

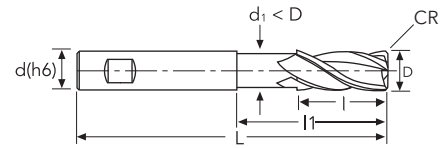
# HF443

weldon shank and reduced neck, corner radius



P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
3	0/-0.030	0.30	+/-0.020	6	9	15	2.80	57	4	HF44303030	●
3	0/-0.030	0.50	+/-0.020	6	9	15	2.80	57	4	HF44305030	●
4	0/-0.030	0.30	+/-0.020	6	11	18	3.80	57	4	HF44303040	●
4	0/-0.030	0.50	+/-0.020	6	11	18	3.80	57	4	HF44305040	●
5	0/-0.030	0.50	+/-0.020	6	13	19	4.80	57	4	HF44305050	●
6	0/-0.030	0.50	+/-0.020	6	13	20	5.80	57	4	HF44305060	●
6	0/-0.030	1.00	+/-0.020	6	13	20	5.80	57	4	HF44310060	●
8	0/-0.030	0.50	+/-0.020	8	20	26	7.80	64	4	HF44305080	●
8	0/-0.030	1.00	+/-0.020	8	20	26	7.80	64	4	HF44310080	●
10	0/-0.030	0.50	+/-0.020	10	22	30	9.80	72	4	HF44305100	●
10	0/-0.030	1.00	+/-0.020	10	22	30	9.80	72	4	HF44310100	●
12	0/-0.030	0.50	+/-0.020	12	26	36	11.80	83	4	HF44305120	●
12	0/-0.030	1.00	+/-0.020	12	26	36	11.80	83	4	HF44310120	●
14	0/-0.030	1.00	+/-0.020	14	26	36	13.70	83	4	HF44310140	●
16	0/-0.030	1.00	+/-0.020	16	32	42	15.70	92	4	HF44310160	●
20	0/-0.030	1.00	+/-0.020	20	38	50	19.70	104	4	HF44310200	●

● stock standard ○ non-standard stock ▽ stock exhaustion

### HF443

	<b>Material Group ISO 513</b>	P1 P2 M1 K1			P3 P4 M2 K2 K3			P5 M3 M4 K4 S1 S4			S2 S3 S5		
	<b>Hardness/Rm</b>	≤ 700 N/mm <sup>2</sup>			700-1000 N/mm <sup>2</sup>			≤ 35 HRC			≤ 40 HRC		
	<b>ap x ae</b>	<b>D x D</b>			<b>D x D</b>			<b>0.5D x D</b>			<b>0.5D x D</b>		
	<b>Vc (m/min)</b>	<b>110-130</b>			<b>70-90</b>			<b>50-70</b>			<b>30-50</b>		
	<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	0.013	640	8490	0.011	390	6370	0.009	240	4250	0.009	150
	<b>4</b>	9550	0.017	640	6370	0.015	380	4780	0.012	240	3180	0.012	150
	<b>5</b>	7640	0.021	630	5100	0.019	380	3820	0.016	240	2550	0.014	150
	<b>6</b>	6370	0.024	620	4250	0.022	370	3180	0.018	230	2120	0.017	140
	<b>8</b>	4780	0.032	600	3180	0.028	360	2390	0.024	230	1590	0.022	140
<b>10</b>	3820	0.038	580	2550	0.034	350	1910	0.028	220	1270	0.026	130	
<b>12</b>	3180	0.043	550	2120	0.039	330	1590	0.032	210	1060	0.030	130	
<b>14</b>	2730	0.049	530	1820	0.044	320	1360	0.036	200	910	0.034	120	
<b>16</b>	2390	0.054	520	1590	0.049	310	1190	0.041	190	800	0.038	120	
<b>20</b>	1910	0.066	500	1270	0.059	300	960	0.049	190	640	0.046	120	
<b>ap x ae</b>	<b>≤ D5</b>	0.5D x D			0.5D x D			0.25D x D			0.25D x D		

	<b>Material Group ISO 513</b>	P1 P2 M1 K1			P3 P4 M2 K2 K3							
	<b>Hardness/Rm</b>	≤ 700 N/mm <sup>2</sup>			700-1000 N/mm <sup>2</sup>							
	<b>ap x ae</b>	<b>1.5D x D</b>			<b>1.5D x D</b>							
	<b>Vc (m/min)</b>	<b>85-105</b>			<b>55-75</b>							
	<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>8</b>	3780	0.025	380	2590	0.023	230					
	<b>10</b>	3030	0.030	370	2070	0.027	230					
	<b>12</b>	2520	0.035	350	1730	0.031	220					
	<b>14</b>	2160	0.039	340	1480	0.035	210					
	<b>16</b>	1890	0.043	330	1290	0.039	200					
<b>20</b>	1510	0.053	320	1040	0.047	200						

	<b>Material Group ISO 513</b>	P1 P2 M1 K1										
	<b>Hardness/Rm</b>	≤ 700 N/mm <sup>2</sup>										
	<b>ap x ae</b>	<b>2D x D</b>										
	<b>Vc (m/min)</b>	<b>60-80</b>										
	<b>D (mm)</b>	<b>n (rpm)</b>	<b>fz (mm/z)</b>	<b>Vf (mm/min)</b>								
	<b>10</b>	2230	0.023	200								
	<b>12</b>	1860	0.026	190								
	<b>14</b>	1590	0.029	190								
	<b>16</b>	1390	0.032	180								
	<b>20</b>	1110	0.039	180								

- 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 PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION. FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF442 PARAMETERS.

CUTTING PARAMETERS

### HF443

	<b>Material Group ISO 513</b>	<b>P1 P2 M1 K1</b>				<b>P3 P4 M2 K2 K3</b>			<b>P5 M3 M4 K4 S1 S4</b>				<b>S2 S3 S5</b>		
	<b>Hardness/Rm</b>	≤ 700 N/mm <sup>2</sup>				700-1000 N/mm <sup>2</sup>			≤ 35 HRC				≤ 40 HRC		
	<b>ap x ae</b>	<b>1.5D x 0.5D</b>				<b>1.5D x 0.5D</b>			<b>1.2D x 0.3D</b>				<b>1.2D x 0.3D</b>		
	<b>Vc (m/min)</b>	<b>130-150</b>				<b>90-110</b>			<b>60-80</b>				<b>40-60</b>		
	<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>	14860	0.015	900	10620	0.014	580	7430	0.012	360	5310	0.017	350		
	<b>4</b>	11150	0.020	890	7960	0.018	570	5570	0.016	360	3980	0.022	350		
	<b>5</b>	8920	0.025	890	6370	0.022	570	4460	0.020	350	3180	0.027	350		
	<b>6</b>	7430	0.029	870	5310	0.026	560	3720	0.023	350	2650	0.032	340		
	<b>8</b>	5570	0.038	840	3980	0.034	540	2790	0.030	340	1990	0.042	330		
	<b>10</b>	4460	0.045	810	3180	0.041	520	2230	0.036	320	1590	0.050	320		
	<b>12</b>	3720	0.052	770	2650	0.047	490	1860	0.041	310	1330	0.057	300		
	<b>14</b>	3180	0.058	740	2270	0.052	480	1590	0.047	300	1140	0.064	290		
<b>16</b>	2790	0.065	720	1990	0.058	460	1390	0.052	290	1000	0.071	290			
<b>20</b>	2230	0.079	700	1590	0.071	450	1110	0.063	280	800	0.087	280			
<b>ap x ae</b>	<b>≤ D5</b>	1.5D x 0.25D				1.5D x 0.25D			1.2D x 0.1D				1.2D x 0.1D		

	<b>Material Group ISO 513</b>	<b>P1 P2 M1 K1</b>				<b>P3 P4 M2 K2 K3</b>			<b>P5 M3 M4 K4 S1 S4</b>				<b>S2 S3 S5</b>		
	<b>Hardness/Rm</b>	≤ 700 N/mm <sup>2</sup>				700-1000 N/mm <sup>2</sup>			≤ 35 HRC				≤ 40 HRC		
	<b>α° x ae</b>	<b>5° x 0.4D</b>				<b>4° x 0.4D</b>			<b>3° x 0.4D</b>				<b>3° x 0.4D</b>		
	<b>Vc (m/min)</b>	<b>110-130</b>				<b>70-90</b>			<b>50-70</b>				<b>30-50</b>		
	<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	0.009	470	8490	0.009	290	6370	0.008	193	4250	0.007	120		
	<b>4</b>	9550	0.012	465	6370	0.011	290	4780	0.010	191	3180	0.009	119		
	<b>5</b>	7640	0.015	460	5100	0.014	285	3820	0.012	190	2550	0.012	118		
	<b>6</b>	6370	0.018	450	4250	0.016	280	3180	0.015	186	2120	0.014	115		
	<b>8</b>	4780	0.023	440	3180	0.021	270	2390	0.019	181	1590	0.018	112		
	<b>10</b>	3820	0.028	420	2550	0.026	260	1910	0.023	173	1270	0.021	108		
	<b>12</b>	3180	0.031	400	2120	0.029	250	1590	0.026	165	1060	0.024	103		
	<b>14</b>	2730	0.035	385	1820	0.033	240	1360	0.029	159	910	0.027	99		
<b>16</b>	2390	0.039	375	1590	0.037	235	1190	0.032	154	800	0.030	97			
<b>20</b>	1910	0.048	365	1270	0.045	225	960	0.039	151	640	0.037	94			
<b>α° max</b>	<b>≤ D5</b>	2°				2°			1°				1°		

	<b>Material Group ISO 513</b>	<b>P1 P2 M1 K1</b>				<b>P3 P4 M2 K2 K3</b>			<b>P5 M3 M4 K4 S1 S4</b>				<b>S2 S3 S5</b>		
	<b>Hardness/Rm</b>	≤ 700 N/mm <sup>2</sup>				700-1000 N/mm <sup>2</sup>			≤ 35 HRC				≤ 40 HRC		
	<b>α° x ae</b>	<b>15° x D</b>				<b>10° x D</b>			<b>5° x D</b>				<b>5° x D</b>		
	<b>Vc (m/min)</b>	<b>100-120</b>				<b>60-80</b>			<b>45-65</b>				<b>30-40</b>		
	<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>6</b>	5840	0.019	455	3720	0.018	265	2920	0.017	198	1860	0.023	174		
	<b>8</b>	4380	0.025	440	2790	0.023	260	2190	0.022	193	1390	0.030	168		
	<b>10</b>	3500	0.030	420	2230	0.028	250	1750	0.026	185	1110	0.036	161		
	<b>12</b>	2920	0.034	405	1860	0.032	235	1460	0.030	176	930	0.042	154		
	<b>14</b>	2500	0.039	390	1590	0.036	225	1250	0.034	170	800	0.047	149		
	<b>16</b>	2190	0.043	375	1390	0.040	220	1090	0.038	165	700	0.052	145		
	<b>20</b>	1750	0.052	365	1110	0.048	215	880	0.046	162	560	0.063	141		

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF442 PARAMETERS.

CUTTING PARAMETERS

### HF443

	Material Group ISO 513	P1 P2 M1 K1			P3 P4 M2 K2 K3			P5 M3 M4 K4 S1 S4				S2 S3 S5		
	Hardness/Rm	≤ 700 N/mm <sup>2</sup>			700-1000 N/mm <sup>2</sup>			≤ 35 HRC				≤ 40 HRC		
	α° x ae	30° x D			15° x D									
	Vc (m/min)	85-105			55-75									
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)	n (rpm)	fz (mm/z)	Vf (mm/min)							
	10	3030	0.025	300	2070	0.023	185							
	12	2520	0.028	285	1730	0.026	180							
14	2160	0.032	275	1480	0.029	170								
16	1890	0.035	265	1290	0.032	165								
20	1510	0.043	260	1040	0.039	165								

	Material Group ISO 513	P1 P2 M1 K1												
	Hardness/Rm	≤ 700 N/mm <sup>2</sup>												
	α° x ae	45° x D												
	Vc (m/min)	60-80												
	D (mm)	n (rpm)	fz (mm/z)	Vf (mm/min)										
	10	2230	0.024	220										
	12	1860	0.028	210										
14	1590	0.031	200											
16	1390	0.035	195											
20	1110	0.042	190											

	Material Group ISO 513	P1 P2 M1 K1			P3 P4 M2 K2 K3			P5 M3 M4 K4 S1 S4				S2 S3 S5		
	Hardness/Rm	≤ 700 N/mm <sup>2</sup>			700-1000 N/mm <sup>2</sup>			≤ 35 HRC				≤ 40 HRC		
	ap x ae	D x 0.4D			D x 0.4D			D x 0.25D				D x 0.25D		
	Vc (m/min)	100-120			60-80			45-65				30-40		
	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	5840	0.024	570	3720	0.022	330	2920	0.018	210	1860	0.017	130	
	8	4380	0.032	550	2790	0.028	320	2190	0.024	210	1390	0.022	120	
10	3500	0.038	530	2230	0.034	300	1750	0.028	200	1110	0.026	120		
12	2920	0.043	500	1860	0.039	290	1460	0.032	190	930	0.030	110		
14	2500	0.049	490	1590	0.044	280	1250	0.036	180	800	0.034	110		
16	2190	0.054	470	1390	0.049	270	1090	0.041	180	700	0.038	110		
20	1750	0.066	460	1110	0.059	260	880	0.049	170	560	0.046	100		

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION. FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF442 PARAMETERS.

- 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

# HF443

	Material Group ISO 513	P1 P2 M1 K1				P3 P4 M2 K2 K3			P5 M3 M4 K4 S1 S4				S2 S3 S5		
	Hardness/Rm	≤ 700 N/mm <sup>2</sup>				700-1000 N/mm <sup>2</sup>			≤ 35 HRC				≤ 40 HRC		
	ap x ae	D x D				D x D			0.5D x D				0.5D x D		
	Vc (m/min)	85-105				55-75			40-60				20-40		
	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)		
	3	10080	0.006	250	6900	0.006	160	5310	0.005	110	3180	0.007	90		
	4	7560	0.008	250	5180	0.007	160	3980	0.007	110	2390	0.009	90		
	5	6050	0.010	250	4140	0.009	150	3180	0.008	110	1910	0.011	90		
	6	5040	0.012	240	3450	0.011	150	2650	0.010	100	1590	0.013	90		
	8	3780	0.016	240	2590	0.014	150	1990	0.013	100	1190	0.017	80		
	10	3030	0.019	230	2070	0.017	140	1590	0.015	100	960	0.021	80		
	12	2520	0.022	220	1730	0.019	130	1330	0.017	90	800	0.024	80		
	14	2160	0.024	210	1480	0.022	130	1140	0.019	90	680	0.027	70		
16	1890	0.027	200	1290	0.024	130	1000	0.022	90	600	0.030	70			
20	1510	0.033	200	1040	0.030	120	800	0.026	80	480	0.036	70			
ap x ae	≤ D5	0.5D x D				0.5D x D			0.25D x D				0.25D x D		

	Material Group ISO 513	P1 P2 M1 K1				P3 P4 M2 K2 K3			P5 M3 M4 K4 S1 S4				S2 S3 S5		
	Hardness/Rm	≤ 700 N/mm <sup>2</sup>				700-1000 N/mm <sup>2</sup>			≤ 35 HRC				≤ 40 HRC		
	ap x ae	2D x 0.2D				2D x 0.1D			1.5D x 0.1D				1.5D x 0.1D		
	Vc (m/min)	160-200				110-130			80-100				50-70		
	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)		
	3	19110	0.032	2410	12740	0.028	1440	9550	0.025	960	6370	0.035	880		
	4	14330	0.042	2390	9550	0.037	1430	7170	0.033	960	4780	0.046	880		
	5	11460	0.052	2370	7640	0.047	1420	5730	0.041	950	3820	0.057	870		
	6	9550	0.061	2320	6370	0.055	1390	4780	0.049	930	3180	0.067	850		
	8	7170	0.079	2260	4780	0.071	1360	3580	0.063	900	2390	0.087	830		
	10	5730	0.095	2170	3820	0.085	1300	2870	0.076	870	1910	0.104	790		
	12	4780	0.108	2060	3180	0.097	1240	2390	0.086	830	1590	0.119	760		
	14	4090	0.122	1990	2730	0.109	1190	2050	0.097	800	1360	0.134	730		
16	3580	0.135	1930	2390	0.122	1160	1790	0.108	770	1190	0.149	710			
20	2870	0.164	1890	1910	0.148	1130	1430	0.131	750	960	0.181	690			
ap x ae	≤ D5	1.5D x 0.1D				1.5D x 0.1D									

**NOTES:**

Down milling CNC programming is required.

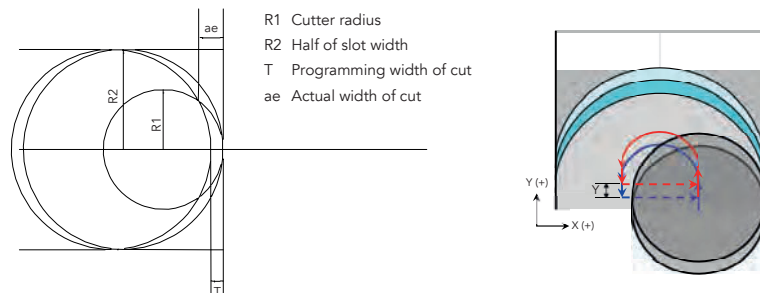
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
 FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF442 PARAMETERS.