49°	36.21	37.47	-	-	-	
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			60.0	3.75°	12.43	12.84	13.29	13.77	14.84
XM2R-040N16-0.5RX		16.0				65.0			2.97°	16.56	17.12	17.72	18.37	-	
XM2R-040N20-0.5RX		20.0				75.0			2.47°	20.70	21.40	22.15	22.97	-	
XM2R-040N30-0.5RX		30.0				80.0			1.73°	31.03	32.10	33.24	-	-	
XM2R-040N35-0.5RX		35.0				90.0			1.5°	36.20	37.44	-	-	-	
XM2R-040N45-0.5RX		45.0				60.0			1.19°	46.54	48.14	-	-	-	
XM2R-040N12-1.0RX		1.0				12.0			60.0	3.88°	12.41	12.81	13.23	13.69	14.72
XM2R-040N16-1.0RX						16.0			65.0	3.05°	16.54	17.09	17.67	18.29	19.70
XM2R-040N20-1.0RX			20.0			75.0			2.52°	20.68	21.36	22.10	22.89	-	
XM2R-040N30-1.0RX			30.0			80.0			1.75°	31.02	32.06	33.18	-	-	
XM2R-040N35-1.0RX			35.0			90.0			1.52°	36.18	37.41	38.73	-	-	
XM2R-040N45-1.0RX	45.0		65.0	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	
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

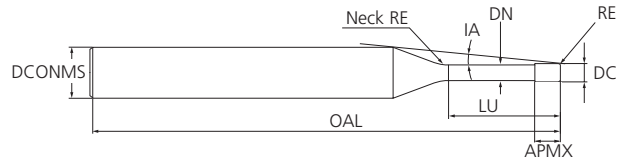
Series XM2B

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			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	1.54	50.0	4.0	4.0	5.8°	8.38	8.66	8.94	9.25	9.93
XM2B-016N12X			12.0			4.34°			12.53	12.94	13.37	13.85	14.90	
XM2B-016N16X			16.0			3.47°			16.66	17.21	17.81	18.44	19.88	
XM2B-016N20X			20.0			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			4.11°			12.50	12.91	13.34	13.81	14.85	
XM2B-018N16X			16.0			3.26°			16.64	17.19	17.77	18.41	19.83	
XM2B-018N20X			20.0			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	DCNMS	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			4.0						8.17°	4.23	4.42	4.58	4.75	5.13	
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	4.0	8.75°	4.27	4.47	4.65	4.82	5.21
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	60.0	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	25.0	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	0.3	0.3	4.0	1.6	1.92	50.0	4.0	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	

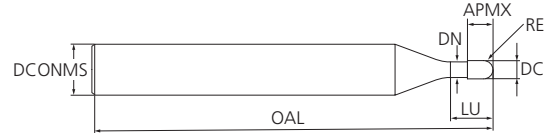
Series XM4R

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	1.92	60.0	4.0	4.0	3.63°
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	13.84	-					
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	70.0		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	80.0		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							

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	-	-	-	-			-								
XM4R-060N72-1.0RX			72.0	120.0	-	-	-	-			-								

TuffCut[®] XM Series XM2BH



Tool No.	DC	DCONMS	DN	OAL	APMX	LU	RE	NOF
XM2BH-01061X	1.0	6.0	0.95	50.0	1.0	2.5	0.5	2
XM2BH-02061X	2.0		1.95		2.0	5.0	1.0	2
XM2BH-03061X	3.0		2.9		3.0	7.5	1.5	2
XM2BH-04061X	4.0		3.9		4.0	10.0	2.0	2
XM2BH-05061X	5.0		4.9		5.0	12.5	2.5	2
XM2BH-06061X	6.0		5.9		6.0	15.0	3.0	2

TuffCut[®] XM Series XM4SH



Tool No.	DC	DCONMS	OAL	APMX	NOF
XM4SH-01061X	1.0	6.0	60.0	3.5	4
XM4SH-02061X	2.0			7.0	4
XM4SH-025061X	2.5			8.0	4
XM4SH-03061X	3.0			10.0	4
XM4SH-04061X	4.0			12.0	4
XM4SH-05061X	5.0			15.0	4

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	●	●	○	2D/3D HSC	0.085	0.45	95	0.0048	0.0072	0.0096	0.0120	0.0144
Die / Tool Steels		●	●	○	2D/3D HSC	0.077	0.40	85	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	●	X	○	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	○	●	●	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	●	●	○	2D/3D HSC	0.055	0.45	95	0.0046	0.0069	0.0092	0.0115	0.0138
Die / Tool Steels		●	●	○	2D/3D HSC	0.050	0.40	85	0.0040	0.0060	0.0080	0.0100	0.0120
Austenitic Stainless Steels	M	●	X	○	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	○	●	●	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	●	●	○	2D/3D HSC	0.040	0.35	85	0.0044	0.0066	0.0088	0.0110	0.0132
Die / Tool Steels		●	●	○	2D/3D HSC	0.036	0.35	75	0.0038	0.0057	0.0076	0.0095	0.0114
Austenitic Stainless Steels	M	●	X	○	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	○	●	●	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 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												
0.0161	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
						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
						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
						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	●	●	○	2D/3D HSC	0.050	0.45	130	0.0048	0.0072	0.0096	0.0120	0.0144
Die / Tool Steels		●	●	○	2D/3D HSC	0.045	0.40	110	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	●	X	○	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	○	●	●	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	●	●	○	2D/3D HSC	0.030	0.45	105	0.0048	0.0072	0.0096	0.0120	0.0144
Die / Tool Steels		●	●	○	2D/3D HSC	0.027	0.40	90	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	●	X	○	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	○	●	●	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	●	●	○	2D/3D HSC	0.024	0.35	85	0.0048	0.0072	0.0096	0.0120	0.0144
Die / Tool Steels		●	●	○	2D/3D HSC	0.022	0.30	75	0.0042	0.0063	0.0084	0.0105	0.0126
Austenitic Stainless Steels	M	●	X	○	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	○	●	●	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 × 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.

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
						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
						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
						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 × 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												
0.0168	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	●	●	○	2D/3D HSC	0.100	0.30	155	0.0070	0.0105	0.0140	0.0175	0.0210
Die / Tool Steels		●	●	○	2D/3D HSC	0.090	0.30	150	0.0064	0.0096	0.0128	0.0160	0.0192
Austenitic Stainless Steels	M	●	X	○	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	○	●	●	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	●	●	○	2D/3D HSC	0.060	0.18	135	0.0066	0.0099	0.0132	0.0165	0.0198
Die / Tool Steels		●	●	○	2D/3D HSC	0.054	0.18	130	0.0060	0.0090	0.0120	0.0150	0.0180
Austenitic Stainless Steels	M	●	X	○	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	○	●	●	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	●	●	○	2D/3D HSC	0.040	0.12	120	0.0064	0.0096	0.0128	0.0160	0.0192
Die / Tool Steels		●	●	○	2D/3D HSC	0.036	0.12	115	0.0060	0.0090	0.0120	0.0150	0.0180
Austenitic Stainless Steels	M	●	X	○	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	○	●	●	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 × 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.

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 × 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.

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.

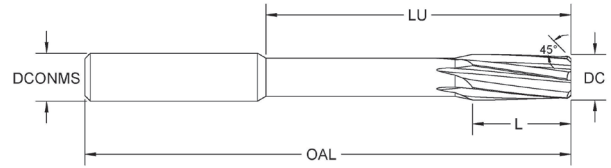
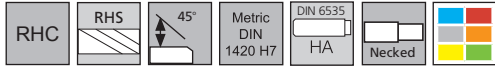
10xD Neck Length												
End Mill Diameter (mm)												
0.6	0.7	0.8	0.9	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	
fz - mm/tooth												
0.0011	0.0013	0.0014	0.0016	0.0018	0.0027	0.0036	0.0045	0.0054	0.00720	0.00900	0.01080	
0.0030	0.0035	0.0040	0.0045	0.0050	0.0075	0.0100	0.0125	0.0150	0.02000	0.02500	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.**

TrueSize® NC Series 275 Common Shank Reamer



Metric (mm) Sizes	
DC	Tolerance
1.00 - 12.00	DIN 1420 H7
DCONMS	Tolerance (h6)
0.00 - 3.00	+0/-0.006
3.01 - 6.00	+0/-0.008
6.01 - 10.00	+0/-0.009
10.01 - 14.00	+0/-0.011

DIN1420 H7	
DC	Tolerance
≤ 3mm	+0.0041/+0.0078
> 3mm - 6mm	+0.0051/+0.0100
> 6mm - 10mm	+0.0061/+0.0120
> 10mm - 12mm	+0.0078/+0.0150

Lead Chamfer Width (45° ± 1°)	
DC	Width
0.00 - 2.45	21% - 23% of DC
2.46 - 3.45	0.38 - 23% of DC
3.46 - 9.52	0.5 - 1.02
9.53 - 12.00	0.76 - 1.27

Tool No.	EDP	DC	DCONMS	OAL	L	LU	NOF
		mm					
275M0100	27530	1.0	3.0	50.0	6.0	22.0	4
275M0150	27531	1.5	3.0	50.0	9.0	22.0	4
275M0200	27535	2.0	3.0	50.0	12.0	22.0	4
275M0250	27538	2.5	3.0	50.0	12.0	22.0	4
275M0300	27539	3.0	4.0	66.0	12.0	38.0	4
275M0350	27546	3.5	4.0	66.0	12.0	38.0	4
275M0400	27548	4.0	6.0	76.0	12.0	40.0	4
275M0450	27549	4.5	6.0	76.0	12.0	40.0	4
275M0500	27554	5.0	6.0	76.0	12.0	40.0	4
275M0550	27555	5.5	6.0	76.0	12.0	40.0	4
275M0600	27557	6.0	8.0	101.0	12.0	65.0	4
275M0650	27562	6.5	8.0	101.0	16.0	65.0	6
275M0700	27563	7.0	8.0	101.0	16.0	65.0	6
275M0750	27566	7.5	8.0	101.0	16.0	65.0	6
275M0800	27568	8.0	10.0	103.0	16.0	63.0	6
275M0850	27569	8.5	10.0	103.0	19.0	63.0	6
275M0900	27570	9.0	10.0	103.0	19.0	63.0	6
275M0950	27571	9.5	10.0	103.0	19.0	63.0	6
275M1000	27575	10.0	12.0	120.0	19.0	75.0	6
275M1050	27576	10.5	12.0	120.0	19.0	75.0	6
275M1100	27577	11.0	12.0	120.0	19.0	75.0	6
275M1150	27579	11.5	12.0	120.0	19.0	75.0	6
275M1200	27581	12.0	14.0	125.0	19.0	80.0	6

TrueSize® NC Series 275

Recommended Cutting Data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

Workpiece Material Group	ISO	Vc - M/Min	Tool Diameter (mm)					
			1.0 - 1.5	1.6 - 3.0	3.1 - 5.0	5.1 - 7.0	7.1 - 9.5	9.6 - 12.0
			Feed (mm/rev)					
Low Carbon Steels	P	30 - 45	0.08 - 0.200	0.20 - 0.35	0.20 - 0.40	0.25 - 0.55	0.40 - 0.70	0.40 - 0.75
Medium Carbon Steels		25 - 35	0.08 - 0.200	0.20 - 0.35	0.20 - 0.40	0.25 - 0.55	0.40 - 0.70	0.40 - 0.75
Alloy Steels		20 - 35	0.08 - 0.200	0.20 - 0.35	0.20 - 0.40	0.25 - 0.55	0.40 - 0.70	0.40 - 0.75
Die / Tool Steels		15 - 25	0.08 - 0.200	0.20 - 0.35	0.20 - 0.40	0.25 - 0.55	0.40 - 0.70	0.40 - 0.75
Free Machining Stainless Steels	M	20 - 30	0.08 - 0.200	0.20 - 0.35	0.20 - 0.40	0.28 - 0.53	0.40 - 0.70	0.40 - 0.75
Austenitic Stainless Steels		10 - 20	0.03 - 0.12	0.15 - 0.30	0.20 - 0.30	0.20 - 0.40	0.30 - 0.50	0.30 - 0.60
Difficult Stainless Steels		5 - 15	0.03 - 0.12	0.15 - 0.30	0.20 - 0.30	0.20 - 0.40	0.30 - 0.50	0.30 - 0.60
PH Stainless Steels		10 - 20	0.03 - 0.12	0.15 - 0.30	0.20 - 0.30	0.20 - 0.40	0.30 - 0.50	0.30 - 0.60
High Temp Alloys	S	5 - 15	0.02 - 0.07	0.10 - 0.20	0.15 - 0.30	0.20 - 0.30	0.20 - 0.40	0.25 - 0.45
Titanium Alloys		10 - 20	0.03 - 0.13	0.15 - 0.30	0.20 - 0.30	0.20 - 0.40	0.30 - 0.50	0.30 - 0.60
Gray Cast Irons	K	25 - 35	0.12 - 0.30	0.25 - 0.45	0.35 - 0.65	0.40 - 0.78	0.50 - 0.85	0.60 - 1.00
Ductile Cast Irons		20 - 35	0.12 - 0.30	0.25 - 0.45	0.35 - 0.65	0.40 - 0.78	0.50 - 0.85	0.60 - 1.00
Malleable Cast Irons		20 - 30	0.12 - 0.30	0.25 - 0.45	0.35 - 0.65	0.40 - 0.78	0.50 - 0.85	0.60 - 1.00
Aluminium - ≤ 10% Si	N	75 - 105	0.12 - 0.30	0.25 - 0.45	0.35 - 0.65	0.40 - 0.78	0.50 - 0.85	0.60 - 1.00
Aluminium - > 10% Si		60 - 90	0.12 - 0.30	0.25 - 0.45	0.35 - 0.65	0.40 - 0.78	0.50 - 0.85	0.60 - 1.00
Copper / Brass		55 - 75	0.12 - 0.30	0.25 - 0.45	0.35 - 0.65	0.40 - 0.78	0.50 - 0.85	0.60 - 1.00
Hardened Steels 45-50 HRC	H	10 - 20	0.08 - 0.20	0.20 - 0.33	0.20 - 0.40	0.28 - 0.53	0.40 - 0.70	0.40 - 0.78
Hardened Steels 50-55 HRC		10 - 15	0.03 - 0.12	0.15 - 0.30	0.20 - 0.30	0.20 - 0.40	0.30 - 0.50	0.30 - 0.60

Stock Allowance for NC Machine Reamers - Metric	
Reamer Diameter (mm)	Total Allowance
1.0 - 1.5	0.08 - 0.15
1.5 - 3.0	0.13 - 0.23
3.0 - 6.0	0.18 - 0.30
6.0 - 12.0	0.25 - 0.38

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.



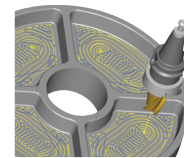
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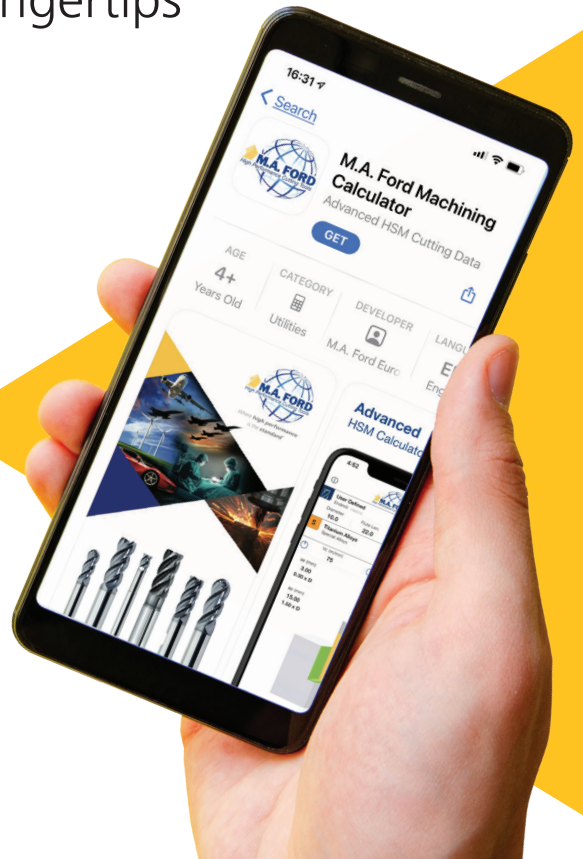
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