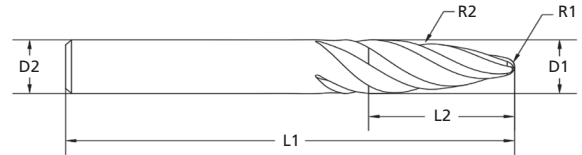
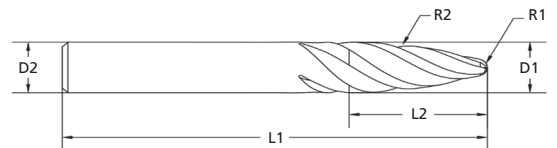


**NEW** **TuffCut® 3D Series XFO**

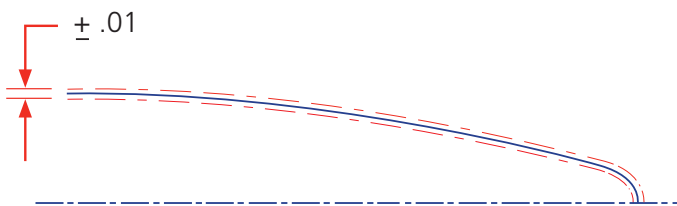


Tool No.	EDP	D1	D2 (h6)	L1	L2	R1	R2	No. of Flutes
XFO-4M06R95AQ	19904	6.0	6.0	64.0	20.8	1.0	95.0	4
XFO-4M08R90AQ	19905	8.0	8.0	64.0	24.5	1.0	90.0	4
XFO-4M10R85AQ	19906	10.0	10.0	72.0	24.7	2.0	85.0	4
XFO-6M10R85AQ	19907	10.0	10.0	72.0	24.7	2.0	85.0	6
XFO-4M12R80AQ	19908	12.0	12.0	84.0	27.3	2.0	80.0	4
XFO-6M12R80AQ	19909	12.0	12.0	84.0	27.3	2.0	80.0	6

**NEW** **TuffCut® 3D Series XFO-AL**



Tool No.	EDP	D1	D2 (h6)	L1	L2	R1	R2	No. of Flutes
XFO-AL3M06R95F	19900	6.0	6.0	64.0	20.8	1.0	95.0	3
XFO-AL3M08R90F	19901	8.0	8.0	64.0	24.5	1.0	90.0	3
XFO-AL4M10R85F	19902	10.0	10.0	72.0	24.7	2.0	85.0	4
XFO-AL4M12R80F	19903	12.0	12.0	84.0	27.3	2.0	80.0	4



**Radius form tolerance**

The XFO and XFO-AL series are held to a precision radius form tolerance of  $\pm 0.010\text{mm}$  to ensure high accuracy finishing, and prevention of mis-match on component surfaces.

## Recommended Cutting Data

Series XFO							
Recommended Speeds by Material Group		Stock Allowance 			Finishing	Semi-Finishing	
Workpiece Material Group	Material Type	Coolant			.01-.03 x D	.05-.07 x D	
		Emulsion	Air	MQL	Vc - M/Min		
Steels	P	Low Carbon	●	●	●	450	350
		Medium Carbon	●	●	●	345	275
		Alloy Steels	●	●	●	315	255
		Die / Tool Steels (≤ 45 HRC)	●	●	●	275	220
Stainless Steels	M	Free Machining	●	X		205	165
		Austenitic	●	X		160	130
		Difficult Stainless	●	X		125	100
		PH Stainless (≤ 45 HRC)	●	X		160	130
		Cobalt Chrome Alloys	●	X		125	100
		Duplex (22%)	●	X		75	60
		Super Duplex (25%)	●	X		60	50
Special Alloys	S	High Temp Alloys	●	X	X	45	30
		Titanium Alloys	●	X	X	110	90

● Preferred    Possible    X Not Possible

Series XFO										
Recommended Feeds by Material Group		Tool Diameter								
Workpiece Material Group	Material Type	6		8		10		12		
		Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	
		Fz - mm/tooth								
Steels	P	Low Carbon	.048	.030	.064	.040	.080	.050	.096	.060
		Medium Carbon	.048	.030	.064	.040	.080	.050	.096	.060
		Alloy Steels	.048	.030	.064	.040	.080	.050	.096	.060
		Die / Tool Steels (≤ 45 HRC)	.036	.024	.048	.032	.060	.040	.072	.048
Stainless Steels	M	Free Machining	.048	.030	.064	.040	.080	.050	.096	.060
		Austenitic	.048	.030	.064	.040	.080	.050	.096	.060
		Difficult Stainless	.048	.030	.064	.040	.080	.050	.096	.060
		PH Stainless (≤ 45 HRC)	.036	.024	.048	.032	.060	.040	.072	.048
		Cobalt Chrome Alloys	.036	.024	.048	.032	.060	.040	.072	.048
		Duplex (22%)	.036	.024	.048	.032	.060	.040	.072	.048
		Super Duplex (25%)	.036	.024	.048	.032	.060	.040	.072	.048
Special Alloys	S	High Temp Alloys	.036	.024	.048	.032	.060	.040	.072	.048
		Titanium Alloys	.042	.030	.056	.040	.070	.050	.084	.060

**Notes:**

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application.
- To prevent chip evacuation issues, utilize 4-flute tools for semi-finishing operations & avoid cutting with the tip of the tool wherever possible.
- Reduced feeds required when cutting with the tip of the tool.

## Recommended Cutting Data

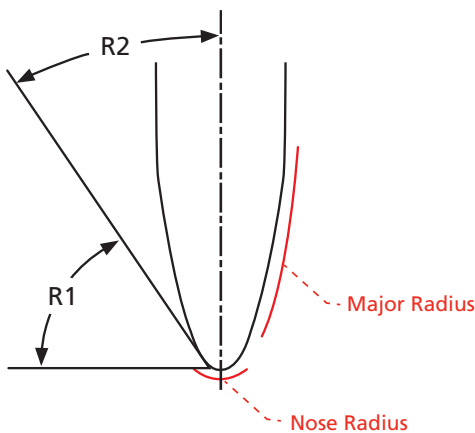
Series XFO-AL							
Recommended Speeds by Material Group						Finishing	Semi-Finishing
Workpiece Material Group	Material Type	Stock Allowance	Coolant			.01-.03 x D	.05-.07 x D
			Emulsion	Air	MQL		
			Vc - M/Min				
Aluminium	N	Wrought (≤ 10% Si)	●	X		610	580
		Cast (> 10% Si)	●	X		520	490

● Preferred    Possible    X Not Possible

Series XFO-AL										
Recommended Feeds by Material Group			Tool Diameter							
Workpiece Material Group	Material Type		6		8		10		12	
			Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish	Semi Finish	Finish
			Fz - mm/tooth							
Aluminium	N	Wrought (≤ 10% Si)	.060	.039	.080	.052	.100	.065	.120	.078
		Cast (> 10% Si)	.060	.039	.080	.052	.100	.065	.120	.078

**Notes:**

- Cutting data provided should be considered advisory only. Adjustments may be necessary depending on the application.
- To prevent chip evacuation issues, avoid cutting with the tip of the tool wherever possible.
- Reduced feeds required when cutting with the tip of the tool.



Tool Ø	Nose Radius		Major Radius	
D1	R1	Effective Angle (Max.)	R2	Effective Angle (Max.)
6	1	78.2°	95	11.8°
8	1	75.1°	90	14.9°
10	2	74.6°	85	15.4°
12	2	71.6°	80	18.4°

\*Numbers above represent maximum angle values.

## Stepover Distance by Cusp Height

Tool Ø (mm)		Cusp Height (mm)	0.003	0.005	0.008	0.010	0.013
D1	R2						
6	95	Stepover (mm)	1.50	1.95	2.46	2.76	3.14
8	90		1.47	1.90	2.40	2.69	3.06
10	85		1.43	1.84	2.33	2.61	2.97
12	80		1.38	1.79	2.26	2.53	2.88