

For High-Efficiency Aluminum Cutting

HF PCD MILLING CUTTER



For High-Efficiency Cutting of Aluminum and
Non-Ferrous Metals



■ General Features

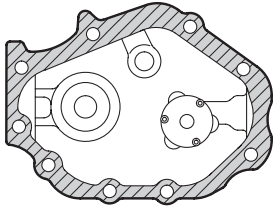
The HF Type high-efficiency aluminum cutter with **air/ coolant through system** employs a unique insert design to eliminate burrs and to achieve superior surface finishes.

■ Part Material

- Aluminum and aluminum alloys
- Other non-ferrous metal
- **Not suited for cast iron or steel**

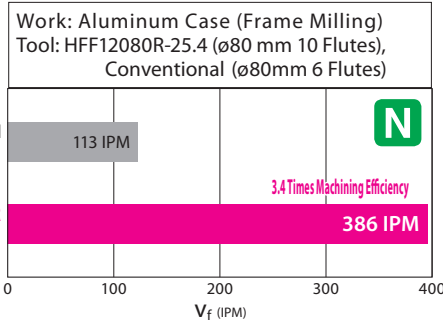
■ Characteristics

- Achieves high-efficiency milling due to its high density design (3 teeth per inch)



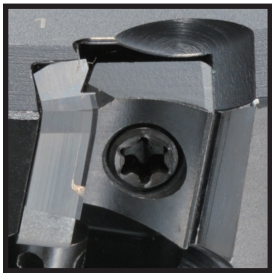
Conventional Tool
 $f_z=0.002$ IPT

HFF12080R
 $f_z=0.006$ IPT



■ Table 1

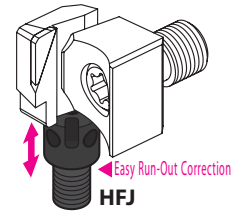
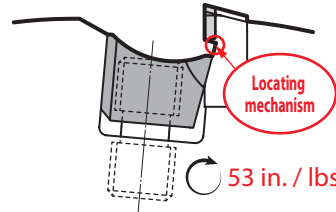
Cutter (in.)	s max (RPM)	V_c Max (SFM)	f_z (IPT)	Max No. of Edges	Feed (IPM)
2.500	13,000	8,500	to 0.008	6	to 624
3.000	12,000	9,400	to 0.008	9	to 864
4.000	9,500	9,900	to 0.008	12	to 912
5.000	7,500	9,800	to 0.008	15	to 900
6.000	6,000	9,400	to 0.008	18	to 864



- The wedge clamp's locating mechanism ensures safety and ease of use

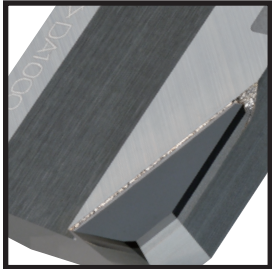
The shape and structure of the clamp prevents dislocation by centrifugal force

Ensure that the maximum allowable spindle speed (s max) specified for each cutter diameter is not exceeded. Failing to do so is very dangerous (*See table 1)



1. Preset height adjuster
2. Tighten wedge clamp
3. Fasten height adjustment screw

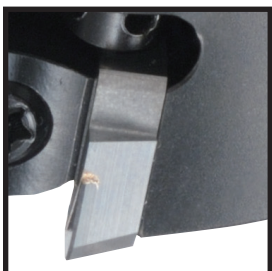
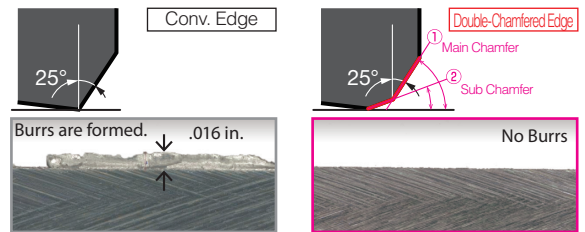
- Achieves a run-out precision of $5\mu\text{m}$ (0.0002") or less by employing an easy fine-tuning mechanism



- Reduces burrs by using a double-chamfered cutting edge

Drastically reduces burrs by preventing the plastic deformation that causes burrs.

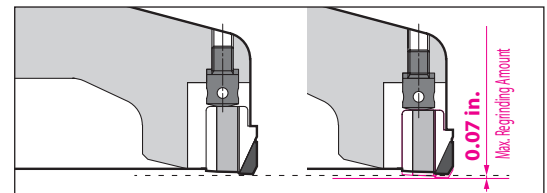
Work Material: A6061 Blanks
Cutting Conditions: $v_c=9,800$ SFM,
 $f_z=0.004$ in./t,
 $a_p=0.02$ in., Dry



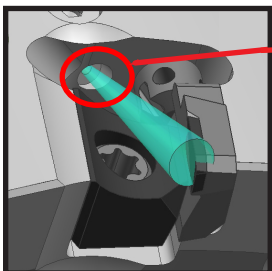
- Reduces tooling costs by drastically increasing the insert regrinding amount (to 0.07 in.)

Assuming the amount of regrinding to be 0.007 in., an edge can be used up to 10 times.

(* Given the condition of normal wear with a_p of .055 in. or less)



The regrinding amount has been drastically increased compared to conventional screw-lock types.



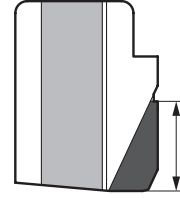
Internal coolant holes

- Improved chip evacuation with internal coolant (HFFH, HFMH, HF-BBT30 Series)
- Prevent chip packing and lengthen tool life by using internal coolant

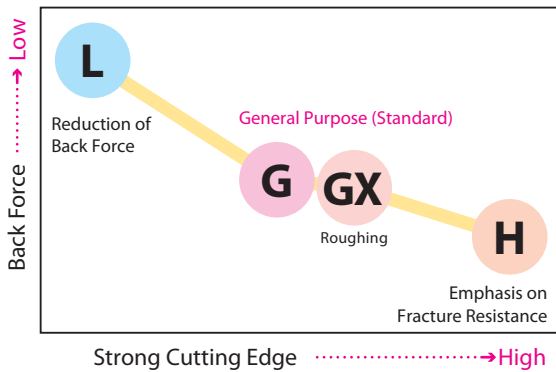
■ Edge Selection Guide

Material	N				
Type	L	G	GX	H	W
Cutting Edge Insert Figure					
Characteristics	Low Cutting Force	Standard	Long Edge	High Strength	Wiper
Application	Reduction of Back Force	General Purpose	Roughing	Emphasis on Fracture Resistance	
*Blank Length	6.0mm	6.0mm	9.0mm	6.0mm	
Max D.O.C.	3.0mm	3.0mm	3.0mm	3.0mm	—

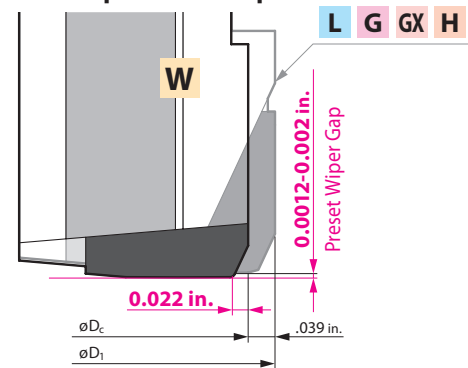
*Blank Length
9.0mm only for GX Type



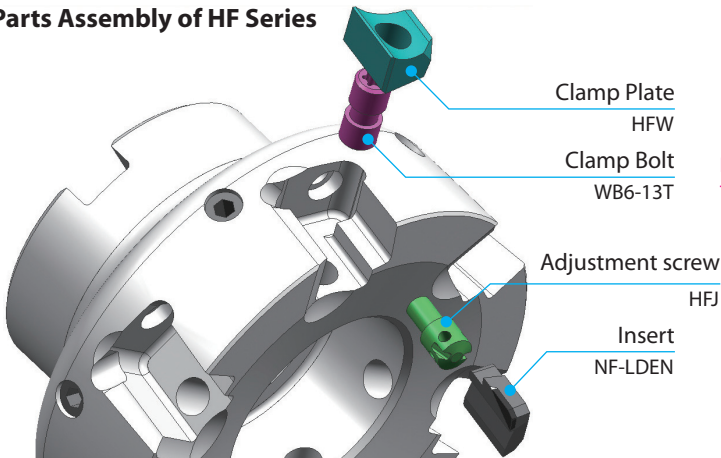
■ Guideline for Edge Selection



■ Amount of Wiper Insert Gap



■ Parts Assembly of HF Series

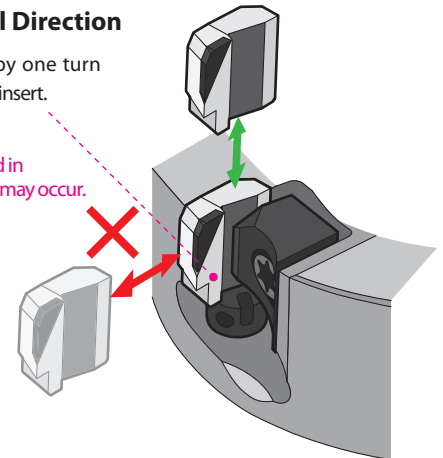


■ Insert Removal Direction

Loosen the screw by one turn before removing the insert.



If the insert is forcibly removed in the wrong direction, damage may occur.

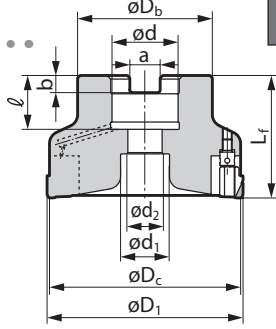


■ Application Examples

● Work : Crankcase Cover		HFFH
	Work Material : Aluminium Alloy	
	Tool	HFFH12100R-25.4
	Insert	NF-LDEN12T3ZDTR-H
	Grade	DA1000
	No. of Teeth	12
	V_c (SFM)	6,181
	n (RPM)	6000
	V_f (IPM)	141"
	f_z (in./t)	.002"
	a_p (in.)	.008"
Coolant	Wet	
Results	With through coolant, Tool Life x 2 vs. flood coolant Achieved 3600 finished parts Excellent surface finish!	

● Work : Engine Component		HFFH
	Work Material : Aluminium Alloy	
	Tool	HFFH12125R-31.75
	Insert	NF-LDEN12T3ZDTR-G
	Grade	DA1000
	No. of Teeth	15
	V_c (SFM)	9,662
	n (RPM)	7,500
	V_f (IPM)	266"
	f_z (in./t)	.0024"
	a_p (in.)	.00788"
Coolant	Wet	
Results	With through coolant, Tool Life x 1.7 vs. flood coolant Achieved 17,000 finished parts Great chip control!	

HF Lineup - Inch



Rake Angle	Radial	+4°
	Axial	+10°

.12" 90°



HFMH Body (Standard Pitch) - INCH

Cat. No.	Stock	Dimensions (in.)										Coolant Hole	Coolant Bolt	No. of Teeth	Weight (lbs)
		$\varnothing D_c$	$\varnothing D_1$	$\varnothing D_b$	L_f	$\varnothing d$	a	b	ℓ	$\varnothing d_1$	$\varnothing d_2$				
HFMH42500R	●	2.500	2.579	1.970	2.000	1.000	0.375	0.220	1.020	0.797	0.531	YES	BFXH1/2X1 1/4	6	1.76
HFMH43000R	●	3.000	3.079	1.970	2.000	1.000	0.375	0.220	1.020	0.797	0.531	YES	BFXH1/2X1 1/4	6	2.42
HFMH44000R	●	4.000	4.079	2.756	2.000	1.500	0.625	0.380	1.457	2.126	0.781	YES	BFXH3/4X2	8	3.96
HFMH45000R	●	5.000	5.079	3.150	2.000	1.500	0.625	0.380	1.457	2.126	0.781	YES	BFXH3/4X2	10	6.17
HFMH46000R	●	6.000	6.079	3.740	2.374	1.500	0.625	0.380	1.457	2.756	0.781	YES	BFXH3/4X2	12	9.50

HFFH Body (Fine Pitch) - INCH

Cat. No.	Stock	Dimensions (in.)										Coolant Hole	Coolant Bolt	No. of Teeth	Weight (lbs)
		$\varnothing D_c$	$\varnothing D_1$	$\varnothing D_b$	L_f	$\varnothing d$	a	b	ℓ	$\varnothing d_1$	$\varnothing d_2$				
HFFH43000R	●	3.000	3.079	1.970	2.000	1.000	0.375	0.220	1.020	0.797	0.531	YES	BFXH1/2X1 1/4	9	2.20
HFFH44000R	●	4.000	4.079	2.756	2.000	1.500	0.625	0.380	1.457	2.126	0.781	YES	BFXH3/4X2	12	3.75
HFFH45000R	●	5.000	5.079	3.150	2.000	1.500	0.625	0.380	1.457	2.126	0.781	YES	BFXH3/4X2	15	5.95
HFFH46000R	●	6.000	6.079	3.740	2.374	1.500	0.625	0.380	1.457	2.756	0.781	YES	BFXH3/4X2	18	9.30

Inserts

Grade		PCD	SCD				
Application	High Speed/Light	N	N	N Non-Ferrous Metal			
	General Purpose	N					
	Roughing	N					
Cat. No.		DA1000	SCV10	Edge Length	Unique Wiper Edge	Application	Fig
NF-LDEN 12T3ZDFR-L		●		6	Straight	Low Cutting Force	4
12T3ZDFR-G		●		6	Arc	General Purpose	4
12T3ZDTR-H		●		6	Arc	Strong Edge	4
12T3ZDFR-R0.4		●		6	Arc	Radius Edge	7
12T3ZDFR-GX		●		9	Arc	Long Edge	5
12T3ZDFR-W		●		-	Arc	Wiper	6
12T3ZDFR-WS			○	-	Arc	Wiper	6

Fig 4

Fig 5

Fig 6

Fig 7

Wiper Insert

Parts

Clamp Plate	Clamp Bolt	Adjustment screw	Adjusting Wrench	Wrench	Assembling Wrench
HFW	WB6-13T	53.0 in./lbs	HFJ	TTX20	RFT
					HFVT (Sold Separately)

● : U.S.A. Stock Standard

○ : Made to Order : Single Crystal Diamond (SCV10)

Recommended Tightening Torque (in./lbs)

Recommended Cutting Conditions

Si content of 12.6% or less.

ISO	Work Material	Hardness	Cutting Speed v_c (SFM) Min.- Optimum -Max.	Feed Rate f_z (in./t) Min.- Optimum -Max.	Grade
N	Aluminium Alloy	-	6550- 8200 -9850	0.002-0.005-0.008	DA1000

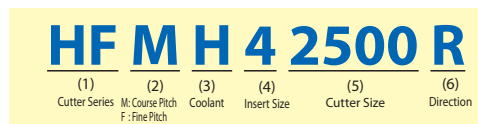
*see table 1 for Max SFM by cutter diameter

Si content of over 12.6%

N	Aluminium Alloy	-	1300-1950-2600	0.02-0.005-0.008	DA1000
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Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth, and other factors.

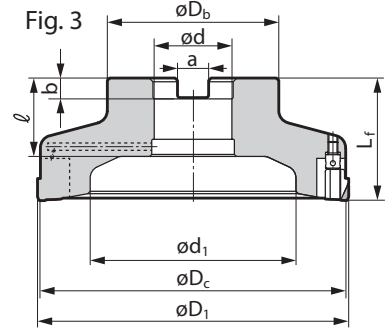
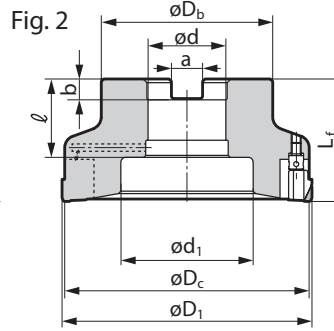
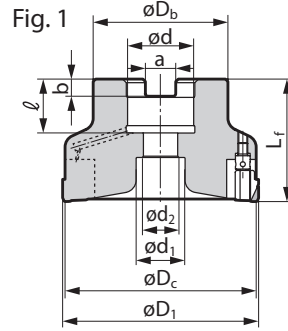
Identification Details



HF Lineup - Metric

Rake Angle	Radial	+4°
	Axial	+10°

3mm 90°



HFM Body (Standard Pitch) - METRIC

Cat. No.	Stock	Dimensions (mm)										Coolant Hole	Coolant Bolt	No. of Teeth	Weight (lbs)	Fig.
		ϕD_c	ϕD_1	ϕD_b	L_f	ϕd	a	b	ℓ	ϕd_1	ϕd_2					
HFM12080RS-22	★	80	82	50	40	22	10.4	6.3	20	18	11	-	-	6	2.20	1
HFM12080RS-27	★	80	82	55	50	27	12.4	7	22	20	14	-	-	6	2.64	1
HFM12100RS-32	★	100	102	70	50	32	14.4	8	32	54	-	-	-	8	3.75	2
HFM12125RS-32	★	125	127	70	50	32	14.4	8	32	84	-	-	-	10	4.85	3
HFM12125RS-40	★	125	127	90	63	40	16.4	9	35	84	-	-	-	10	6.17	3
HFM12080R-25.4	★	80	82	50	50	25.40	9.5	6	30	35	-	-	-	6	2.20	2
HFM12100R-25.4	★	100	102	50	50	25.40	9.5	6	30	54	-	-	-	8	3.31	2
HFM12100R-31.75	★	100	102	70	50	31.75	12.7	8	32	54	-	-	-	8	3.75	2
HFM12125R-25.4	★	125	127	50	50	25.40	9.5	6	30	84	-	-	-	10	4.40	3
HFM12125R-31.75	★	125	127	70	50	31.75	12.7	8	32	84	-	-	-	10	4.85	3
HFM12125R-38.1	★	125	127	80	63	38.10	15.9	10	36	84	-	-	-	10	5.51	3

HFF / HFFH Body (Fine Pitch) - METRIC

Cat. No.	Stock	Dimensions (mm)										Coolant Hole	Coolant Bolt	No. of Teeth	Weight (lbs)	Fig.
		ϕD_c	ϕD_1	ϕD_b	L_f	ϕd	a	b	ℓ	ϕd_1	ϕd_2					
HFF12080RS-22	★	80	82	50	40	22	10.4	6.3	20	18	11	-	-	10	2.20	1
HFF12080RS-27	★	80	82	55	50	27	12.4	7	22	20	14	-	-	10	2.64	1
HFF12100RS-32	★	100	102	70	50	32	14.4	8	32	54	-	-	-	12	3.75	2
HFF12125RS-32	★	125	127	70	50	32	14.4	8	32	84	-	-	-	15	4.85	3
HFF12125RS-40	★	125	127	90	63	40	16.4	9	35	84	-	-	-	15	6.17	3
HFF12080R-25.4	★	80	82	50	50	25.40	9.5	6.3	30	35	-	-	-	10	2.20	2
HFF12100R-25.4	★	100	102	50	50	25.40	9.5	6	30	54	-	-	-	12	3.30	2
HFF12100R-31.75	★	100	102	70	50	31.75	12.7	8	32	54	-	-	-	12	3.75	2
HFF12125R-25.4	★	125	127	50	50	25.40	9.5	6	30	84	-	-	-	15	4.41	3
HFF12125R-31.75	★	125	127	70	50	31.75	12.7	8	32	84	-	-	-	15	4.85	3
HFF12125R-38.1	★	125	127	80	63	38.10	15.9	10	36	84	-	-	-	15	5.51	3
HFFH12080RS-22	★	80	82	50	40	22	10.4	6.3	20	18	11	YES	* BFXH1025-D16	10	2.20	1
HFFH12080RS-27	★	80	82	55	50	27	12.4	7	22	20	14	YES	* BFXH1230-D18	10	2.64	1
HFFH12100RS-32	★	100	102	70	50	32	14.4	8	32	54	-	YES	* BFXH1635-D40	12	3.75	2
HFFH12125RS-32	★	125	127	70	50	32	14.4	8	32	84	-	YES	* BFXH1635-D40	15	4.85	3
HFFH12125RS-40	★	125	127	90	63	40	16.4	9	35	84	-	YES	* BFXH2036-D50	15	6.17	3
HFFH12080R-25.4	●	80	82	50	50	25.40	9.5	6.3	30	35	-	YES	* BFXH1/2-20X1 1/4-D33	10	2.20	2
HFFH12100R-25.4	●	100	102	50	50	25.40	9.5	6	30	54	-	YES	* BFXH1/2-20X1 1/4-D40	12	3.30	2
HFFH12100R-31.75	●	100	102	70	50	31.75	12.7	8	32	54	-	YES	* BFXH5/8-18X1 1/2-D50	12	3.75	2
HFFH12125R-25.4	●	125	127	50	50	25.40	9.5	6	30	84	-	YES	* BFXH1/2-20X1 1/4-D40	15	4.41	3
HFFH12125R-31.75	●	125	127	70	50	31.75	12.7	8	32	84	-	YES	* BFXH5/8-18X1 1/2-D50	15	4.85	3
HFFH12125R-38.1	●	125	127	80	63	38.10	15.9	10	36	84	-	YES	* BFXH3/4X2	15	5.51	3

* Sold Separately

■ HFM Identification Details

HF M 12 080 RS -22

(1) Cutter Series (2) Standard Pitch (3) Insert Size (4) Cutter Size (5) Direction (6) Metric Bore (7) Arbor Size

■ HFF Identification Details

HF F 12 080 RS -22

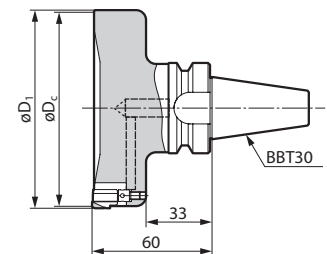
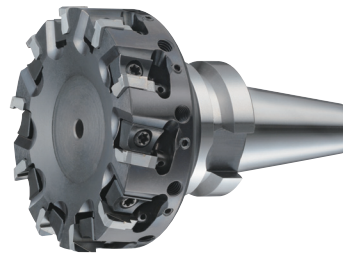
(1) Cutter Series (2) Fine Pitch (3) Insert Size (4) Cutter Size (5) Direction (6) Metric Bore (7) Arbor Size

■ HFFH Identification Details

HF F H 12 080 RS -22

(1) Cutter Series (2) Fine Pitch (3) Coolant (4) Insert Size (5) Cutter Size (6) Direction (7) Metric Bore (8) Arbor Size

HF Lineup - Metric



HF Mono Block Type - Fine Pitch - METRIC

Cat. No.	Stock	Dimensions (mm)		Coolant Hole	No. of Teeth	Weight (lbs)
		ϕD_C	ϕD_1			
HFFH12080R-BBT30	★	80	82	YES	10	3.52
HFFH12100R-BBT30	★	100	102	YES	12	5.29
HFFH12125R-BBT30	★	125	127	YES	15	5.95

■ Inserts

Grade		PCD	SCD				
Application	High Speed/Light	N	N	N Non-Ferrous Metal			
	General Purpose	N					
	Roughing	N					
Cat. No.		DA1000	SCV10	Edge Length	Unique Wiper Edge	Application	Fig
NF-LDEN 12T3ZDFR-L		●		6	Straight	Low Cutting Force	4
12T3ZDFR-G		●		6	Arc	General Purpose	4
12T3ZDTR-H		●		6	Arc	Strong Edge	4
12T3ZDFR-R0.4		●		6	Arc	Radius Edge	7
12T3ZDFR-GX		●		9	Arc	Long Edge	5
12T3ZDFR-W		●		-	Arc	Wiper	6
12T3ZDFR-WS			○	-	Arc	Wiper	6

Fig 4

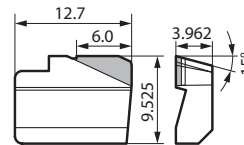


Fig 5

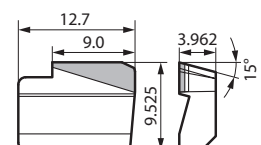


Fig 6

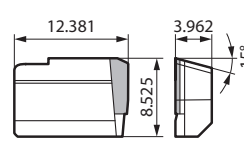
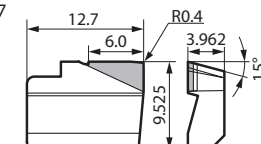


Fig 7



■ Recommended Cutting Conditions

● : U.S.A. Stock Standard ○ : Made to Order : Single Crystal Diamond (SCV10)

Si content of 12.6% or less.

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min.- Optimum -Max.	Feed Rate f_z (mm/t) Min.- Optimum -Max.	Grade
N	Aluminium Alloy	-	2000- 2500 -3000	0.05- 0.13 -0.20	DA1000

Si content of over 12.6%

*see table 1 for Max RPM by cutter diameter

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min.- Optimum -Max.	Feed Rate f_z (mm/t) Min.- Optimum -Max.	Grade
N	Aluminium Alloy	-	400- 600 -800	0.05- 0.13 -0.20	DA1000

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth, and other factors.

■ HFF Identification Details

HF F H 12 080 R -BBT30

(1) Cutter Series (2) Fine Pitch (3) Coolant (4) Insert Size (5) Cutter (6) Direction (7) Arbor Type

Rake Angle	Radial	+4°
	Axial	+10°

3mm 90°



*BIG-PLUS® is a registered trademark of BIG Daishowa Seiki Co., Ltd.

**Mono-block type can be applied for BT30 machining

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