

PCD Cartridge Style Face Mill and End Mill Program



soft, free-cutting
non-ferrous
metals
(eg: 6061
aluminum, brass,
and copper)

graphite,
carbon, green
ceramics,
fiber-reinforced
plastics, and
fiberboard

low-silicon
aluminum
(eg: 380)

high-silicon
aluminum
(eg: 390)

metal matrix
composites
(eg: Duralcan)

K110M carbide

KD1410 cartridges

diamond film technology

KC510M coated carbide

KD1405 cartridges

abrasiveness



Features

- high cartridge density per cutter
- symmetrical body cartridge pockets
- cutting forces directed to center axis
- open design
- axial adjustment
- thru-spindle coolant flow
- aluminum and steel body designs
- specials available

Benefits

- higher machining feeds and speeds
- LH and RH mounting with same body
- higher load bearing and rigidity
- improved chip evacuation... less chip damage
- improved surface finish and tool life
- washes chips out of cutter path... eliminates chip re-cutting
- spindle load reduction for aluminum... higher speeds
- adds flexibility and options for using standard inserts/cartridges

End Mills



Cartridges

Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index

1. KE End Mills

KE — end mill

3. Hand of Cartridge

R — right hand
L — left hand

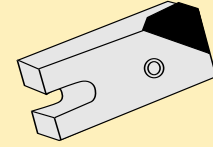
5. Wiper Flat

0 — no wiper
1 — .060
2 — .080
3 — .100
4 — .120

7. Maximum Depth of Cut

0 — .200 standard
1 — .250
2 — .375*
3 — .500*
4 — .625*
5 — .750*

Standard Stocked Cartridges



KE-style end mills



2. Insert Style

B — CBN
D — PCD

4. Nose Radius

0 — .000
1 — .010
2 — .030
3 — .060
4 — .090
5 — .016
6 — .100

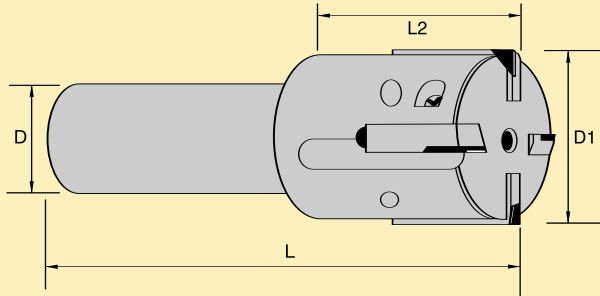
6. Cartridge Style

0 — standard
1 — long edge

*Special radii available upon request.

catalog number	corner radius	wiper flat	max. depth of cut	KD1405	KD1410
KEDR2100	.030	.060	.200	■	■
KEDR2103	.030	.060	.500	■	■
KEDR3200	.060	.080	.200	■	■
KEDR3203	.060	.080	.500	■	■
KEDR4100	.090	.060	.200	■	■
KEDR4101	.090	.060	.250	■	■

End Mill Bodies (use cartridges shown above)



effective cutting diameter "D1"	order number	catalog number	number of inserts	number of adjustable inserts	shank diameter "D"	overall length "L"	head length "L2"	max. rpm
1.000	2217389	KIPR100PC03SS3	3	3	.750	3.532	1.500	24,000
1.250	2217390	KIPR125PC03SS4	3	3	1.000	4.031	1.750	22,000
1.500	2217391	KIPR150PC04SS4	4	4	1.000	4.031	1.750	20,000
1.750	2217392	KIPR175PC04SS5	4	4	1.250	4.531	2.250	18,500
2.000	2217393	KIPR200PC04SS5	4	4	1.250	4.531	2.250	17,000

Face Mills



Cutter Bodies (See cartridges on page M162.)

Features

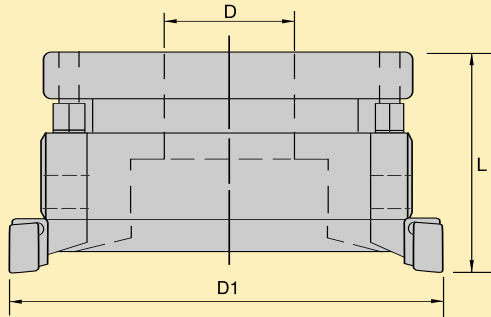
- cartridge
- cutters designed to accept RH or LH cartridges
- steel bodies available as specials
- good chip evacuation
- thru-spindle coolant capability

Benefits

- better stability
- lower inventory/production flexibility
- lower hp requirements
- superior chip removal
- improved surface finishes



Face Mills – Inch



effective cutting diameter D1	order number	catalog number	number of inserts	number of adjustable inserts	height "L"	mounting bore "D"	keyway	bolt circle	max. rpm
2.50	2217335	KACN250PC03	3	3	2.00	.75	.31	—	15,500
2.50	2217336	KACN250PC06	6	6	2.00	.75	.31	—	15,500
3.00	2217337	KACN300PC04	4	4	2.00	1.00	.38	—	14,200
3.00	2217338	KACN300PC08	8	8	2.00	1.00	.38	—	14,200
4.00	2217339	KACN400PC06	6	6	2.00	1.25	.50	—	12,250
4.00	2217340	KACN400PC12	12	12	2.00	1.25	.50	—	12,250
5.00	2217341	KACN500PC08	8	8	2.38	1.50	.63	—	11,000
5.00	2217342	KACN500PC16	16	16	2.38	1.50	.63	—	11,000
6.00	2217373	KACN600PC08	8	8	2.38	1.50	.63	—	10,000
6.00	2217374	KACN600PC20	20	20	2.38	1.50	.63	—	10,000
8.00	2217375	KACN800PC10	10	10	2.38	2.50	1.00	4	8,600
8.00	2217376	KACN800PC24	24	24	2.38	2.50	1.00	4	8,600
10.00	2217377	KACN1000PC12	12	12	2.38	2.50	1.00	4	7,750
10.00	2217378	KACN1000PC28	28	28	2.38	2.50	1.00	4	7,750

Face Mills – Metric*

effective cutting diameter D1	order number	catalog number	number of inserts	number of adjustable inserts	height "L"	mounting bore "D"	keyway	bolt circle	max. rpm
80,0	2217379	KACN80PC04	4	4	50,0	22,0	10,4	—	14,200
100,0	2217381	KACN100PC06	6	6	50,0	32,0	14,4	—	12,250
100,0	2217382	KACN100PC12	12	12	50,0	32,0	14,4	—	12,250
125,0	2217383	KACN125PC08	8	8	63,0	40,0	16,4	—	11,000
125,0	2217384	KACN125PC16	16	16	63,0	40,0	16,4	—	11,000
160,0	2217385	KACN160PC10	10	10	63,0	40,0	16,4	—	10,000
160,0	2217386	KACN160PC20	20	20	63,0	40,0	16,4	—	10,000
200,0	2217387	KACN200PC12	12	12	63,0	60,0	25,4	101,6	8,600
200,0	2217388	KACN200PC24	24	24	63,0	60,0	25,4	101,6	8,600

*Metric cutters are available as non-stock standards.
Steel bodies and special cutters available upon request.
See page M164 for spare parts.

Inserts

Face Mills

End Mills

Die and Mold

Slotting

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Widia Cutters

Vintage Cutters

Accessories

Technical Data

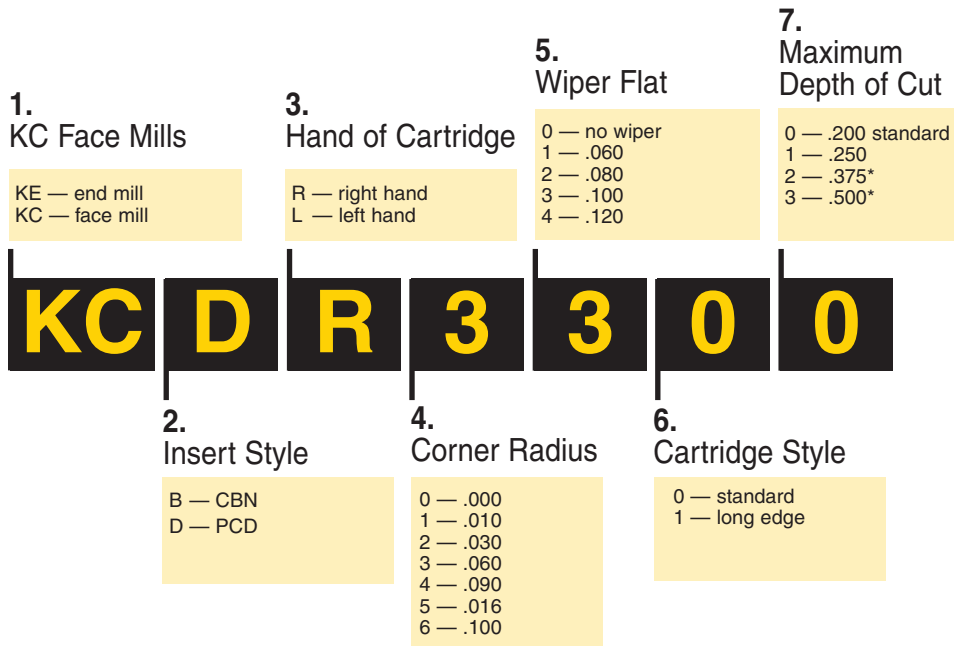
Mat'l Database

Index

Face Mills

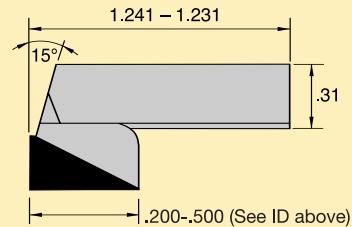
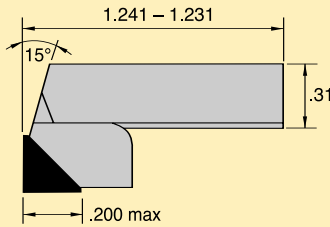


Cartridges



NOTE: Recommended cartridge for all standard purposes is a KCDR-33-00 cartridge.
 *Special radii are available.

Standard Stocked Cartridges



catalog number	corner radius	wiper flat	max. depth of cut	KD1405	KD1410
KCDR1000	.010	—	.200		■
KCDR1100	.010	.060	.200		■
KCDR2200	.030	.080	.200	■	■
KCDR3300	.060	.100	.200	■	■
KCDR4400	.090	.120	.200	■	■
KCDL2200	.030	.080	.200	■	■
KCDL3300	.060	.100	.200	■	■
KCDL4400	.090	.120	.200	■	■
KCDL4401	.090	.120	.250	■	■

Setup Procedure for PCD Cartridge-Style Milling Cutters



1. When installing new cartridges, ensure pockets are clean and free of burrs.
2. Clean bottom of cutter to ensure it is free of burrs and dirt. Cutter **must** sit flat on surface or setting fixture.
3. Turn adjustment hex nut down one turn with fingers.
4. Install new cartridges in body and slightly tighten with Torx wrench.
5. Set dial indicator to desired height.
6. Using 1/4" wrench, turn hex nut and adjust cartridges to within .001 from setting height.
 - 10-24 lock screws – Tighten each cartridge screw to 45 in.-lbs. NOTE: Make sure screws are securely tightened.
7. Using 1/4" wrench, turn hex nut to adjust the cartridge to proper setting height. To achieve the best surface finishes, all cartridges need to be within $\pm .0001$ (0,0025 mm).
8. Check Torx screws to verify that they are tight.

Kennametal is not responsible for any defects caused by improper use or setting of its milling cutters. Care should be taken and exercised when handling aluminum cutter bodies. Although the outside surface is hard, it is made of aluminum and will dent or nick from improper handling. Also, all PCD and grade KD1405 cartridges are very brittle. Extreme caution should be taken when handling and setting diamond products. Proper handling and setting will ensure maximum cutter performance.



Maximum rpm guidelines in the chart below must be followed per milling cutter.

diameter of cutter (inches)	maximum rpm
2.5	15,500
3	14,200
4	12,250
5	11,000
6	10,000
7	9,400
8	8,600
9	8,075
10	7,750
11	7,250
12	7,075

Technical Support Phone: 800-835-3668

Application Data for Grades KD1405 and KD1410

	workpiece material	cutting speed range (sfm)	starting sfm	feed rate range	starting ipt
non-ferrous metals	free-machining aluminum alloys	3,500 - 15,000	12,000	.004 - .014	.008
	low-silicon aluminum (< 12%)	3,500 - 12,000	10,000	.004 - .012	.006
	high-silicon aluminum (> 12%)	3,000 - 12,000	7,500	.004 - .010	.005
	metal matrix composites	1,000 - 3000	2,500	.004 - .010	.005
	free-machining copper alloys, brass, bronze, lead, and zinc	3,000 -11,000	10,000	.005 - .014	.008
non-metallic materials	graphite, carbon, and unfilled plastics	2,000 - 8,000	4,000	.003 - .008	.004
	carbon and graphite composites	2,000 - 7,500	3,500	.001 - .010	.003
	machinable ceramics (macor) and glass	2,000 - 8,000	3,000	.003 - .008	.004
	plastics, nylon, phenolics, and rubber	3,500 - 10,000	6,500	.001 - .010	.005
	green ceramics	500 - 1,500	1,000	.002 - .006	.003

KD1410		<p>composition: Polycrystalline diamond tip, with 25 um grain size, brazed on a standard carbide insert.</p> <p>application: For machining aluminum with high-silicon content; abrasive, non-ferrous metals; and fiber-reinforced plastics at very high cutting speeds. Will produce generally good surface finishes.</p>
KD1405		<p>composition: Pure diamond material.</p> <p>application: Excellent for finish and semi-finish milling applications in high-silicon content aluminum and abrasive non-ferrous materials. Produces extremely good surface finishes.</p>

Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index

Face Mill and End Mill Hardware



Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index

face mills	cartridge adjustment nut	description	cartridge mounting screw	description	wrench	adjustment nut screw	description
KACN250PC03	S2137PKG	10-32 x 1/3" long x 1/4" nut	S2138PKG	10-24 x 5/8" long TX25 Torx button head	TT25	S2139PKG	10-32 x 5/8" set screw
KACN250PC06	S2137PKG	"	S2138PKG	"	TT25	S2139PKG	"
KACN300PC04	S2137PKG	"	S2138PKG	"	TT25	S2139PKG	"
KACN300PC08	S2137PKG	"	S2138PKG	"	TT25	S2139PKG	"
KACN400PC06	S2137PKG	"	S2140PKG	10-24 x 3/4" long TX25 Torx button head	TT25	S2141PKG	10-32 x 3/4" set screw
KACN400PC12	S2137PKG	"	S2140PKG	"	TT25	S2141PKG	"
KACN500PC08	S2137PKG	"	S2140PKG	"	TT25	S2141PKG	"
KACN500PC16	S2137PKG	"	S2140PKG	"	TT25	S2141PKG	"
KACN600PC08	S2137PKG	"	S2140PKG	"	TT25	S2141PKG	"
KACN600PC20	S2137PKG	"	S2140PKG	"	TT25	S2141PKG	"
KACN800PC10	S2137PKG	"	S2140PKG	"	TT25	S2141PKG	"
KACN800PC24	S2137PKG	"	S2140PKG	"	TT25	S2141PKG	"
KACN1000PC12	S2137PKG	"	S2140PKG	"	TT25	S2141PKG	"
KACN1000PC28	S2137PKG	"	S2140PKG	"	TT25	S2141PKG	"

end mills	cartridge adjustment screw	description	wrench	cartridge mounting screw	description	wrench
KIPR100PC03SS3	S2142PKG	6-32 x 1/2" long set screw	KW078	S2143PKG	6-32 x .36" long T15 Torx screw	TT15
KIPR125PC03SS4	S2142PKG	"	KW078	S2143PKG	"	TT15
KIPR150PC04SS4	S2144PKG	8-32 x 1/2" long set screw	KW078	S2143PKG	"	TT15
KIPR175PC04SS5	S2145PKG	10-32 x 1/2" long set screw	KW093	S2143PKG	"	TT15
KIPR200PC04SS5	S2145PKG	"	KW093	S2143PKG	"	TT15

presenting...

Kennametal's PCD Diamond Cutter Program

Engineered specifically to deliver ultimate performance in non-ferrous milling applications!

Engineering Your Competitive Edge



- Excellent surface finishes
- 2" thru 10" diameters
- Cutters accept right- or left-hand cartridges
- All pockets are axially adjustable
- Capable of high metal removal rates

Call 800/446-7738

www.kennametal.com

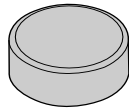
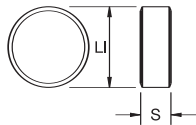


High-Performance Milling Inserts and Cutters



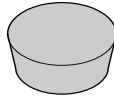
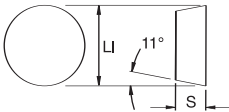
Inserts

RNG-T



catalog number	ISO catalog number	dimensions				grades	
		D inch	D mm	S inch	S mm	KY2100	KY1540
RNG45T0420	RNG120700T01020	1/2	12,70	5/16	7,94	■	■

RPG



catalog number	ISO catalog number	dimensions				grades	
		D inch	D mm	S inch	S mm	KY2100	KY1540
RPG43	RPGN120400	1/2	12,70	3/16	4,76	■	■

Guidelines for Cutting Speed and Feed by Material Groups for High-Performance Face Mills

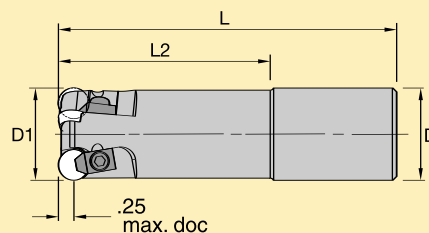
material	grade	feed range		speed range		wet or dry
		ipt	mm/tooth	sfm	m/min	
PH stainless steels 13-8, 15-5, and 17-4 ≤135-450 HB (≤48 HRC)	KY2100	.002-.005	0,05-0,13	2500-3200	760-975	d
	KY1540	.003-.004	0,08-0,1	1700-2400	520-730	
300 series austenitic stainless steel 302,303,304,316,321,347, and 329 135-275 HB (≤28 HRC)	KY2100	.002-.005	0,05-0,13	2000-3200	610-975	d
iron-base, heat-resistant alloys A286, Inconel, Incoloy 135-328 HB (≤34 HRC)	KY2100	.002-.005	0,05-0,13	3000-7000	915-2135	d
	KY1540	.002-.005	0,05-0,13	1000-3000	305-915	
cobalt-base, heat-resistant alloys Haynes 21/25/188, Stellite 150-425 HB (≤45 HRC)	KY2100	.002-.005	0,05-0,13	2000-5500	610-1680	d
	KY1540	.002-.005	0,05-0,13	900-4000	275-1220	
nickel-base, heat-resistant alloys Inconel 601/617/625/718/x-750/901, Nimonic 80A, Waspaloy, Rene 95, Hastaloy C, Udimet 700 140-475 HB (≤48 HRC)	KY2100	.002-.005	0,05-0,13	2000-5500	610-1680	d
	KY1540	.002-.005	0,05-0,13	900-4000	275-1220	
titanium and titanium alloys 110-450 HB (≤48 HRC)		NOT RECOMMENDED				

Use calculated vs actual chip corrections chart on page M166 when determining actual chip load.

High-Performance End Mill 0°/90° – Hi-Temp Alloys

KIPR-RP – Clamp-on Insert – Integral Shank

- For use on both high-temperature alloys and stainless steels.



effective cutting diameter D1	order number	ANSI catalog number	no. of inserts	shank diameter D	overall length L	head length L2	clamp	clamp screw	maximum rpm	lbs.
1.25	1873486	KIPR125RP43540	3	1.25	4.00	1.61	KCI3	S1997PKG	21000	<2
1.25	1775726	KIPR125RP43555	3	1.25	5.50	3.11	KCI3	S1997PKG	21000	<2
1.25	1775727	KIPR125RP43570	3	1.25	7.00	4.61	KCI3	S1997PKG	21000	2.0
1.50	1880186	KIPR150RP43640	3	1.50	4.00	2.00	KCI3	S1997PKG	19500	2.3
1.50	1775728	KIPR150RP43655	3	1.50	5.50	3.50	KCI3	S1997PKG	19500	2.3
1.50	1775729	KIPR150RP43666	3	1.50	6.61	4.61	KCI3	S1997PKG	19500	2.8

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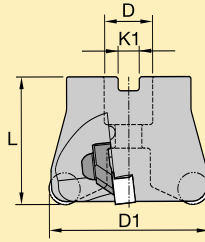
Index

High-Performance Face Mill 0°/90° – Hi-Temp Alloys



KDNR-RN – Clamp-On Insert – Shell Mill

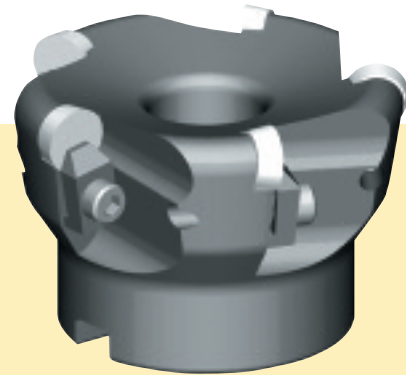
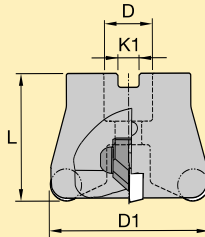
- These cutters are your best choice for milling high-temp alloys.



effective cutting diameter D1	order number	ANSI catalog number	total no. of inserts	height L	mounting bore D	keyway K1	clamp	clamp screw	max. rpm	lbs.
2.00	1775730	KDNR200RN40C3	3	2.00	.75	.31	KCI4	554.202	13700	0.90
2.50	1775731	KDNR250RN40C3	4	2.00	.75	.50	KCI4	554.202	12300	1.20
3.00	1775753	KDNR300RN40C4	5	2.00	1.00	.38	KCI4	554.202	11200	1.80
4.00	1775754	KDNR400RN40C5	6	2.00	1.25	.50	KCI4	554.202	9700	3.50

KSSR-RP – Clamp-On Insert – Shell Mill

- These cutters are your best choice for milling PH stainless and 300 series stainless steel.



effective cutting diameter D1	order number	ANSI catalog number	total no. of inserts	height L	mounting bore D	keyway K1	clamp	clamp screw	max. rpm	lbs.
2.00	1942350	KSSR200RP430C3	3	2.00	.75	.31	KCI3	S1997PKG	16000	1.00
2.00	1942586	KSSR200RP430F3	4	2.00	.75	.31	KCI3	S1997PKG	16000	0.90
2.50	1942587	KSSR250RP430C3	4	2.41	.75	.31	KCI3	S1997PKG	14500	1.30
3.00	1942589	KSSR300RP430C4	5	2.00	1.00	.38	KCI3	S1997PKG	13500	1.90
4.00	1942607	KSSR400RP430C5	6	2.00	1.25	.50	KCI3	S1997PKG	11500	3.50

Calculated vs. Actual Chip Correction Chart

Insert radius = .25"

Correct IPT is to be used to calculate the feed (IPM)

axial depth of cut	desired actual chip load			
	.002	.003	.004	.005
	corrected IPT	corrected IPT	corrected IPT	corrected IPT
.010	.00752	.01161	.01600	.02076
.015	.00605	.00924	.01255	.01601
.020	.00522	.00793	.01071	.01357
.031	.00420	.00635	.00853	.01074
.063	.00304	.00457	.00611	.00766
.094	.00257	.00386	.00515	.00645
.125	.00231	.00347	.00463	.00579
.156	.00216	.00324	.00432	.00540
.188	.00207	.00310	.00413	.00517
.219	.00202	.00302	.00403	.00504
.250	.00200	.00300	.00400	.00500