

Engineering Your
Competitive Edge
IN MILLING



Introducing **KENNA UNIVERSAL Carbide End Mills**

KENNA UNIVERSAL

Expanded Offering!



***...engineered to deliver consistent
and reliable performance in a wide
range of workpiece materials!***

- Hundreds of new sizes now available in a wide range of square-end and ball nose roughing and finishing styles.
- Perfect for the job shop environment.
- Unique PVD coating enhances tool life and enables smoother, faster machining.
- Available in inch and metric sizes.
- Available in long-shank and necked end mill styles for long-reach applications.

Distributed by:

Kennametal will significantly improve your end milling performance!

Let us prove it.

 **KENNAMETAL®**
Engineering Your Competitive Edge

Markets and Applications

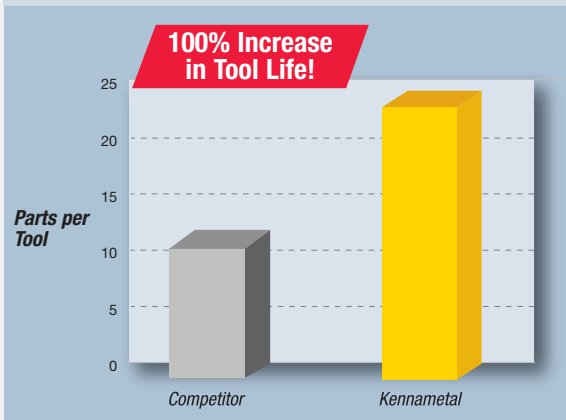
- For steel, stainless steel <30 HRC, and nonferrous materials in general job shop applications.
- Excellent for use in light-duty milling and short-run production operations.
- Use 2- and 3-flute finishing styles for slotting, pocket end milling and heavy radial depths of cut.
- Use ball nose styles for slotting applications and 3-dimensional machining.

Featured Application:

Operation: Milling Radial Through Slots
 Customer: Oil & Gas Drill Bit Manufacturer
 Material: 410 SS BMS305
 Workpiece: Latch Mandrel
 Results:

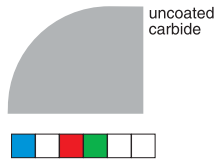
- More than doubled the tool life per edge!
- Machined twice the number of workpieces!

	COMPETITOR	KENNAMETAL
end mill:	.375" end mill	HEC375S4
grade:	SGS Tinamite	KC610M
material:	410 SS BMS305	410 SS BMS305
speed:	140 sfm	140 sfm
feed/IPT:	.001"	.001"
depth of cut:	.218"	.218"
parts per tool:	1	2
tool life edge/ per minute:	11.7	23.5



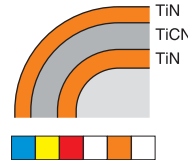
Recommended Milling Grades

K600



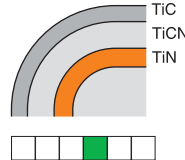
Carbide grade made from high quality, micro-grain materials for cutting all types of workpiece materials. Very high toughness ensures a controlled wear rate. The micro-grain structure enables extremely sharp cutting edges.

KC610M



PVD (TiN/TiCN/TiN) coated carbide grade. KC610M is a high-performance grade for milling all types of workpiece materials. This grade is characterized by good hardness and wear resistance. This grade should be used with coolant or minimal lubricant.

KC625M



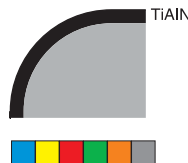
Coated carbide grade with PVD multi-layer (TiN/TiCN/TiC). For universal use due to its high wear resistance and hardness. Only use wet or with minimal amounts of lubrication.

KC633M



Coated carbide grade with PVD coating (TiAlN/TiN/TiAlN). KC633M is a high-performance grade for dry milling most workpiece materials. This grade is characterized by good hardness and wear resistance. It provides outstanding protection for solid carbide tools against cratering and abrasion.

KC635M

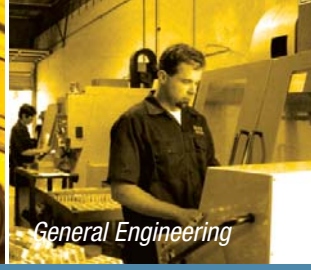


Coated carbide grade with PVD coating (TiAlN). KC635M is a high-performance grade for hard machining. This grade is characterized by high hardness and wear resistance and is suitable for cutting hard materials (up to 65 HRC).

Product Offering — Metric Styles



Automotive



General Engineering

■ Square-End Finishers — Metric

Type of Tool	Tool Style	Range of Diameter (mm) Min–Max	No. of Flutes	Helix Angle	Special Features KW–Keyway	 Type of Application		● ...first choice ○ ...alternate choice Workpiece Materials						See Page
								P	M	K	N	S	H	
	F2AH...A/BDK30	2–20	2	30/45		Side Milling	Slotting	●	●	●	○	●		20
	F3AH...A/BDK30/45	2,5–20	3	30/45		Side Milling	Slotting	●	●	●	○	●		21
	F4AJ...A/BDK30	2–20	4	30		Side Milling		●	●	●	○	●		23
	F3AR...BWS30	2–10	3	30		Side Milling		●	●	●	○	●		24
	F2AU...A/BDK30	2,8–19,7	2	30	KW		Slotting	●	●	●	○	●		25
	F3AU...A/BDK30	2,8–19,7	3	30	KW		Slotting	●	●	●	○	●		26
	F2/3AH...ADN30	2–20	2/3	30		Side Milling	Slotting	●	●	●	○	●		31
	F4AJ...ADN30	2–20	4	30		Side Milling		●	●	●	○	●		33
	F2AH...A/BDL30	2,5–20	2	30		Side Milling	Slotting	●	●	●	○	●		34
	F3AH...A/BDL30/45	3–20	3	30/45		Side Milling	Slotting	●	●	●	○	●		35
	F3AJ...ADL60	6–20	3	60		Side Milling		●	●	●	○	●	○	37
	F4AJ...A/BDL30	4–20	4	30		Side Milling		●	●	●	○	●		38
	F2AH...AWM/L/X30	4–20	2	30		Side Milling	Slotting	●	●	●	○	●		39
	F4AJ...AWM/L/X30	3–20	4	30		Side Milling	Slotting	●	●	●	○	●		40

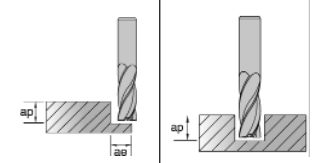




■ Ball Nose Finishers — Metric

Type of Tool	Tool Style	Range of Diameter (mm) Min–Max	No. of Flutes	Helix Angle	Special Features BNF–Ball Nose	 Type of Application		● ...first choice ○ ...alternate choice Workpiece Materials						See Page
								P	M	K	N	S	H	
	F2AL...AWL/M30	1–16	2	30	BNF	3D cutting		●	●	●		●		99
	F2AL...AWM/L/X30	6–16	2	30	BNF	3D cutting		●	●	●		●		101
	F2AL...AWM/L/X20	2–12	2	20	BNF	3D cutting		●	●	●		●		100
	F2/4AL...ADN30	2–20	2/4	30	BNF	3D cutting		●	●	●		○		106
	F2AL...A/BDL30	2–20	2	30	BNF	3D cutting		●	●	●		○		108
	F4AL...A/BDL30	3–20	4	30	BNF	3D cutting		●	●	●		○		109
	F2/4AL...AWM/L/X30L...	3–12	2/4	30	BNF	3D cutting		●	●	○	●	○		110

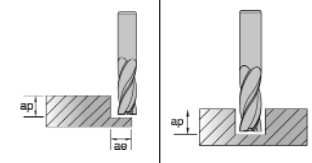


P	steel
M	stainless steel
K	cast iron
N	nonferrous
S	high-temperature alloys
N	hardened materials

For order information or more product detail, see Kennametal's new Milling METRIC 6050 catalog and reference the page numbers shown in the chart.

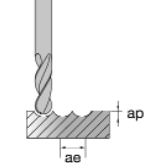




■ Square-End Finishers — Inch

Type of Tool	Tool Style	Range of Diameter (inch) Min-Max	No. of Flutes	Helix Angle	Special Features R-Radius			Workpiece Materials						See Page
								P	M	K	N	S	H	
	HEC	.016–1.250	2/3/4	30		Side milling	Slotting	●	●	●	○	○	○	18–19
	CRHEC	.125–1.000	4	30	R	Side milling	Slotting	●	●	●	○	○	○	25
	DHEC	.031–0.500	2/4	30		Side milling	Slotting	●	●	●	○	○	○	26
	HHEC	.125–1.000	3	60		Side milling		●	○	○	○	○	○	24

■ Roughers — Inch

Type of Tool	Tool Style	Range of Diameter (inch) Min-Max	No. of Flutes	Helix Angle	Special Features CH-Chamfer			Workpiece Materials						See Page
								P	M	K	N	S	H	
	SFRHEC	.250–1.000	3	42	CH	Side milling	Slotting	●	○	○	○	○	○	50
	MDRHEC	.250–1.000	4/5	30	CH	Side milling	Slotting	●	●	●	○	○	○	52

■ Ball Nose Finishers — Inch

Type of Tool	Tool Style	Range of Diameter (inch) Min-Max	No. of Flutes	Helix Angle	Special Features BNF-Ball Nose			Workpiece Materials						See Page
								P	M	K	N	S	H	
	BNEC...S2	.031–1.000	2	30	BNF	3D Milling		●	●	●	○	○	○	58–59
	BNEC...S3	.031–.500	3	30	BNF	3D Milling		●	●	●	○	○	○	60
	BNEC...S4	.031–1.000	4	30	BNF	3D Milling		●	●	●	○	○	○	61–62
	DBNEC	.031–.500	4	30	BNF	3D Milling		●	●	○	○	○	○	63

For order information or more product detail, see Kennametal's new Milling INCH 6050 catalog and reference the page numbers shown in the chart.

P	steel
M	stainless steel
K	cast iron
N	nonferrous
S	high-temperature alloys
H	hardened materials



For a complete listing of Kennametal solid carbide end mills, see our new Milling INCH 6050 and Milling METRIC 6050 catalogs. To order your **FREE** copy or to download a pdf of the catalog, visit www.kennametal.com.