



CUTTING PARAMETERS

INFO

### HF840

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>130÷150</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>3</b>	0.014	0.013	0.011	0.010
	<b>4</b>	0.019	0.017	0.014	0.013
	<b>5</b>	0.023	0.021	0.017	0.016
	<b>6</b>	0.027	0.024	0.020	0.019
	<b>8</b>	0.035	0.032	0.026	0.025
	<b>10</b>	0.042	0.038	0.032	0.029
	<b>12</b>	0.048	0.043	0.036	0.034
	<b>14</b>	0.054	0.049	0.041	0.038
	<b>16</b>	0.060	0.054	0.045	0.042
<b>18</b>	0.066	0.059	0.050	0.046	
<b>20</b>	0.073	0.066	0.055	0.051	
<b>ap x ae</b>	<b>≤ D5</b>	0.5D x D	0.5D x D	0.25D x D	0.25D x D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>3</b>	0.017	0.015	0.013	0.018
	<b>4</b>	0.022	0.020	0.018	0.024
	<b>5</b>	0.028	0.025	0.022	0.030
	<b>6</b>	0.032	0.029	0.026	0.036
	<b>8</b>	0.042	0.038	0.034	0.046
	<b>10</b>	0.050	0.045	0.040	0.055
	<b>12</b>	0.058	0.052	0.046	0.063
	<b>14</b>	0.065	0.058	0.052	0.071
	<b>16</b>	0.072	0.065	0.058	0.079
<b>18</b>	0.079	0.071	0.063	0.087	
<b>20</b>	0.088	0.079	0.070	0.096	
<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

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>3</b>	0.010	0.010	0.008	0.008
	<b>4</b>	0.013	0.013	0.011	0.010
	<b>5</b>	0.017	0.016	0.014	0.013
	<b>6</b>	0.020	0.018	0.016	0.015
	<b>8</b>	0.025	0.024	0.021	0.020
	<b>10</b>	0.031	0.029	0.025	0.024
	<b>12</b>	0.035	0.033	0.029	0.027
	<b>14</b>	0.039	0.037	0.032	0.030
	<b>16</b>	0.044	0.041	0.036	0.034
<b>18</b>	0.048	0.045	0.040	0.037	
<b>20</b>	0.053	0.050	0.044	0.041	
<b>α° x ae</b>	<b>≤ D5</b>	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

# HF840

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.022	0.020	0.019	0.026
8	0.028	0.026	0.024	0.034
10	0.034	0.031	0.029	0.040
12	0.038	0.035	0.034	0.046
14	0.043	0.040	0.038	0.052
16	0.048	0.044	0.042	0.058
18	0.053	0.048	0.046	0.063
20	0.058	0.054	0.051	0.070

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.027	0.024	0.020	0.019
8	0.035	0.032	0.026	0.025
10	0.042	0.038	0.032	0.029
12	0.048	0.043	0.036	0.034
14	0.054	0.049	0.041	0.038
16	0.060	0.054	0.045	0.042
18	0.066	0.059	0.050	0.046
20	0.073	0.066	0.055	0.051

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.007	0.006	0.006	0.008
4	0.009	0.008	0.007	0.010
5	0.012	0.010	0.009	0.013
6	0.014	0.012	0.011	0.015
8	0.018	0.016	0.014	0.019
10	0.021	0.019	0.017	0.023
12	0.024	0.022	0.019	0.026
14	0.027	0.024	0.022	0.030
16	0.030	0.027	0.024	0.033
18	0.033	0.030	0.026	0.036
20	0.037	0.033	0.029	0.040
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

# HF840

Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.035	0.032	0.028	0.039
4	0.046	0.042	0.037	0.051
5	0.058	0.052	0.046	0.063
6	0.068	0.061	0.054	0.074
8	0.088	0.079	0.070	0.096
10	0.105	0.095	0.084	0.116
12	0.120	0.108	0.096	0.132
14	0.135	0.122	0.108	0.149
16	0.150	0.135	0.120	0.165
18	0.165	0.149	0.132	0.182
20	0.183	0.164	0.146	0.201
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	



**NOTES:**

Down milling CNC programming is required.

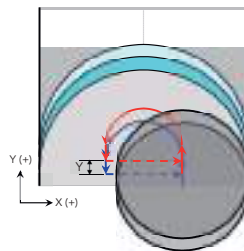
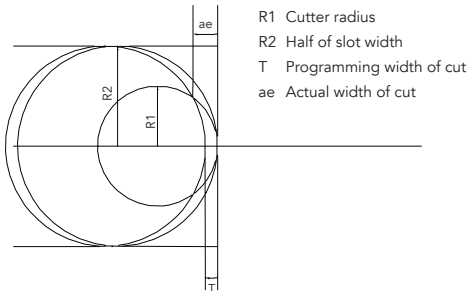
“ae” value max 0.2xD - “T” value max 0.1xD.

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.



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



CUTTING PARAMETERS

INFO

**HF440**

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>3</b>	0.013	0.011	0.009	0.009
	<b>4</b>	0.017	0.015	0.012	0.012
	<b>5</b>	0.021	0.019	0.016	0.014
	<b>6</b>	0.024	0.022	0.018	0.017
	<b>8</b>	0.032	0.028	0.024	0.022
	<b>10</b>	0.038	0.034	0.028	0.026
	<b>12</b>	0.043	0.039	0.032	0.030
	<b>14</b>	0.049	0.044	0.036	0.034
<b>16</b>	0.054	0.049	0.041	0.038	
<b>20</b>	0.066	0.059	0.049	0.046	
<b>ap x ae</b>	<b>≤ D5</b>	0.5D x D	0.5D x D	0.25D x D	0.25D x D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>fz (mm/z)</b>	<b>fz (mm/z)</b>		
	<b>8</b>	0.025	0.023		
	<b>10</b>	0.030	0.027		
	<b>12</b>	0.035	0.031		
	<b>14</b>	0.039	0.035		
	<b>16</b>	0.043	0.039		
<b>20</b>	0.053	0.047			

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>3</b>	0.015	0.014	0.012	0.017
	<b>4</b>	0.020	0.018	0.016	0.022
	<b>5</b>	0.025	0.022	0.020	0.027
	<b>6</b>	0.029	0.026	0.023	0.032
	<b>8</b>	0.038	0.034	0.030	0.042
	<b>10</b>	0.045	0.041	0.036	0.050
	<b>12</b>	0.052	0.047	0.041	0.057
	<b>14</b>	0.058	0.052	0.047	0.064
<b>16</b>	0.065	0.058	0.052	0.071	
<b>20</b>	0.079	0.071	0.063	0.087	
<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

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF440

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x 0.4D</b>	<b>5° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.009	0.009	0.008	0.007
<b>4</b>	0.012	0.011	0.010	0.009
<b>5</b>	0.015	0.014	0.012	0.012
<b>6</b>	0.018	0.016	0.015	0.014
<b>8</b>	0.023	0.021	0.019	0.018
<b>10</b>	0.028	0.026	0.023	0.021
<b>12</b>	0.031	0.029	0.026	0.024
<b>14</b>	0.035	0.033	0.029	0.027
<b>16</b>	0.039	0.037	0.032	0.030
<b>20</b>	0.048	0.045	0.039	0.037
α° x ae	≤ D5	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.019	0.018	0.017	0.023
<b>8</b>	0.025	0.023	0.022	0.030
<b>10</b>	0.030	0.028	0.026	0.036
<b>12</b>	0.034	0.032	0.030	0.042
<b>14</b>	0.039	0.036	0.034	0.047
<b>16</b>	0.043	0.040	0.038	0.052
<b>20</b>	0.052	0.048	0.046	0.063

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
α° x ae	<b>30° x D</b>	<b>15° x D</b>		
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
<b>10</b>	0.025	0.023		
<b>12</b>	0.028	0.026		
<b>14</b>	0.032	0.029		
<b>16</b>	0.035	0.032		
<b>20</b>	0.043	0.039		

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

**HF440**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.024	0.022	0.018	0.017
	<b>8</b>	0.032	0.028	0.024	0.022
	<b>10</b>	0.038	0.034	0.028	0.026
	<b>12</b>	0.043	0.039	0.032	0.030
	<b>14</b>	0.049	0.044	0.036	0.034
<b>16</b>	0.054	0.049	0.041	0.038	
<b>20</b>	0.066	0.059	0.049	0.046	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.006	0.006	0.005	0.007
	<b>4</b>	0.008	0.007	0.007	0.009
	<b>5</b>	0.010	0.009	0.008	0.011
	<b>6</b>	0.012	0.011	0.010	0.013
	<b>8</b>	0.016	0.014	0.013	0.017
<b>10</b>	0.019	0.017	0.015	0.021	
<b>12</b>	0.022	0.019	0.017	0.024	
<b>14</b>	0.024	0.022	0.019	0.027	
<b>16</b>	0.027	0.024	0.022	0.030	
<b>20</b>	0.033	0.030	0.026	0.036	
ap x ae	<b>≤ D5</b>	0.5D x D	0.5D x D	0.25D x D	0.25D x D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# HF440

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.2D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.032	0.028	0.025	0.035
4	0.042	0.037	0.033	0.046
5	0.052	0.047	0.041	0.057
6	0.061	0.055	0.049	0.067
8	0.079	0.071	0.063	0.087
10	0.095	0.085	0.076	0.104
12	0.108	0.097	0.086	0.119
14	0.122	0.109	0.097	0.134
16	0.135	0.122	0.108	0.149
20	0.164	0.148	0.131	0.181
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.

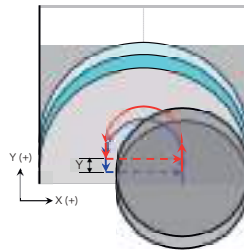
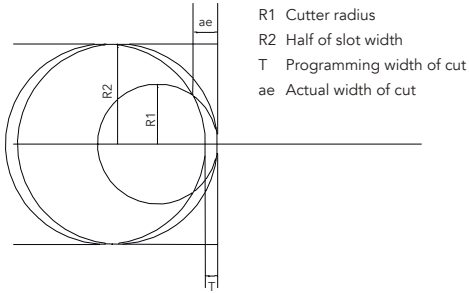
The cutting conditions are based on CNC programming with medium dynamic speed.

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.

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP**
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

# HF441

weldon shank and reduced neck, 45° chamfer



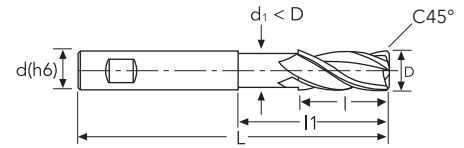
OSAWA NORM	MG PV300	<40 HRC	VH 36°/39°	C45°	Z4 UP
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INFO

P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable

SLOTTING	SIDE MILLING	HELICAL	RAMPING	VERTICAL	DRILLING	TROCHOIDAL
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D	D Tol.	C45°	C45° Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
3	0/-0.030	0.10	+/-0.020	6	9	15	2.80	57	4	HF441030	●
4	0/-0.030	0.10	+/-0.020	6	11	18	3.80	57	4	HF441040	●
5	0/-0.030	0.10	+/-0.020	6	13	19	4.80	57	4	HF441050	●
6	0/-0.030	0.10	+/-0.020	6	13	20	5.80	57	4	HF441060	●
8	0/-0.030	0.20	+/-0.020	8	20	26	7.80	64	4	HF441080	●
10	0/-0.030	0.20	+/-0.020	10	22	30	9.80	72	4	HF441100	●
12	0/-0.030	0.20	+/-0.020	12	26	36	11.80	83	4	HF441120	●
14	0/-0.030	0.20	+/-0.020	14	26	36	13.70	83	4	HF441140	●
16	0/-0.030	0.30	+/-0.020	16	32	42	15.70	92	4	HF441160	●
18	0/-0.030	0.30	+/-0.020	18	32	42	17.70	92	4	HF441180	●
20	0/-0.030	0.40	+/-0.020	20	38	50	19.70	104	4	HF441200	●

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# HF441

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.013	0.011	0.009	0.009
<b>4</b>	0.017	0.015	0.012	0.012
<b>5</b>	0.021	0.019	0.016	0.014
<b>6</b>	0.024	0.022	0.018	0.017
<b>8</b>	0.032	0.028	0.024	0.022
<b>10</b>	0.038	0.034	0.028	0.026
<b>12</b>	0.043	0.039	0.032	0.030
<b>14</b>	0.049	0.044	0.036	0.034
<b>16</b>	0.054	0.049	0.041	0.038
<b>18</b>	0.059	0.053	0.045	0.042
<b>20</b>	0.066	0.059	0.049	0.046
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>		
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
<b>8</b>	0.025	0.023		
<b>10</b>	0.030	0.027		
<b>12</b>	0.035	0.031		
<b>14</b>	0.039	0.035		
<b>16</b>	0.043	0.039		
<b>18</b>	0.048	0.043		
<b>20</b>	0.053	0.047		

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	P1 P2 P7 K1			
Hardness/Rm	≤700 N/mm <sup>2</sup>			
ap x ae	<b>2D x D</b>			
Vc (m/min)	<b>60÷80</b>			
D (mm)	fz (mm/z)			
<b>10</b>	0.023			
<b>12</b>	0.026			
<b>14</b>	0.029			
<b>16</b>	0.032			
<b>18</b>	0.036			
<b>20</b>	0.039			

HSS 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 HF440 PARAMETERS.

CUTTING PARAMETERS

INFO

### HF441

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<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>
	Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.015	0.014	0.012	0.017
	4	0.020	0.018	0.016	0.022
	5	0.025	0.022	0.020	0.027
	6	0.029	0.026	0.023	0.032
	8	0.038	0.034	0.030	0.042
	10	0.045	0.041	0.036	0.050
	12	0.052	0.047	0.041	0.057
	14	0.058	0.052	0.047	0.064
16	0.065	0.058	0.052	0.071	
18	0.071	0.064	0.057	0.078	
20	0.079	0.071	0.063	0.087	
ap x ae	≤ D5	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.009	0.009	0.008	0.007
	4	0.012	0.011	0.010	0.009
	5	0.015	0.014	0.012	0.012
	6	0.018	0.016	0.015	0.014
	8	0.023	0.021	0.019	0.018
	10	0.028	0.026	0.023	0.021
	12	0.031	0.029	0.026	0.024
	14	0.035	0.033	0.029	0.027
16	0.039	0.037	0.032	0.030	
18	0.043	0.040	0.036	0.033	
20	0.048	0.045	0.039	0.037	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF440 PARAMETERS.

INFO

# HF441

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.019	0.018	0.017	0.023
<b>8</b>	0.025	0.023	0.022	0.030
<b>10</b>	0.030	0.028	0.026	0.036
<b>12</b>	0.034	0.032	0.030	0.042
<b>14</b>	0.039	0.036	0.034	0.047
<b>16</b>	0.043	0.040	0.038	0.052
<b>18</b>	0.047	0.044	0.042	0.057
<b>20</b>	0.052	0.048	0.046	0.063

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
α° x ae	<b>30° x D</b>	<b>15° x D</b>		
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
<b>10</b>	0.025	0.023		
<b>12</b>	0.028	0.026		
<b>14</b>	0.032	0.029		
<b>16</b>	0.035	0.032		
<b>18</b>	0.039	0.036		
<b>20</b>	0.043	0.039		

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1			
Hardness/Rm	≤700 N/mm <sup>2</sup>			
α° x ae	<b>45° x D</b>			
Vc (m/min)	<b>60÷80</b>			
D (mm)	fz (mm/z)			
<b>10</b>	0.024			
<b>12</b>	0.028			
<b>14</b>	0.031			
<b>16</b>	0.035			
<b>18</b>	0.038			
<b>20</b>	0.042			

HSS  
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 HF440 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF441

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.024	0.022	0.018	0.017
	8	0.032	0.028	0.024	0.022
	10	0.038	0.034	0.028	0.026
	12	0.043	0.039	0.032	0.030
	14	0.049	0.044	0.036	0.034
	16	0.054	0.049	0.041	0.038
18	0.059	0.053	0.045	0.042	
20	0.066	0.059	0.049	0.046	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.006	0.006	0.005	0.007
	4	0.008	0.007	0.007	0.009
	5	0.010	0.009	0.008	0.011
	6	0.012	0.011	0.010	0.013
	8	0.016	0.014	0.013	0.017
	10	0.019	0.017	0.015	0.021
12	0.022	0.019	0.017	0.024	
14	0.024	0.022	0.019	0.027	
16	0.027	0.024	0.022	0.030	
18	0.030	0.027	0.024	0.033	
20	0.033	0.030	0.026	0.036	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D
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CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF440 PARAMETERS.

INFO

# HF441

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.032	0.028	0.025	0.035
4	0.042	0.037	0.033	0.046
5	0.052	0.047	0.041	0.057
6	0.061	0.055	0.049	0.067
8	0.079	0.071	0.063	0.087
10	0.095	0.085	0.076	0.104
12	0.108	0.097	0.086	0.119
14	0.122	0.109	0.097	0.134
16	0.135	0.122	0.108	0.149
18	0.149	0.134	0.119	0.163
20	0.164	0.148	0.131	0.181
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.

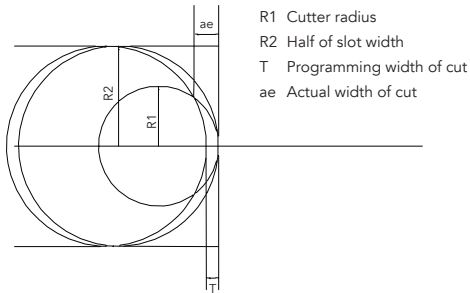
The cutting conditions are based on CNC programming with medium dynamic speed.

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

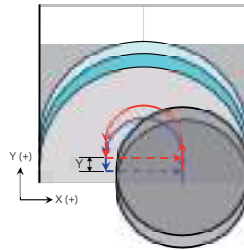
With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



R1 Cutter radius  
R2 Half of slot width  
T Programming width of cut  
ae Actual width of cut



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF440 PARAMETERS.



INFO

# HF844

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.029	0.026	0.022	0.020
8	0.038	0.034	0.028	0.026
10	0.045	0.041	0.034	0.032
12	0.052	0.047	0.039	0.036
14	0.058	0.052	0.044	0.041
16	0.065	0.058	0.049	0.045
20	0.079	0.071	0.059	0.055

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>		
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
8	0.030	0.027		
10	0.036	0.033		
12	0.041	0.037		
14	0.047	0.042		
16	0.052	0.047		
20	0.063	0.057		

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<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>
Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.035	0.031	0.028	0.038
8	0.045	0.041	0.036	0.050
10	0.054	0.049	0.044	0.060
12	0.062	0.056	0.050	0.068
14	0.070	0.063	0.056	0.077
16	0.078	0.070	0.062	0.086
20	0.095	0.085	0.076	0.104

HSS  
END-MILLS

CARBIDE  
BURRS

CUTTING PARAMETERS

INFO

# HF844

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>8° x 0.4D</b>	<b>6° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.020	0.019	0.016	0.016
	<b>8</b>	0.026	0.024	0.021	0.021
	<b>10</b>	0.031	0.029	0.026	0.025
	<b>12</b>	0.036	0.033	0.029	0.029
	<b>14</b>	0.040	0.037	0.033	0.033
<b>16</b>	0.045	0.041	0.037	0.036	
<b>20</b>	0.055	0.050	0.045	0.044	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>8</b>	0.030	0.028	0.026	0.036
	<b>10</b>	0.036	0.033	0.032	0.044
	<b>12</b>	0.041	0.038	0.036	0.050
	<b>14</b>	0.047	0.043	0.041	0.056
	<b>16</b>	0.052	0.048	0.045	0.062
<b>20</b>	0.063	0.058	0.055	0.076	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	<b>30° x D</b>	<b>15° x D</b>		
	Vc (m/min)	<b>85÷105</b>	<b>45÷65</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	<b>10</b>	0.030	0.027		
	<b>12</b>	0.034	0.031		
	<b>14</b>	0.038	0.035		
	<b>16</b>	0.042	0.039		
	<b>20</b>	0.051	0.047		

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF844

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.029	0.026	0.022	0.020
8	0.038	0.034	0.028	0.026
10	0.045	0.041	0.034	0.032
12	0.052	0.047	0.039	0.036
14	0.058	0.052	0.044	0.041
16	0.065	0.058	0.049	0.045
20	0.079	0.071	0.059	0.055



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.073	0.066	0.058	0.080
8	0.095	0.085	0.076	0.104
10	0.113	0.102	0.091	0.125
12	0.130	0.117	0.104	0.143
14	0.146	0.131	0.117	0.160
16	0.162	0.146	0.130	0.178
20	0.197	0.177	0.158	0.217

**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.

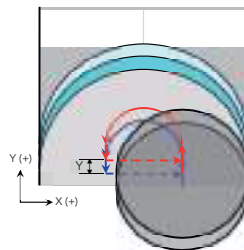
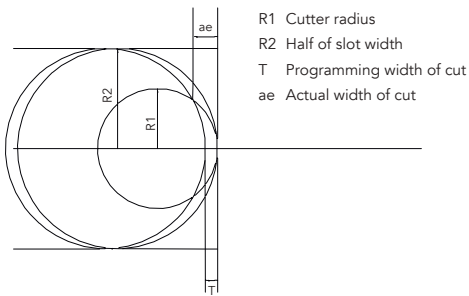
The cutting conditions are based on CNC programming with medium dynamic speed.

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.

CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH



HSS END-MILLS

CARBIDE BURRS



INFO

# HF444

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.026	0.024	0.020	0.018
8	0.034	0.031	0.026	0.024
10	0.041	0.037	0.031	0.029
12	0.047	0.042	0.035	0.033
14	0.052	0.047	0.039	0.037
16	0.058	0.052	0.044	0.041
20	0.071	0.064	0.053	0.050

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>		
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
8	0.027	0.024		
10	0.033	0.029		
12	0.037	0.034		
14	0.042	0.038		
16	0.047	0.042		
20	0.057	0.051		

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<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>
Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.031	0.028	0.025	0.035
8	0.041	0.037	0.033	0.045
10	0.049	0.044	0.039	0.054
12	0.056	0.050	0.045	0.062
14	0.063	0.057	0.050	0.069
16	0.070	0.063	0.056	0.077
20	0.085	0.077	0.068	0.094

HSS  
END-MILLS

CARBIDE  
BURRS

CUTTING PARAMETERS

INFO

### HF444

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>7° x 0.4D</b>	<b>5° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.018	0.017	0.016	0.015
	<b>8</b>	0.024	0.022	0.020	0.019
	<b>10</b>	0.029	0.027	0.025	0.023
	<b>12</b>	0.033	0.031	0.028	0.026
	<b>14</b>	0.037	0.034	0.032	0.029
<b>16</b>	0.041	0.038	0.035	0.033	
<b>20</b>	0.050	0.046	0.043	0.040	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>8</b>	0.027	0.025	0.024	0.033
	<b>10</b>	0.033	0.030	0.029	0.039
	<b>12</b>	0.037	0.034	0.033	0.045
	<b>14</b>	0.042	0.039	0.037	0.050
	<b>16</b>	0.047	0.043	0.041	0.056
<b>20</b>	0.057	0.052	0.050	0.068	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	<b>30° x D</b>	<b>15° x D</b>		
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	<b>10</b>	0.027	0.024		
	<b>12</b>	0.030	0.028		
	<b>14</b>	0.034	0.031		
	<b>16</b>	0.038	0.035		
	<b>20</b>	0.046	0.042		

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# HF444

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.026	0.024	0.020	0.018
8	0.034	0.031	0.026	0.024
10	0.041	0.037	0.031	0.029
12	0.047	0.042	0.035	0.033
14	0.052	0.047	0.039	0.037
16	0.058	0.052	0.044	0.041
20	0.071	0.064	0.053	0.050



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.066	0.059	0.052	0.072
8	0.085	0.077	0.068	0.094
10	0.102	0.092	0.082	0.112
12	0.117	0.105	0.093	0.128
14	0.131	0.118	0.105	0.144
16	0.146	0.131	0.117	0.160
20	0.177	0.160	0.142	0.195

**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.

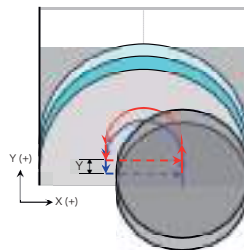
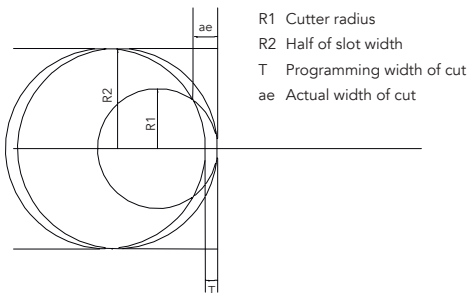
The cutting conditions are based on CNC programming with medium dynamic speed.

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.

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



HSS END-MILLS

CARBIDE BURRS

# HF445

weldon shank and reduced neck, 45° chamfer, roughing HR

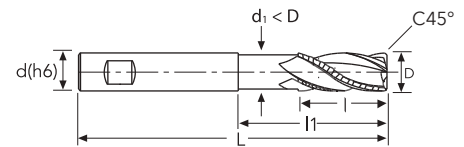


OSAWA NORM	MG PV300	<40 HRC	VH 36°/39°	C45°	HR FINE	Z4 UP
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INFO

P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable



CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D	D Tol.	C45°	C45° Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
6	0/-0.050	0.10	+/-0.020	6	13	20	5.80	57	4	HF445060	●
8	0/-0.050	0.20	+/-0.020	8	20	26	7.80	64	4	HF445080	●
10	0/-0.050	0.20	+/-0.020	10	22	30	9.80	72	4	HF445100	●
12	0/-0.050	0.20	+/-0.020	12	26	36	11.80	83	4	HF445120	●
14	0/-0.050	0.20	+/-0.020	14	26	36	13.70	83	4	HF445140	●
16	0/-0.050	0.30	+/-0.020	16	32	42	15.70	92	4	HF445160	●
20	0/-0.050	0.40	+/-0.020	20	38	50	19.70	104	4	HF445200	●

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# HF445

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.026	0.024	0.020	0.018
<b>8</b>	0.034	0.031	0.026	0.024
<b>10</b>	0.041	0.037	0.031	0.029
<b>12</b>	0.047	0.042	0.035	0.033
<b>14</b>	0.052	0.047	0.039	0.037
<b>16</b>	0.058	0.052	0.044	0.041
<b>20</b>	0.071	0.064	0.053	0.050

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>		
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
<b>8</b>	0.027	0.024		
<b>10</b>	0.033	0.029		
<b>12</b>	0.037	0.034		
<b>14</b>	0.042	0.038		
<b>16</b>	0.047	0.042		
<b>20</b>	0.057	0.051		

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1			
Hardness/Rm	≤700 N/mm <sup>2</sup>			
ap x ae	<b>2D x D</b>			
Vc (m/min)	<b>60÷80</b>			
D (mm)	fz (mm/z)			
<b>10</b>	0.024			
<b>12</b>	0.028			
<b>14</b>	0.031			
<b>16</b>	0.035			
<b>20</b>	0.043			

HSS  
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 HF444 PARAMETERS.

CUTTING PARAMETERS

INFO

### HF445

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<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>
	Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.031	0.028	0.025	0.035
	<b>8</b>	0.041	0.037	0.033	0.045
	<b>10</b>	0.049	0.044	0.039	0.054
	<b>12</b>	0.056	0.050	0.045	0.062
	<b>14</b>	0.063	0.057	0.050	0.069
<b>16</b>	0.070	0.063	0.056	0.077	
<b>20</b>	0.085	0.077	0.068	0.094	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>7° x 0.4D</b>	<b>5° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.018	0.017	0.016	0.015
	<b>8</b>	0.024	0.022	0.020	0.019
	<b>10</b>	0.029	0.027	0.025	0.023
	<b>12</b>	0.033	0.031	0.028	0.026
	<b>14</b>	0.037	0.034	0.032	0.029
<b>16</b>	0.041	0.038	0.035	0.033	
<b>20</b>	0.050	0.046	0.043	0.040	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>8</b>	0.027	0.025	0.024	0.033
	<b>10</b>	0.033	0.030	0.029	0.039
	<b>12</b>	0.037	0.034	0.033	0.045
	<b>14</b>	0.042	0.039	0.037	0.050
	<b>16</b>	0.047	0.043	0.041	0.056
<b>20</b>	0.057	0.052	0.050	0.068	

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF444 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF445

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
<b>α° x ae</b>	<b>30° x D</b>	<b>15° x D</b>		
<b>Vc (m/min)</b>	<b>80÷100</b>	<b>50÷70</b>		
<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>		
<b>10</b>	0.027	0.024		
<b>12</b>	0.030	0.028		
<b>14</b>	0.034	0.031		
<b>16</b>	0.038	0.035		
<b>20</b>	0.046	0.042		



<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>			
<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>			
<b>α° x ae</b>	<b>45° x D</b>			
<b>Vc (m/min)</b>	<b>60÷80</b>			
<b>D (mm)</b>	<b>fz (mm/z)</b>			
<b>10</b>	0.026			
<b>12</b>	0.030			
<b>14</b>	0.034			
<b>16</b>	0.038			
<b>20</b>	0.046			

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
<b>ap x ae</b>	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</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>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
<b>6</b>	0.026	0.024	0.020	0.018
<b>8</b>	0.034	0.031	0.026	0.024
<b>10</b>	0.041	0.037	0.031	0.029
<b>12</b>	0.047	0.042	0.035	0.033
<b>14</b>	0.052	0.047	0.039	0.037
<b>16</b>	0.058	0.052	0.044	0.041
<b>20</b>	0.071	0.064	0.053	0.050

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH


HSS  
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 HF444 PARAMETERS.

CUTTING PARAMETERS

**HF445**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.066	0.059	0.052	0.072	
8	0.085	0.077	0.068	0.094	
10	0.102	0.092	0.082	0.112	
12	0.117	0.105	0.093	0.128	
14	0.131	0.118	0.105	0.144	
16	0.146	0.131	0.117	0.160	
20	0.177	0.160	0.142	0.195	

**NOTES:**

Down milling CNC programming is required.

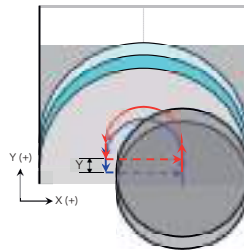
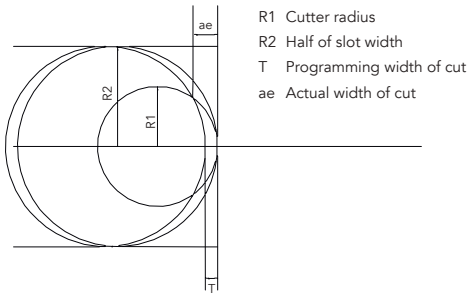
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF444 PARAMETERS.



CUTTING PARAMETERS

HF342

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.014	0.013	0.011	0.010
	<b>4</b>	0.019	0.017	0.014	0.013
	<b>5</b>	0.023	0.021	0.017	0.016
	<b>6</b>	0.027	0.024	0.020	0.019
	<b>8</b>	0.035	0.032	0.026	0.025
<b>10</b>	0.042	0.038	0.032	0.029	
<b>12</b>	0.048	0.043	0.036	0.034	
ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.017	0.015	0.013	0.018
	<b>4</b>	0.022	0.020	0.018	0.024
	<b>5</b>	0.028	0.025	0.022	0.030
	<b>6</b>	0.032	0.029	0.026	0.036
	<b>8</b>	0.042	0.038	0.034	0.046
<b>10</b>	0.050	0.045	0.040	0.055	
<b>12</b>	0.058	0.052	0.046	0.063	
ap x ae	≤ D5	1.2D x 0.3D	1.2D x 0.3D	D x 0.2D	D x 0.2D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.010	0.010	0.008	0.008
	<b>4</b>	0.013	0.013	0.011	0.010
	<b>5</b>	0.017	0.016	0.014	0.013
	<b>6</b>	0.020	0.018	0.016	0.015
	<b>8</b>	0.025	0.024	0.021	0.020
<b>10</b>	0.031	0.029	0.025	0.024	
<b>12</b>	0.035	0.033	0.029	0.027	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

# HF342

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>120÷140</b>	<b>70÷90</b>	<b>55÷75</b>	<b>25÷45</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.022	0.020	0.019	0.026
<b>8</b>	0.028	0.026	0.024	0.034
<b>10</b>	0.034	0.031	0.029	0.040
<b>12</b>	0.038	0.035	0.034	0.046



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>120÷140</b>	<b>70÷90</b>	<b>55÷75</b>	<b>25÷45</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.027	0.024	0.020	0.019
<b>8</b>	0.035	0.032	0.026	0.025
<b>10</b>	0.042	0.038	0.032	0.029
<b>12</b>	0.048	0.043	0.036	0.034

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.007	0.006	0.006	0.008
<b>4</b>	0.009	0.008	0.007	0.010
<b>5</b>	0.012	0.010	0.009	0.013
<b>6</b>	0.014	0.012	0.011	0.015
<b>8</b>	0.018	0.016	0.014	0.019
<b>10</b>	0.021	0.019	0.017	0.023
<b>12</b>	0.024	0.022	0.019	0.026
ap x ae	<b>≤ D5</b>	0.5D x D	0.25D x D	0.25D x D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION



INFO

# HF842

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>130÷150</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.014	0.013	0.011	0.010
4	0.019	0.017	0.014	0.013
5	0.023	0.021	0.017	0.016
6	0.027	0.024	0.020	0.019
8	0.035	0.032	0.026	0.025
10	0.042	0.038	0.032	0.029
12	0.048	0.043	0.036	0.034
14	0.054	0.049	0.041	0.038
16	0.060	0.054	0.045	0.042
18	0.066	0.059	0.050	0.046
20	0.073	0.066	0.055	0.051
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.017	0.015	0.013	0.018
4	0.022	0.020	0.018	0.024
5	0.028	0.025	0.022	0.030
6	0.032	0.029	0.026	0.036
8	0.042	0.038	0.034	0.046
10	0.050	0.045	0.040	0.055
12	0.058	0.052	0.046	0.063
14	0.065	0.058	0.052	0.071
16	0.072	0.065	0.058	0.079
18	0.079	0.071	0.063	0.087
20	0.088	0.079	0.070	0.096
ap x ae	≤ D5	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.010	0.010	0.008	0.008
4	0.013	0.013	0.011	0.010
5	0.017	0.016	0.014	0.013
6	0.020	0.018	0.016	0.015
8	0.025	0.024	0.021	0.020
10	0.031	0.029	0.025	0.024
12	0.035	0.033	0.029	0.027
14	0.039	0.037	0.032	0.030
16	0.044	0.041	0.036	0.034
18	0.048	0.045	0.040	0.037
20	0.053	0.050	0.044	0.041
α° x ae	≤ D5	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMTERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

### HF842

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	15° x D	10° x D	5° x D	5° x D
	Vc (m/min)	130÷150	80÷100	60÷80	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.022	0.020	0.019	0.026
	8	0.028	0.026	0.024	0.034
	10	0.034	0.031	0.029	0.040
	12	0.038	0.035	0.034	0.046
	14	0.043	0.040	0.038	0.052
	16	0.048	0.044	0.042	0.058
	18	0.053	0.048	0.046	0.063
20	0.058	0.054	0.051	0.070	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷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)	130÷150	80÷100	60÷80	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.027	0.024	0.020	0.019
	8	0.035	0.032	0.026	0.025
	10	0.042	0.038	0.032	0.029
	12	0.048	0.043	0.036	0.034
	14	0.054	0.049	0.041	0.038
	16	0.060	0.054	0.045	0.042
	18	0.066	0.059	0.050	0.046
20	0.073	0.066	0.055	0.051	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷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)	100÷120	60÷80	45÷65	20÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.007	0.006	0.006	0.008
	4	0.009	0.008	0.007	0.010
	5	0.012	0.010	0.009	0.013
	6	0.014	0.012	0.011	0.015
	8	0.018	0.016	0.014	0.019
	10	0.021	0.019	0.017	0.023
	12	0.024	0.022	0.019	0.026
14	0.027	0.024	0.022	0.030	
16	0.030	0.027	0.024	0.033	
18	0.033	0.030	0.026	0.036	
20	0.037	0.033	0.029	0.040	
ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D		

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF842

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	
Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.035	0.032	0.028	0.039	
<b>4</b>	0.046	0.042	0.037	0.051	
<b>5</b>	0.058	0.052	0.046	0.063	
<b>6</b>	0.068	0.061	0.054	0.074	
<b>8</b>	0.088	0.079	0.070	0.096	
<b>10</b>	0.105	0.095	0.084	0.116	
<b>12</b>	0.120	0.108	0.096	0.132	
<b>14</b>	0.135	0.122	0.108	0.149	
<b>16</b>	0.150	0.135	0.120	0.165	
<b>18</b>	0.165	0.149	0.132	0.182	
<b>20</b>	0.183	0.164	0.146	0.201	
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.

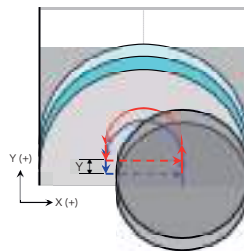
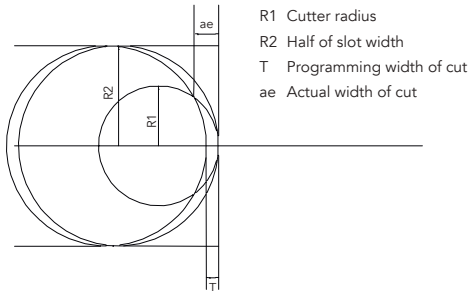
The cutting conditions are based on CNC programming with medium dynamic speed.

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.

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP**
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# HF442

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.013	0.011	0.009	0.009	
4	0.017	0.015	0.012	0.012	
5	0.021	0.019	0.016	0.014	
6	0.024	0.022	0.018	0.017	
8	0.032	0.028	0.024	0.022	
10	0.038	0.034	0.028	0.026	
12	0.043	0.039	0.032	0.030	
14	0.049	0.044	0.036	0.034	
16	0.054	0.049	0.041	0.038	
20	0.066	0.059	0.049	0.046	
ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>			
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>			
D (mm)	fz (mm/z)	fz (mm/z)			
8	0.025	0.023			
10	0.030	0.027			
12	0.035	0.031			
14	0.039	0.035			
16	0.043	0.039			
20	0.053	0.047			

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>130÷150</b>	<b>90÷140</b>	<b>60÷80</b>	<b>40÷60</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.015	0.014	0.012	0.017	
4	0.020	0.018	0.016	0.022	
5	0.025	0.022	0.020	0.027	
6	0.029	0.026	0.023	0.032	
8	0.038	0.034	0.030	0.042	
10	0.045	0.041	0.036	0.050	
12	0.052	0.047	0.041	0.057	
14	0.058	0.052	0.047	0.064	
16	0.065	0.058	0.052	0.071	
20	0.079	0.071	0.063	0.087	
ap x ae	≤ D5	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

### HF442

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.009	0.009	0.008	0.007
	<b>4</b>	0.012	0.011	0.010	0.009
	<b>5</b>	0.015	0.014	0.012	0.012
	<b>6</b>	0.018	0.016	0.015	0.014
	<b>8</b>	0.023	0.021	0.019	0.018
	<b>10</b>	0.028	0.026	0.023	0.021
	<b>12</b>	0.031	0.029	0.026	0.024
	<b>14</b>	0.035	0.033	0.029	0.027
<b>16</b>	0.039	0.037	0.032	0.030	
<b>20</b>	0.048	0.045	0.039	0.037	
α° x ae	<b>≤ D5</b>	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.019	0.018	0.017	0.023
	<b>8</b>	0.025	0.023	0.022	0.030
	<b>10</b>	0.030	0.028	0.026	0.036
	<b>12</b>	0.034	0.032	0.030	0.042
	<b>14</b>	0.039	0.036	0.034	0.047
	<b>16</b>	0.043	0.040	0.038	0.052
	<b>20</b>	0.052	0.048	0.046	0.063

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	<b>30° x D</b>	<b>15° x D</b>		
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	<b>10</b>	0.025	0.023		
	<b>12</b>	0.028	0.026		
	<b>14</b>	0.032	0.029		
	<b>16</b>	0.035	0.032		
	<b>20</b>	0.043	0.039		

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# HF442

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.024	0.022	0.018	0.017
8	0.032	0.028	0.024	0.022
10	0.038	0.034	0.028	0.026
12	0.043	0.039	0.032	0.030
14	0.049	0.044	0.036	0.034
16	0.054	0.049	0.041	0.038
20	0.066	0.059	0.049	0.046

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.006	0.006	0.005	0.007
4	0.008	0.007	0.007	0.009
5	0.010	0.009	0.008	0.011
6	0.012	0.011	0.010	0.013
8	0.016	0.014	0.013	0.017
10	0.019	0.017	0.015	0.021
12	0.022	0.019	0.017	0.024
14	0.024	0.022	0.019	0.027
16	0.027	0.024	0.022	0.030
20	0.033	0.030	0.026	0.036
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

CUTTING PARAMETERS

HF442

Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.032	0.028	0.025	0.035
4	0.042	0.037	0.033	0.046
5	0.052	0.047	0.041	0.057
6	0.061	0.055	0.049	0.067
8	0.079	0.071	0.063	0.087
10	0.095	0.085	0.076	0.104
12	0.108	0.097	0.086	0.119
14	0.122	0.109	0.097	0.134
16	0.135	0.122	0.108	0.149
20	0.164	0.148	0.131	0.181
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	



NOTES:

Down milling CNC programming is required.

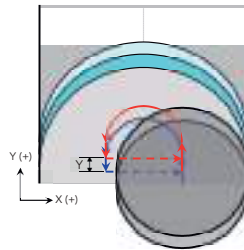
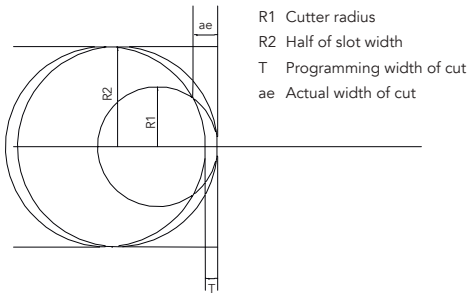
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

**HF443**

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>3</b>	0.013	0.011	0.009	0.009
	<b>4</b>	0.017	0.015	0.012	0.012
	<b>5</b>	0.021	0.019	0.016	0.014
	<b>6</b>	0.024	0.022	0.018	0.017
	<b>8</b>	0.032	0.028	0.024	0.022
	<b>10</b>	0.038	0.034	0.028	0.026
	<b>12</b>	0.043	0.039	0.032	0.030
	<b>14</b>	0.049	0.044	0.036	0.034
	<b>16</b>	0.054	0.049	0.041	0.038
<b>18</b>	0.059	0.053	0.045	0.042	
<b>20</b>	0.066	0.059	0.049	0.046	
<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>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>fz (mm/z)</b>	<b>fz (mm/z)</b>		
	<b>8</b>	0.025	0.023		
	<b>10</b>	0.030	0.027		
	<b>12</b>	0.035	0.031		
	<b>14</b>	0.039	0.035		
	<b>16</b>	0.043	0.039		
	<b>18</b>	0.048	0.043		
<b>20</b>	0.053	0.047			

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>			
	<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>fz (mm/z)</b>			
	<b>10</b>	0.023			
	<b>12</b>	0.026			
	<b>14</b>	0.029			
	<b>16</b>	0.032			
	<b>18</b>	0.036			
<b>20</b>	0.039				

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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

INFO

# HF443

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<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>
Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.015	0.014	0.012	0.017
4	0.020	0.018	0.016	0.022
5	0.025	0.022	0.020	0.027
6	0.029	0.026	0.023	0.032
8	0.038	0.034	0.030	0.042
10	0.045	0.041	0.036	0.050
12	0.052	0.047	0.041	0.057
14	0.058	0.052	0.047	0.064
16	0.065	0.058	0.052	0.071
18	0.071	0.064	0.057	0.078
20	0.079	0.071	0.063	0.087
ap x ae	≤ D5	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.009	0.009	0.008	0.007
4	0.012	0.011	0.010	0.009
5	0.015	0.014	0.012	0.012
6	0.018	0.016	0.015	0.014
8	0.023	0.021	0.019	0.018
10	0.028	0.026	0.023	0.021
12	0.031	0.029	0.026	0.024
14	0.035	0.033	0.029	0.027
16	0.039	0.037	0.032	0.030
18	0.043	0.040	0.036	0.033
20	0.048	0.045	0.039	0.037
α° x ae	≤ D5	2° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.019	0.018	0.017	0.023
8	0.025	0.023	0.022	0.030
10	0.030	0.028	0.026	0.036
12	0.034	0.032	0.030	0.042
14	0.039	0.036	0.034	0.047
16	0.043	0.040	0.038	0.052
18	0.047	0.044	0.042	0.057
20	0.052	0.048	0.046	0.063

HSS 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**

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	<b>30° x D</b>	<b>15° x D</b>		
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	<b>10</b>	0.025	0.023		
	<b>12</b>	0.028	0.026		
	<b>14</b>	0.032	0.029		
	<b>16</b>	0.035	0.032		
	<b>18</b>	0.039	0.036		
<b>20</b>	0.043	0.039			

	Material Group ISO 513	<b>P1 P2 P7 K1</b>			
	Hardness/Rm	≤700 N/mm <sup>2</sup>			
	α° x ae	<b>45° x D</b>			
	Vc (m/min)	<b>60÷80</b>			
	D (mm)	fz (mm/z)			
	<b>10</b>	0.024			
	<b>12</b>	0.028			
	<b>14</b>	0.031			
	<b>16</b>	0.035			
	<b>18</b>	0.038			
<b>20</b>	0.042				

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.024	0.022	0.018	0.017
	<b>8</b>	0.032	0.028	0.024	0.022
	<b>10</b>	0.038	0.034	0.028	0.026
	<b>12</b>	0.043	0.039	0.032	0.030
	<b>14</b>	0.049	0.044	0.036	0.034
	<b>16</b>	0.054	0.049	0.041	0.038
	<b>18</b>	0.059	0.053	0.045	0.042
<b>20</b>	0.066	0.059	0.049	0.046	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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.

INFO

# HF443

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.006	0.006	0.005	0.007
4	0.008	0.007	0.007	0.009
5	0.010	0.009	0.008	0.011
6	0.012	0.011	0.010	0.013
8	0.016	0.014	0.013	0.017
10	0.019	0.017	0.015	0.021
12	0.022	0.019	0.017	0.024
14	0.024	0.022	0.019	0.027
16	0.027	0.024	0.022	0.030
18	0.030	0.027	0.024	0.033
20	0.033	0.030	0.026	0.036
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.032	0.028	0.025	0.035
4	0.042	0.037	0.033	0.046
5	0.052	0.047	0.041	0.057
6	0.061	0.055	0.049	0.067
8	0.079	0.071	0.063	0.087
10	0.095	0.085	0.076	0.104
12	0.108	0.097	0.086	0.119
14	0.122	0.109	0.097	0.134
16	0.135	0.122	0.108	0.149
18	0.149	0.134	0.119	0.163
20	0.164	0.148	0.131	0.181
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

**NOTES:**

Down milling CNC programming is required.

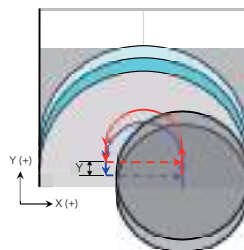
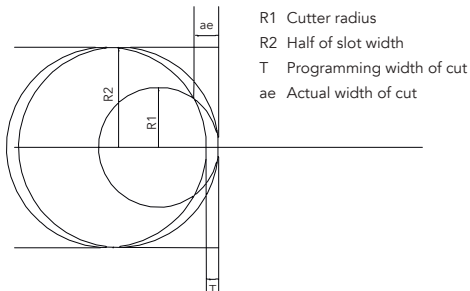
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



HSS 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.

# HF542

cylindrical shank and reduced neck, long reach, corner radius



OSAWA  
NORM

MG  
PV300

<40  
HRC

VH 36°/39°

RADIUS

Z4 UP

INFO

P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable

SLOTTING

SIDE MILLING

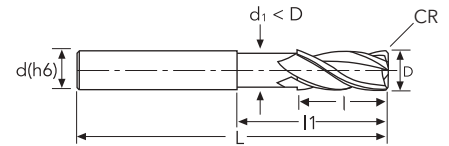
HELICAL

RAMPING

VERTICAL

DRILLING

TROCHOIDAL



CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
6	0/-0.030	0.30	+/-0.020	6	12	30	5.80	75	4	HF5420306075	●
6	0/-0.030	0.50	+/-0.020	6	12	30	5.80	75	4	HF5420506075	●
6	0/-0.030	1.00	+/-0.020	6	12	30	5.80	75	4	HF5421006075	●
6	0/-0.030	0.30	+/-0.020	6	12	30	5.80	100	4	HF54203060100	●
6	0/-0.030	0.50	+/-0.020	6	12	30	5.80	100	4	HF54205060100	●
6	0/-0.030	1.00	+/-0.020	6	12	30	5.80	100	4	HF54210060100	●
8	0/-0.030	0.50	+/-0.020	8	16	40	7.80	100	4	HF54205080100	●
8	0/-0.030	1.00	+/-0.020	8	16	40	7.80	100	4	HF54210080100	●
8	0/-0.030	2.00	+/-0.020	8	16	40	7.80	100	4	HF54220080100	●
10	0/-0.030	0.50	+/-0.020	10	20	50	9.80	125	4	HF54205100125	●
10	0/-0.030	1.00	+/-0.020	10	20	50	9.80	125	4	HF54210100125	●
10	0/-0.030	2.00	+/-0.020	10	20	50	9.80	125	4	HF54220100125	●
12	0/-0.030	0.50	+/-0.020	12	24	60	11.80	125	4	HF54205120125	●
12	0/-0.030	1.00	+/-0.020	12	24	60	11.80	125	4	HF54210120125	●
12	0/-0.030	2.00	+/-0.020	12	24	60	11.80	125	4	HF54220120125	●
12	0/-0.030	3.00	+/-0.020	12	24	60	11.80	125	4	HF54230120125	●
12	0/-0.030	0.50	+/-0.020	12	24	60	11.80	150	4	HF54205120150	●
12	0/-0.030	1.00	+/-0.020	12	24	60	11.80	150	4	HF54210120150	●
12	0/-0.030	2.00	+/-0.020	12	24	60	11.80	150	4	HF54220120150	●
12	0/-0.030	3.00	+/-0.020	12	24	60	11.80	150	4	HF54230120150	●
16	0/-0.030	0.50	+/-0.020	16	32	80	15.70	150	4	HF54205160150	●
16	0/-0.030	1.00	+/-0.020	16	32	80	15.70	150	4	HF54210160150	●
16	0/-0.030	2.00	+/-0.020	16	32	80	15.70	150	4	HF54220160150	●
16	0/-0.030	3.00	+/-0.020	16	32	80	15.70	150	4	HF54230160150	●
16	0/-0.030	4.00	+/-0.020	16	32	80	15.70	150	4	HF54240160150	●
20	0/-0.030	0.50	+/-0.020	20	40	100	19.70	150	4	HF54205200150	●
20	0/-0.030	1.00	+/-0.020	20	40	100	19.70	150	4	HF54210200150	●
20	0/-0.030	2.00	+/-0.020	20	40	100	19.70	150	4	HF54220200150	●
20	0/-0.030	3.00	+/-0.020	20	40	100	19.70	150	4	HF54230200150	●
20	0/-0.030	4.00	+/-0.020	20	40	100	19.70	150	4	HF54240200150	●

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

# HF542

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	<b>0.2D x D</b>
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.019	0.017	0.015	0.014
8	0.025	0.023	0.019	0.018
10	0.030	0.027	0.023	0.021
12	0.035	0.031	0.026	0.024
14	0.039	0.035	0.029	0.027
16	0.043	0.039	0.032	0.030
20	0.053	0.047	0.039	0.037



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.023	0.021	0.019	0.026
8	0.030	0.027	0.024	0.033
10	0.036	0.033	0.029	0.040
12	0.041	0.037	0.033	0.046
14	0.047	0.042	0.037	0.051
16	0.052	0.047	0.041	0.057
20	0.063	0.057	0.050	0.069



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.015	0.014	0.012	0.012
8	0.019	0.018	0.015	0.016
10	0.023	0.022	0.018	0.019
12	0.026	0.025	0.021	0.022
14	0.029	0.028	0.023	0.025
16	0.033	0.031	0.026	0.027
20	0.040	0.038	0.032	0.033



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>7° x D</b>	<b>5° x D</b>	<b>3° x D</b>	<b>3° x D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>35÷55</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.016	0.015	0.015	0.021
8	0.021	0.020	0.019	0.027
10	0.025	0.024	0.023	0.032
12	0.029	0.027	0.027	0.037
14	0.033	0.031	0.030	0.041
16	0.036	0.034	0.033	0.046
20	0.044	0.041	0.040	0.056

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

CUTTING PARAMETERS

# HF542

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>45÷55</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.019	0.017	0.015	0.014
	<b>8</b>	0.025	0.023	0.019	0.018
	<b>10</b>	0.030	0.027	0.023	0.021
	<b>12</b>	0.035	0.031	0.026	0.024
	<b>14</b>	0.039	0.035	0.029	0.027
<b>16</b>	0.043	0.039	0.032	0.030	
<b>20</b>	0.053	0.047	0.039	0.037	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>70÷90</b>	<b>50÷60</b>	<b>35÷45</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.010	0.009	0.008	0.011
	<b>8</b>	0.013	0.011	0.010	0.014
	<b>10</b>	0.015	0.014	0.012	0.017
	<b>12</b>	0.017	0.016	0.014	0.019
	<b>14</b>	0.019	0.017	0.016	0.021
<b>16</b>	0.022	0.019	0.017	0.024	
<b>20</b>	0.026	0.024	0.021	0.029	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION



CUTTING PARAMETERS

INFO

### HF942

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>4</b>	0.016	0.015	0.013	0.018
	<b>5</b>	0.021	0.019	0.017	0.023
	<b>6</b>	0.026	0.023	0.021	0.029
	<b>8</b>	0.031	0.028	0.025	0.034
	<b>10</b>	0.036	0.033	0.029	0.040
<b>12</b>	0.041	0.037	0.033	0.045	
<b>16</b>	0.047	0.042	0.038	0.052	
<b>20</b>	0.063	0.057	0.051	0.070	
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.1D	1.2D x 0.1D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
	Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>4</b>	0.010	0.010	0.008	0.009
	<b>5</b>	0.013	0.013	0.011	0.011
	<b>6</b>	0.016	0.016	0.013	0.014
	<b>8</b>	0.019	0.018	0.015	0.016
	<b>10</b>	0.023	0.022	0.018	0.019
<b>12</b>	0.026	0.025	0.021	0.022	
<b>16</b>	0.030	0.028	0.024	0.025	
<b>20</b>	0.040	0.038	0.032	0.033	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

# HF942

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	5° x D	5° x D	3° x D	3° x D
Vc (m/min)	80÷100	50÷70	35÷55	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.012	0.011	0.010	0.014
5	0.015	0.014	0.014	0.019
6	0.019	0.017	0.017	0.023
8	0.022	0.020	0.020	0.027
10	0.027	0.024	0.023	0.032
12	0.030	0.027	0.026	0.036
16	0.034	0.031	0.030	0.041
20	0.046	0.042	0.041	0.056

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷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)	80÷100	50÷70	35÷55	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.014	0.012	0.010	0.010
5	0.018	0.016	0.013	0.012
6	0.022	0.019	0.016	0.015
8	0.026	0.023	0.019	0.018
10	0.030	0.027	0.023	0.021
12	0.034	0.031	0.026	0.024
16	0.039	0.035	0.029	0.027
20	0.053	0.048	0.040	0.037

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	D x 0.5D	D x 0.5D
Vc (m/min)	70÷90	50÷60	35÷45	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.007	0.006	0.005	0.007
5	0.009	0.008	0.007	0.010
6	0.011	0.010	0.009	0.012
8	0.013	0.012	0.010	0.014
10	0.015	0.014	0.012	0.017
12	0.017	0.015	0.014	0.019
16	0.020	0.018	0.016	0.022
20	0.026	0.024	0.021	0.029

HSS END-MILLS

ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D
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CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

**HF942**

	<b>Material Group ISO 513</b>	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	<b>ap x ae</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	<b>Vc (m/min)</b>	<b>140÷160</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>4</b>	0.034	0.031	0.027	0.037
	<b>5</b>	0.044	0.040	0.035	0.048
	<b>6</b>	0.054	0.049	0.043	0.059
	<b>8</b>	0.064	0.058	0.051	0.070
	<b>10</b>	0.076	0.068	0.061	0.084
	<b>12</b>	0.086	0.077	0.069	0.095
	<b>16</b>	0.098	0.088	0.078	0.108
<b>20</b>	0.132	0.119	0.106	0.145	
<b>ap x ae</b>	<b>≤ D5</b>	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.05D	1.2D x 0.05D

**NOTES:**

Down milling CNC programming is required.

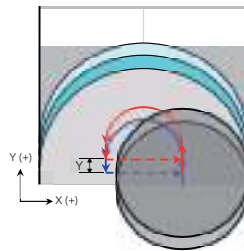
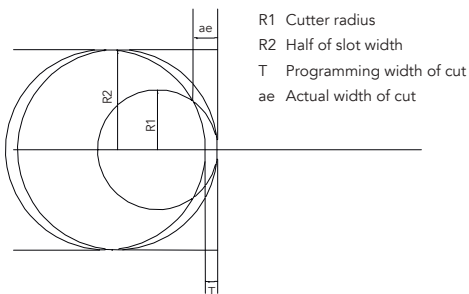
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION



CUTTING PARAMETERS

**HF943**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.016	0.015	0.013	0.018
	5	0.021	0.019	0.017	0.023
	6	0.026	0.023	0.021	0.029
	8	0.031	0.028	0.025	0.034
	10	0.036	0.033	0.029	0.040
12	0.041	0.037	0.033	0.045	
16	0.047	0.042	0.038	0.052	
20	0.063	0.057	0.051	0.070	
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.1D	1.2D x 0.1D

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
	Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.010	0.010	0.008	0.009
	5	0.013	0.013	0.011	0.011
	6	0.016	0.016	0.013	0.014
	8	0.019	0.018	0.015	0.016
	10	0.023	0.022	0.018	0.019
12	0.026	0.025	0.021	0.022	
16	0.030	0.028	0.024	0.025	
20	0.040	0.038	0.032	0.033	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF942 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF943

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	5° x D	5° x D	3° x D	3° x D
Vc (m/min)	80÷100	50÷70	35÷55	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.012	0.011	0.010	0.014
5	0.015	0.014	0.014	0.019
6	0.019	0.017	0.017	0.023
8	0.022	0.020	0.020	0.027
10	0.027	0.024	0.023	0.032
12	0.030	0.027	0.026	0.036
16	0.034	0.031	0.030	0.041
20	0.046	0.042	0.041	0.056

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷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)	80÷100	50÷70	35÷55	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.014	0.012	0.010	0.010
5	0.018	0.016	0.013	0.012
6	0.022	0.019	0.016	0.015
8	0.026	0.023	0.019	0.018
10	0.030	0.027	0.023	0.021
12	0.034	0.031	0.026	0.024
16	0.039	0.035	0.029	0.027
20	0.053	0.048	0.040	0.037

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	D x 0.5D	D x 0.5D
Vc (m/min)	70÷90	50÷60	35÷45	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.007	0.006	0.005	0.007
5	0.009	0.008	0.007	0.010
6	0.011	0.010	0.009	0.012
8	0.013	0.012	0.010	0.014
10	0.015	0.014	0.012	0.017
12	0.017	0.015	0.014	0.019
16	0.020	0.018	0.016	0.022
20	0.026	0.024	0.021	0.029

HSS  
END-MILLS

ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D
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CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF942 PARAMETERS.

CUTTING PARAMETERS

**HF943**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>140÷160</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>4</b>	0.034	0.031	0.027	0.037	
<b>5</b>	0.044	0.040	0.035	0.048	
<b>6</b>	0.054	0.049	0.043	0.059	
<b>8</b>	0.064	0.058	0.051	0.070	
<b>10</b>	0.076	0.068	0.061	0.084	
<b>12</b>	0.086	0.077	0.069	0.095	
<b>16</b>	0.098	0.088	0.078	0.108	
<b>20</b>	0.132	0.119	0.106	0.145	
<b>ap x ae</b>	<b>≤ D5</b>	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.05D	1.2D x 0.05D

**NOTES:**

Down milling CNC programming is required.

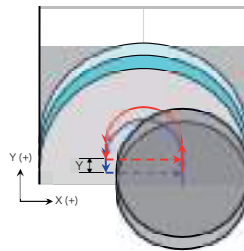
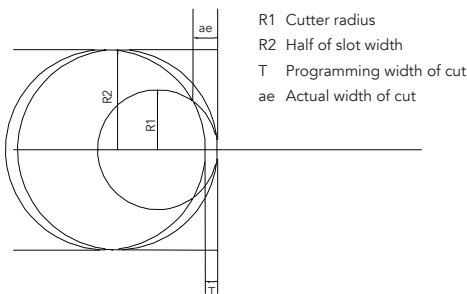
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF942 PARAMETERS.



CUTTING PARAMETERS

INFO

**HF642**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<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>
	Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.019	0.017	0.015	0.021
	5	0.023	0.021	0.019	0.026
	6	0.028	0.025	0.022	0.030
	8	0.036	0.032	0.029	0.039
	10	0.043	0.039	0.034	0.047
12	0.049	0.044	0.039	0.054	
14	0.055	0.050	0.044	0.061	
16	0.061	0.055	0.049	0.067	
20	0.074	0.067	0.060	0.082	
ap x ae	≤ D5	1.5D x 0.3D	1.5D x 0.3D	1.2D x 0.2D	1.2D x 0.2D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.011	0.011	0.009	0.009
	5	0.014	0.013	0.012	0.011
	6	0.017	0.016	0.014	0.013
	8	0.022	0.020	0.018	0.017
	10	0.026	0.024	0.021	0.020
12	0.030	0.028	0.024	0.023	
14	0.033	0.031	0.028	0.026	
16	0.037	0.035	0.031	0.029	
20	0.045	0.042	0.037	0.035	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.018	0.017	0.016	0.022
	8	0.024	0.022	0.021	0.029
	10	0.028	0.026	0.025	0.034
	12	0.033	0.030	0.029	0.039
	14	0.037	0.034	0.032	0.044
16	0.041	0.037	0.036	0.049	
20	0.050	0.046	0.043	0.060	

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF642

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.023	0.021	0.017	0.016	
<b>8</b>	0.030	0.027	0.022	0.021	
<b>10</b>	0.036	0.032	0.027	0.025	
<b>12</b>	0.041	0.037	0.031	0.029	
<b>14</b>	0.046	0.041	0.034	0.032	
<b>16</b>	0.051	0.046	0.038	0.036	
<b>20</b>	0.062	0.056	0.047	0.043	

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>4</b>	0.039	0.035	0.031	0.043	
<b>5</b>	0.049	0.044	0.039	0.054	
<b>6</b>	0.057	0.052	0.046	0.063	
<b>8</b>	0.074	0.067	0.060	0.082	
<b>10</b>	0.089	0.080	0.071	0.098	
<b>12</b>	0.102	0.092	0.082	0.112	
<b>14</b>	0.115	0.103	0.092	0.126	
<b>16</b>	0.128	0.115	0.102	0.140	
<b>20</b>	0.155	0.140	0.124	0.171	
ap x ae	<b>≤ D5</b>	1.5D x 0.1D	1.5D x 0.1D	D x 0.1D	D x 0.1D

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

**NOTES:**

Down milling CNC programming is required.

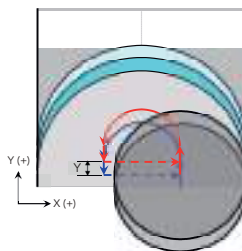
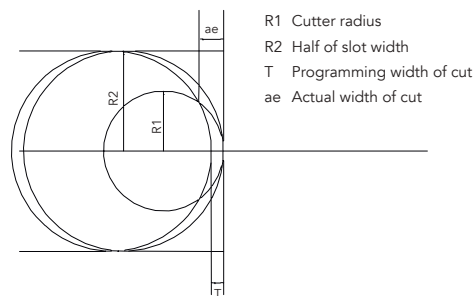
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



HSS END-MILLS

CARBIDE BURRS



INFO

# HF643

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<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>
Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.019	0.017	0.015	0.021
5	0.023	0.021	0.019	0.026
6	0.028	0.025	0.022	0.030
8	0.036	0.032	0.029	0.039
10	0.043	0.039	0.034	0.047
12	0.049	0.044	0.039	0.054
14	0.055	0.050	0.044	0.061
16	0.061	0.055	0.049	0.067
20	0.074	0.067	0.060	0.082
ap x ae	≤ D5	1.5D x 0.3D	1.5D x 0.3D	1.2D x 0.2D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.011	0.011	0.009	0.009
5	0.014	0.013	0.012	0.011
6	0.017	0.016	0.014	0.013
8	0.022	0.020	0.018	0.017
10	0.026	0.024	0.021	0.020
12	0.030	0.028	0.024	0.023
14	0.033	0.031	0.028	0.026
16	0.037	0.035	0.031	0.029
20	0.045	0.042	0.037	0.035
α° x ae	≤ D5	2° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.018	0.017	0.016	0.022
8	0.024	0.022	0.021	0.029
10	0.028	0.026	0.025	0.034
12	0.033	0.030	0.029	0.039
14	0.037	0.034	0.032	0.044
16	0.041	0.037	0.036	0.049
20	0.050	0.046	0.043	0.060

HSS 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 HF642 PARAMETERS.

CUTTING PARAMETERS

HF643

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.023	0.021	0.017	0.016
	8	0.030	0.027	0.022	0.021
	10	0.036	0.032	0.027	0.025
	12	0.041	0.037	0.031	0.029
	14	0.046	0.041	0.034	0.032
16	0.051	0.046	0.038	0.036	
20	0.062	0.056	0.047	0.043	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.039	0.035	0.031	0.043
	5	0.049	0.044	0.039	0.054
	6	0.057	0.052	0.046	0.063
	8	0.074	0.067	0.060	0.082
	10	0.089	0.080	0.071	0.098
12	0.102	0.092	0.082	0.112	
14	0.115	0.103	0.092	0.126	
16	0.128	0.115	0.102	0.140	
20	0.155	0.140	0.124	0.171	
ap x ae	<b>≤ D5</b>	1.5D x 0.1D	1.5D x 0.1D	D x 0.1D	D x 0.1D

NOTES:

Down milling CNC programming is required.

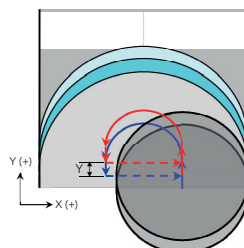
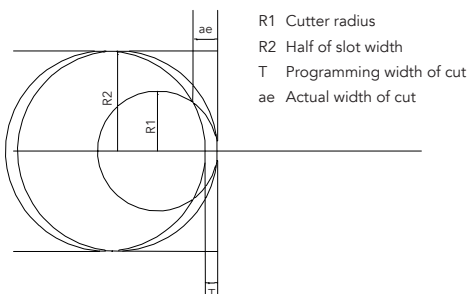
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF642 PARAMETERS.



CUTTING PARAMETERS

HF742

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.023	0.021	0.019	0.026
	8	0.028	0.025	0.022	0.030
	10	0.033	0.030	0.026	0.036
	12	0.037	0.033	0.030	0.041
	16	0.042	0.038	0.034	0.047
20	0.057	0.051	0.046	0.063	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
	Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.016	0.016	0.013	0.014
	8	0.019	0.018	0.015	0.016
	10	0.023	0.022	0.018	0.019
	12	0.026	0.025	0.021	0.022
	16	0.030	0.028	0.024	0.025
20	0.040	0.038	0.032	0.033	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x D</b>	<b>4° x D</b>	<b>3° x D</b>	<b>3° x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>35÷55</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.017	0.016	0.015	0.021
	8	0.020	0.019	0.018	0.024
	10	0.024	0.022	0.021	0.029
	12	0.027	0.025	0.024	0.033
	16	0.031	0.029	0.027	0.037
20	0.042	0.039	0.037	0.050	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# HF742

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>80±100</b>	<b>50±70</b>	<b>35±55</b>	<b>20±30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.022	0.019	0.016	0.015
	8	0.026	0.023	0.019	0.018
	10	0.030	0.027	0.023	0.021
	12	0.034	0.031	0.026	0.024
	16	0.039	0.035	0.029	0.027
20	0.053	0.048	0.040	0.037	

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>3D x 0.1D</b>	<b>3D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>
	Vc (m/min)	<b>130±170</b>	<b>100±120</b>	<b>70±90</b>	<b>40±60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.054	0.049	0.043	0.059
	8	0.064	0.058	0.051	0.070
	10	0.076	0.068	0.061	0.084
	12	0.086	0.077	0.069	0.095
	16	0.098	0.088	0.078	0.108
20	0.132	0.119	0.106	0.145	

**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.

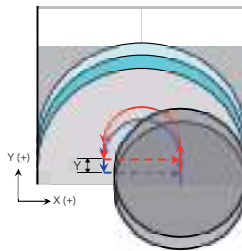
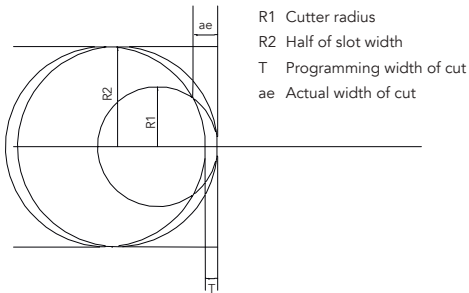
The cutting conditions are based on CNC programming with medium dynamic speed.

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.

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

INFO

# HF743

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.023	0.021	0.019	0.026
8	0.028	0.025	0.022	0.030
10	0.033	0.030	0.026	0.036
12	0.037	0.033	0.030	0.041
16	0.042	0.038	0.034	0.047
20	0.057	0.051	0.046	0.063



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.016	0.016	0.013	0.014
8	0.019	0.018	0.015	0.016
10	0.023	0.022	0.018	0.019
12	0.026	0.025	0.021	0.022
16	0.030	0.028	0.024	0.025
20	0.040	0.038	0.032	0.033

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x D</b>	<b>4° x D</b>	<b>3° x D</b>	<b>3° x D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>35÷55</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.017	0.016	0.015	0.021
8	0.020	0.019	0.018	0.024
10	0.024	0.022	0.021	0.029
12	0.027	0.025	0.024	0.033
16	0.031	0.029	0.027	0.037
20	0.042	0.039	0.037	0.050

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
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 HF742 PARAMETERS.

CUTTING PARAMETERS

HF743

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>80±100</b>	<b>50±70</b>	<b>35±55</b>	<b>20±30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.022	0.019	0.016	0.015
	8	0.026	0.023	0.019	0.018
	10	0.030	0.027	0.023	0.021
	12	0.034	0.031	0.026	0.024
	16	0.039	0.035	0.029	0.027
20	0.053	0.048	0.040	0.037	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>3D x 0.1D</b>	<b>3D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>
	Vc (m/min)	<b>130±170</b>	<b>100±120</b>	<b>70±90</b>	<b>40±60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.054	0.049	0.043	0.059
	8	0.064	0.058	0.051	0.070
	10	0.076	0.068	0.061	0.084
	12	0.086	0.077	0.069	0.095
	16	0.098	0.088	0.078	0.108
20	0.132	0.119	0.106	0.145	

NOTES:

Down milling CNC programming is required.

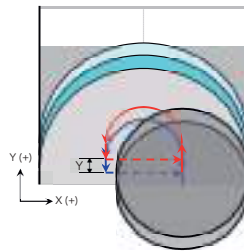
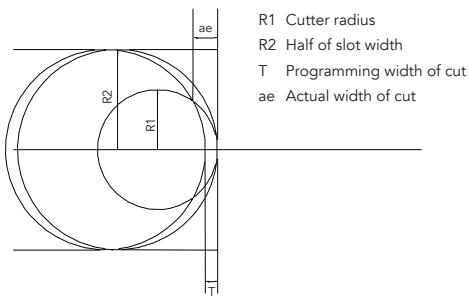
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



INFO

CARBIDE DRILLS

PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
**HFVH/UP**  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
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INFO

# HF871

weldon shank, SC smooth cut for low cutting force, chamfer + radius



from D1 to D2.5: cylindrical shank



C+R  
from D3: weldon shank

CARBIDE DRILLS

PU-HPU  
TA-4HTA

SUH

ALH

HRC

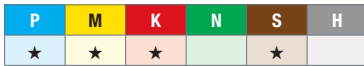
SUH MINI

HL

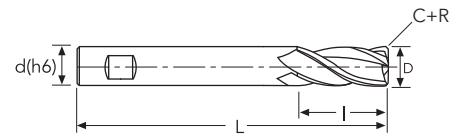
HSD

C-SD-TA

Replaces HF861 with new general dimensions



★ 1st choice ☆ suitable



D	D Tol.	C+R	C+R Tol	d(h6)	l	l1	d1	L	z	EDP No.	Stock
1	0/-0.020	0.1	+/-0.020	4	3			50	4	HF871010	●
1.5	0/-0.020	0.1	+/-0.020	4	4.5			50	4	HF871015	●
2	0/-0.020	0.1	+/-0.020	4	6.5			50	4	HF871020	●
2.5	0/-0.020	0.1	+/-0.020	4	6.5			50	4	HF871025	●
3	0/-0.025	0.1	+/-0.020	6	9			50	4	HF871030	●
3.5	0/-0.025	0.1	+/-0.020	6	11			57	4	HF871035	●
4	0/-0.025	0.1	+/-0.020	6	11			57	4	HF871040	●
4.5	0/-0.025	0.1	+/-0.020	6	13			57	4	HF871045	●
5	0/-0.025	0.1	+/-0.020	6	13			57	4	HF871050	●
6	0/-0.025	0.1	+/-0.020	6	13			57	4	HF871060	●
7	0/-0.030	0.2	+/-0.020	8	20			64	4	HF871070	●
8	0/-0.030	0.2	+/-0.020	8	20			64	4	HF871080	●
9	0/-0.030	0.2	+/-0.020	10	22			72	4	HF871090	●
10	0/-0.030	0.2	+/-0.020	10	22			72	4	HF871100	●
11	0/-0.030	0.2	+/-0.020	12	26			83	4	HF871110	●
12	0/-0.030	0.2	+/-0.020	12	26			83	4	HF871120	●
13	0/-0.030	0.2	+/-0.020	14	26			83	4	HF871130	●
14	0/-0.030	0.2	+/-0.020	14	26			83	4	HF871140	●
15	0/-0.030	0.2	+/-0.020	16	32			92	4	HF871150	●
16	0/-0.030	0.2	+/-0.020	16	32			92	4	HF871160	●
18	0/-0.030	0.2	+/-0.020	18	32			92	4	HF871180	●
20	0/-0.030	0.2	+/-0.020	20	38			104	4	HF871200	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA

HFVH/UP

MEF

ALU

MEX/MH

UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

**HF871**

	<b>Material Group ISO 513</b>	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>1</b>	0.005	0.005	0.004	0.004
	<b>2</b>	0.010	0.009	0.008	0.007
	<b>3</b>	0.014	0.013	0.011	0.010
	<b>4</b>	0.019	0.017	0.014	0.013
	<b>5</b>	0.023	0.021	0.017	0.016
	<b>6</b>	0.027	0.024	0.020	0.019
	<b>8</b>	0.035	0.032	0.026	0.025
	<b>10</b>	0.042	0.038	0.032	0.029
	<b>12</b>	0.048	0.043	0.036	0.034
	<b>14</b>	0.054	0.049	0.041	0.038
<b>16</b>	0.060	0.054	0.045	0.042	
<b>18</b>	0.066	0.059	0.050	0.046	
<b>20</b>	0.073	0.066	0.055	0.051	
<b>ap x ae</b>	<b>D1</b>	0.25D x D	0.25D x D	0.2D x D	0.2D x D
<b>ap x ae</b>	<b>≤ D3</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 P7 K1	P3 P4 M1 K2 K3		
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷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>100÷120</b>	<b>60÷80</b>		
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>		
	<b>8</b>	0.028	0.025		
	<b>10</b>	0.034	0.030		
	<b>12</b>	0.038	0.035		
	<b>14</b>	0.043	0.039		
	<b>16</b>	0.048	0.043		
	<b>18</b>	0.053	0.048		
<b>20</b>	0.058	0.053			

	<b>Material Group ISO 513</b>	P1 P2 P7 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>75÷95</b>			
	<b>D (mm)</b>	<b>fz (mm/z)</b>			
	<b>10</b>	0.025			
	<b>12</b>	0.029			
	<b>14</b>	0.032			
	<b>16</b>	0.036			
	<b>18</b>	0.040			
<b>20</b>	0.044				

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF840 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF871

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<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>
Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.006	0.005	0.005	0.007
2	0.012	0.011	0.010	0.013
3	0.017	0.015	0.013	0.018
4	0.022	0.020	0.018	0.024
5	0.028	0.025	0.022	0.030
6	0.032	0.029	0.026	0.036
8	0.042	0.038	0.034	0.046
10	0.050	0.045	0.040	0.055
12	0.058	0.052	0.046	0.063
14	0.065	0.058	0.052	0.071
16	0.072	0.065	0.058	0.079
18	0.079	0.071	0.063	0.087
20	0.088	0.079	0.070	0.096
ap x ae	≤ D3	1.5D x 0.1D	1.2D x 0.1D	1.2D x 0.1D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.004	0.003	0.003	0.003
2	0.007	0.007	0.006	0.006
3	0.010	0.010	0.008	0.008
4	0.013	0.013	0.011	0.010
5	0.017	0.016	0.014	0.013
6	0.020	0.018	0.016	0.015
8	0.025	0.024	0.021	0.020
10	0.031	0.029	0.025	0.024
12	0.035	0.033	0.029	0.027
14	0.039	0.037	0.032	0.030
16	0.044	0.041	0.036	0.034
18	0.048	0.045	0.040	0.037
20	0.053	0.050	0.044	0.041
α° x ae	≤ D3	1° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
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 HF840 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF871

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.022	0.020	0.019	0.026
	<b>8</b>	0.028	0.026	0.024	0.034
	<b>10</b>	0.034	0.031	0.029	0.040
	<b>12</b>	0.038	0.035	0.034	0.046
	<b>14</b>	0.043	0.040	0.038	0.052
	<b>16</b>	0.048	0.044	0.042	0.058
<b>18</b>	0.053	0.048	0.046	0.063	
<b>20</b>	0.058	0.054	0.051	0.070	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	<b>30° x D</b>	<b>15° x D</b>		
	Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	<b>10</b>	0.025	0.023		
	<b>12</b>	0.028	0.026		
	<b>14</b>	0.032	0.029		
	<b>16</b>	0.035	0.032		
	<b>18</b>	0.039	0.036		
	<b>20</b>	0.043	0.039		

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.027	0.024	0.020	0.019
	<b>8</b>	0.035	0.032	0.026	0.025
	<b>10</b>	0.042	0.038	0.032	0.029
	<b>12</b>	0.048	0.043	0.036	0.034
	<b>14</b>	0.054	0.049	0.041	0.038
	<b>16</b>	0.060	0.054	0.045	0.042
<b>18</b>	0.066	0.059	0.050	0.046	
<b>20</b>	0.073	0.066	0.055	0.051	

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF840 PARAMETERS.

INFO

# HF871

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.002	0.002	0.003
2	0.005	0.005	0.004	0.006
3	0.007	0.006	0.006	0.008
4	0.009	0.008	0.007	0.010
5	0.012	0.010	0.009	0.013
6	0.014	0.012	0.011	0.015
8	0.018	0.016	0.014	0.019
10	0.021	0.019	0.017	0.023
12	0.024	0.022	0.019	0.026
14	0.027	0.024	0.022	0.030
16	0.030	0.027	0.024	0.033
18	0.033	0.030	0.026	0.036
20	0.037	0.033	0.029	0.040
ap x ae	≤ D3	0.5D x D	0.25D x D	0.25D x D

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.013	0.011	0.010	0.014
2	0.025	0.023	0.020	0.028
3	0.035	0.032	0.028	0.039
4	0.046	0.042	0.037	0.051
5	0.058	0.052	0.046	0.063
6	0.068	0.061	0.054	0.074
8	0.088	0.079	0.070	0.096
10	0.105	0.095	0.084	0.116
12	0.120	0.108	0.096	0.132
14	0.135	0.122	0.108	0.149
16	0.150	0.135	0.120	0.165
18	0.165	0.149	0.132	0.182
20	0.183	0.164	0.146	0.201
ap x ae	<b>D1</b>	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
ap x ae	≤ D3	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.1D

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

**NOTES:**

Down milling CNC programming is required.

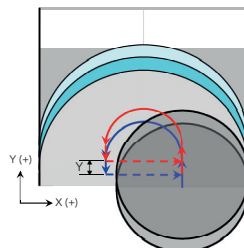
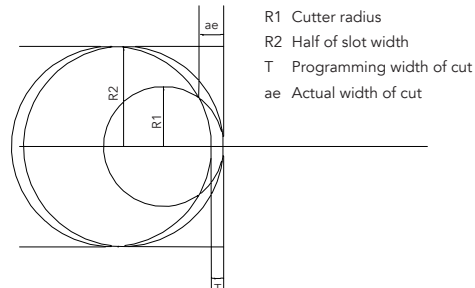
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF840 PARAMETERS.



CUTTING PARAMETERS

INFO

# HF850

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	
Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.012	0.011	0.009	0.008	
4	0.016	0.014	0.012	0.011	
5	0.020	0.018	0.015	0.014	
6	0.023	0.021	0.017	0.016	
8	0.030	0.027	0.022	0.021	
10	0.036	0.032	0.027	0.025	
12	0.041	0.037	0.031	0.029	
14	0.046	0.041	0.034	0.032	
16	0.051	0.046	0.038	0.036	
20	0.062	0.056	0.047	0.043	
ap x ae	≤ D5	0.3D x D	0.3D x D	0.2D x D	0.1D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>100÷120</b>	<b>70÷90</b>	<b>50÷70</b>	<b>40÷60</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.014	0.013	0.011	0.016	
4	0.019	0.017	0.015	0.021	
5	0.023	0.021	0.019	0.026	
6	0.028	0.025	0.022	0.030	
8	0.036	0.032	0.029	0.039	
10	0.043	0.039	0.034	0.047	
12	0.049	0.044	0.039	0.054	
14	0.055	0.050	0.044	0.061	
16	0.061	0.055	0.049	0.067	
20	0.074	0.067	0.060	0.082	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.1D	D x 0.1D	D x 0.05D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>	
Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.009	0.008	0.007	0.008	
4	0.011	0.011	0.009	0.010	
5	0.014	0.013	0.012	0.012	
6	0.017	0.016	0.014	0.015	
8	0.022	0.020	0.018	0.019	
10	0.026	0.024	0.021	0.023	
12	0.030	0.028	0.024	0.026	
14	0.033	0.031	0.028	0.029	
16	0.037	0.035	0.031	0.032	
20	0.045	0.042	0.037	0.039	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

HF850

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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)	80÷100	60÷80	40÷60	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.020	0.019	0.018	0.027
	8	0.026	0.024	0.023	0.035
	10	0.031	0.029	0.027	0.043
	12	0.036	0.033	0.031	0.049
	14	0.040	0.037	0.035	0.055
16	0.045	0.042	0.039	0.061	
20	0.054	0.051	0.048	0.074	

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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)	80÷100	60÷80	40÷60	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.023	0.021	0.017	0.016
	8	0.030	0.027	0.022	0.021
	10	0.036	0.032	0.027	0.025
	12	0.041	0.037	0.031	0.029
	14	0.046	0.041	0.034	0.032
16	0.051	0.046	0.038	0.036	
20	0.062	0.056	0.047	0.043	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF850

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
Hardness/Rm					
ap x ae	<b>1-5D x 0.1D</b>	<b>1-5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>130÷150</b>	<b>100÷120</b>	<b>60÷80</b>	<b>50÷70</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
<b>3</b>	0.027	0.024	0.021	0.029	
<b>4</b>	0.035	0.032	0.028	0.039	
<b>5</b>	0.044	0.040	0.035	0.048	
<b>6</b>	0.052	0.046	0.041	0.057	
<b>8</b>	0.067	0.060	0.054	0.074	
<b>10</b>	0.080	0.072	0.064	0.088	
<b>12</b>	0.092	0.083	0.073	0.101	
<b>14</b>	0.103	0.093	0.083	0.114	
<b>16</b>	0.115	0.103	0.092	0.126	
<b>20</b>	0.140	0.126	0.112	0.154	

**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.

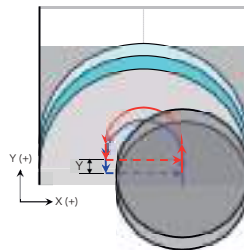
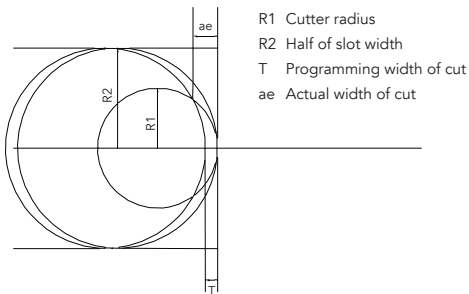
The cutting conditions are based on CNC programming with medium dynamic speed.

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.

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# HF450

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.011	0.010	0.008	0.007	
4	0.014	0.013	0.011	0.010	
5	0.018	0.016	0.013	0.012	
6	0.021	0.019	0.015	0.014	
8	0.027	0.024	0.020	0.019	
10	0.032	0.029	0.024	0.022	
12	0.037	0.033	0.028	0.026	
14	0.041	0.037	0.031	0.029	
16	0.046	0.041	0.034	0.032	
20	0.056	0.050	0.042	0.039	
ap x ae	≤ D5	0.3D x D	0.3D x D	0.2D x D	0.1D x D

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.013	0.012	0.010	0.014	
4	0.017	0.015	0.014	0.019	
5	0.021	0.019	0.017	0.023	
6	0.025	0.022	0.020	0.027	
8	0.032	0.029	0.026	0.035	
10	0.039	0.035	0.031	0.042	
12	0.044	0.040	0.035	0.048	
14	0.050	0.045	0.040	0.055	
16	0.055	0.050	0.044	0.061	
20	0.067	0.060	0.054	0.074	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.2D	D x 0.1D	D x 0.05D

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>	
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.008	0.007	0.006	0.007	
4	0.010	0.010	0.008	0.009	
5	0.013	0.012	0.011	0.011	
6	0.015	0.014	0.012	0.013	
8	0.019	0.018	0.016	0.017	
10	0.023	0.022	0.019	0.020	
12	0.027	0.025	0.022	0.023	
14	0.030	0.028	0.025	0.026	
16	0.033	0.031	0.028	0.029	
20	0.041	0.038	0.034	0.035	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

# HF450

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.018	0.017	0.016	0.025
	8	0.023	0.022	0.021	0.032
	10	0.028	0.026	0.025	0.038
	12	0.032	0.030	0.028	0.044
	14	0.036	0.034	0.032	0.049
16	0.040	0.037	0.035	0.055	
20	0.049	0.045	0.043	0.067	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.021	0.019	0.015	0.014
	8	0.027	0.024	0.020	0.019
	10	0.032	0.029	0.024	0.022
	12	0.037	0.033	0.028	0.026
	14	0.041	0.037	0.031	0.029
16	0.046	0.041	0.034	0.032	
20	0.056	0.050	0.042	0.039	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF450

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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
<b>ap x ae</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>
<b>Vc (m/min)</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>	<b>40÷60</b>
<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
<b>3</b>	0.027	0.024	0.021	0.029
<b>4</b>	0.035	0.032	0.028	0.039
<b>5</b>	0.044	0.040	0.035	0.048
<b>6</b>	0.052	0.046	0.041	0.057
<b>8</b>	0.067	0.060	0.054	0.074
<b>10</b>	0.080	0.072	0.064	0.088
<b>12</b>	0.092	0.083	0.073	0.101
<b>14</b>	0.103	0.093	0.083	0.114
<b>16</b>	0.115	0.103	0.092	0.126
<b>20</b>	0.140	0.126	0.112	0.154

**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.

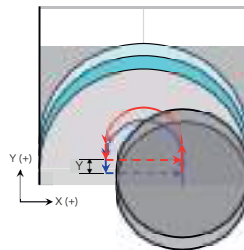
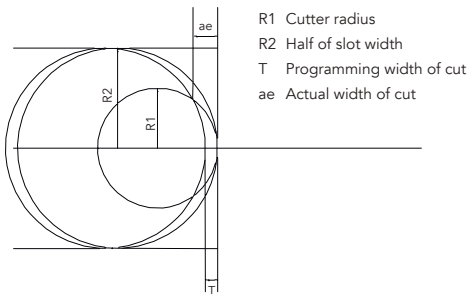
The cutting conditions are based on CNC programming with medium dynamic speed.

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.

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# HF451

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.011	0.010	0.008	0.007	
4	0.014	0.013	0.011	0.010	
5	0.018	0.016	0.013	0.012	
6	0.021	0.019	0.015	0.014	
8	0.027	0.024	0.020	0.019	
10	0.032	0.029	0.024	0.022	
12	0.037	0.033	0.028	0.026	
14	0.041	0.037	0.031	0.029	
16	0.046	0.041	0.034	0.032	
20	0.056	0.050	0.042	0.039	
ap x ae	≤ D5	0.3D x D	0.2D x D	0.1D x D	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.013	0.012	0.010	0.014	
4	0.017	0.015	0.014	0.019	
5	0.021	0.019	0.017	0.023	
6	0.025	0.022	0.020	0.027	
8	0.032	0.029	0.026	0.035	
10	0.039	0.035	0.031	0.042	
12	0.044	0.040	0.035	0.048	
14	0.050	0.045	0.040	0.055	
16	0.055	0.050	0.044	0.061	
20	0.067	0.060	0.054	0.074	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.1D	D x 0.1D	D x 0.05D

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>	
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.008	0.007	0.006	0.007	
4	0.010	0.010	0.008	0.009	
5	0.013	0.012	0.011	0.011	
6	0.015	0.014	0.012	0.013	
8	0.019	0.018	0.016	0.017	
10	0.023	0.022	0.019	0.020	
12	0.027	0.025	0.022	0.023	
14	0.030	0.028	0.025	0.026	
16	0.033	0.031	0.028	0.029	
20	0.041	0.038	0.034	0.035	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS 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 HF450 PARAMETERS.

CUTTING PARAMETERS

**HF451**

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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	<b>5° x D</b>	<b>4° x D</b>	<b>3° x D</b>	<b>2° x D</b>
	Vc (m/min)	<b>60÷80</b>	<b>50÷60</b>	<b>30÷40</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.018	0.017	0.016	0.025
	<b>8</b>	0.023	0.022	0.021	0.032
	<b>10</b>	0.028	0.026	0.025	0.038
	<b>12</b>	0.032	0.030	0.028	0.044
	<b>14</b>	0.036	0.034	0.032	0.049
<b>16</b>	0.040	0.037	0.035	0.055	
<b>20</b>	0.049	0.045	0.043	0.067	

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>60÷80</b>	<b>50÷60</b>	<b>30÷40</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.021	0.019	0.015	0.014
	<b>8</b>	0.027	0.024	0.020	0.019
	<b>10</b>	0.032	0.029	0.024	0.022
	<b>12</b>	0.037	0.033	0.028	0.026
	<b>14</b>	0.041	0.037	0.031	0.029
<b>16</b>	0.046	0.041	0.034	0.032	
<b>20</b>	0.056	0.050	0.042	0.039	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF450 PARAMETERS.

INFO

# HF451

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>
Vc (m/min)	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.027	0.024	0.021	0.029
4	0.035	0.032	0.028	0.039
5	0.044	0.040	0.035	0.048
6	0.052	0.046	0.041	0.057
8	0.067	0.060	0.054	0.074
10	0.080	0.072	0.064	0.088
12	0.092	0.083	0.073	0.101
14	0.103	0.093	0.083	0.114
16	0.115	0.103	0.092	0.126
20	0.140	0.126	0.112	0.154

**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.

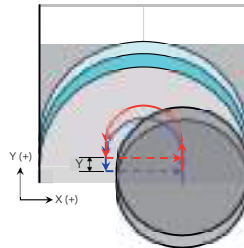
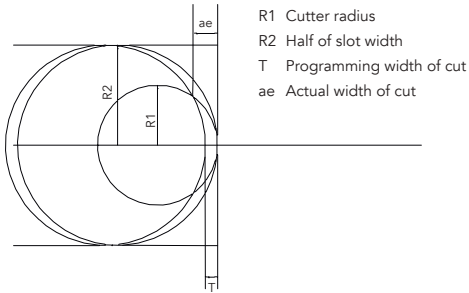
The cutting conditions are based on CNC programming with medium dynamic speed.

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.

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS 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 HF450 PARAMETERS.



INFO

# HF852

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	
Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.012	0.011	0.009	0.008	
4	0.016	0.014	0.012	0.011	
5	0.020	0.018	0.015	0.014	
6	0.023	0.021	0.017	0.016	
8	0.030	0.027	0.022	0.021	
10	0.036	0.032	0.027	0.025	
12	0.041	0.037	0.031	0.029	
14	0.046	0.041	0.034	0.032	
16	0.051	0.046	0.038	0.036	
20	0.062	0.056	0.047	0.043	
ap x ae	≤ D5	0.3D x D	0.3D x D	0.2D x D	0.1D x D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>100÷120</b>	<b>70÷90</b>	<b>50÷70</b>	<b>40÷60</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.014	0.013	0.011	0.016	
4	0.019	0.017	0.015	0.021	
5	0.023	0.021	0.019	0.026	
6	0.028	0.025	0.022	0.030	
8	0.036	0.032	0.029	0.039	
10	0.043	0.039	0.034	0.047	
12	0.049	0.044	0.039	0.054	
14	0.055	0.050	0.044	0.061	
16	0.061	0.055	0.049	0.067	
20	0.074	0.067	0.060	0.082	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.2D	D x 0.1D	D x 0.05D

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>	
Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.009	0.008	0.007	0.008	
4	0.011	0.011	0.009	0.010	
5	0.014	0.013	0.012	0.012	
6	0.017	0.016	0.014	0.015	
8	0.022	0.020	0.018	0.019	
10	0.026	0.024	0.021	0.023	
12	0.030	0.028	0.024	0.026	
14	0.033	0.031	0.028	0.029	
16	0.037	0.035	0.031	0.032	
20	0.045	0.042	0.037	0.039	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

# HF852

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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)	80÷100	60÷80	40÷60	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.020	0.019	0.018	0.027
	8	0.026	0.024	0.023	0.035
	10	0.031	0.029	0.027	0.043
	12	0.036	0.033	0.031	0.049
	14	0.040	0.037	0.035	0.055
16	0.045	0.042	0.039	0.061	
20	0.054	0.051	0.048	0.074	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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)	80÷100	60÷80	40÷60	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.023	0.021	0.017	0.016
	8	0.030	0.027	0.022	0.021
	10	0.036	0.032	0.027	0.025
	12	0.041	0.037	0.031	0.029
	14	0.046	0.041	0.034	0.032
16	0.051	0.046	0.038	0.036	
20	0.062	0.056	0.047	0.043	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF852

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>
Vc (m/min)	<b>130÷150</b>	<b>100÷120</b>	<b>60÷80</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.027	0.024	0.021	0.029
4	0.035	0.032	0.028	0.039
5	0.044	0.040	0.035	0.048
6	0.052	0.046	0.041	0.057
8	0.067	0.060	0.054	0.074
10	0.080	0.072	0.064	0.088
12	0.092	0.083	0.073	0.101
14	0.103	0.093	0.083	0.114
16	0.115	0.103	0.092	0.126
20	0.140	0.126	0.112	0.154

**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.

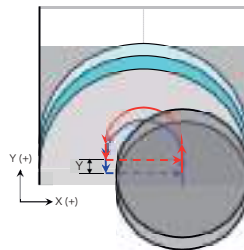
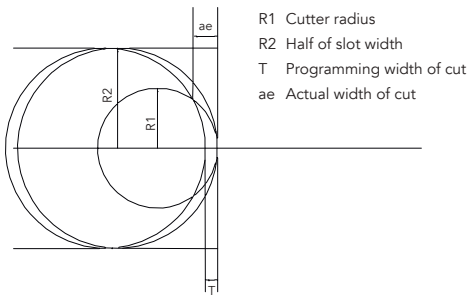
The cutting conditions are based on CNC programming with medium dynamic speed.

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.

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# HF452

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.011	0.010	0.008	0.007	
4	0.014	0.013	0.011	0.010	
5	0.018	0.016	0.013	0.012	
6	0.021	0.019	0.015	0.014	
8	0.027	0.024	0.020	0.019	
10	0.032	0.029	0.024	0.022	
12	0.037	0.033	0.028	0.026	
14	0.041	0.037	0.031	0.029	
16	0.046	0.041	0.034	0.032	
20	0.056	0.050	0.042	0.039	
ap x ae	≤ D5	0.3D x D	0.2D x D	0.1D x D	

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.013	0.012	0.010	0.014	
4	0.017	0.015	0.014	0.019	
5	0.021	0.019	0.017	0.023	
6	0.025	0.022	0.020	0.027	
8	0.032	0.029	0.026	0.035	
10	0.039	0.035	0.031	0.042	
12	0.044	0.040	0.035	0.048	
14	0.050	0.045	0.040	0.055	
16	0.055	0.050	0.044	0.061	
20	0.067	0.060	0.054	0.074	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.1D	D x 0.1D	D x 0.05D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>	
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.008	0.007	0.006	0.007	
4	0.010	0.010	0.008	0.009	
5	0.013	0.012	0.011	0.011	
6	0.015	0.014	0.012	0.013	
8	0.019	0.018	0.016	0.017	
10	0.023	0.022	0.019	0.020	
12	0.027	0.025	0.022	0.023	
14	0.030	0.028	0.025	0.026	
16	0.033	0.031	0.028	0.029	
20	0.041	0.038	0.034	0.035	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

HF452

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.018	0.017	0.016	0.025
	8	0.023	0.022	0.021	0.032
	10	0.028	0.026	0.025	0.038
	12	0.032	0.030	0.028	0.044
	14	0.036	0.034	0.032	0.049
16	0.040	0.037	0.035	0.055	
20	0.049	0.045	0.043	0.067	

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 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)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.021	0.019	0.015	0.014
	8	0.027	0.024	0.020	0.019
	10	0.032	0.029	0.024	0.022
	12	0.037	0.033	0.028	0.026
	14	0.041	0.037	0.031	0.029
16	0.046	0.041	0.034	0.032	
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INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
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HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF452

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



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		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
Hardness/Rm					
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>	<b>40÷60</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
<b>3</b>	0.027	0.024	0.021	0.029	
<b>4</b>	0.035	0.032	0.028	0.039	
<b>5</b>	0.044	0.040	0.035	0.048	
<b>6</b>	0.052	0.046	0.041	0.057	
<b>8</b>	0.067	0.060	0.054	0.074	
<b>10</b>	0.080	0.072	0.064	0.088	
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<b>16</b>	0.115	0.103	0.092	0.126	
<b>20</b>	0.140	0.126	0.112	0.154	

**NOTES:**

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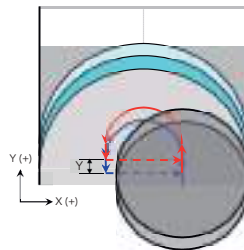
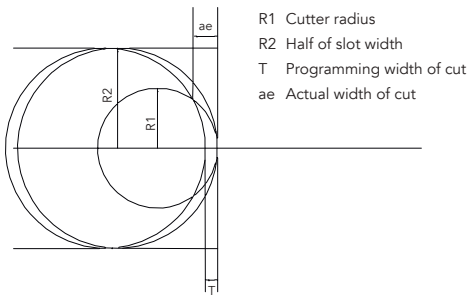
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HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS