

RAISE **YOUR** STANDARDS

OFFER
EXTENDED
TO JUNE 30, 2021

KOR 5™
FROM
\$41.00

HARVI™ I TE
FROM
\$22.00

HARVI™ III
FROM
\$41.00

5-FLUTES

**MAXIMUM MRR
IN ALUMINUM**

4-FLUTES

**MAXIMUM VERSATILITY
MAXIMUM PRODUCTIVITY**

6-FLUTES

**MAXIMUM PRODUCTIVITY
IN TITANIUM**

**HELP SUPPORT VETERANS BY USING
KENNAMETAL END MILLS**

Valid from August 1, 2020 to June 30, 2021

Kennametal.com/TitanPromo



***KENNAMETAL WILL DONATE ONE DOLLAR
OF EACH PROMOTIONAL END MILL SALE
TO WORKSHOPS FOR WARRIORS®***



WORKSHOP FOR WARRIORS IS A NONPROFIT ORGANIZATION THAT TRAINS AND CERTIFIES VETERANS AND
TRANSITIONING SERVICE MEMBERS FOR CAREERS IN ADVANCED MANUFACTURING.

TO LEARN ABOUT ENROLLMENT OR DONATING, VISIT: WFW.ORG



Materials

P M K S H

Applications



Slotting



3D Profiling



Side Milling/
Shoulder Milling



Ramping



Helical Interpolation



Plunge Milling



Trochoidal Milling



Trochoidal Milling:
Ball Nose

HARVI™ I TE
FROM
\$22.00



Asymmetrical divided
flutes and variable helix.

Twisted end face.

Chip gashes
within the flutes.

Faceted eccentric relief
with AVF-technology.

Promo Number	Description	Promotional Price
HARVI I TE • RADIUS • 4 FLUTES • STRAIGHT SHANK		
6862747	HARVI I TE 1/4 x 1/4 x 3/4 x 2 1/2 R.015	\$22.00
6862748	HARVI I TE 3/8 x 3/8 x 7/8 x 2 1/2 R.015	\$41.00
6827274	HARVI I TE 3/8 x 3/8 x 1 x 3; R.015	\$41.00
6862749	HARVI I TE 1/2 x 1/2 x 1 x 3 R.015	\$56.00
6862750	HARVI I TE 1/2 x 1/2 x 1 x 3 R.03	\$56.00
6827273	HARVI I TE 1/2 x 1/2 x 1 1/4 x 3 1/4; R.015	\$56.00
6862751	HARVI I TE 1/2 x 1/2 x 1 1/4 x 3 1/4 R.03	\$56.00
HARVI I TE • RADIUS • 4 FLUTES • WELDON SHANK		
6862752	HARVI I TE 1/2 x 1/2 x 1 x 3 R.015	\$56.00
6862753	HARVI I TE 1/2 x 1/2 x 1 x 3 R.03	\$56.00
6862754	HARVI I TE 1/2 x 1/2 x 1 1/4 x 3 1/4 R.015	\$56.00
6862755	HARVI I TE 1/2 x 1/2 x 1 1/4 x 3 1/4 R.03	\$56.00
HARVI I TE • SQUARE END • 4 FLUTES • STRAIGHT SHANK		
6862756	HARVI I TE 1/4 x 1/4 x 3/4 x 2 1/2 S	\$22.00
6862757	HARVI I TE 1/2 x 1/2 x 1 x 3 S	\$56.00
HARVI I TE • SQUARE END • 4 FLUTES • WELDON SHANK		
6862758	HARVI I TE 1/2 x 1/2 x 1 1/4 x 3 1/4 S	\$56.00

* Returns will be refunded at promotional order price.

Application Data										
Material Group						Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.				
						KCSM15		D1 — Diameter		
				Cutting Speed — vc SFM		frac.	1/4	3/8	1/2	
		ap	ae	ap	min	max	dec.	.2500	.3750	.5000
P	0	1.5 x D1	0.5 x D1	1.25 x D1	490	660	IPT	.0020	.0030	.0037
	1	1.5 x D1	0.5 x D1	1.25 x D1	490	660	IPT	.0020	.0030	.0037
	2	1.5 x D1	0.5 x D1	1.25 x D1	460	620	IPT	.0020	.0030	.0037
	3	1.5 x D1	0.5 x D1	1.25 x D1	390	520	IPT	.0017	.0025	.0032
	4	1.5 x D1	0.5 x D1	1.25 x D1	300	490	IPT	.0015	.0022	.0028
	5	1.5 x D1	0.5 x D1	1.25 x D1	200	330	IPT	.0014	.0020	.0025
M	6	1.5 x D1	0.5 x D1	1.25 x D1	160	250	IPT	.0011	.0017	.0021
	1	1.5 x D1	0.5 x D1	1.25 x D1	300	380	IPT	.0017	.0025	.0032
	2	1.5 x D1	0.5 x D1	1.25 x D1	200	260	IPT	.0014	.0020	.0025
K	3	1.5 x D1	0.5 x D1	1.00 x D1	200	230	IPT	.0011	.0017	.0021
	1	1.5 x D1	0.5 x D1	1.00 x D1	390	490	IPT	.0020	.0030	.0037
	2	1.5 x D1	0.5 x D1	1.00 x D1	360	460	IPT	.0017	.0025	.0032
S	3	1.5 x D1	0.5 x D1	1.00 x D1	360	430	IPT	.0014	.0020	.0025
	1	1.5 x D1	0.3 x D1	0.75 x D1	160	300	IPT	.0017	.0025	.0032
	2	1.5 x D1	0.3 x D1	0.75 x D1	160	260	IPT	.0014	.0020	.0025
	3	1.5 x D1	0.5 x D1	0.50 x D1	80	130	IPT	.0009	.0013	.0017
H	4	1.5 x D1	0.5 x D1	1.25 x D1	160	200	IPT	.0012	.0019	.0023
	1	1.5 x D1	0.5 x D1	1.00 x D1	260	460	IPT	.0015	.0022	.0028
	2	1.5 x D1	0.2 x D1	1.00 x D1	230	390	IPT	.0011	.0017	.0021

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.
For tools with reach >5 x D1, reduce fz by 30%.
Slot milling applications — for longest reach (L3) tools, reduce ae by 30%.

ADJUSTMENT FACTOR FOR FEED AND SPEED CALCULATION

To calculate application-specific cutting data, please use KV coefficient table to the right for adaptation of cutting speed and Kfz for feed respectively.

Vc new = Vc * Kv
Fz new = IPT * Kfz

Calculation example:

Application: D1 = 1 inch;
S4 material group;
Ae 0.02 inch

Cutting data recommendation: 150 SFM;
fz = 0.0033 IPT

Adjustment coefficients: Ae = 0.02 = inch equals 2.00%;
Kv = 2; Kfz = 2.4

	Ae/D	0.50%	1.00%	1.60%	2.00%	4.00%	5.00%	8.00%	10.00%	20.00%	30.00%	40.00%	50.00%
Speed factor	Kv	2.9	2.85	2.8	2	1.5	1.45	1.4	1.35	1.25	1.2	1	1
Feed factor	Kfz	2.8	2.6	2.5	2.4	2.3	2.2	2	1.7	1.25	1.02	1	1

Final cutting data recommendation:

Vc new = 150 SFM * 2 = 300 SFM

Fz new = .0033 IPT * 2.4 = .0079 IPT



Materials

N

Applications



Ramping



Trochoidal Milling



Side Milling/Shoulder
Milling: Roughing



Side Milling/Shoulder
Milling: Finishing

KOR 5™
FROM
\$41.00



Internal coolant.

Up to 66% higher
table feed in aluminum
applications.

Chipbreakers manage chip
removal efficiently.

Safe-Lock™ shank prevents
end mill pullout.

Promo Number	Description	Promotional Price
KOR 5 DA • SQUARE END • 5 FLUTES • STRAIGHT SHANK		
6827276	KOR5 3/8 x 1 1/8 x 3	\$41.00
KOR 5 DA • SQUARE END • 5 FLUTES • SAFE-LOCK SHANK		
6827275	KOR5 1/2 x 1 1/2 x 3 1/2; SafeLock	\$56.00

* Returns will be refunded at promotional order price.

Application Data									
Material Group				K600		Recommended feed per tooth (IPT = inch/th)			
				Cutting Speed — vc SFM			D1 — Diameter		
						frac.	3/8	1/2	
	ap		ae	ap	min	max	dec.	.3750	.5000
N	1	0.5 x D1	0.5 x D1	0.25 x D1	640	6560	IPT	0.0030	0.0050
	2	0.5 x D1	0.5 x D1	0.25 x D1	640	4920	IPT	0.0025	0.0045

NOTE: Those guidelines may require variations to achieve optimum results. For better surface finish, reduce feed per tooth.

For cutting aluminum with high silicon, TiCN coating is recommended.

Ap for milling machine with ceramic bearings spindle, multiply by 0.5.

Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

ADJUSTMENT FACTOR TABLE FOR FEED CALCULATION

To calculate application-specific cutting data, please
use above coefficient for adaptation of feed.

Fz new = IPT * Feed Multiplier

Calculation example:

Application: D = 1";

N1 material group;

Ae 0.1"

Cutting data recommendation: 640 SFM;

fz = 0.0090 IPT

Adjustment coefficients: Ae = 0.1" equals 10.00%;

Feed Multiplier = 1.7

Final cutting data recommendation:

FZ new = .0090 IPT * 1.7 = .0153 IPT

Ae/D1	100%	50%	40%	30%	20%	10%	5%	2%
Max Ap	.25 x D1	.5 x D1	1 x D1	2 x D1	Ap1 Max	Ap1 Max	Ap1 Max	Ap1 Max
Feed Multiplier	.90	1.00	1.02	1.09	1.25	1.70	2.30	3.60



ARONSON-CAMPBELL
INDUSTRIAL SUPPLY INC.

SEATTLE

1700 136th Place N.E.
Bellevue, WA 98005
Tel: (425) 372-2000
Fax: (425) 372-2001
Toll Free: (800) 562-8375

PORTLAND

12820 S.E. Hwy 212
Clackamas, OR 97015
Tel: (503) 212-5353
Fax: (503) 212-5354
Toll Free: (800) 922-1263

SPOKANE

10925 E. Montgomery, Unit A
Spokane, WA 99206
Tel: (509) 891-4047
Fax: (509) 891-4051
Toll Free: (800) 854-7601



Materials

M S

Applications



Ramping



Trochoidal Milling



Side Milling/Shoulder
Milling: Roughing



Side Milling/Shoulder
Milling: Finishing

HARVI™ III
FROM
\$41.00



Center cutting enables axial
movement, and expands
ramping capabilities.

Unequal flute spacing
reduces vibrations.
Improves surface finish.

Safe-Lock™ shank
prevents end mill pullout.

Eccentric relief grind
improves edge stability.
Enables higher feed rates.

Promo Number	Description	Promotional Price
HARVI III • SQUARE END • 6 FLUTES • STRAIGHT SHANK		
6827272	HARVI III $\frac{3}{8} \times \frac{3}{8} \times 1 \times 3$	\$41.00
6827271	HARVI III $\frac{1}{2} \times \frac{1}{2} \times 1\frac{1}{4} \times 3$	\$56.00
6862759	HARVI III $\frac{1}{2} \times \frac{1}{2} \times 1\frac{1}{2} \times 3\frac{1}{2} \text{ R.03}$	\$56.00

* Returns will be refunded at promotional order price.

Application Data • Roughing								
Material Group				KCSM15		Recommended feed per tooth (IPT = inch/th) for side milling (A).		
				Cutting Speed — vc SFM			D1 — Diameter	
						frac.	3/8	1/2
		ap	ae	min	max	dec.	.3750	.5000
M	1	Ap max	0.4 x D	300	380	IPT	.0023	.0029
	2	Ap max	0.4 x D	200	260	IPT	.0018	.0023
	3	Ap max	0.4 x D	200	230	IPT	.0015	.0019
S	1	Ap max	0.4 x D	160	300	IPT	.0023	.0029
	2	Ap max	0.4 x D	80	130	IPT	.0012	.0015
	3	Ap max	0.4 x D	80	130	IPT	.0012	.0015
	4	Ap max	0.4 x D	160	200	IPT	.0017	.0021

Application Data • Finishing								
Material Group			KCSM15		Recommended feed per tooth (IPT = inch/th) for side milling (A).			
			Cutting Speed — vc SFM			D1 — Diameter		
					frac.	3/8	1/2	
M	1	ap max	ae	min	max	dec.	.3750	.5000
	2	Ap max	0.06 x D	560	720	IPT	.0027	.0035
	3	Ap max	0.06 x D	370	500	IPT	.0022	.0028
S	1	Ap max	0.06 x D	370	440	IPT	.0018	.0023
	2	Ap max	0.06 x D	310	560	IPT	.0027	.0035
	3	Ap max	0.06 x D	160	250	IPT	.0015	.0018
	4	Ap max	0.06 x D	160	250	IPT	.0015	.0018
	4	Ap max	0.06 x D	310	370	IPT	.0020	.0026

NOTE: Those guidelines may require variations to achieve optimum results.

Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.

Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.





**"THESE TOOLS ARE
THE STANDARD IN MY SHOP.
FROM GENERAL ENGINEERING
TO AEROSPACE APPLICATIONS,
THEY CUT THROUGH IT ALL!"**

— Titan Gilroy



SEATTLE

1700 136th Place N.E.
Bellevue, WA 98005
Tel: (425) 372-2000
Fax: (425) 372-2001
Toll Free: (800) 562-8375

PORTLAND

12820 S.E. Hwy 212
Clackamas, OR 97015
Tel: (503) 212-5353
Fax: (503) 212-5354
Toll Free: (800) 922-1263

SPOKANE

10925 E. Montgomery, Unit A
Spokane, WA 99206
Tel: (509) 891-4047
Fax: (509) 891-4051
Toll Free: (800) 854-7601

KENNAMETAL WILL DONATE ONE DOLLAR OF EACH PROMOTIONAL
END MILL SALE TO WORKSHOPS FOR WARRIORS®



TO LEARN ABOUT ENROLLMENT OR DONATING, VISIT: WFW.ORG



kennametal.com