

3 flute taper neck ball nose end mill for hardened materials

VF-3XB

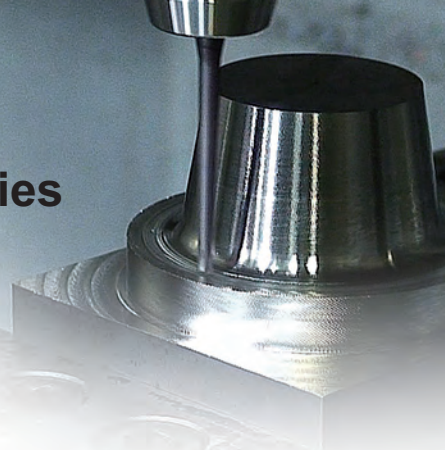
The latest advantage for deep machining!

Taper neck ball nose end mill
for high efficiency deep milling.



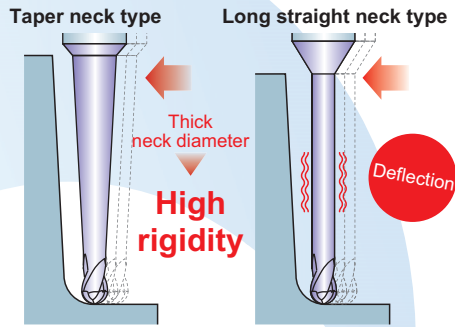
IMPACT MIRACLE End Mill Series

VF-3XB



1 [High rigidity] taper neck type

- Taper neck prevents vibration during deep milling applications.
- High efficiency machining for depths up to and over 20D.
- 89 sizes and lengths in total covering R0.4–R2.5.



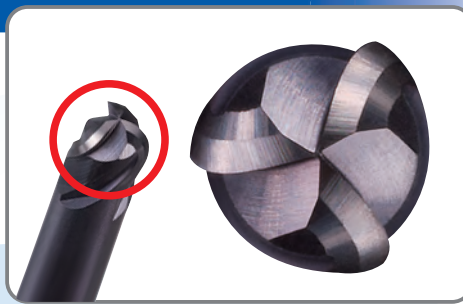
2 [Long tool life] IMPACT MIRACLE coating

- IMPACT MIRACLE coating suitable for materials ranging from general steels and pre-hardened steels, through to high hardened steels over 60 HRC.

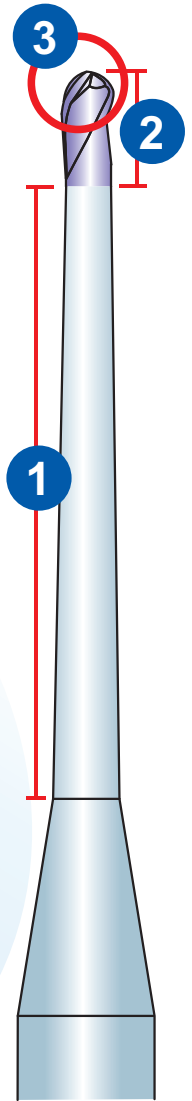
	IMPACT MIRACLE	(Al,Ti,Si)N	(Al,Ti)N
Hardness	3700HV	3200HV	2800HV
Adhesion	100N	80N	80N
Oxidation temperature	1300°C	1100°C	840°C
Friction coefficient	0.48	0.53	0.58

3 [High efficiency] 3 flute geometry

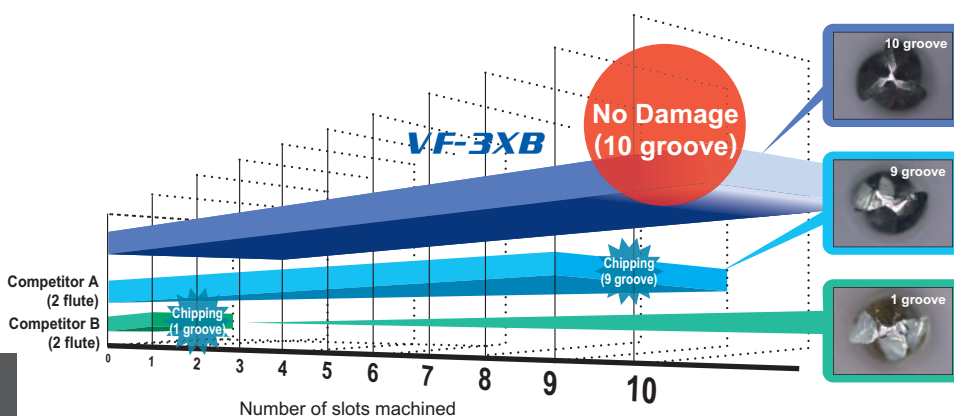
- VF3XB type reduced the cutting load compared to a conventional 2 flute end mill and helped control vibration to achieve higher efficiency!
- Newly developed negative cutting edge shape and 3 flute geometry for high feed machining.



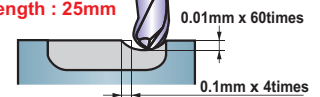
3 flute geometry



Comparison with conventional 2 flute end mill, VF-3XB shows high fracture resistance.

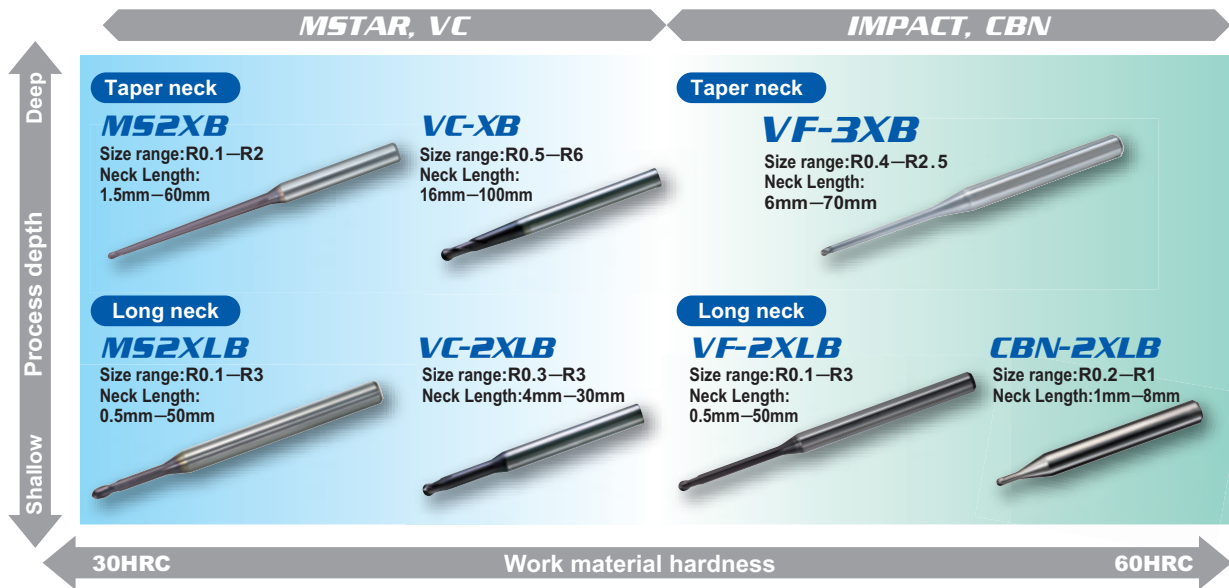


Neck Length : 25mm



End mill	VF-3XB R0.5 x 1.5° x 25
Work material	SKD61(52HRC)
Revolution	13,000min ⁻¹ (40.8m/min)
Feed rate	1,500mm/min (0.038mm/t)
Cutting method	Air blow

Tool selection chart

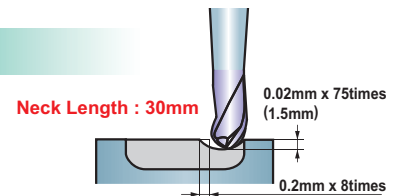
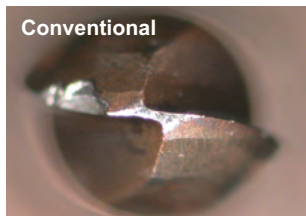


Long neck ball end mill : For all forms of machining including deep walls.
 Taper neck ball end mill : High efficiency machining for depths over 10D.

Hardened steel machining, feed rate increased by a factor of 1.6

Previous feed rate : 1600mm/min

VF3XB : 2600mm/min

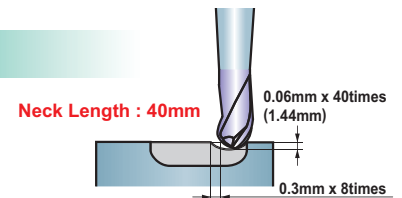
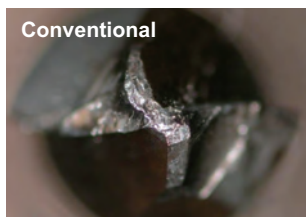
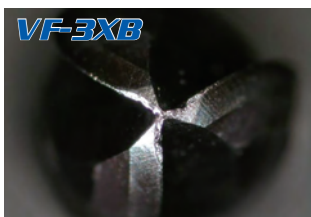


End mill	VF-3XB R1 x 0.9° x 30
Work material	SKD61(52HRC)
Revolution	16,000min ⁻¹ (100m/min)
Feed rate	2,600mm/min (0.054mm/t)
Cutting method	Coolant mist

Feed rate increased by 50%

Previous feed rate : 2500mm/min

VF3XB : 3400mm/min

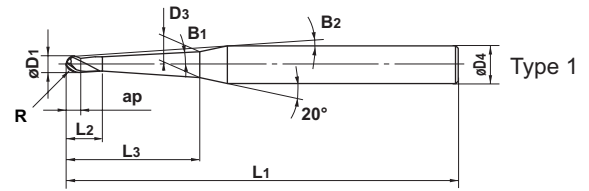
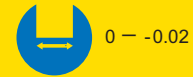


End mill	VF-3XB 1.5R x 0.9° x 40
Work material	SKD61(52HRC)
Revolution	14,000min ⁻¹ (131m/min)
Feed rate	3,400mm/min (0.08mm/t)
Cutting method	Coolant mist

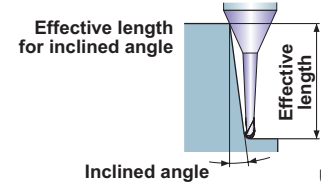
IMPACT MIRACLE END MILL

VF-3XB

Ball nose end mill, 3 flute, Taper neck, For hardened materials



● 3 flute ball end mill, high rigidity taper neck type.



Inclined angle Unit : mm

Order Number	Radius of Ball Nose	Dia.	Taper Angle One Side	Length of Cut	Neck Length	Length of Straight Neck	Cutting Edge to Shank Angle	Neck Dia.	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	B1	ap	L3	L2	B2	D3	L1	D4	N			30°	1°	2°	3°
VF3XBR0040T0024L006	0.4	0.8	0.4	0.5	6	1.5	8.9°	0.82	60	4	3	●	1	6.3	6.6	6.9	7.3
R0040T0024L008	0.4	0.8	0.4	0.5	8	1.5	7.5°	0.85	60	4	3	●	1	8.4	8.6	9.1	9.5
R0040T0024L012	0.4	0.8	0.4	0.5	12	1.5	5.7°	0.91	60	4	3	●	1	12.4	12.7	13.4	14.1
R0040T0054L008	0.4	0.8	0.9	0.5	8	1.5	7.6°	0.96	60	4	3	●	1	—	8.4	8.9	9.3
R0040T0054L012	0.4	0.8	0.9	0.5	12	1.5	5.8°	1.09	60	4	3	●	1	—	12.4	13.1	13.8
R0040T0054L016	0.4	0.8	0.9	0.5	16	1.5	4.7°	1.22	60	4	3	●	1	—	16.5	17.3	18.3
R0050T0024L008	0.5	1	0.4	0.8	8	2.3	9.6°	1.02	60	6	3	●	1	8.5	8.8	9.3	9.8
R0050T0024L010	0.5	1	0.4	0.8	10	2.3	8.5°	1.05	60	6	3	●	1	10.5	10.9	11.4	12.1
R0050T0024L012	0.5	1	0.4	0.8	12	2.3	7.6°	1.08	60	6	3	●	1	12.6	13.0	13.6	14.4
R0050T0024L016	0.5	1	0.4	0.8	16	2.3	6.3°	1.13	70	6	3	●	1	16.6	17.1	18.0	18.9
R0050T0024L020	0.5	1	0.4	0.8	20	2.3	5.4°	1.19	70	6	3	●	1	20.6	21.2	22.3	23.5
R0050T0024L025	0.5	1	0.4	0.8	25	2.3	4.6°	1.26	70	6	3	●	1	25.7	26.3	27.7	29.3
R0050T0024L030	0.5	1	0.4	0.8	30	2.3	4.0°	1.33	80	6	3	●	1	30.7	31.5	33.1	35.0
R0050T0024L035	0.5	1	0.4	0.8	35	2.3	3.5°	1.40	80	6	3	●	1	35.7	36.6	38.6	40.7
R0050T0054L008	0.5	1	0.9	0.8	8	2.3	9.7°	1.12	60	6	3	●	1	—	8.6	9.1	9.6
R0050T0054L012	0.5	1	0.9	0.8	12	2.3	7.7°	1.24	60	6	3	●	1	—	12.6	13.3	14.1
R0050T0054L016	0.5	1	0.9	0.8	16	2.3	6.4°	1.37	70	6	3	●	1	—	16.7	17.6	18.5
R0050T0054L020	0.5	1	0.9	0.8	20	2.3	5.5°	1.50	70	6	3	●	1	—	20.7	21.8	23.0
R0050T0054L025	0.5	1	0.9	0.8	25	2.3	4.7°	1.65	70	6	3	●	1	—	25.7	27.1	28.6
R0050T0054L030	0.5	1	0.9	0.8	30	2.3	4.0°	1.81	80	6	3	●	1	—	30.8	32.4	34.2
R0050T0054L035	0.5	1	0.9	0.8	35	2.3	3.6°	1.97	80	6	3	●	1	—	35.8	37.7	39.8
R0050T0054L040	0.5	1	0.9	0.8	40	2.3	3.2°	2.12	80	6	3	●	1	—	40.8	43.0	45.4
R0050T0054L050	0.5	1	0.9	0.8	50	2.3	2.7°	2.44	110	6	3	●	1	—	50.9	53.6	No interference
R0050T0054L060	0.5	1	0.9	0.8	60	2.3	2.3°	2.75	110	6	3	●	1	—	60.9	64.1	No interference
R0050T0054L070	0.5	1	0.9	0.8	70	2.3	2.0°	3.07	110	6	3	●	1	—	71.0	74.7	No interference
R0050T0130L012	0.5	1	1.5	0.8	12	2.3	7.9°	1.45	60	6	3	●	1	—	—	13.0	13.7
R0050T0130L016	0.5	1	1.5	0.8	16	2.3	6.5°	1.66	70	6	3	●	1	—	—	17.1	18.0
R0050T0130L020	0.5	1	1.5	0.8	20	2.3	5.6°	1.87	70	6	3	●	1	—	—	21.2	22.4
R0050T0130L025	0.5	1	1.5	0.8	25	2.3	4.8°	2.13	70	6	3	●	1	—	—	26.3	27.8
R0050T0130L030	0.5	1	1.5	0.8	30	2.3	4.1°	2.39	80	6	3	●	1	—	—	31.5	33.2
R0050T0130L035	0.5	1	1.5	0.8	35	2.3	3.7°	2.65	80	6	3	●	1	—	—	36.6	38.6
R0075T0024L010	0.75	1.5	0.4	1.3	10	2.8	8.1°	1.54	60	6	3	●	1	10.6	10.9	11.4	12.0
R0075T0024L015	0.75	1.5	0.4	1.3	15	2.8	6.2°	1.61	60	6	3	●	1	15.6	16.0	16.9	17.8
R0075T0024L020	0.75	1.5	0.4	1.3	20	2.8	5.0°	1.68	70	6	3	●	1	20.6	21.2	22.3	23.5
R0075T0024L030	0.75	1.5	0.4	1.3	30	2.8	3.7°	1.82	80	6	3	●	1	30.7	31.5	33.1	35.0
R0075T0054L015	0.75	1.5	0.9	1.3	15	2.8	6.3°	1.82	60	6	3	●	1	—	15.7	16.5	17.4
R0075T0054L020	0.75	1.5	0.9	1.3	20	2.8	5.1°	1.98	70	6	3	●	1	—	20.7	21.8	23.0
R0075T0054L030	0.75	1.5	0.9	1.3	30	2.8	3.7°	2.29	80	6	3	●	1	—	30.8	32.4	34.2

Order Number	Radius of Ball Nose	Dia.	Taper Angle One Side	Length of Cut	Neck Length	Length of Straight Neck	Cutting Edge to Shank Angle	Neck Dia.	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	B1	ap	L3	L2	B2	D3	L1	D4	N			30°	1°	2°	3°
VF3XBR0075T0054L040	0.75	1.5	0.9	1.3	40	2.8	3.0°	2.61	80	6	3	●	1	—	40.8	43.0	45.3
R0075T0130L015	0.75	1.5	1.5	1.3	15	2.8	6.4°	2.08	60	6	3	●	1	—	—	16.1	17.0
R0075T0130L020	0.75	1.5	1.5	1.3	20	2.8	5.2°	2.34	70	6	3	●	1	—	—	21.2	22.4
R0075T0130L030	0.75	1.5	1.5	1.3	30	2.8	3.8°	2.86	80	6	3	●	1	—	—	31.5	33.2
R0100T0024L016	1	2	0.4	1.6	16	3.6	5.5°	2.07	70	6	3	●	1	16.7	17.1	18.0	19.0
R0100T0024L020	1	2	0.4	1.6	20	3.6	4.6°	2.13	70	6	3	●	1	20.7	21.3	22.3	23.5
R0100T0024L025	1	2	0.4	1.6	25	3.6	3.9°	2.20	70	6	3	●	1	25.8	26.4	27.8	29.3
R0100T0024L030	1	2	0.4	1.6	30	3.6	3.4°	2.27	80	6	3	●	1	30.8	31.6	33.2	35.0
R0100T0024L035	1	2	0.4	1.6	35	3.6	2.9°	2.34	80	6	3	●	1	35.8	36.7	38.6	No interference
R0100T0024L040	1	2	0.4	1.6	40	3.6	2.6°	2.41	80	6	3	●	1	40.8	41.9	44.0	No interference
R0100T0054L020	1	2	0.9	1.6	20	3.6	4.7°	2.42	70	6	3	●	1	—	20.8	21.9	23.0
R0100T0054L025	1	2	0.9	1.6	25	3.6	4.0°	2.57	70	6	3	●	1	—	25.8	27.2	28.6
R0100T0054L030	1	2	0.9	1.6	30	3.6	3.4°	2.73	80	6	3	●	1	—	30.9	32.5	34.2
R0100T0054L035	1	2	0.9	1.6	35	3.6	3.0°	2.89	80	6	3	●	1	—	35.9	37.7	39.8
R0100T0054L040	1	2	0.9	1.6	40	3.6	2.7°	3.04	80	6	3	●	1	—	40.9	43.0	No interference
R0100T0054L050	1	2	0.9	1.6	50	3.6	2.2°	3.36	110	6	3	●	1	—	51.0	53.6	No interference
R0100T0054L060	1	2	0.9	1.6	60	3.6	1.9°	3.67	110	6	3	●	1	—	61.0	No interference	No interference
R0100T0054L070	1	2	0.9	1.6	70	3.6	1.6°	3.99	110	6	3	●	1	—	71.1	No interference	No interference
R0100T0130L025	1	2	1.5	1.6	25	3.6	4.1°	3.02	70	6	3	●	1	—	—	26.4	27.9
R0100T0130L030	1	2	1.5	1.6	30	3.6	3.5°	3.28	80	6	3	●	1	—	—	31.6	33.3
R0100T0130L035	1	2	1.5	1.6	35	3.6	3.1°	3.54	80	6	3	●	1	—	—	36.7	38.7
R0100T0130L040	1	2	1.5	1.6	40	3.6	2.7°	3.81	80	6	3	●	1	—	—	41.8	No interference
R0125T0054L020	1.25	2.5	0.9	2	20	4.5	4.3°	2.89	60	6	3	●	1	—	20.8	21.9	23.1
R0125T0054L030	1.25	2.5	0.9	2	30	4.5	3.1°	3.20	80	6	3	●	1	—	30.9	32.5	34.2
R0125T0054L040	1.25	2.5	0.9	2	40	4.5	2.4°	3.52	80	6	3	●	1	—	40.9	43.1	No interference
R0125T0130L020	1.25	2.5	1.5	2	20	4.5	4.4°	3.21	60	6	3	●	1	—	—	21.4	22.5
R0125T0130L030	1.25	2.5	1.5	2	30	4.5	3.1°	3.74	80	6	3	●	1	—	—	31.6	33.3
R0125T0130L040	1.25	2.5	1.5	2	40	4.5	2.5°	4.26	80	6	3	●	1	—	—	41.9	No interference
R0150T0024L020	1.5	3	0.4	2	20	5	3.8°	3.11	60	6	3	●	1	20.7	21.3	22.3	23.5
R0150T0024L025	1.5	3	0.4	2	25	5	3.1°	3.18	80	6	3	●	1	25.8	26.4	27.7	29.2
R0150T0024L030	1.5	3	0.4	2	30	5	2.7°	3.25	80	6	3	●	1	30.8	31.6	33.2	No interference
R0150T0024L040	1.5	3	0.4	2	40	5	2.1°	3.39	80	6	3	●	1	40.9	41.9	44.0	No interference
R0150T0024L050	1.5	3	0.4	2	50	5	1.7°	3.53	100	6	3	●	1	50.9	52.2	No interference	No interference
R0150T0054L020	1.5	3	0.9	2	20	5	3.8°	3.37	60	6	3	●	1	—	20.9	21.9	23.0
R0150T0054L030	1.5	3	0.9	2	30	5	2.7°	3.69	80	6	3	●	1	—	30.9	32.5	No interference
R0150T0054L040	1.5	3	0.9	2	40	5	2.1°	4.00	80	6	3	●	1	—	41.0	43.1	No interference
R0150T0054L050	1.5	3	0.9	2	50	5	1.7°	4.31	100	6	3	●	1	—	51.0	No interference	No interference
R0150T0054L060	1.5	3	0.9	2	60	5	2.3°	4.63	110	8	3	●	1	—	61.1	64.2	No interference
R0150T0054L070	1.5	3	0.9	2	70	5	2.0°	4.94	120	8	3	●	1	—	71.1	74.8	No interference
R0150T0130L040	1.5	3	1.5	2	40	5	2.2°	4.73	80	6	3	●	1	—	—	41.9	No interference
R0150T0130L050	1.5	3	1.5	2	50	5	2.8°	5.26	110	8	3	●	1	—	—	52.2	No interference
R0150T0130L060	1.5	3	1.5	2	60	5	2.4°	5.78	110	8	3	●	1	—	—	62.4	No interference
R0150T0130L070	1.5	3	1.5	2	70	5	2.1°	6.30	120	8	3	●	1	—	—	72.7	No interference
R0200T0054L030	2	4	0.9	3	30	6	3.5°	4.65	90	8	3	●	1	—	30.9	32.5	34.2
R0200T0054L040	2	4	0.9	3	40	6	2.7°	4.97	90	8	3	●	1	—	41.0	43.0	No interference
R0200T0054L050	2	4	0.9	3	50	6	2.2°	5.28	110	8	3	●	1	—	51.0	53.6	No interference
R0200T0054L060	2	4	0.9	3	60	6	1.9°	5.60	110	8	3	●	1	—	61.1	No interference	No interference
R0250T0054L035	2.5	5	0.9	3.5	35	6.5	2.4°	5.80	90	8	3	●	1	—	35.9	37.7	No interference
R0250T0054L040	2.5	5	0.9	3.5	40	6.5	2.2°	5.95	90	8	3	●	1	—	41.0	43.0	No interference
R0250T0054L050	2.5	5	0.9	3.5	50	6.5	1.8°	6.27	110	8	3	●	1	—	51.0	No interference	No interference
R0250T0054L060	2.5	5	0.9	3.5	60	6.5	1.5°	6.58	110	8	3	●	1	—	61.1	No interference	No interference

IMPACT MIRACLE END MILL

VF-3XB

Ball nose end mill, 3 flute, Taper neck, For hardened materials

Work material			Carbon steel, Alloy steel (-30HRC) AISI 1055			Alloy steel, Pre-hardened steel (30-45HRC) NAK			Hardened steel (45-55HRC) AISI H13, STAVAX			Hardened steel (55-62HRC) AISI D2		
R (mm)	Taper angle one side	Neck length (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut (mm)
R0.4	0.4°	6	34,000	2,700	0.03	31,000	2,200	0.025	24,000	1,700	0.02	19,000	1,400	0.015
		8	31,000	2,100	0.02	29,000	1,700	0.02	22,000	1,300	0.015	18,000	1,000	0.01
		12	28,000	2,000	0.015	26,000	1,600	0.01	20,000	1,200	0.01	16,000	960	0.007
	0.9°	8	31,000	2,200	0.02	29,000	1,800	0.02	22,000	1,400	0.015	18,000	1,100	0.01
		12	28,000	2,100	0.015	26,000	1,700	0.01	20,000	1,300	0.01	16,000	1,000	0.007
		16	25,000	1,100	0.01	23,000	910	0.01	18,000	700	0.008	14,000	560	0.006
R0.5	0.4°	8	27,000	2,700	0.04	25,000	2,200	0.04	19,000	1,700	0.03	15,000	1,400	0.02
		10	24,000	2,200	0.03	22,000	1,800	0.025	17,000	1,400	0.02	14,000	1,100	0.015
		12	24,000	2,200	0.03	22,000	1,800	0.025	17,000	1,400	0.02	14,000	1,100	0.015
		16	22,000	2,100	0.03	21,000	1,700	0.025	16,000	1,300	0.02	13,000	1,000	0.015
		20	20,000	1,400	0.015	18,000	1,200	0.01	14,000	900	0.01	11,000	720	0.007
		25	18,000	1,300	0.015	17,000	1,000	0.01	13,000	800	0.009	10,000	640	0.006
		30	15,000	960	0.01	14,000	780	0.01	11,000	600	0.008	8,800	480	0.006
		35	14,000	800	0.008	13,000	650	0.007	10,000	500	0.006	8,000	400	0.004
	0.9°	8	27,000	2,900	0.04	25,000	2,300	0.04	19,000	1,800	0.03	15,000	1,400	0.02
		12	24,000	2,400	0.03	22,000	2,000	0.025	17,000	1,500	0.02	14,000	1,200	0.015
		16	22,000	2,200	0.03	21,000	1,800	0.025	16,000	1,400	0.02	13,000	1,100	0.015
		20	20,000	1,600	0.015	18,000	1,300	0.01	14,000	1,000	0.01	11,000	800	0.007
		25	18,000	1,400	0.015	17,000	1,200	0.01	13,000	900	0.009	10,000	720	0.006
		30	15,000	1,100	0.01	14,000	910	0.009	11,000	700	0.008	8,800	560	0.006
		35	14,000	960	0.008	13,000	780	0.007	10,000	600	0.006	8,000	480	0.004
		40	11,000	800	0.007	11,000	650	0.006	8,000	500	0.005	6,400	400	0.003
		50	8,400	610	0.006	7,800	490	0.005	6,000	380	0.004	4,800	300	0.003
		60	7,000	510	0.004	6,500	400	0.004	5,000	320	0.003	4,000	260	0.002
	70	7,000	480	0.003	6,500	390	0.002	5,000	300	0.002	4,000	240	0.001	
	1.5°	12	24,000	2,600	0.03	22,000	2,100	0.025	17,000	1,600	0.02	14,000	1,300	0.015
		16	22,000	2,400	0.03	21,000	2,000	0.025	16,000	1,500	0.02	13,000	1,200	0.015
		20	20,000	1,800	0.015	18,000	1,400	0.01	14,000	1,100	0.01	11,000	880	0.007
		25	18,000	1,600	0.015	17,000	1,300	0.01	13,000	1,000	0.009	11,000	800	0.006
		30	15,000	1,300	0.01	14,000	1,000	0.01	11,000	800	0.008	8,800	640	0.006
35		14,000	1,100	0.008	13,000	910	0.007	10,000	700	0.006	8,000	560	0.004	
R0.75	0.4°	10	18,000	2,700	0.06	17,000	2,200	0.05	13,000	1,700	0.04	10,000	1,400	0.03
		15	17,000	2,200	0.04	16,000	1,800	0.04	12,000	1,400	0.03	9,600	1,100	0.02
		20	17,000	2,100	0.03	16,000	1,700	0.025	12,000	1,300	0.02	9,600	1,000	0.015
		30	14,000	1,600	0.015	13,000	1,300	0.01	10,000	1,000	0.01	8,000	800	0.007
	0.9°	15	17,000	2,400	0.04	16,000	2,000	0.04	12,000	1,500	0.03	9,600	1,200	0.02
		20	17,000	2,200	0.03	16,000	1,800	0.025	12,000	1,400	0.02	9,600	1,100	0.015
		30	14,000	1,800	0.015	13,000	1,400	0.01	10,000	1,100	0.01	8,000	880	0.007
		40	13,000	1,300	0.01	12,000	1,000	0.01	9,000	800	0.008	7,200	640	0.006
	1.5°	15	17,000	2,600	0.04	16,000	2,100	0.04	12,000	1,600	0.03	9,600	1,300	0.02
		20	17,000	2,400	0.03	16,000	2,000	0.025	12,000	1,500	0.02	9,600	1,200	0.015
		30	14,000	2,000	0.015	13,000	1,600	0.01	10,000	1,200	0.01	8,000	960	0.007
		30	14,000	2,000	0.015	13,000	1,600	0.01	10,000	1,200	0.01	8,000	960	0.007

Work material			Carbon steel, Alloy steel (-30HRC) AISI 1055			Alloy steel, Pre-hardened steel (30-45HRC) NAK			Hardened steel (45-55HRC) AISI H13, STAVAX			Hardened steel (55-62HRC) AISI D2			
R (mm)	Taper angle one side	Neck length (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut (mm)	
R1	0.4°	16	15,000	3,200	0.07	14,000	2,600	0.06	11,000	2,000	0.05	8,800	1,600	0.03	
		20	14,000	2,400	0.06	13,000	2,000	0.05	10,000	1,500	0.04	8,000	1,200	0.03	
		25	14,000	2,100	0.04	13,000	1,700	0.04	10,000	1,300	0.03	8,000	1,000	0.02	
		30	13,000	1,800	0.03	12,000	1,400	0.03	9,000	1,100	0.025	7,200	880	0.02	
		35	13,000	1,600	0.03	12,000	1,300	0.025	9,000	1,000	0.02	7,200	800	0.015	
		40	12,000	1,400	0.015	11,000	1,200	0.01	8,500	900	0.01	6,800	720	0.007	
	0.9°	20	14,000	2,600	0.06	13,000	2,100	0.05	10,000	1,600	0.04	8,000	1,300	0.03	
		25	14,000	2,200	0.05	13,000	1,800	0.04	10,000	1,400	0.03	8,000	1,100	0.025	
		30	13,000	1,900	0.04	12,000	1,600	0.04	9,000	1,200	0.03	7,200	960	0.02	
		35	13,000	1,800	0.04	12,000	1,400	0.03	9,000	1,100	0.025	7,200	880	0.02	
		40	12,000	1,600	0.03	11,000	1,300	0.025	8,500	1,000	0.02	6,800	800	0.015	
		50	11,000	1,400	0.015	10,000	1,200	0.01	8,000	900	0.01	6,400	720	0.007	
	1.5°	60	9,800	1,100	0.007	9,100	910	0.006	7,000	700	0.005	5,600	560	0.003	
		70	8,400	960	0.004	7,800	780	0.004	6,000	600	0.003	4,800	480	0.002	
		25	14,000	2,400	0.05	13,000	2,000	0.04	10,000	1,500	0.03	8,000	1,200	0.025	
		30	12,600	2,100	0.04	12,000	1,700	0.04	9,000	1,300	0.03	7,200	1,000	0.02	
	R1.25	0.9°	35	13,000	1,900	0.04	12,000	1,600	0.03	9,000	1,200	0.025	7,200	960	0.02
			40	12,000	1,800	0.03	11,000	1,400	0.025	8,500	1,100	0.02	6,800	880	0.015
20			13,000	2,900	0.06	12,000	2,300	0.05	9,000	1,800	0.04	7,200	1,400	0.03	
1.5°	30	12,000	2,700	0.05	11,050	2,200	0.04	8,500	1,700	0.03	6,800	1,400	0.025		
	40	11,000	2,400	0.04	9,800	2,000	0.04	7,500	1,500	0.03	6,000	1,200	0.02		
	20	13,000	3,000	0.06	12,000	2,500	0.05	9,000	1,900	0.04	7,200	1,500	0.03		
R1.5	0.4°	40	11,000	2,400	0.06	10,000	2,000	0.05	8,000	1,500	0.04	6,400	1,200	0.03	
		50	11,000	2,000	0.04	9,800	1,600	0.04	7,500	1,200	0.03	6,000	960	0.02	
		20	12,000	3,700	0.13	11,000	3,000	0.1	8,500	2,300	0.09	6,800	1,800	0.06	
		30	11,000	2,900	0.07	10,000	2,300	0.06	8,000	1,800	0.05	6,400	1,400	0.03	
	0.9°	40	11,000	2,400	0.06	10,000	2,000	0.05	8,000	1,500	0.04	6,400	1,200	0.03	
		50	11,000	2,000	0.04	9,800	1,600	0.04	7,500	1,200	0.03	6,000	960	0.02	
		20	12,000	3,800	0.13	11,000	3,100	0.1	8,500	2,400	0.09	6,800	1,900	0.06	
		30	11,000	3,000	0.07	10,000	2,500	0.06	8,000	1,900	0.05	6,400	1,500	0.03	
		40	11,000	2,600	0.06	10,000	2,100	0.05	8,000	1,600	0.04	6,400	1,300	0.03	
		50	11,000	2,100	0.04	9,800	1,700	0.04	7,500	1,300	0.03	6,000	1,000	0.02	
	1.5°	60	9,800	2,000	0.03	9,100	1,600	0.025	7,000	1,200	0.02	5,600	960	0.015	
		70	9,800	1,800	0.015	9,100	1,400	0.01	7,000	1,100	0.01	5,600	880	0.007	
		50	11,000	2,200	0.04	9,800	1,800	0.04	7,500	1,400	0.03	6,000	1,100	0.02	
		60	9,800	2,100	0.03	9,100	1,700	0.025	7,000	1,300	0.02	5,600	1,000	0.015	
	R2	0.9°	70	9,800	2,000	0.015	9,100	1,600	0.01	7,000	1,200	0.01	5,600	960	0.007
30			10,000	3,200	0.3	9,400	2,600	0.25	7,200	2,000	0.2	5,800	1,600	0.15	
40			9,500	2,400	0.15	8,800	2,000	0.12	6,800	1,500	0.1	5,400	1,200	0.07	
50			9,500	2,100	0.1	8,800	1,700	0.1	6,800	1,300	0.08	5,400	1,000	0.06	
60			9,000	1,900	0.07	8,300	1,600	0.06	6,400	1,200	0.05	5,100	960	0.03	
R2.5	0.9°	35	8,000	3,500	0.3	7,400	2,900	0.25	5,700	2,200	0.2	4,600	1,800	0.15	
		40	8,000	3,200	0.2	7,400	2,600	0.18	5,700	2,000	0.15	4,600	1,600	0.1	
		60	7,600	2,400	0.15	7,000	2,000	0.12	5,400	1,500	0.1	4,300	1,200	0.07	

- 1) The above table shows depth of cut. Please control the pick feed (ae) according to machining conditions, up to a maximum of R x 1.5.
- 2) It is recommend to use high accuracy type machines and holders wherever possible.
- 3) Please reduce the depth of cut if chattering and noise are generated and reduce the feed rate proportionately.

IMPACT MIRACLE END MILL

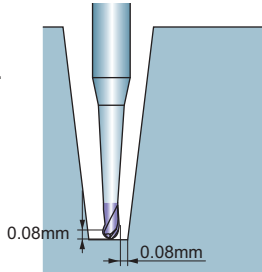
Tool : **VF-3XB** : STAVAX (Copy turning)

- 1) 30% increase in efficiency!
- 2) Surface finish improved and longer tool life.

<Geometry>



<Depth of cut> Machining the bottom of the slot.



<Result>



End mill	VF-3XB R1 x 1.5° x 25
Work material	STAVAX (40HRC)
Revolution	12,000min ⁻¹ (75m/min)
Feed rate	850mm/min (0.024mm/t)
Cutting method	Climb cut, Oil

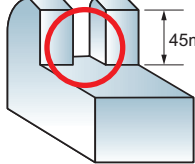
Tool : **VF-3XB** : SKD61 (Rib processing)

Conventional end mill : damage at the cutting edge
VF3XB: damage was reduced.

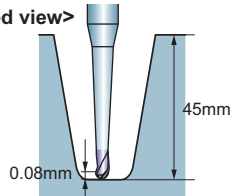
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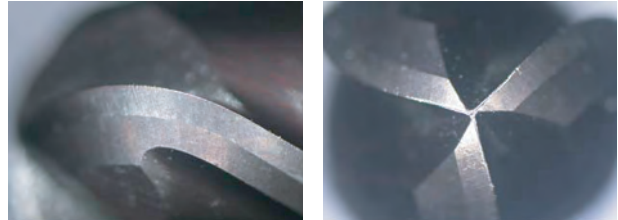
<Depth of cut>



<Enlarged view>



<Result>



End mill	VF-3XB R2 x 0.9° x 40
Work material	SKD61 (45HRC)
Revolution	10,000min ⁻¹ (MAX 125m/min)
Feed rate	Roughing 2,000mm/min (0.067mm/t), Finishing 720mm/min (0.024mm/t)
Cutting method	Emulsion



JQA-2522
JQA-EM0941

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