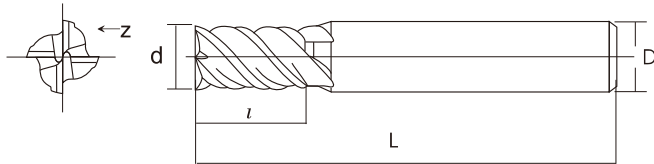


Dimensions



UMG-FHPS

4 flutes · Stub(Heavy-duty operation type)

Tool Material : Ultra Micro Grain Carbide

Surface Treatment : AlTiN Coating

Tolerance for outerDiameter : 0 ~ -0.02mm

Helix Angle : 45°

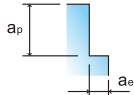
MODE	d	L	l	D	Stock
FHPS 020	2	50	3	6	○
FHPS 021	2.1	50	3.2	6	○
FHPS 022	2.2	50	3.3	6	○
FHPS 023	2.3	50	3.5	6	○
FHPS 024	2.4	50	3.6	6	○
FHPS 025	2.5	50	3.8	6	○
FHPS 026	2.6	50	3.9	6	○
FHPS 027	2.7	50	4.1	6	○
FHPS 028	2.8	50	4.2	6	○
FHPS 029	2.9	50	4.4	6	○
FHPS 030	3	50	4.5	6	○
FHPS 031	3.1	50	4.7	6	○
FHPS 032	3.2	50	4.8	6	○
FHPS 033	3.3	50	5	6	○
FHPS 034	3.4	50	5.1	6	○
FHPS 035	3.5	50	5.3	6	○
FHPS 036	3.6	50	5.4	6	○
FHPS 037	3.7	50	5.6	6	○
FHPS 038	3.8	50	5.7	6	○
FHPS 039	3.9	50	5.9	6	○
FHPS 040	4	50	6	6	○
FHPS 041	4.1	50	6.2	6	○
FHPS 042	4.2	50	6.3	6	○
FHPS 043	4.3	50	6.5	6	○
FHPS 044	4.4	50	6.6	6	○
FHPS 045	4.5	50	6.8	6	○
FHPS 046	4.6	50	6.9	6	○
FHPS 047	4.7	50	7.1	6	○
FHPS 048	4.8	50	7.2	6	○
FHPS 049	4.9	50	7.4	6	○
FHPS 050	5	50	7.5	6	○
FHPS 051	5.1	50	7.7	6	○
FHPS 052	5.2	50	7.8	6	○
FHPS 053	5.3	50	8	6	○
FHPS 054	5.4	50	8.1	6	○
FHPS 055	5.5	50	8.3	6	○
FHPS 056	5.6	50	8.4	6	○
FHPS 057	5.7	50	8.6	6	○
FHPS 058	5.8	50	8.7	6	○
FHPS 059	5.9	50	8.9	6	○
FHPS 060	6	50	9	6	○
FHPS 061	6.1	60	9.2	8	○
FHPS 062	6.2	60	9.3	8	○
FHPS 063	6.3	60	9.5	8	○
FHPS 064	6.4	60	9.6	8	○
FHPS 065	6.5	60	9.8	8	○
FHPS 066	6.6	60	9.9	8	○
FHPS 067	6.7	60	10.1	8	○
FHPS 068	6.8	60	10.2	8	○

MODE	d	L	l	D	Stock
FHPS 069	6.9	60	10.4	8	○
FHPS 070	7	60	10.5	8	○
FHPS 071	7.1	60	10.7	8	○
FHPS 072	7.2	60	10.8	8	○
FHPS 073	7.3	60	11	8	○
FHPS 074	7.4	60	11.1	8	○
FHPS 075	7.5	60	11.3	8	○
FHPS 076	7.6	60	11.4	8	○
FHPS 077	7.7	60	11.6	8	○
FHPS 078	7.8	60	11.7	8	○
FHPS 079	7.9	60	11.9	8	○
FHPS 080	8	60	12	8	○
FHPS 081	8.1	75	12.2	10	○
FHPS 082	8.2	75	12.3	10	○
FHPS 083	8.3	75	12.5	10	○
FHPS 084	8.4	75	12.6	10	○
FHPS 085	8.5	75	12.8	10	○
FHPS 086	8.6	75	12.9	10	○
FHPS 087	8.7	75	13.1	10	○
FHPS 088	8.8	75	13.2	10	○
FHPS 089	8.9	75	13.4	10	○
FHPS 090	9	75	13.5	10	○
FHPS 091	9.1	75	13.7	10	○
FHPS 092	9.2	75	13.8	10	○
FHPS 093	9.3	75	14	10	○
FHPS 094	9.4	75	14.1	10	○
FHPS 095	9.5	75	14.3	10	○
FHPS 096	9.6	75	14.4	10	○
FHPS 097	9.7	75	14.6	10	○
FHPS 098	9.8	75	14.7	10	○
FHPS 099	9.9	75	14.9	10	○
FHPS 100	10	75	15	10	○
FHPS 105	10.5	100	15.8	12	○
FHPS 110	11	100	16.5	12	○
FHPS 115	11.5	100	17.3	12	○
FHPS 120	12	100	18	12	○
FHPS 125	12.5	100	18.8	16	○
FHPS 130	13	100	19.5	16	○
FHPS 135	13.5	100	20.3	16	○
FHPS 140	14	100	21	16	○
FHPS 145	14.5	100	21.8	16	○
FHPS 150	15	100	22.5	16	○
FHPS 155	15.5	100	23.3	16	○
FHPS 160	16	100	24	16	○
FHPS 170	17	100	25.5	20	○
FHPS 180	18	100	27	20	○
FHPS 190	19	100	28.5	20	○
FHPS 200	20	100	30	20	○


Recommended milling conditions

UMG-FHPS & UMG-FHP & UMG-CR-FHP

Side Milling

Work material	Mild steels, Carbon steels, Cast iron SS400, S55c, FC250 (~750N/mm ²)		Alloy steels, Tool steels, SCM, SKT, SKS, SKD (~30HRC)		Hardened steels, Prehardened steels, (Free-cutting) SKT, SKD, NAK55, HPM1		Hardened steels, Stainless steels SUS304, SKD		Hardened steels, Titanium alloys, Heat resistant alloys steels,		Hardened steels,													
	Cutting Speed		Cutting Speed		Cutting Speed		Cutting Speed		Cutting Speed		Cutting Speed													
MILL DIA. (mm)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)												
3	10600	975	8300	760	7000	560	6600	555	6035	485	3200	190												
4	7950	1000	6200	820	5250	565	4950	590	4750	515	2400	190												
5	6350	1050	4950	845	4200	590	3950	630	3800	535	1900	190												
6	5300	1250	4150	945	3500	700	3300	660	3200	545	1600	190												
8	4000	1250	3100	895	2650	660	2450	640	2400	555	1200	175												
10	3200	1100	2500	855	2100	605	1950	590	1900	525	955	160												
12	2650	1100	2050	850	1750	565	1650	535	1600	475	795	160												
16	2000	955	1550	745	1300	500	1250	445	1200	400	595	160												
20	1600	765	1250	595	1050	455	985	395	955	355	475	160												
Depth of cut	 <table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>1.5D</td> <td>0.2D</td> </tr> </table>				a_p	a_e	1.5D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>1.5D</td> <td>0.1D</td> </tr> </table>				a_p	a_e	1.5D	0.1D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>1D</td> <td>0.05D</td> </tr> </table>				a_p	a_e	1D	0.05D
a_p	a_e																							
1.5D	0.2D																							
a_p	a_e																							
1.5D	0.1D																							
a_p	a_e																							
1D	0.05D																							

Slotting

Work material	Mild steels, Carbon steels, Cast iron SS400, S55c, FC250 (~750N/mm ²)		Alloy steels, Tool steels, SCM, SKT, SKS, SKD (~30HRC)		Hardened steels, Prehardened steels, (Free-cutting) SKT, SKD, NAK55, HPM1		Hardened steels, Stainless steels SUS304, SKD		Hardened steels, Titanium alloys, Heat resistant alloys steels,		Hardened steels,	
	Cutting Speed		Cutting Speed		Cutting Speed		Cutting Speed		Cutting Speed		Cutting Speed	
MILL DIA. (mm)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)
3	8500	705	6350	959	5850	455	5500	400	4450	320	2100	110
4	6350	705	4750	675	4400	455	4150	450	3350	360	1600	120
5	5100	715	3800	660	3500	475	3300	475	2650	385	1250	125
6	4250	715	3200	560	2900	500	2750	495	2250	400	1050	125
8	3200	660	2400	550	2200	545	2050	515	1650	415	795	125
10	2550	610	1900	535	1750	475	1650	470	1350	380	635	115
12	2100	610	1600	475	1450	450	1400	440	1100	355	530	115
16	1600	610	1200	430	1100	370	1050	370	835	300	400	88
20	1250	510	955	380	875	350	830	330	670	265	320	89
Depth of cut	 $a_p=0.5D$				$a_p=0.05D$				$a_p=0.05D$			

Caution

1. Use a rigid and precise machine and holder.
2. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
3. Please use a suitable fluid with high smoke retardant properties.
4. During Dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.

Recommended milling conditions

UMG-FHPS & UMG-FHP & UMG-CR-FHP

Caution:
Sparks generated during operation or heat caused by tool breakage can cause fire. Be sure to use all proper fire-prevention measures.

High Speed Side Milling

The conditions below are for high speed / high precision machining centers.

Work material	Mild steels, Carbom steels, Cast iron SS400, S55c, FC250 (~750N/mm ²)		Alloy steels, Tool steels, SCM, SKT, SKS, SKD (~30HRC)		Hardened steels, Prehardened steels, (Free-cutting) SKT, SKD, NAK55, HPM1		Hardened steels, Stainless steels SUS304, SKD		Hardened steels, Titanium alloys, Heat resistant alloys steels,		Hardened steels,																								
	Cutting Speed		78m/min		66m/min		62m/min		60m/min		30m/min																								
MILL DIA. (mm)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)																							
	3	21200	2150	21200	2400	21200	1300	15900	1150	10600	680	8500	440																						
4	15900	2050	15900	2300	15900	1300	11900	1250	7950	795	6350	460																							
5	12700	1900	12700	2150	12700	1250	9550	1350	6350	840	5100	510																							
6	10600	3050	10600	2650	10600	2000	7950	1450	5300	910	4250	610																							
8	7950	2800	7950	2400	7950	1900	5950	1400	4000	860	3200	575																							
10	6350	2550	6350	2200	6350	1850	4750	1350	3200	830	2550	510																							
12	5300	2550	5300	2200	5300	1800	4000	1350	2650	830	2100	510																							
16	4000	1900	4000	1900	4000	1700	3000	1350	2000	830	1600	510																							
20	3200	1550	3200	1550	3200	1550	2400	1150	1600	730	1250	510																							
Depth of cut			<table border="1"> <thead> <tr><th></th><th>a_p</th><th>a_e</th></tr> </thead> <tbody> <tr><td>D < Ø6</td><td>1.5D</td><td>0.02D</td></tr> <tr><td>Ø6 ≤ D</td><td>1.5D</td><td>0.05D</td></tr> </tbody> </table>			a _p	a _e	D < Ø6	1.5D	0.02D	Ø6 ≤ D	1.5D	0.05D	<table border="1"> <thead> <tr><th></th><th>a_p</th><th>a_e</th></tr> </thead> <tbody> <tr><td>D < Ø6</td><td>1.5D</td><td>0.01D</td></tr> <tr><td>Ø6 ≤ D</td><td>1.5D</td><td>0.02D</td></tr> </tbody> </table>			a _p	a _e	D < Ø6	1.5D	0.01D	Ø6 ≤ D	1.5D	0.02D	<table border="1"> <thead> <tr><th></th><th>a_p</th><th>a_e</th></tr> </thead> <tbody> <tr><td>D < Ø6</td><td>1D</td><td>0.01D</td></tr> <tr><td>Ø6 ≤ D</td><td>1D</td><td>0.02D</td></tr> </tbody> </table>			a _p	a _e	D < Ø6	1D	0.01D	Ø6 ≤ D	1D	0.02D
				a _p	a _e																														
D < Ø6	1.5D	0.02D																																	
Ø6 ≤ D	1.5D	0.05D																																	
	a _p	a _e																																	
D < Ø6	1.5D	0.01D																																	
Ø6 ≤ D	1.5D	0.02D																																	
	a _p	a _e																																	
D < Ø6	1D	0.01D																																	
Ø6 ≤ D	1D	0.02D																																	
		a _e Max=0.5mm		a _e Max=0.5mm		a _e Max=0.5mm																													

The conditions below are for high speed / high precision machining centers.

High Speed Slotting

Work material	Mild steels, Carbom steels, Cast iron SS400, S55c, FC250 (~750N/mm ²)		Alloy steels, Tool steels, SCM, SKT, SKS, SKD (~30HRC)		Hardened steels, Prehardened steels, (Free-cutting) SKT, SKD, NAK55, HPM1		Hardened steels, Stainless steels SUS304, SKD	
	Cutting Speed		78m/min		66m/min		62m/min	
MILL DIA. (mm)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)	Speed (mm ⁻¹)	Speed (mm/min)
	3	12700	1050	10600	935	9550	745	6350
4	9550	1150	7950	1000	7150	745	5150	560
5	7650	1200	7000	1100	6350	865	4150	595
6	3650	1550	5850	1150	5300	910	3700	670
8	4750	1450	4400	1300	4000	985	2800	690
10	3800	1400	3500	1200	3200	865	2250	635
12	3200	1250	2900	1150	2650	815	1850	595
16	2400	1050	2200	965	2000	675	1400	500
20	1900	840	1750	770	1600	635	1100	445
Depth of cut					a _p =0.2D		a _p Max=3mm	

Caution

1. Use a rigid and precise machine and holder.
2. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
3. Please use a suitable fluid with high smoke retardant properties.
4. During Dry(no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.

