SUMITOMO

CARBIDE - CBN - DIAMOND

CAT.DFCBROCHURE.12/15

Sumitomo High Efficiency, Double-sided 90° Milling Cutter

DFC Milling Cutter

Superior Toughness & Excellent Tool Life
High Performance Double-sided 6 Edge Inserts

SUMITOMO ELECTRIC GROUP

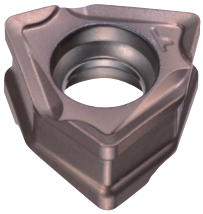
DFC Mill Features & Benefits

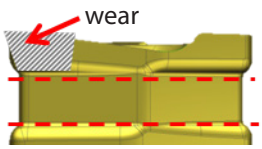
- High toughness insert design enables stable cutting and high efficiency machining with high feed rate
- Optimized machining accuracy by separating the insert contact areas and the cutting edges
- Large lineup for DFC available from 1″ through 8″ in standard, fine pitch and extra-fine pitch styles

Insert Characteristics

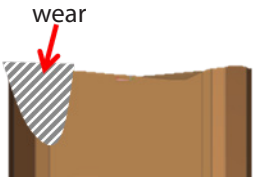
Precise repositioning of inserts due to thick supporting area

Optimized cutting edge yields excellent machining accuracy



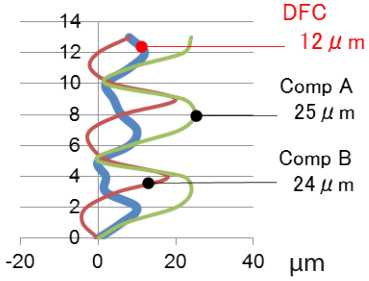


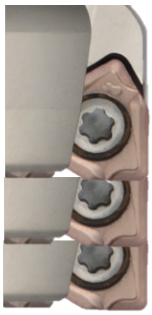
XNMU side view



conventional insert side view

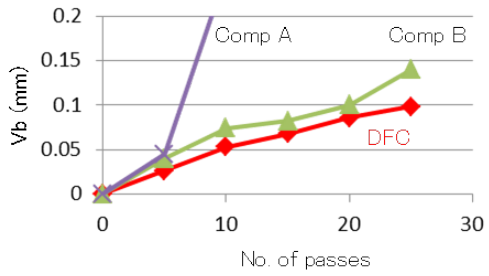
Squareness Performance





Work material : 1049 steel
Cutting Conditions: v_C=650 SFM f_Z=.0039 IPT
D_C= 63mm
a_p= .197" x 3 pass, a_e=.197"

Wear Resistance Chart



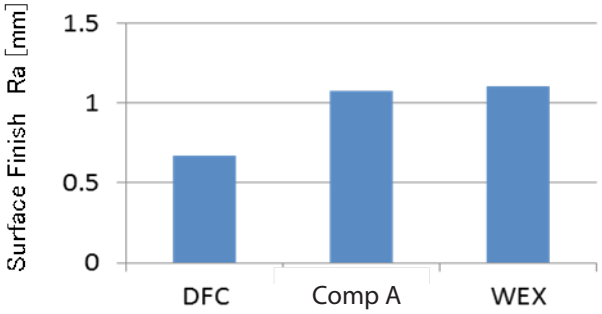
Work material: 1049 steel
Cutting Conditions: v_C=650 SFM f_Z=.0079 IPT
D_C= 100mm cutter
a_p= .118", a_e=3.346"

Cutting Edge Strength

	Feed Per Tooth (in/t)		
	0.012	0.016	0.020
DFC	•	•	•
Comp A	•	damage	
Comp B	damage		

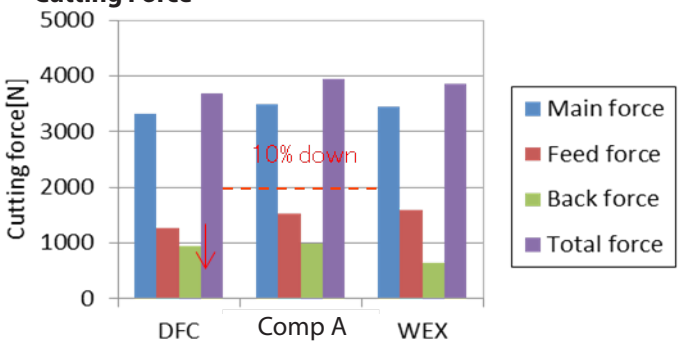
Work material: 1049 steel with holes
Cutting Conditions: v_C=650 SFM f_Z=.0079 IPT
D_C= 100mm cutter
a_p= .118", a_e=2.047" x 3 pass

Surface Finish Graph



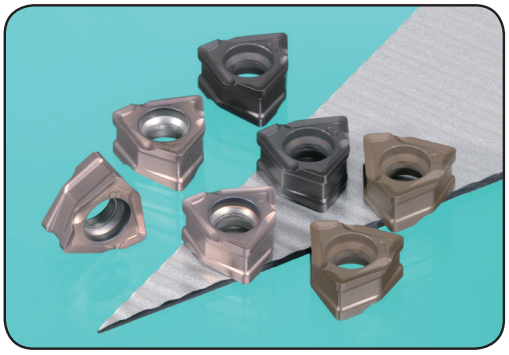
Work material: 1049 steel
Cutting Conditions: v_C=650 SFM f_Z=.0079 IPT
D_C= 100mm cutter
a_p= .118", a_e=3.346"

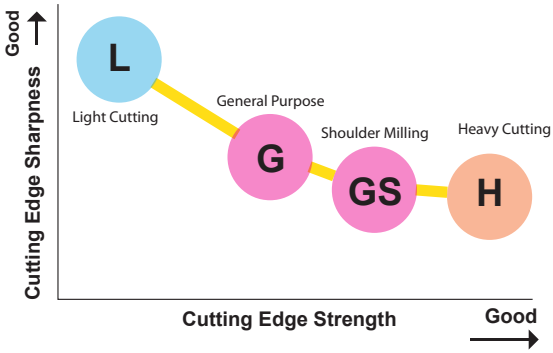
Cutting Force



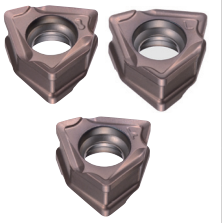
Work material: 1049 steel
Cutting Conditions: v_C=650 SFM f_Z=.0079 IPT
D_C= 100mm cutter
a_p= .118", a_e=2.953"

Inserts



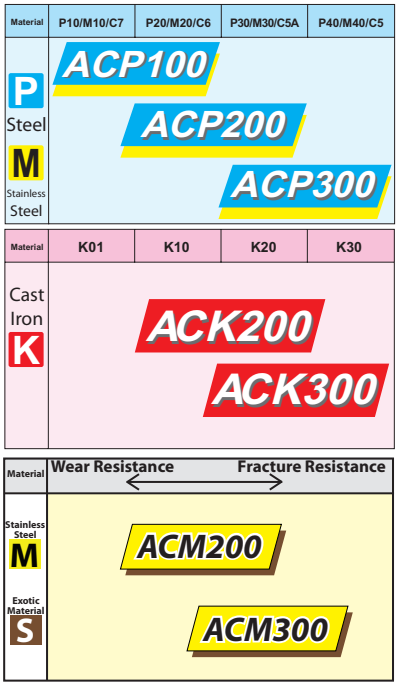


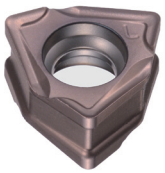
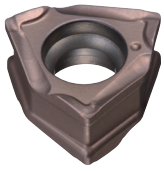
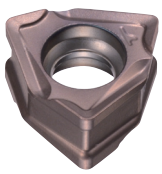
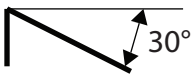
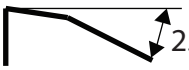
XNMU Inserts — **Max. Depth of Cut:** 6mm (.236")



Catalog Number	P ACP100	P ACP200	P ACP300	K ACK200	K ACK300	M/S ACM200	M/S ACM300	Radius
XNMU060604PNER-L		●	●		●		●	.016
XNMU060608PNER-L		●	●		●		●	.031
XNMU060604PNER-G	●	●	●	●	●	●	●	.016
XNMU060608PNER-G	●	●	●	●	●	●	●	.031
XNMU060612PNER-G	●	●	●	●	●	●	●	.047
XNMU060616PNER-G	●	●	●	●	●	●	●	.063
XNMU060608PNER-H	●	●	●	●	●	●	●	.031
XNMU060612PNER-H	●	●	●	●	●	●	●	.047
XNMU060616PNER-H	●	●	●	●	●	●	●	.063
XNMU060604PNER-LS		★	★				★	.016
XNMU060608PNER-LS		★	★				★	.031
XNMU060604PNER-GS	★	●	★			★	●	.016
XNMU060608PNER-GS	●	●	●			●	●	.031
XNMU060612PNER-GS	★	★	★			★	★	.047
XNMU060616PNER-GS	★	★	★			★	★	.063

●= USA Stocked Item
★= World Wide Warehouse Item

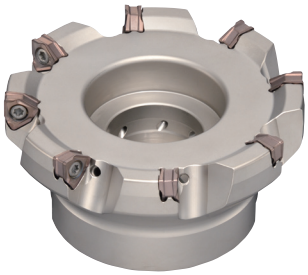


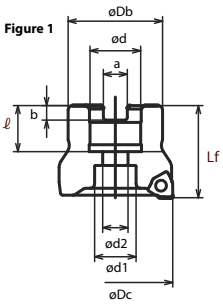
	L	G	GS	H
Chipbreakers				
Cutting Edge	 30°	25°	 25°	20°
Corner Radius	.016, .031	.016, .031, .047, .063	.016, .031, .047, .063	.031, .047, .063
Application	Light Cut, Low Rigidity Milling Low-Burr Design	Face Milling, General - Interrupted Milling	Shoulder Milling	Heavy Cut, Heavy Interrupted Machining Hardened Steel

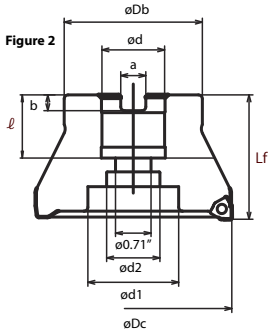
Running Conditions

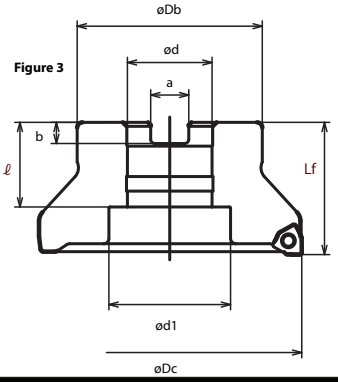
ISO	Work Material	Hardness	Cutting Speed (SFM) Min. - Optimum - Max.	Feed Rate (in./t) Min. - Optimum - Max.	D.O.C. (in.)	Grade
P	General Steel	180 ~ 280HB	500 - 650 - 820	0.004 - 0.008 - 0.012	<0.236	ACP200 ACP300
	Soft Steel	<180HB	600 - 820 - 1,150	0.006 - 0.010 - 0.014	< 0.236	ACP200 ACP300
	Die Steel	200 ~ 220HB	330 - 500 - 650	0.004 - 0.007 - 0.010	< 0.157	ACP200 ACP300
M	PH Stainless Steel	>220HB	300 - 500 - 750	0.004 - 0.007 - 0.010	<0.196	ACM200
	Austenitic Stainless	<250HB	525 - 675 - 820	0.005 - 0.007 - 0.010	<0.236	ACM300
K	Cast Iron	250HB	500 - 750 - 1150	0.004 - 0.008 - 0.012	<0.236	ACK200 ACK300

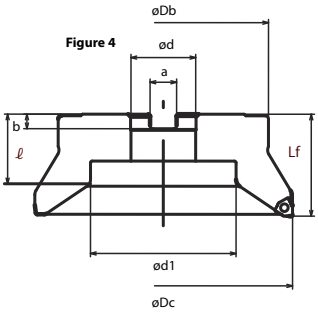
DFC Shell Mill Inch Lineup









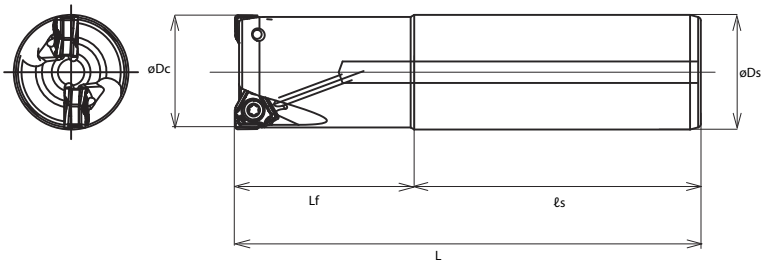


Cat. No.	Stock	Dimensions (in.)									No. of Teeth	Weight (lbs)	Fig.
		øDc	øDb	Lf	ød	a	b	ℓ	ød1	ød2			
Body (Standard Pitch) - Inch													
DFC22000R	●	2.000	1.500	1.750	0.750	0.312	0.190	0.750	0.609	0.406	4	0.66	1
DFC22500R	●	2.500	1.750	1.750	1.000	0.375	0.220	0.750	0.797	0.531	5	1.10	1
DFC23000R	●	3.000	2.250	1.750	1.000	0.375	0.220	0.750	0.797	0.531	6	2.20	1
DFC24000R	●	4.000	2.870	2.000	1.250	0.500	0.280	0.750	1.000	0.656	6	3.08	3
DFC24000R-1.50	●	4.000			1.500								
DFC25000R	●	5.000	3.750	2.500	1.500	0.625	0.380	1.000	2.000	1.181	7	6.17	1
DFC26000R	●	6.000	4.380	2.500	1.500	0.625	0.380	1.000	2.000	1.181	8	10.14	4
DFC28000R	●	8.000	5.906	2.500	2.500	1.000	0.560	1.594	5.118	-	10	12.56	1
Body (Fine Pitch) - Inch													
DFCM22000R	●	2.000	1.500	1.750	0.750	0.312	0.190	0.750	0.609	0.406	5	0.66	1
DFCM22500R	●	2.500	1.750	1.750	1.000	0.375	0.220	0.750	0.797	0.531	6	1.10	1
DFCM23000R	●	3.000	2.250	1.750	1.000	0.375	0.220	0.750	0.797	0.531	8	1.98	1
DFCM24000R	●	4.000	2.870	2.000	1.250	0.500	0.280	0.750	1.000	0.656	10	3.08	3
DFCM24000R-1.50	●	4.000			1.500								
DFCM25000R	●	5.000	3.750	2.500	1.500	0.625	0.380	1.000	2.000	1.181	12	5.95	1
DFCM26000R	●	6.000	4.380	2.500	1.500	0.625	0.380	1.000	2.000	1.181	14	9.90	4
DFCM28000R	●	8.000	5.906	2.500	2.500	1.000	0.560	1.594	5.118	-	15	12.05	1
Body (Extra-Fine Pitch) - Inch													
DFCF22000R	●	2.000	1.500	1.750	0.750	0.312	0.190	0.750	0.609	0.406	6	0.66	1
DFCF22500R	●	2.500	1.750	1.750	1.000	0.375	0.220	0.750	0.797	0.531	7	1.10	1
DFCF23000R	●	3.000	2.250	1.750	1.000	0.375	0.220	0.750	0.797	0.531	9	2.00	1
DFCF24000R	●	4.000	2.870	2.000	1.250	0.500	0.280	0.750	1.000	0.656	11	2.86	3
DFCF24000R-1.50	●	4.000			1.500								
DFCF25000R	●	5.000	3.750	2.500	1.500	0.625	0.380	1.000	2.000	1.181	14	5.73	1
DFCF26000R	●	6.000	4.380	2.500	1.500	0.625	0.380	1.000	2.000	1.181	16	12.41	4
DFCF28000R	●	8.000	5.906	2.500	2.500	1.000	0.560	1.594	5.118	-	20	14.75	1

● USA stocked item

DFC Endmill Inch Lineup

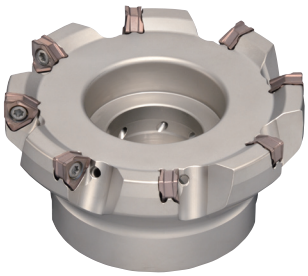
Body (Shank Type)							
Cat. No.	Stock	Dimensions (in.)					No. of Teeth
		øDc	øDs	Lf	ℓs	L	
DFC21000EW	●	1.000	1.000	2.060	2.281	4.341	2
DFC21250EW	●	1.250	1.250	2.060	2.281	4.341	3
DFC21500EW	●	1.500	1.250	2.060	2.281	4.341	3
DFC22000EW	●	2.000	1.250	2.060	2.281	4.341	4
DFC22500EW	●	2.500	1.250	2.060	2.281	4.341	5
DFCM21500EW	●	1.500	1.250	2.060	2.281	4.341	4
DFCM22000EW	●	2.000	1.250	2.060	2.281	4.341	5
DFCM22500EW	●	2.500	1.250	2.060	2.281	4.341	7

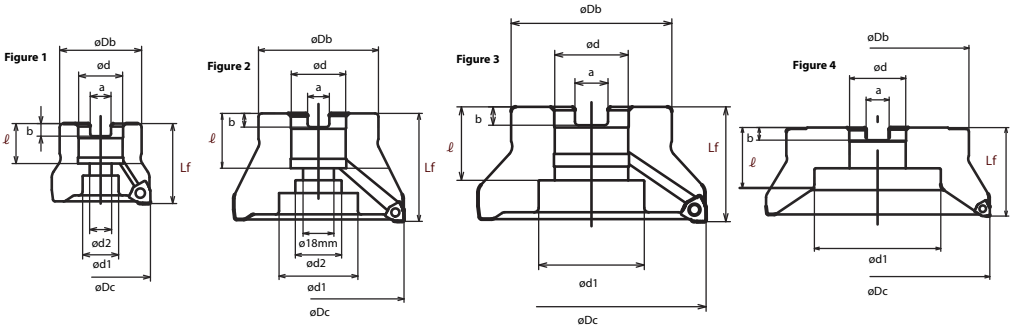


Hardware

Insert Screw	Insert Wrench	Coolant Through Bolts	
		Catalog Number	Cutter Size
		BFXH 3/8 x 1	**2.00"**
		BFXH 1/2 x 1 1/4	**2.50"**
BFTX03512IP	TRDR15IP Torque: 3.0 N • m	**BFXH 1/2 x 1 1/4**	**3.00"**
		BFXH 5/8 x 1 1/4	**4.00"**
		BFXH 3/4 x 2	**5.00"**

DFC Shell Mill Metric Lineup

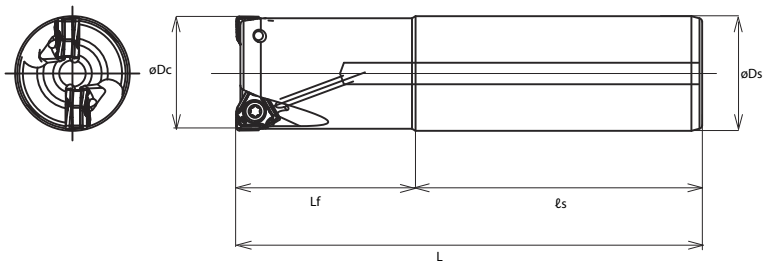




Body (Standard Pitch) - Metric													
Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Fig.
		$øD_c$	$øD_b$	Lf	ød	a	b	ℓ	$ød_1$	$ød_2$			
DFC09050RS	★	50	41	40	22	10.4	6.3	20	18	11	4	0.3	1
DFC09063RS	★	63	50	40	22	10.4	6.3	20	18	11	4	0.5	1
DFC09080RS	★	80	55	50	27	12.4	7	22	20	14	5	1	1
DFC09100RS	★	100	70	50	32	14.4	8	26	46	32	6	1.4	3
DFC09125RS	★	125	80	63	40	16.4	9	29	52	29	7	2.8	1
DFC09160RS	★	160	100	63	40	16.4	9	29	90	-	8	4.6	4
DFC09080R	★	80	55	50	25.4	9.5	6	25	20	14	5	1	1
DFC09100R	★	100	70	63	31.75	12.7	8	32	27	18	6	2	2
DFC09125R	★	125	80	63	38.1	15.9	10	35.5	55	30	7	2.8	1
DFC09160R	★	160	100	63	50.8	19.1	11	38	72	-	8	3.6	4
Body (Fine Pitch) - Metric													
DFCM09050RS	★	50	41	40	22	10.4	6.3	20	18	11	5	0.3	1
DFCM09063RS	★	63	50	40	22	10.4	6.3	20	18	11	6	0.5	1
DFCM09080RS	★	80	55	50	27	12.4	7	22	20	14	7	0.9	1
DFCM09100RS	★	100	70	50	32	14.4	8	26	46	32	8	1.4	3
DFCM09125RS	★	125	80	63	40	16.4	9	29	52	29	11	2.7	1
DFCM09160RS	★	160	100	63	40	16.4	9	29	90	-	12	4.5	4
DFCM09080R	★	80	55	50	25.4	9.5	6	25	20	14	7	0.9	1
DFCM09100R	★	100	70	63	31.75	12.7	8	32	27	18	8	1.9	2
DFCM09125R	★	125	80	63	38.1	15.9	10	35.5	55	30	11	2.7	1
DFCM09160R	★	160	100	63	50.8	19.1	11	38	72	-	12	3.5	4
Body (Extra-Fine Pitch) - Metric													
DFCF09050RS	★	50	41	40	22	10.4	6.3	20	18	11	6	0.3	1
DFCF09063RS	★	63	50	40	22	10.4	6.3	20	18	11	7	0.5	1
DFCF09080RS	★	80	55	50	27	12.4	7	22	20	14	9	0.9	1
DFCF09100RS	★	100	70	50	32	14.4	8	26	46	32	11	1.3	3
DFCF09125RS	★	125	80	63	40	16.4	9	29	52	29	14	2.6	1
DFCF09160RS	★	160	100	63	40	16.4	9	29	90	-	16	4.6	4
DFCF09080R	★	80	55	50	25.4	9.5	6	25	20	14	9	0.9	1
DFCF09100R	★	100	70	63	31.75	12.7	8	32	27	18	11	1.9	2
DFCF09125R	★	125	80	63	38.1	15.9	10	35.5	55	30	14	2.7	1
DFCF09160R	★	160	100	63	50.8	19.1	11	38	72	-	16	3.5	4

★ worldwide warehouse item

DFC Endmill Metric Lineup



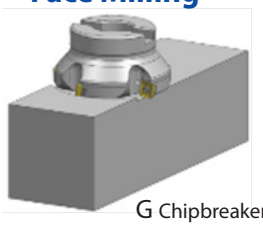
Body (Shank Type)							
Cat. No.	Stock	Dimensions (mm)					No. of Teeth
		$øD_c$	$øD_s$	Lf	$ℓ_s$	L	
DFC09025E	★	25	25	40	80	120	2
DFC09032E	★	32	32	50	80	130	2
DFC09040E	★	40	32	50	80	130	3
DFC09050E	★	50	32	50	80	130	3
DFC09050E-42	★	50	42	50	100	150	3
DFC09063E	★	63	32	50	80	130	4
DFC09063E-42	★	63	42	50	100	150	4
DFC09080E	★	80	32	50	80	130	5
DFC09080E-42	★	80	42	50	100	150	5
DFCM09032E	★	32	32	50	80	130	3
DFCM09040E	★	40	32	50	80	130	4
DFCM09050E	★	50	32	50	80	130	5
DFCM09050E-42	★	50	42	50	100	150	5
DFCM09063E	★	63	32	50	80	130	6
DFCM09063E-42	★	63	42	50	100	150	6
DFCM09080E	★	80	32	50	80	130	7
DFCM09080E-42	★	80	42	50	100	150	7

★ worldwide warehouse item

High efficiency machining due to its optimized cutting edge geometry and highly rigid body

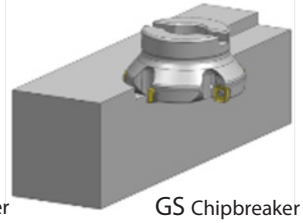
For a wide range of applications

Face Milling



G Chipbreaker

Shoulder Milling



GS Chipbreaker

Slot Milling

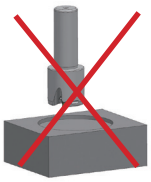
GS Chipbreaker

Side Face Milling

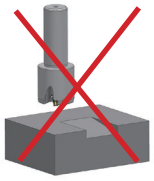
G / GS Chipbreakers

Not Applicable

Helical Milling

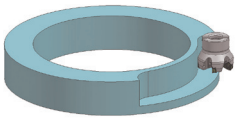


Ramping



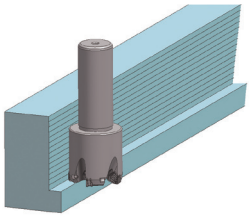
Application Examples

Part Material: 4140		DFC	Comp.
Ring Part	**Tool**	DFCM22000R	Double Sided 6-corners
	Grade	ACP200	-
	Chipbreaker	GS	-
	Diameter	2.000″	2.000″
	# of Teeth	5	5
	V_c (sfm)	460	460
	V_f (in. /min)	44″	44″
	f_z (in. /t)	0.010″	0.010″
	a_p (in.)	0.100″	0.100″
	a_e (in.)	1.181″	1.181″
	Coolant	Dry	Dry



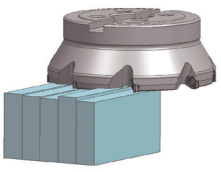
Results: Achieving 6x longer tool life without re-cutting and 160% higher efficiency

Part Material: 1045		DFC	Comp.
Machine Vice	**Tool**	DFC-M22000EW	Single Sided 2-corner
	Grade	ACP200	-
	Chipbreaker	GS	-
	Diameter	2.000″	2.000″
	# of Teeth	5	5
	Vc (sfm)	617	617
	Vf (in./min.)	47″	31″
	fz (in./t)	0.008″	0.005″
	ap (in.)	0.200″	0.200″
	ae (in.)	0.512″	0.512″
	Coolant	Air	Air



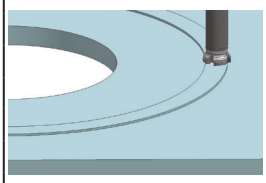
Results: Achieving 150% higher efficiency

Part Material: A128		DFC	Comp.
Block Material Simultaneous Cutting	**Tool**	DFC26000R	Double Sided 8-corner
	Grade	ACP300	-
	Chipbreaker	G	-
	Diameter	6.000″	6.000″
	# of Teeth	8	12
	V_c (sfm)	492	492
	V_f (in./min.)	20″	20″
	f_z (in./t)	0.008″	0.006″
	a_p (in.)	0.040″	0.020″
	a_e (in.)	4.000″	4.000″
	Coolant	Wet	Wet



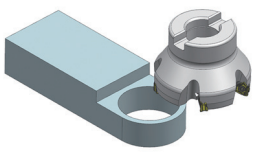
Results: Achieving 300% longer tool life and 200% higher efficiency

Part Material: 1049		DFC	Comp.
Construction Component	**Tool**	DFC09063RS	Single Sided 2-Corner
	Grade	ACP200	-
	Chipbreaker	G	-
	Diameter	2.500″ (63mm)	2.500″ (63mm)
	# of Teeth	4	5
	V_c (sfm)	590	590
	V_f (in./min.)	43″	36″
	f_z (in./t)	0.012″	0.008″
	a_p (in.)	0.080″	0.080″
	a_e (in.)	2.000″	2.000″
	Coolant	Dry	Dry



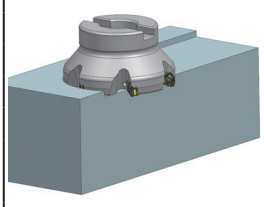
Results: Achieving 120% higher efficiency

Part Material: 1049		DFC	Comp.
Automotive Component	**Tool**	DFC09080RS	Single Sided 4-corner
	Grade	ACP200	-
	Chipbreaker	G	-
	Diameter	3.000″ (80mm)	3.000″ (80mm)
	# of Teeth	5	5
	V_c (sfm)	742	656
	V_f (in. /min)	50″	31″
	f_z (in. /t)	0.011″	0.008″
	a_p (in.)	0.080″	0.080″
	a_e (in.)	0.197″	0.197″
	Coolant	Wet	Wet



Results: Achieving 160% higher efficiency

Part Material: 60-40-18		DFC	Comp.
Pump Part	**Tool**	DFCF24000R	Double Sided 6-corner
	Grade	ACK300	-
	Chipbreaker	G	-
	Diameter	4.000″	4.000″
	# of Teeth	11	8
	Vc (sfm)	1,100	1,100
	Vf (in./min.)	72″	72″
	fz (in./t)	0.006″	0.008″
	ap (in.)	0.080″	0.080″
	ae (in.)	2.950″	2.950″
	Coolant	Dry	Dry



Results: Achieving 150% longer tool life

In addition to drastic economic advantage from DFC, double-sided 90° milling cutter, Sumitomo Electric Carbide, Inc. also provides a wide variety of high performance 90° milling cutters to fulfill your needs in any application!

SUMITOMO

CARBIDE - CBN - DIAMOND

Sumitomo Electric Carbide, Inc.

Headquarters

1001 Business Center Drive
Mount Prospect, IL 60056-2181
P.O. Box 545, Mt. Prospect, IL 60056-0545
Phone: (800) 950-5202
Phone: (847) 635-0044
Fax: (847) 635-7866
http://www.sumicarbide.com

Sumitomo Electric Tool Engineering Center

5637 S. Westridge Drive
New Berlin, Wi 53151
Phone: (800) 950-5202

Indiana Branch

595 S. Emerson Avenue
Suite 100
Greenwood, IN 46143
Phone: (800) 950-5202

Sumicarbide Canada, Inc.

150 Research Lane
Unit #210
Guelph, Ontario N1G 4T2
Canada
Phone: (519) 265-6050
Phone: (844) 211-6050

Torrance Branch

21241 South Western Avenue
Suite 120
Torrance, CA 90501
Phone: (800) 950-5202
Fax: (310) 782-0211

Detroit Branch

14496 Sheldon Road #230
Plymouth, MI 48170
Phone: (800) 239-5177
Phone: (734) 451-0200
Fax: (734) 451-5338

Huntsville Branch

6700 Odyssey Drive
Suite 211
Huntsville, AL 35806
Phone: (256) 971-1203
Fax: (256) 971-1205

CAT.DFCBROCHURE.12/15