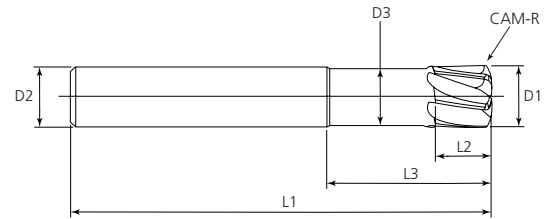
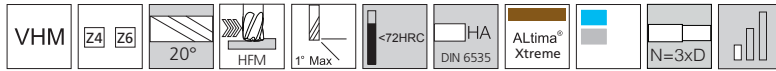
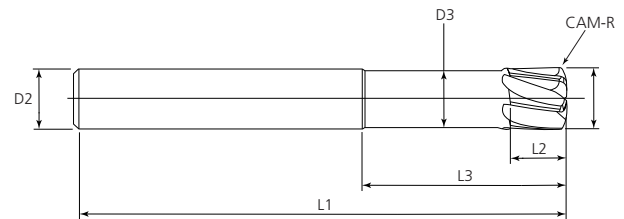


TuffCut® HF Series FHFN-N3



Tool Number	D1	D2	D3	L1	L2	L3	Flutes	CAM-R
FHFN 03N3-AX	3.0	6.0	2.9	60.0	3.0	9.0	4	0.25
FHFN 04N3-AX	4.0	6.0	3.9	60.0	4.0	12.0	4	0.3
FHFN 05N3-AX	5.0	6.0	4.7	60.0	5.0	15.0	4	0.35
FHFN 06N3-AX	6.0	6.0	5.5	60.0	5.0	18.0	6	0.45
FHFN 08N3-AX	8.0	8.0	7.5	75.0	7.0	24.0	6	0.6
FHFN 10N3-AX	10.0	10.0	9.5	90.0	8.0	30.0	6	0.75
FHFN 12N3-AX	12.0	12.0	11.5	100.0	10.0	36.0	6	0.9

TuffCut® HF Series FHFN-N4



Tool Number	D1	D2	D3	L1	L2	L3	Flutes	CAM-R
FHFN 06N4-AX	6.0	6.0	5.5	100.0	5.0	24.0	6	0.45
FHFN 08N4-AX	8.0	8.0	7.5	100.0	7.0	32.0	6	0.6
FHFN 10N4-AX	10.0	10.0	9.5	120.0	8.0	40.0	6	0.75
FHFN 12N4-AX	12.0	12.0	11.5	150.0	10.0	48.0	6	0.9

Recommended Cutting Data

Series FHFN - 3xD																	
Workpiece Material Group	ISO	Coolant			Vc- m/min	Tool Diameter & CAM-R											
		Emulsion	Air	MQL		3mm x R0.25			4mm x R0.3			5mm x R0.35			6mm x R0.45		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Pre-Hardened Steels 35-45HRC	P	○	●	●	100	0.1	1.7	0.09	0.15	2.2	0.12	0.18	2.8	0.15	0.300	3.3	0.180
Hardened Steels 50 - 55HRC	H	X	●	○	80	0.1	1.7	0.115	0.15	2.2	0.155	0.18	2.8	0.19	0.240	3.3	0.230
Hardened Steels 55 - 60HRC		X	●	○	60	0.07	1.7	0.075	0.095	2.2	0.1	0.115	2.8	0.12	0.140	3.3	0.145
Hardened Steels 60 - 65HRC		X	●	○	50	0.055	1.7	0.055	0.075	2.2	0.07	0.09	2.8	0.09	0.110	3.3	0.105
Hardened Steels 65 - 70HRC		X	●	○	40	0.04	1.5	0.04	0.055	2	0.05	0.065	2.5	0.065	0.080	3.0	0.075

Series FHFN - 3xD														
Workpiece Material Group	ISO	Coolant			Vc- m/min	Tool Diameter & CAM-R								
		Emulsion	Air	MQL		8mm x R0.6			10mm x R0.75			12mm x R0.9		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Pre-Hardened Steels 35-45HRC	P	○	●	●	100	0.4	4.4	0.240	0.5	5.5	0.300	0.6	6.6	0.360
Hardened Steels 50 - 55HRC	H	X	●	○	80	0.32	4.4	0.305	0.4	5.5	0.380	0.48	6.6	0.460
Hardened Steels 55 - 60HRC		X	●	○	60	0.185	4.4	0.195	0.23	5.5	0.240	0.28	6.6	0.290
Hardened Steels 60 - 65HRC		X	●	○	50	0.145	4.4	0.140	0.18	5.5	0.175	0.22	6.6	0.210
Hardened Steels 65 - 70HRC		X	●	○	40	0.105	4.0	0.100	0.13	5.0	0.125	0.16	6.0	0.150

Series FHFN - 4xD																	
Workpiece Material Group	ISO	Coolant			Vc- m/min	Tool Diameter & CAM-R											
		Emulsion	Air	MQL		6mm x R0.45			8mm x R0.6			10mm x R0.75			12mm x R0.9		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Pre-Hardened Steels 35-45HRC	P	○	●	●	90	0.260	3.3	0.180	0.34	4.4	0.240	0.43	5.5	0.300	0.51	6.6	0.360
Hardened Steels 50 - 55HRC	H	X	●	○	75	0.200	3.3	0.230	0.27	4.4	0.305	0.34	5.5	0.380	0.41	6.6	0.460
Hardened Steels 55 - 60HRC		X	●	○	55	0.120	3.3	0.145	0.16	4.4	0.195	0.2	5.5	0.240	0.24	6.6	0.290
Hardened Steels 60 - 65HRC		X	●	○	45	0.090	3.3	0.105	0.12	4.4	0.140	0.15	5.5	0.175	0.19	6.6	0.210
Hardened Steels 65 - 70HRC		X	●	○	35	0.070	3.0	0.075	0.09	4.0	0.100	0.11	5.0	0.125	0.14	6.0	0.150

● Preferred ○ Possible X Not Possible

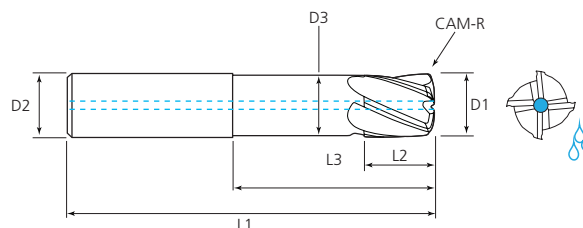
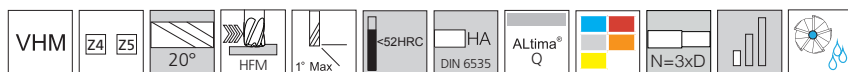
Notes:

Ramp angle 0.5° or less

For roughing, area clearance, slotting and pocketing operations

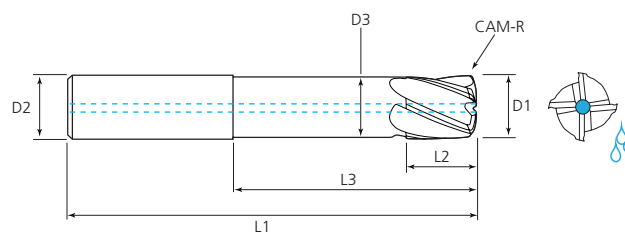
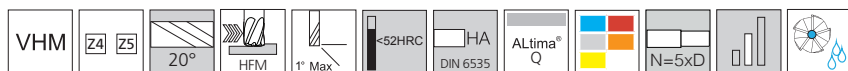


TuffCut® HF Series FHFP N3



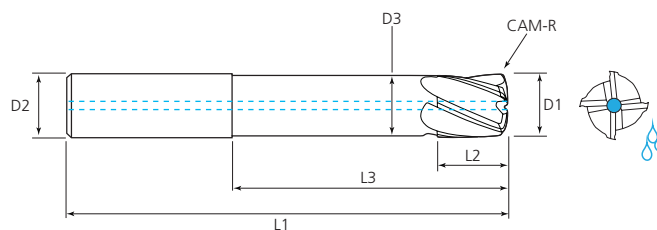
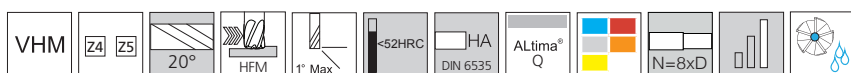
Tool Number	D1	D2	D3	L1	L2	L3	Flutes	CAM-R
FHFP 06N3-CCAQ	6.0	6.0	5.8	57.0	6.0	20.0	4	0.6
FHFP 08N3-CCAQ	8.0	8.0	7.8	63.0	8.0	26.0	4	0.8
FHFP 10N3-CCAQ	10.0	10.0	9.8	72.0	10.0	32.0	4	1.0
FHFP 12N3-CCAQ	12.0	12.0	11.8	83.0	12.0	38.0	5	1.2
FHFP 16N3-CCAQ	16.0	16.0	15.8	100.0	16.0	50.0	5	1.6

TuffCut® HF Series FHFP N5



Tool Number	D1	D2	D3	L1	L2	L3	Flutes	CAM-R
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

TuffCut® HF Series FHFP N8



Tool Number	D1	D2	D3	L1	L2	L3	Flutes	CAM-R
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

Recommended Cutting Data

Series FHFP - 3xD																				
Workpiece Material Group	ISO	Coolant			Vc- m/min	End Mill Diameter and CAM-R														
		Max	Air	MQL		6mm x R0.6			8mm x R0.8			10mm x R1.0			12mm x R1.2			16mm x R1.6		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	300	0.30	4.5	0.39	0.40	6.0	0.52	0.50	7.5	0.65	0.60	9.0	0.78	0.70	12.0	1.04
Medium Carbon Steels		●	●	●	250	0.30	4.5	0.36	0.40	6.0	0.48	0.50	7.5	0.6	0.60	9.0	0.72	0.70	12.0	0.96
Alloy Steels		●	●	●	200	0.30	4.5	0.33	0.40	6.0	0.44	0.50	7.5	0.55	0.60	9.0	0.66	0.70	12.0	0.88
Die/Tool Steels		●	●	●	150	0.30	4.5	0.3	0.40	6.0	0.4	0.50	7.5	0.5	0.60	9.0	0.6	0.70	12.0	0.8
Austenitic Stainless Steels	M	●	X	○	120	0.24	3.6	0.24	0.32	4.8	0.32	0.40	6.0	0.4	0.48	7.2	0.48	0.56	9.6	0.64
Duplex (22%)		●	X	○	90	0.21	3.6	0.24	0.28	4.8	0.32	0.35	6.0	0.4	0.42	7.2	0.48	0.49	9.6	0.64
Super Duplex (25%)		●	X	○	75	0.18	2.4	0.24	0.24	3.2	0.32	0.30	4.0	0.4	0.36	4.8	0.48	0.42	6.4	0.64
Titanium Alloys	S	●	X	X	100	0.18	2.4	0.24	0.24	3.2	0.32	0.30	4.0	0.4	0.36	4.8	0.48	0.42	6.4	0.64
High Temp Alloys		●	X	X	30	0.15	1.8	0.16	0.20	2.4	0.22	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	0.27	4.5	0.27	0.36	6.0	0.36	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	0.24	3.6	0.21	0.32	4.8	0.28	0.40	6.0	0.35	0.48	7.2	0.42	0.56	9.6	0.56

Series FHFP - 5xD																				
Workpiece Material Group	ISO	Coolant			Vc- m/min	End Mill Diameter and CAM-R														
		Max	Air	MQL		6mm x R0.6			8mm x R0.8			10mm x R1.0			12mm x R1.2			16mm x R1.6		
						Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz	Ap	Ae	Fz
Low Carbon Steels	P	●	●	●	270	0.24	4.5	0.39	0.32	6.0	0.52	0.4	7.5	0.65	0.48	9.0	0.78	0.56	12.0	1.04
Medium Carbon Steels		●	●	●	225	0.24	4.5	0.36	0.32	6.0	0.48	0.4	7.5	0.6	0.48	9.0	0.72	0.56	12.0	0.96
Alloy Steels		●	●	●	180	0.24	4.5	0.33	0.32	6.0	0.44	0.4	7.5	0.55	0.48	9.0	0.66	0.56	12.0	0.88
Die/Tool Steels		●	●	●	135	0.24	4.5	0.3	0.32	6.0	0.4	0.4	7.5	0.5	0.48	9.0	0.6	0.56	12.0	0.8
Austenitic Stainless Steels	M	●	X	○	110	0.19	3.6	0.24	0.26	4.8	0.32	0.32	6.0	0.4	0.38	7.2	0.48	0.45	9.6	0.64
Duplex (22%)		●	X	○	80	0.17	3.6	0.24	0.22	4.8	0.32	0.28	6.0	0.4	0.34	7.2	0.48	0.39	9.6	0.64
Super Duplex (25%)		●	X	○	70	0.14	2.4	0.24	0.19	3.2	0.32	0.24	4.0	0.4	0.29	4.8	0.48	0.34	6.4	0.64
Titanium Alloys	S	●	X	X	90	0.14	2.4	0.24	0.19	3.2	0.32	0.24	4.0	0.4	0.29	4.8	0.48	0.34	6.4	0.64
High Temp Alloys		●	X	X	30	0.12	1.8	0.16	0.16	2.4	0.22	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	0.22	4.5	0.27	0.29	6.0	0.36	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	0.19	3.6	0.21	0.26	4.8	0.28	0.32	6.0	0.35	0.38	7.2	0.42	0.45	9.6	0.56

Series FHFP - 8xD																				
Workpiece Material Group	ISO	Coolant			Vc- m/min	End Mill Diameter and CAM-R														
		Max	Air	MQL		6mm x R0.6			8mm x R0.8			10mm x R1.0			12mm x R1.2			16mm x R1.6		
						Ap	Ae	Fz	Ap	Ae	Fz	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	0.36	7.2	0.78	0.42	9.6	1.04
Medium Carbon Steels		●	●	●	120	0.18	3.6	0.36	0.24	4.8	0.48	0.3	6.0	0.6	0.36	7.2	0.72	0.42	9.6	0.96
Alloy Steels		●	●	●	100	0.18	3.6	0.33	0.24	4.8	0.44	0.3	6.0	0.55	0.36	7.2	0.66	0.42	9.6	0.88
Die/Tool Steels		●	●	●	100	0.18	3.6	0.3	0.24	4.8	0.4	0.3	6.0	0.5	0.36	7.2	0.6	0.42	9.6	0.8
Austenitic Stainless Steels	M	●	X	○	80	0.14	3.6	0.24	0.19	4.8	0.32	0.24	6.0	0.4	0.29	7.2	0.48	0.34	9.6	0.64
Duplex (22%)		●	X	○	60	0.13	2.4	0.24	0.17	3.2	0.32	0.21	4.0	0.4	0.25	4.8	0.48	0.29	6.4	0.64
Super Duplex (25%)		●	X	○	50	0.11	2.4	0.24	0.14	3.2	0.32	0.18	4.0	0.4	0.22	4.8	0.48	0.25	6.4	0.64
Titanium Alloys	S	●	X	X	70	0.11	2.4	0.24	0.14	3.2	0.32	0.18	4.0	0.4	0.22	4.8	0.48	0.25	6.4	0.64
High Temp Alloys		●	X	X	20	0.09	1.8	0.16	0.12	2.4	0.22	0.15	3.0	0.27	0.18	3.6	0.32	0.21	4.8	0.43
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	0.32	7.2	0.54	0.38	9.6	0.72
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	0.29	4.8	0.42	0.34	6.4	0.56

● Preferred ○ Possible X Not Possible