

# HF450

cylindrical shank and reduced neck, 45° chamfer



OSAWA  
NORM

MG  
**PV300**

30±55  
HRC

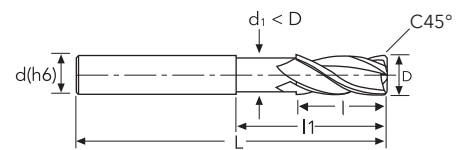
40°

C45°

Z4 UP

P	M	K	N	S	H
★	★	★	★	★	★

★ 1st choice ☆ suitable



D	D Tol.	C45°	C45° Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
<b>3</b>	0/-0.030	0.10	+/-0.020	6	9	15	2.80	57	4	HF450030	●
<b>4</b>	0/-0.030	0.10	+/-0.020	6	11	18	3.80	57	4	HF450040	●
<b>5</b>	0/-0.030	0.10	+/-0.020	6	13	19	4.80	57	4	HF450050	●
<b>6</b>	0/-0.030	0.10	+/-0.020	6	13	20	5.80	57	4	HF450060	●
<b>8</b>	0/-0.030	0.20	+/-0.020	8	20	26	7.80	64	4	HF450080	●
<b>10</b>	0/-0.030	0.20	+/-0.020	10	22	30	9.80	72	4	HF450100	●
<b>12</b>	0/-0.030	0.20	+/-0.020	12	26	36	11.80	83	4	HF450120	●
<b>14</b>	0/-0.030	0.20	+/-0.020	14	26	36	13.70	83	4	HF450140	●
<b>16</b>	0/-0.030	0.30	+/-0.020	16	32	42	15.70	92	4	HF450160	●
<b>20</b>	0/-0.030	0.40	+/-0.020	20	38	50	19.70	104	4	HF450200	●

- INFO
- TYPHOON TA-HTA-4HTA
- TYPHOON PU-HPU
- TYPHOON SUH
- TYPHOON ALH
- TYPHOON HRC
- TYPHOON SUH MINI
- TYPHOON HL
- C-SD-TA
- LFTA
- SUTA
- HSS-HSS/CO DRILLS
- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX
- UH
- HSS/CO-HSSP END MILLS
- CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

### HF450

	<b>Material Group ISO 513</b>	P4 M4 K4			P4 P5 M4 M5 K4 S1			P5 P6 M5 K4 S2 S3			H1 H4 H5		
	<b>Hardness/Rm</b>	800-1000 N/mm <sup>2</sup>			900-1200 N/mm <sup>2</sup>			35-45 HRC			≤ 55 HRC		
	<b>ap x ae</b>	0.5D x D			0.5D x D			0.3D x D			0.2D x D		
	<b>Vc (m/min)</b>	70-90			50-70			30-50			20-40		
	<b>D (mm)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>
	<b>3</b>	8490	0.011	360	6370	0.010	250	4250	0.008	140	3180	0.007	100
	<b>4</b>	6370	0.014	360	4780	0.013	240	3180	0.011	140	2390	0.010	90
	<b>5</b>	5100	0.018	360	3820	0.016	240	2550	0.013	130	1910	0.012	90
	<b>6</b>	4250	0.021	350	3180	0.019	240	2120	0.015	130	1590	0.014	90
	<b>8</b>	3180	0.027	340	2390	0.024	230	1590	0.020	130	1190	0.019	90
<b>10</b>	2550	0.032	330	1910	0.029	220	1270	0.024	120	960	0.022	90	
<b>12</b>	2120	0.037	310	1590	0.033	210	1060	0.028	120	800	0.026	80	
<b>14</b>	1820	0.041	300	1360	0.037	200	910	0.031	110	680	0.029	80	
<b>16</b>	1590	0.046	290	1190	0.041	200	800	0.034	110	600	0.032	80	
<b>20</b>	1270	0.056	280	960	0.050	190	640	0.042	110	480	0.039	80	
<b>ap x ae</b>	≤ D5	0.3D x D			0.3D x D			0.2D x D			0.1D x D		


	<b>Material Group ISO 513</b>	P4 M4 K4			P4 P5 M4 M5 K4 S1			P5 P6 M5 K4 S2 S3			H1 H4 H5		
	<b>Hardness/Rm</b>	800-1000 N/mm <sup>2</sup>			900-1200 N/mm <sup>2</sup>			35-45 HRC			≤ 55 HRC		
	<b>ap x ae</b>	1.5D x 0.3D			1.5D x 0.2D			1.2D x 0.2D			D x 0.1D		
	<b>Vc (m/min)</b>	90-110			60-80			40-60			30-50		
	<b>D (mm)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>
	<b>3</b>	10620	0.013	550	7430	0.012	340	5310	0.010	220	4250	0.014	240
	<b>4</b>	7960	0.017	540	5570	0.015	340	3980	0.014	220	3180	0.019	240
	<b>5</b>	6370	0.021	540	4460	0.019	340	3180	0.017	210	2550	0.023	240
	<b>6</b>	5310	0.025	530	3720	0.022	330	2650	0.020	210	2120	0.027	230
	<b>8</b>	3980	0.032	510	2790	0.029	320	1990	0.026	200	1590	0.035	220
<b>10</b>	3180	0.039	490	2230	0.035	310	1590	0.031	200	1270	0.042	220	
<b>12</b>	2650	0.044	470	1860	0.040	300	1330	0.035	190	1060	0.048	210	
<b>14</b>	2270	0.050	450	1590	0.045	280	1140	0.040	180	910	0.055	200	
<b>16</b>	1990	0.055	440	1390	0.050	280	1000	0.044	180	800	0.061	190	
<b>20</b>	1590	0.067	430	1110	0.060	270	800	0.054	170	640	0.074	190	
<b>ap x ae</b>	≤ D5	1.2D x 0.2D			1.2D x 0.1D			D x 0.1D			D x 0.05D		


	<b>Material Group ISO 513</b>	P4 M4 K4			P4 P5 M4 M5 K4 S1			P5 P6 M5 K4 S2 S3			H1 H4 H5		
	<b>Hardness/Rm</b>	800-1000 N/mm <sup>2</sup>			900-1200 N/mm <sup>2</sup>			35-45 HRC			≤ 55 HRC		
	<b>α° x ae</b>	5° x 0.4D			4° x 0.4D			3° x 0.4D			2° x 0.4D		
	<b>Vc (m/min)</b>	70-90			50-70			30-50			20-40		
	<b>D (mm)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>
	<b>3</b>	8490	0.008	265	6370	0.007	185	4250	0.006	109	3180	0.007	86
	<b>4</b>	6370	0.010	265	4780	0.010	185	3180	0.008	108	2390	0.009	86
	<b>5</b>	5100	0.013	260	3820	0.012	185	2550	0.011	108	1910	0.011	85
	<b>6</b>	4250	0.015	255	3180	0.014	180	2120	0.012	105	1590	0.013	83
	<b>8</b>	3180	0.019	250	2390	0.018	175	1590	0.016	102	1190	0.017	81
<b>10</b>	2550	0.023	240	1910	0.022	165	1270	0.019	98	960	0.020	78	
<b>12</b>	2120	0.027	225	1590	0.025	160	1060	0.022	93	800	0.023	74	
<b>14</b>	1820	0.030	220	1360	0.028	155	910	0.025	90	680	0.026	71	
<b>16</b>	1590	0.033	215	1190	0.031	150	800	0.028	88	600	0.029	70	
<b>20</b>	1270	0.041	205	960	0.038	145	640	0.034	86	480	0.035	68	
<b>α°</b>	≤ D5	2°			2°			1°			1°		

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

HF450

	Material Group ISO 513	P4 M4 K4			P4 P5 M4 M5 K4 S1			P5 P6 M5 K4 S2 S3			H1 H4 H5		
	Hardness/Rm	800-1000 N/mm <sup>2</sup>			900-1200 N/mm <sup>2</sup>			35-45 HRC			≤ 55 HRC		
	α° x ae	5° x D			4° x D			3° x D			2° x D		
	Vc (m/min)	60-80			50-60			30-40			20-30		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	6	3720	0.018	270	2920	0.017	195	1860	0.016	118	1330	0.025	131
	8	2790	0.023	260	2190	0.022	190	1390	0.021	114	1000	0.032	128
	10	2230	0.028	250	1750	0.026	185	1110	0.025	110	800	0.038	123
	12	1860	0.032	240	1460	0.030	175	930	0.028	105	660	0.044	116
	14	1590	0.036	230	1250	0.034	170	800	0.032	102	570	0.049	112
16	1390	0.040	225	1090	0.037	165	700	0.035	99	500	0.055	109	
20	1110	0.049	215	880	0.045	160	560	0.043	96	400	0.067	107	

	Material Group ISO 513	P4 M4 K4			P4 P5 M4 M5 K4 S1			P5 P6 M5 K4 S2 S3			H1 H4 H5		
	Hardness/Rm	800-1000 N/mm <sup>2</sup>			900-1200 N/mm <sup>2</sup>			35-45 HRC			≤ 55 HRC		
	ap x ae	D x 0.4D			D x 0.4D			D x 0.25D			D x 0.25D		
	Vc (m/min)	60-80			50-60			30-40			20-30		
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)
	6	3720	0.021	310	2920	0.019	220	1860	0.015	120	1330	0.014	80
	8	2790	0.027	300	2190	0.024	210	1390	0.020	110	1000	0.019	70
	10	2230	0.032	290	1750	0.029	200	1110	0.024	110	800	0.022	70
	12	1860	0.037	270	1460	0.033	190	930	0.028	100	660	0.026	70
	14	1590	0.041	260	1250	0.037	190	800	0.031	100	570	0.029	70
16	1390	0.046	260	1090	0.041	180	700	0.034	100	500	0.032	60	
20	1110	0.056	250	880	0.050	180	560	0.042	90	400	0.039	60	

INFO
TYPHOON TA-HTA-4HTA
TYPHOON PU-HPU
TYPHOON SUH
TYPHOON ALH
TYPHOON HRC
TYPHOON SUH MINI
TYPHOON HL
C-SD-TA
LFTA
SUTA
HSS-HSS/CO DRILLS
G2
MDTA
HF VH/UP
MEF
ALU
MEX
UH
HSS/CO-HSSP END MILLS
CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

# HF450

	<b>Material Group ISO 513</b>	P4 M4 K4			P4 P5 M4 M5 K4 S1			P5 P6 M5 K4 S2 S3			H1 H4 H5		
	<b>Hardness/Rm</b>	800-1000 N/mm <sup>2</sup>			900-1200 N/mm <sup>2</sup>			35-45 HRC			≤ 55 HRC		
	<b>ap x ae</b>	1.5D x 0.1D			1.5D x 0.1D			D x 0.1D			D x 0.1D		
	<b>Vc (m/min)</b>	110-130			80-100			50-70			40-60		
	<b>D (mm)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>
	<b>3</b>	12740	0.027	1360	9550	0.024	920	6370	0.021	550	5310	0.029	630
	<b>4</b>	9550	0.035	1350	7170	0.032	910	4780	0.028	540	3980	0.039	620
	<b>5</b>	7640	0.044	1340	5730	0.040	910	3820	0.035	540	3180	0.048	620
	<b>6</b>	6370	0.052	1320	4780	0.046	890	3180	0.041	530	2650	0.057	600
	<b>8</b>	4780	0.067	1280	3580	0.060	860	2390	0.054	510	1990	0.074	590
	<b>10</b>	3820	0.080	1230	2870	0.072	830	1910	0.064	490	1590	0.088	560
	<b>12</b>	3180	0.092	1170	2390	0.083	790	1590	0.073	470	1330	0.101	540
	<b>14</b>	2730	0.103	1130	2050	0.093	760	1360	0.083	450	1140	0.114	520
<b>16</b>	2390	0.115	1100	1790	0.103	740	1190	0.092	440	1000	0.126	500	
<b>20</b>	1040	0.140	580	1430	0.126	720	960	0.112	430	800	0.154	490	
<b>ap x ae</b>	≤ D5	1.5D x 0.1D			1.5D x 0.1D			D x 0.1D			D x 0.05D		

**NOTES:**

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

