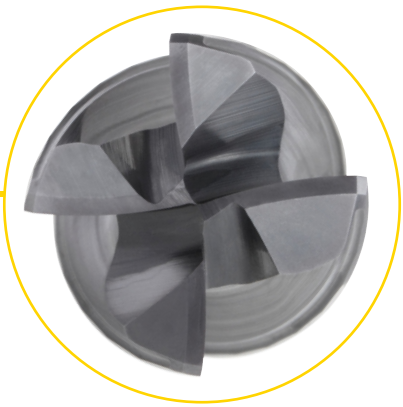
kennametal.com

KENNAMETAL®

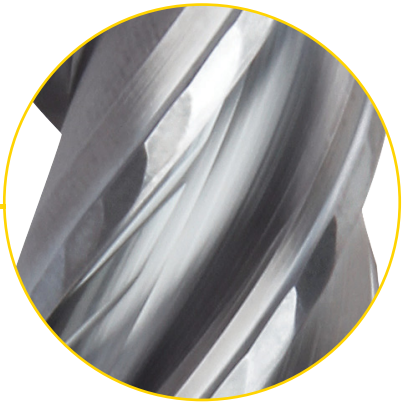
INNOVATIONS
2020 | 02 | METRIC

HARVI™ I TE

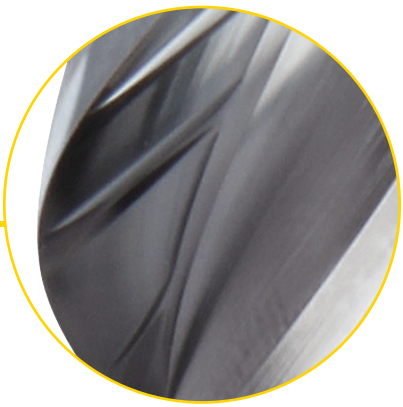
Innovative proprietary design features driving maximum productivity.



Twisted end face.



Faceted eccentric relief.



Chip gashes within flutes.

INNOVATIONS

CAS — Customer Application Support

Get Fast and Reliable Answers to Your Toughest Problems

Our CAS Team is the metalworking industry's leading help desk resource for tooling application solutions and problem resolution.

Easy Access to Proven Metalworking Expertise!

Kennametal Application Engineers assist customers and engineering groups throughout the world with expert tool selection and application recommendations for the entire range of Kennametal tooling.

Region	Originating Country	Language	CAS Hotline	Email
North America	**USA**	English	800 835 3668	na.techsupport@kennametal.com
	Mexico	Spanish	1800 253 0758	na.techsupport@kennametal.com
Africa	**South Africa**	English	0800 981643	na.techsupport@kennametal.com
Europe	**Austria**	German	0800 202873	eu.techsupport@kennametal.com
	Belgium	English/French	0800 80850	eu.techsupport@kennametal.com
	Denmark	English	808 89298	na.techsupport@kennametal.com
	Finland	English	0800 919412	na.techsupport@kennametal.com
	France	French	080 5540 367	eu.techsupport@kennametal.com
	Germany	German	0800 0006651	eu.techsupport@kennametal.com
	Israel	English	1809 449889	na.techsupport@kennametal.com
	Italy	Italian	800 916561	eu.techsupport@kennametal.com
	Netherlands	English	0800 0201 130	eu.techsupport@kennametal.com
	Norway	English	800 10080	na.techsupport@kennametal.com
	Poland	Polish	0080 04411887	eu.techsupport@kennametal.com
	Russia (landline)	Russian	8800 5556394	eu.techsupport@kennametal.com
	Russia (cell phone)	Russian	+7 800 5556394	eu.techsupport@kennametal.com
	Sweden	English	0207 99246	na.techsupport@kennametal.com
	UK	English	0800 032 8339	na.techsupport@kennametal.com
	Ukraine	Russian	800 502664	eu.techsupport@kennametal.com
Asia Pacific	**Australia**	English	1800 666 667	ap-kmt.techsupport@kennametal.com
	India	English	1 800 103 5227	in.techsupport@kennametal.com
	Japan	English	03 3820 2855	ap-kmt.techsupport@kennametal.com
	Korea (South)	English	+82 2 2100 6100	ap-kmt.techsupport@kennametal.com
	Malaysia	English	1800 812 990	ap-kmt.techsupport@kennametal.com
	New Zealand	English	0800 450 941	ap-kmt.techsupport@kennametal.com
	Singapore	English	1800 6221031	ap-kmt.techsupport@kennametal.com
	Taiwan	English	0800 666 197	ap-kmt.techsupport@kennametal.com
	Thailand	English	1800 4417820	ap-kmt.techsupport@kennametal.com

Numbers shown only serve the originating country listed.

Service & Sales Centres Around the World

Region	Country	Sales Hotline	Email
North America	**United States**	+1 800 446 7738	FtMill.Service@kennametal.com
	Canada	+1 800 446 7738	toronto.service@kennametal.com
	Mexico	+1 888 402 4963	k-mx.service@kennametal.com
Central/South America	**Argentina**	+54 11 4719 0700	buenos-aires.ventas@kennametal.com
	Brazil	+55 19 3936 9200	bra.marketing@kennametal.com
	Chile	+56 2 2264 1177	kennametalchile@kennametalchile.cl
Africa	**Egypt**	+44 1384 408060	na.techsupport@kennametal.com
	South Africa	+27 11 748 9300	na.techsupport@kennametal.com
Europe	**Austria**	+43 2236 3798980	brunn.sales@kennametal.com
	Belgium	+32 0800 81 372	belgium.sales@kennametal.com
	Czech Republic	+420 800 900 840	k-prha.sales@kennametal.com
	France	+33 1 60 12 81 00	info.fr@kennametal.com
	Germany	+49 6003 8277 0	rosbach.sales@kennametal.com
	Great Britain	+44 1384 408060	kingswinford.service@kennametal.com
	Hungary	+36 96 618 150	gyoer.sales@kennametal.com
	Ireland	+44 1384 408060	na.techsupport@kennametal.com
	Italy	+39 02 895 961	milano.vendite@kennametal.com
	Luxemborg	+32 4 248 48 48	liege.sales@kennametal.com
	Netherlands	+31 0800 44 33 201	netherlands.sales@kennametal.com
	Poland	+48 61 6656501	poland.service@kennametal.com
	Portugal	+351 22 4119 400	porto.service@kennametal.com
	Russia	+7 495 4115386	moscow.information@kennametal.com
	Slovakia	+421 0800 044 053	k-eu-zilina.sales@kennametal.com
	Spain	+34 93 586 03 50	barcelona.service@kennametal.com
	Turkey	+90 216 574 4780	tr.information@kennametal.com
Asia Pacific	**Australia**	+61 800 666 667	k-au.service@kennametal.com
	China	+86 400 889 2135	k-cn.service@kennametal.com
	India	+91 800 103 5138	k-bngl.information@kennametal.com
	Indonesia	+65 6265 9222	k-sg.sales@kennametal.com
	Japan	+81 3 3820 2855	k-jp.service@kennametal.com
	Korea (South)	+82 2 2109 6100	k-kr-service@kennametal.com
	Malaysia	+60 3 5569 9080	k-sg.sales@kennametal.com
	New Zealand	+64 0800 536626	k-nz.service@kennametal.com
	Singapore*	+65 62659222	k-sg.sales@kennametal.com
	Taiwan	+886 4 2350 1920	taiwan.service@kennametal.com
	Thailand	+66 2 642 3455	k-sg.sales@kennametal.com

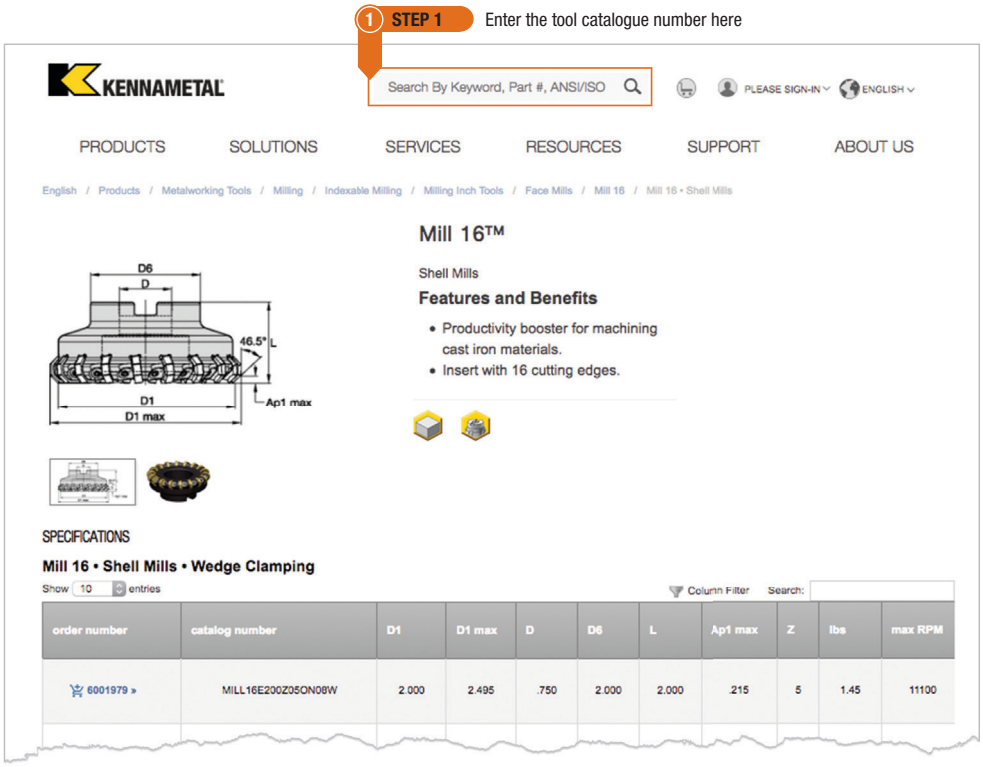
*Vietnam and Philippines individuals should contact the Singapore office.

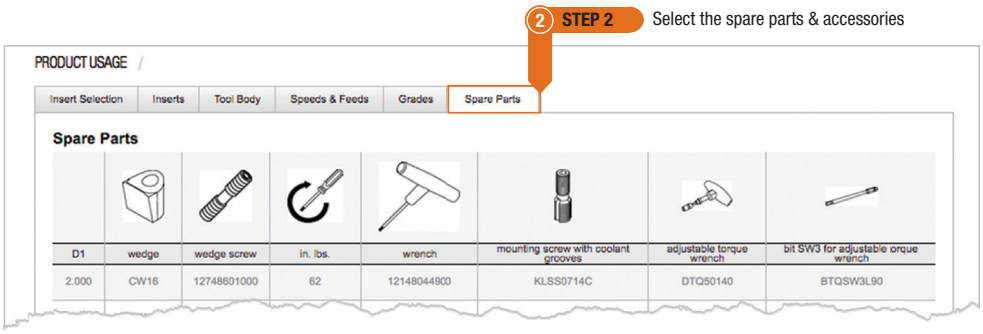
Visit kennametal.com to find local Authorised Kennametal Distributors.

Spare Parts & Accessories Information

Lost a screw? Have to replace worn-out clamping wedges?
Need to find and re-order those spare parts?

Are you in need of some accessories, like a torque wrench or coolant shower plate? These tools are at your fingertips!
Go to **kennametal.com** and find what you need in seconds. Enter the catalogue number of the corresponding tool, and it will display.





NOVO™

Digitally access spare parts and accessories information to ensure you keep your operation running.

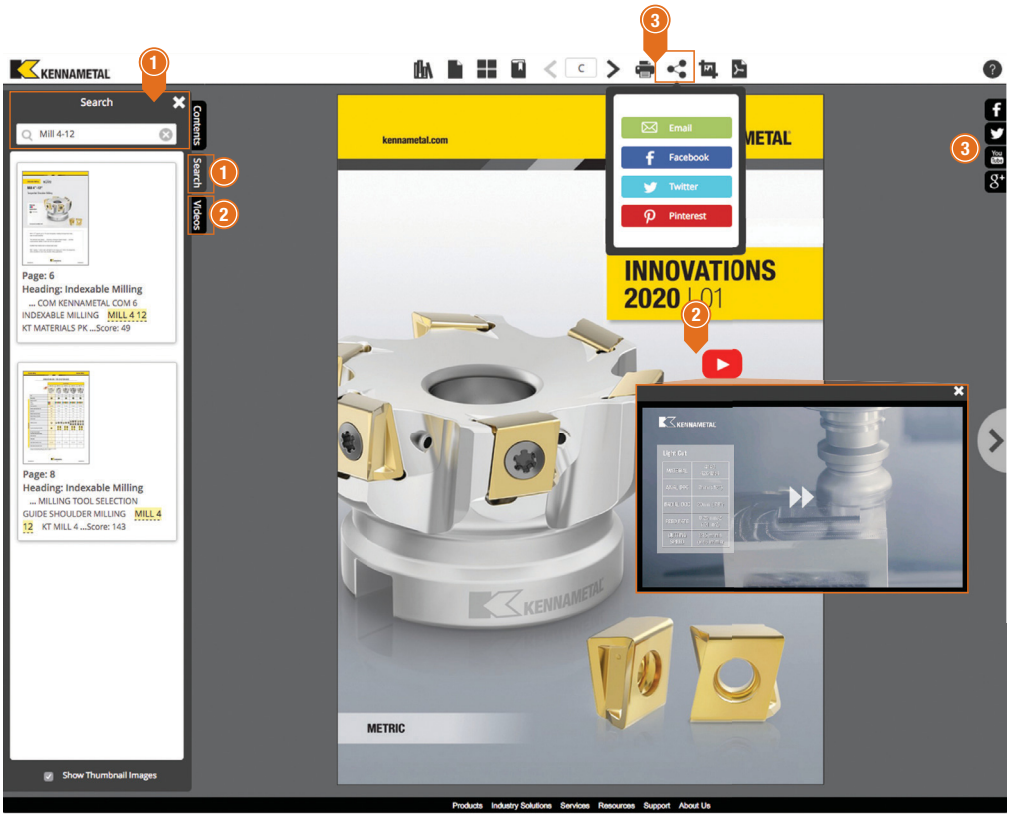
Visit **kennametal.com/novo** and download today. It's Free!

Online Catalogue

Can't find your paper copy of our catalogue anymore?
No worries. Go to catalogs.kennametal.com to see what's out there.

Search for what you need, watch a video, and share pages with others, all from one site! Go to **catalogs.kennametal.com**, and if you want to check it out on your mobile device, just download the FREE app for iOS or Android™.

1. Search for what you need
2. Watch videos
3. Share with others



Check out our new catalogue app.
Available in the Google Play™ Store
or the App Store®

POWERED BY NOVO

HARVI™ I TE

High-Performance Solid End Milling

Materials

P M K S H

Applications

- Slotting
- 3D Profiing
- Side Milling/ Shoulder Milling
- Ramping
- Helical Interpolation
- Plunge Milling
- Trochoidal Milling
- Trochoidal Milling: Ball Nose

kennametal.com/HARVI1TE

Proprietary end face design — Twisted cutting edge increasing the corner stability, enabling soft cutting action even at highest ramping angles.

Proprietary core design — Increasing tool stability.

Innovative end face design — Asymmetric divided flutes and variable helix enabling vibration dampening and unmatched feed rates.

Proprietary relief — with AVF-Technology. A precision faceted eccentric relief reducing vibrations and reducing friction. For excellent cutting conditions in multiple materials.

Proprietary flute design — Innovative chip gashes within the flutes reducing cutting forces and supporting efficient chip evacuation.

HARVI™ I TE — Innovative proprietary design features driving maximum productivity.

Universal character. Machines steel, stainless steel, cast iron, and high-temperature alloys with exceptional feed rates, reaching unmatched metal removal rates.

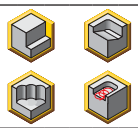
Applicable for a variety of operations, including dynamic milling, and extreme ramping operations.

4-fluted end mill for high-performance roughing and finishing with only one tool.

HARVI I TE — Maximum metal removal. Maximum productivity. Maximum benefit.

Solid Carbide End Mills

HARVI™ • TOOL SELECTION GUIDE

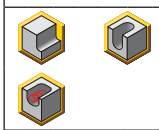
	HIGH-PERFORMANCE (HP) ROUGHING & FINISHING						
	HARVI I	HARVI I	HARVI I	HARVI I Chipbreaker	HARVI I Extended Reach	HARVI I TE	HARVI I TE
						NEW! 	NEW! 
Series	F4AS...DL	UADE	F4AS.. WM-WX-WL/ UBDE	F4BS.. WM-WX-WL	UADE	H1TE4CH	H1TE4CH..N
Page	P16*	P17*	P18*	P19*	P20*	12	13
Tool type							
Rougher	●	●	●	●	●	●	●
Finisher	○	○	○	○	○	○	○
Chamfering							
Main operation							
Workpiece material							
Primary	P M K	P M K	P M K S	P M K	P M K	P M K	P M K
Secondary	S H	S H	H	H	H	S H	S H
Corner style							
Corner radius [Rε]	—	—	0,50–6mm	0,50–4mm	—	—	—
Corner chamfer width [BCH]	0,40–0,50mm	0,40–0,50mm	—	—	0,40–0,50mm	0,40–0,50mm	0,15–0,35
Cutter diameter [D1]	4–25mm	4–25mm	6–25mm	6–25mm	6–20mm	4–25mm	4–25 mm
Length of cut	1,8–3 x D1	3–4 x D	2–2,5 x D1	1,5 x D1	2 x D1	1,8–3 x D1	1,8–3 x D1
Maximum cutting depth [Ap1 max]	12–45mm	11–45mm	9–37,5mm	9–37,5mm	12–40mm	12–45mm	11–45mm
Flute helix angle	38°	38°	38°	38°	38°	36°/39°	36°/39°
Number of flutes [ZU]	4	4	4	4	4	4	4
Centre cutting	✔	✔	✔	✔	✔	✔	✔
Additional operations							

* See page in the Kennametal Master Catalogue 2018 • Volume Two • Rotating Tools, A-16-05217.

● Primary
○ Secondary

Solid Carbide End Mills

HARVI™ • TOOL SELECTION GUIDE

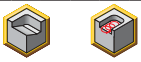
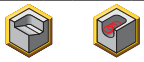
	HP ROUGHING & FINISHING *(CONTINUED)*	HP FINISHING & ROUGHING					
	HARVI I TE	HARVI I Ball Nose	HARVI I Taper Ball Nose	HARVI II	HARVI II	HARVI II Trochoidal	HARVI II Trochoidal
	NEW! 						
Series	**H1TE4RA**	**F4AW..WL-WX**	**F4AW..AWL38-AWX38**	**UCDE**	**UDDE**	**TCDE 3 x D**	**TCDE 5 x D**
Page	14	P21*	P22*	P30*	P31–P32*	P42*	24**
Tool type							
Rougher	●	●	●	○	○	○	○
Finisher	○	○	○	●	●	●	●
Chamfering							
Main operation							
Workpiece material							
Primary	P M K S	P M K		P M K S	P K S	M S	M S
Secondary	H	H	P M S H	H	H	P K H	P K H
Corner style							
Corner radius [Rε]	0,50–6mm	–	–	0,25–0,75mm	0,20–6mm	0,50–1mm	0,5–1mm
Corner chamfer width [BCH]	–	–	–	–	–	–	–
Cutter diameter [D1]	6–25mm	6–16mm	4–10mm	4–25mm	6–25mm	8–25mm	8–25mm
Length of cut	1,5–2 x D1	1 x D1	5–7 x D	1,8–2,7 x D1	1,8–2,2 x D1	3 x D	5 x D
Maximum cutting depth [Ap1 max]	9–37,5mm	6–16mm	30,5–61mm	11–45mm	13–45mm	24–75mm	40–125mm
Flute helix angle	36°/39°	38°	38°	38°	38°	40°	40°
Number of flutes [ZU]	4	4	4	5	5	5	5
Centre cutting	✔	✔	✔				
Additional operations							

* See page in the Kennametal Master Catalogue 2018 • Volume Two • Rotating Tools, A-16-05217.
**See page in the Kennametal Innovations 2020 • 01, A-19-05951.

● Primary
○ Secondary

Solid Carbide End Mills

HARVI™ • TOOL SELECTION GUIDE

	HP FINISHING AND SEMI-FINISHING		HP FINISHING & ROUGHING			
	HARVI II Long	HARVI II Long	HARVI III	HARVI III	HARVI III Ball Nose	HARVI III Taper Ball Nose
						
Series	UGDE 3 x D	UGDE 5 x D	UJDE	UJDE with neck	UJBE	UJBE
Page	P36*	P37*	P48*	P49*	P54*	P62*
Tool type						
Rougher			○	○	○	
Finisher	●	●	●	●	●	●
Chamfering						
Main operation						
Workpiece material						
Primary	P M S	P M S	M S	M S	M S	M S
Secondary	K H	K H	P H	P H	P H	P H
Corner style						
Corner radius [Rε]	0,20–6mm	0,20–6mm	0,50–0,75mm	0,50–6mm	—	—
Corner chamfer width [BCH]	—	—	—	—	—	—
Cutter diameter [D1]	6–25mm	6–25mm	10–25mm	10–25mm	10–20mm	4–10mm
Length of cut	3 x D	5 x D	2 x D	3 x D	1 x D1	5–7 x D
Maximum cutting depth [Ap1 max]	18–75mm	30–125mm	22–45mm	22–45mm	10–20mm	26–39mm
Flute helix angle	43°	43°	38°	38°	38°	38°
Number of flutes [ZU]	5	5	6	6	6	6
Centre cutting			✔	✔	✔	✔
Additional operations						

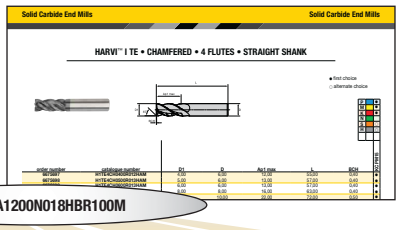
* See page in the Kennametal Master Catalogue 2018 • Volume Two • Rotating Tools, A-16-05217.

● Primary
○ Secondary

Solid Carbide End Mills

HARVI™ I TE • CATALOGUE NUMBERING SYSTEM

Each character in our catalogue number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.



H1TE4RA1200N018HBR100M

H1TE	4	RA	1200	N	018	HB	R100	—	M
Series	Number of Flutes	Front End Style	Cutting Diameter D1	Flute Section Style	Length of Cut Ap1 max	Shank Style	Radius	Specific Features	Standard
H1TE = HARVI I TE	**1** = 1-Flute **2** = 2-Flute **3** = 3-Flute **4** = 4-Flute **5** = 5-Flute **6** = 6-Flute **7** = 7-Flute **8** = 8-Flute **9** = 9-Flute **M** = Multi-flute	**SE** = Sharp Edge **CH** = Chamfer **RA** = Radius **BN** = Ball Nose **TB** = Taper Ball Nose **TO** = Torroid	**Metric** = D1 in mm **Inch** = D1 in decimal inch	**N** = Neck **E** = Extended Neck **S** = Short Without Neck **R** = Regular Without Neck **L** = Long Without Neck **X** = Extra Long Without Neck	**Metric** = Ap1 Max in mm **Inch** = Ap1 Max in decimal inch	**HA** = Plain **HB** = Weldon® **SL** = Safe-Lock™ **DL** = Duo-Lock™		**C** = Chip Splitter **I** = Internal Coolant **O** = Coolant Grooves in Shank **P** = Polished Flutes	**M** = Metric **Blank** = Inch

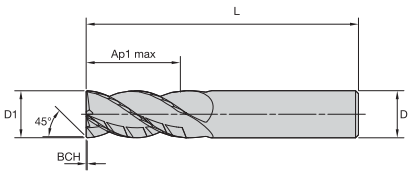
Radius Metric
R020 = 0,2mm
R025 = 0,25mm
R030 = 0,3mm
R040 = 0,4mm
R050 = 0,5mm
R075 = 0,75mm
R100 = 1,0mm
R125 = 1,25mm
R150 = 1,5mm
R200 = 2,0mm
R250 = 2,5mm
R300 = 3,0mm
R400 = 4,0mm
R500 = 5,0mm
R600 = 6,0mm

Radius Inch
R010 = .010"
R015 = .015"
R030 = .030"
R060 = .060"
R090 = .090"
R120 = .120"
R160 = .160"
R250 = .250"
R190 = .190"
R375 = .375"
R045 = .045"

Solid Carbide End Mills

HARVI™ I TE • CHAMFERED • 4 FLUTES • STRAIGHT SHANK

● first choice
○ alternate choice

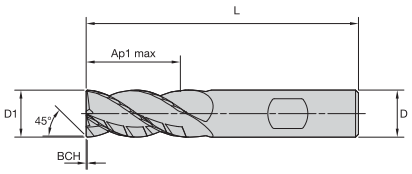


P	●
M	●
K	●
N	
S	○
H	○

order number	catalogue number	D1	D	Ap1 max	L	BCH	KCPM15
6675697	H1TE4CH0400R012HAM	4,00	6,00	12,00	55,00	0,40	●
6675698	H1TE4CH0500R013HAM	5,00	6,00	13,00	57,00	0,40	●
6675699	H1TE4CH0600R013HAM	6,00	6,00	13,00	57,00	0,40	●
6675700	H1TE4CH0800R016HAM	8,00	8,00	16,00	63,00	0,40	●
6675742	H1TE4CH1000R022HAM	10,00	10,00	22,00	72,00	0,50	●
6675743	H1TE4CH1200R026HAM	12,00	12,00	26,00	83,00	0,50	●
6675744	H1TE4CH1400R026HAM	14,00	14,00	26,00	83,00	0,50	●
6675745	H1TE4CH1600R032HAM	16,00	16,00	32,00	92,00	0,50	●
6675746	H1TE4CH1800R032HAM	18,00	18,00	32,00	92,00	0,50	●
6675747	H1TE4CH2000R038HAM	20,00	20,00	38,00	104,00	0,50	●
6675748	H1TE4CH2500R045HAM	25,00	25,00	45,00	121,00	0,50	●

HARVI I TE • CHAMFERED • 4 FLUTES • WELDON® SHANK

● first choice
○ alternate choice



P	●
M	●
K	●
N	
S	○
H	○

order number	catalogue number	D1	D	Ap1 max	L	BCH	KCPM15
6675749	H1TE4CH0400R012HBM	4,00	6,00	12,00	55,00	0,40	●
6675750	H1TE4CH0500R013HBM	5,00	6,00	13,00	57,00	0,40	●
6675751	H1TE4CH0600R013HBM	6,00	6,00	13,00	57,00	0,40	●
6675752	H1TE4CH0800R016HBM	8,00	8,00	16,00	63,00	0,40	●
6675753	H1TE4CH1000R022HBM	10,00	10,00	22,00	72,00	0,50	●
6675754	H1TE4CH1200R026HBM	12,00	12,00	26,00	83,00	0,50	●
6675755	H1TE4CH1400R026HBM	14,00	14,00	26,00	83,00	0,50	●
6675756	H1TE4CH1600R032HBM	16,00	16,00	32,00	92,00	0,50	●
6675757	H1TE4CH1800R032HBM	18,00	18,00	32,00	92,00	0,50	●
6675758	H1TE4CH2000R038HBM	20,00	20,00	38,00	104,00	0,50	●
6687137	H1TE4CH2500R045HBM	25,00	25,00	45,00	121,00	0,50	●


70


72

11

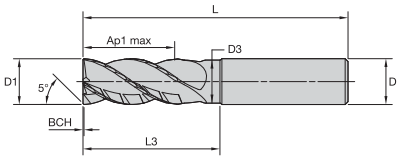

4

76

Solid Carbide End Mills

HARVI™ I TE • CHAMFERED • 4 FLUTES • NECKED • STRAIGHT SHANK

● first choice
○ alternate choice

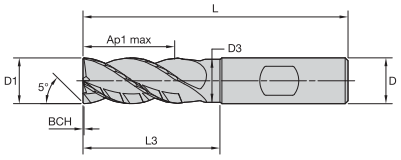


P	●
M	●
K	●
N	
S	○
H	○

order number	catalogue number	D1	D	D3	Ap1 max	L3	L	BCH	KCPM15
6676308	H1TE4CH0400N011HAM	4,00	6,00	3,76	11,00	16,00	57,00	0,15	●
6676310	H1TE4CH0500N013HAM	5,00	6,00	4,70	13,00	18,00	57,00	0,15	●
6676332	H1TE4CH0600N013HAM	6,00	6,00	5,64	13,00	18,00	57,00	0,15	●
6676334	H1TE4CH0800N016HAM	8,00	8,00	7,52	16,00	24,00	63,00	0,20	●
6676336	H1TE4CH1000N022HAM	10,00	10,00	9,40	22,00	30,00	72,00	0,20	●
6676338	H1TE4CH1200N026HAM	12,00	12,00	11,28	26,00	36,00	83,00	0,20	●
6676340	H1TE4CH1400N026HAM	14,00	14,00	13,16	26,00	42,00	83,00	0,25	●
6676342	H1TE4CH1600N032HAM	16,00	16,00	15,04	32,00	48,00	92,00	0,35	●
6676344	H1TE4CH2000N038HAM	20,00	20,00	18,80	38,00	60,00	104,00	0,35	●
6676346	H1TE4CH2500N045HAM	25,00	25,00	24,00	45,00	75,00	121,00	0,35	●

HARVI I TE • CHAMFERED • 4 FLUTES • NECKED • WELDON® SHANK

● first choice
○ alternate choice



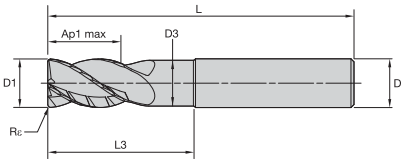
P	●
M	●
K	●
N	
S	○
H	○

order number	catalogue number	D1	D	D3	Ap1 max	L3	L	BCH	KCPM15
6676309	H1TE4CH0400N011HBM	4,00	6,00	3,76	11,00	16,00	57,00	0,15	●
6676331	H1TE4CH0500N013HBM	5,00	6,00	4,70	13,00	18,00	57,00	0,15	●
6676333	H1TE4CH0600N013HBM	6,00	6,00	5,64	13,00	18,00	57,00	0,15	●
6676335	H1TE4CH0800N016HBM	8,00	8,00	7,52	16,00	24,00	63,00	0,20	●
6676337	H1TE4CH1000N022HBM	10,00	10,00	9,40	22,00	30,00	72,00	0,20	●
6676339	H1TE4CH1200N026HBM	12,00	12,00	11,28	26,00	36,00	83,00	0,20	●
6676341	H1TE4CH1400N026HBM	14,00	14,00	13,16	26,00	42,00	83,00	0,25	●
6676343	H1TE4CH1600N032HBM	16,00	16,00	15,04	32,00	48,00	92,00	0,35	●
6676345	H1TE4CH2000N038HBM	20,00	20,00	18,80	38,00	60,00	104,00	0,35	●
6676347	H1TE4CH2500N045HBM	25,00	25,00	24,00	45,00	75,00	121,00	0,35	●

				
70	72	11	4	76

Solid Carbide End Mills

HARVI™ I TE • RADIUSED • 4 FLUTES • NECKED • STRAIGHT SHANK



● first choice
○ alternate choice

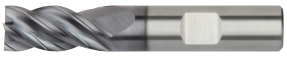
P		○
M		●
K		○
N		
S		●
H		○

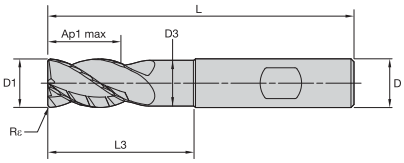
order number	catalogue number	D1	D	D3	Ap1 max	L3	L	Rε	KCSM15
6676190	H1TE4RA0600N009HAR050M	6,00	6,00	5,64	9,00	18,00	63,00	0,50	●
6676231	H1TE4RA0600N009HAR100M	6,00	6,00	5,64	9,00	18,00	63,00	1,00	●
6676234	H1TE4RA0800N012HAR050M	8,00	8,00	7,52	12,00	24,00	68,00	0,50	●
6676235	H1TE4RA0800N012HAR100M	8,00	8,00	7,52	12,00	24,00	68,00	1,00	●
6676238	H1TE4RA1000N015HAR050M	10,00	10,00	9,40	15,00	30,00	76,00	0,50	●
6676239	H1TE4RA1000N015HAR100M	10,00	10,00	9,40	15,00	30,00	76,00	1,00	●
6676240	H1TE4RA1000N015HAR200M	10,00	10,00	9,40	15,00	30,00	76,00	2,00	●
6676251	H1TE4RA1000N015HAR300M	10,00	10,00	9,40	15,00	30,00	76,00	3,00	●
6676252	H1TE4RA1000N015HAR400M	10,00	10,00	9,40	15,00	30,00	76,00	4,00	●
6676257	H1TE4RA1200N018HAR050M	12,00	12,00	11,28	18,00	36,00	83,00	0,50	●
6676258	H1TE4RA1200N018HAR100M	12,00	12,00	11,28	18,00	36,00	83,00	1,00	●
6676259	H1TE4RA1200N018HAR200M	12,00	12,00	11,28	18,00	36,00	83,00	2,00	●
6676260	H1TE4RA1200N018HAR300M	12,00	12,00	11,28	18,00	36,00	83,00	3,00	●
6676271	H1TE4RA1200N018HAR400M	12,00	12,00	11,28	18,00	36,00	83,00	4,00	●
6676277	H1TE4RA1600N024HAR050M	16,00	16,00	15,04	24,00	48,00	100,00	0,50	●
6676278	H1TE4RA1600N024HAR100M	16,00	16,00	15,04	24,00	48,00	100,00	1,00	●
6676279	H1TE4RA1600N024HAR200M	16,00	16,00	15,04	24,00	48,00	100,00	2,00	●
6676280	H1TE4RA1600N024HAR300M	16,00	16,00	15,04	24,00	48,00	100,00	3,00	●
6676281	H1TE4RA1600N024HAR400M	16,00	16,00	15,04	24,00	48,00	100,00	4,00	●
6676282	H1TE4RA1600N024HAR600M	16,00	16,00	15,04	24,00	48,00	100,00	6,00	●
6676289	H1TE4RA2000N030HAR050M	20,00	20,00	18,80	30,00	60,00	115,00	0,50	●
6676290	H1TE4RA2000N030HAR100M	20,00	20,00	18,80	30,00	60,00	115,00	1,00	●
6676291	H1TE4RA2000N030HAR200M	20,00	20,00	18,80	30,00	60,00	115,00	2,00	●
6676292	H1TE4RA2000N030HAR300M	20,00	20,00	18,80	30,00	60,00	115,00	3,00	●
6676293	H1TE4RA2000N030HAR400M	20,00	20,00	18,80	30,00	60,00	115,00	4,00	●
6676294	H1TE4RA2000N030HAR600M	20,00	20,00	18,80	30,00	60,00	115,00	6,00	●
6676299	H1TE4RA2500N038HAR050M	25,00	25,00	24,00	37,50	75,00	135,00	0,50	●
6676300	H1TE4RA2500N038HAR100M	25,00	25,00	24,00	37,50	75,00	135,00	1,00	●
6676301	H1TE4RA2500N038HAR200M	25,00	25,00	24,00	37,50	75,00	135,00	2,00	●
6676302	H1TE4RA2500N038HAR300M	25,00	25,00	24,00	37,50	75,00	135,00	3,00	●
6676303	H1TE4RA2500N038HAR400M	25,00	25,00	24,00	37,50	75,00	135,00	4,00	●
6676304	H1TE4RA2500N038HAR600M	25,00	25,00	24,00	37,50	75,00	135,00	6,00	●

70 | 72 | 11 | 4 | 76

Solid Carbide End Mills

HARVI™ I TE • RADIUSED • 4 FLUTES • NECKED • WELDON® SHANK





● first choice
○ alternate choice

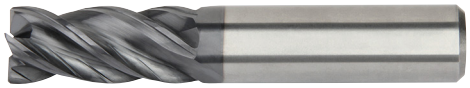
P		○
M		●
K		○
N		
S		●
H		○

order number	catalogue number	D1	D	D3	Ap1 max	L3	L	Rε	KCSM15
6676232	H1TE4RA0600N009HBR050M	6,00	6,00	5,64	9,00	18,00	63,00	0,50	●
6676233	H1TE4RA0600N009HBR100M	6,00	6,00	5,64	9,00	18,00	63,00	1,00	●
6676236	H1TE4RA0800N012HBR050M	8,00	8,00	7,52	12,00	24,00	68,00	0,50	●
6676237	H1TE4RA0800N012HBR100M	8,00	8,00	7,52	12,00	24,00	68,00	1,00	●
6676253	H1TE4RA1000N015HBR050M	10,00	10,00	9,40	15,00	30,00	76,00	0,50	●
6676254	H1TE4RA1000N015HBR100M	10,00	10,00	9,40	15,00	30,00	76,00	1,00	●
6676255	H1TE4RA1000N015HBR200M	10,00	10,00	9,40	15,00	30,00	76,00	2,00	●
6676256	H1TE4RA1000N015HBR300M	10,00	10,00	9,40	15,00	30,00	76,00	3,00	●
6687139	H1TE4RA1000N015HBR400M	10,00	10,00	9,40	15,00	30,00	76,00	4,00	●
6676272	H1TE4RA1200N018HBR050M	12,00	12,00	11,28	18,00	36,00	83,00	0,50	●
6676273	H1TE4RA1200N018HBR100M	12,00	12,00	11,28	18,00	36,00	83,00	1,00	●
6676274	H1TE4RA1200N018HBR200M	12,00	12,00	11,28	18,00	36,00	83,00	2,00	●
6676275	H1TE4RA1200N018HBR300M	12,00	12,00	11,28	18,00	36,00	83,00	3,00	●
6676276	H1TE4RA1200N018HBR400M	12,00	12,00	11,28	18,00	36,00	83,00	4,00	●
6676283	H1TE4RA1600N024HBR050M	16,00	16,00	15,04	24,00	48,00	100,00	0,50	●
6676284	H1TE4RA1600N024HBR100M	16,00	16,00	15,04	24,00	48,00	100,00	1,00	●
6676285	H1TE4RA1600N024HBR200M	16,00	16,00	15,04	24,00	48,00	100,00	2,00	●
6676286	H1TE4RA1600N024HBR300M	16,00	16,00	15,04	24,00	48,00	100,00	3,00	●
6676287	H1TE4RA1600N024HBR400M	16,00	16,00	15,04	24,00	48,00	100,00	4,00	●
6676288	H1TE4RA1600N024HBR600M	16,00	16,00	15,04	24,00	48,00	100,00	6,00	●
6676295	H1TE4RA2000N030HBR050M	20,00	20,00	18,80	30,00	60,00	115,00	0,50	●
6676296	H1TE4RA2000N030HBR100M	20,00	20,00	18,80	30,00	60,00	115,00	1,00	●
6676297	H1TE4RA2000N030HBR200M	20,00	20,00	18,80	30,00	60,00	115,00	2,00	●
6676298	H1TE4RA2000N030HBR300M	20,00	20,00	18,80	30,00	60,00	115,00	3,00	●
6687140	H1TE4RA2000N030HBR400M	20,00	20,00	18,80	30,00	60,00	115,00	4,00	●
6687151	H1TE4RA2000N030HBR600M	20,00	20,00	18,80	30,00	60,00	115,00	6,00	●
6676305	H1TE4RA2500N038HBR050M	25,00	25,00	24,00	37,50	75,00	135,00	0,50	●
6687152	H1TE4RA2500N038HBR100M	25,00	25,00	24,00	37,50	75,00	135,00	1,00	●
6687153	H1TE4RA2500N038HBR200M	25,00	25,00	24,00	37,50	75,00	135,00	2,00	●
6687154	H1TE4RA2500N038HBR300M	25,00	25,00	24,00	37,50	75,00	135,00	3,00	●
6676306	H1TE4RA2500N038HBR400M	25,00	25,00	24,00	37,50	75,00	135,00	4,00	●
6676307	H1TE4RA2500N038HBR600M	25,00	25,00	24,00	37,50	75,00	135,00	6,00	●

				
70	72	11	4	76

Solid Carbide End Mills

HARVI™ I TE • 4 FLUTES • APPLICATION DATA



Material Group		Side Milling (A) and Slotting (B)			KCPM15/KCSM15 Cutting Speed — vc m/min			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.											
		A		B				D1 — Diameter											
		ap	ae	ap	min		max	mm	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	25,0
P	0	1,5 x D	0,5 x D	1,25 x D	150	–	200	fz	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	1	1,5 x D	0,5 x D	1,25 x D	150	–	200	fz	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	2	1,5 x D	0,5 x D	1,25 x D	140	–	190	fz	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	3	1,5 x D	0,5 x D	1,25 x D	120	–	160	fz	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	4	1,5 x D	0,5 x D	1,25 x D	90	–	150	fz	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
	5	1,5 x D	0,5 x D	1,25 x D	60	–	100	fz	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
	6	1,5 x D	0,5 x D	1,25 x D	50	–	75	fz	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078
M	1	1,5 x D	0,5 x D	1,25 x D	90	–	115	fz	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	2	1,5 x D	0,5 x D	1,25 x D	60	–	80	fz	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
	3	1,5 x D	0,5 x D	1,00 x D	60	–	70	fz	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078
K	1	1,5 x D	0,5 x D	1,00 x D	120	–	150	fz	0,031	0,040	0,048	0,066	0,079	0,091	0,102	0,111	0,119	0,125	0,136
	2	1,5 x D	0,5 x D	1,00 x D	110	–	140	fz	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	3	1,5 x D	0,5 x D	1,00 x D	110	–	130	fz	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
S	1	1,5 x D	0,3 x D	0,75 x D	50	–	90	fz	0,026	0,033	0,040	0,055	0,067	0,077	0,087	0,096	0,104	0,111	0,125
	2	1,5 x D	0,3 x D	0,75 x D	50	–	80	fz	0,021	0,027	0,032	0,044	0,053	0,062	0,070	0,077	0,083	0,089	0,100
	3	1,5 x D	0,5 x D	0,5 x D	25	–	40	fz	0,014	0,018	0,021	0,029	0,035	0,041	0,046	0,051	0,055	0,059	0,067
	4	1,5 x D	0,5 x D	1,25 x D	50	–	60	fz	0,017	0,023	0,028	0,040	0,049	0,057	0,064	0,071	0,076	0,082	0,092
H	1	1,5 x D	0,5 x D	1,00 x D	80	–	140	fz	0,024	0,030	0,036	0,049	0,059	0,069	0,077	0,084	0,091	0,097	0,107
	2	1,5 x D	0,2 x D	1,00 x D	70	–	120	fz	0,018	0,022	0,027	0,037	0,044	0,051	0,057	0,063	0,067	0,071	0,078

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 machinining centres, please adjust parameters accordingly on >12mm diameter.
For tools with reach >5 x D, reduce fz by 30%.
Slot milling aplications — for longest reach (L3) tools, reduce Ae by 30%.

ADJUSTMENT FACTOR TABLE FOR FEED AND SPEED CALCULATION

To calculate application specific cutting data, please use above KV coefficient for adaptation of cutting speed and KFz for feed respectively.

Vc new = Vc * Kv

Fz new = Fz * KFz

Calculation example:

Application: D = 20mm;
M2 material group;
Ae 2mm

Cutting data recommendation: Vc = 80 m/min;
fz = 0.089 mm/th

Adjustment coefficients: Ae = 2mm equals 10,0%;
Kv = 1.35; KFz = 1.7

Final cutting data recommendation:

Vc new = 80 * 1.35 = 108 m/min

Fz new = 0,089 * 1.7 = 0,15 mm/min

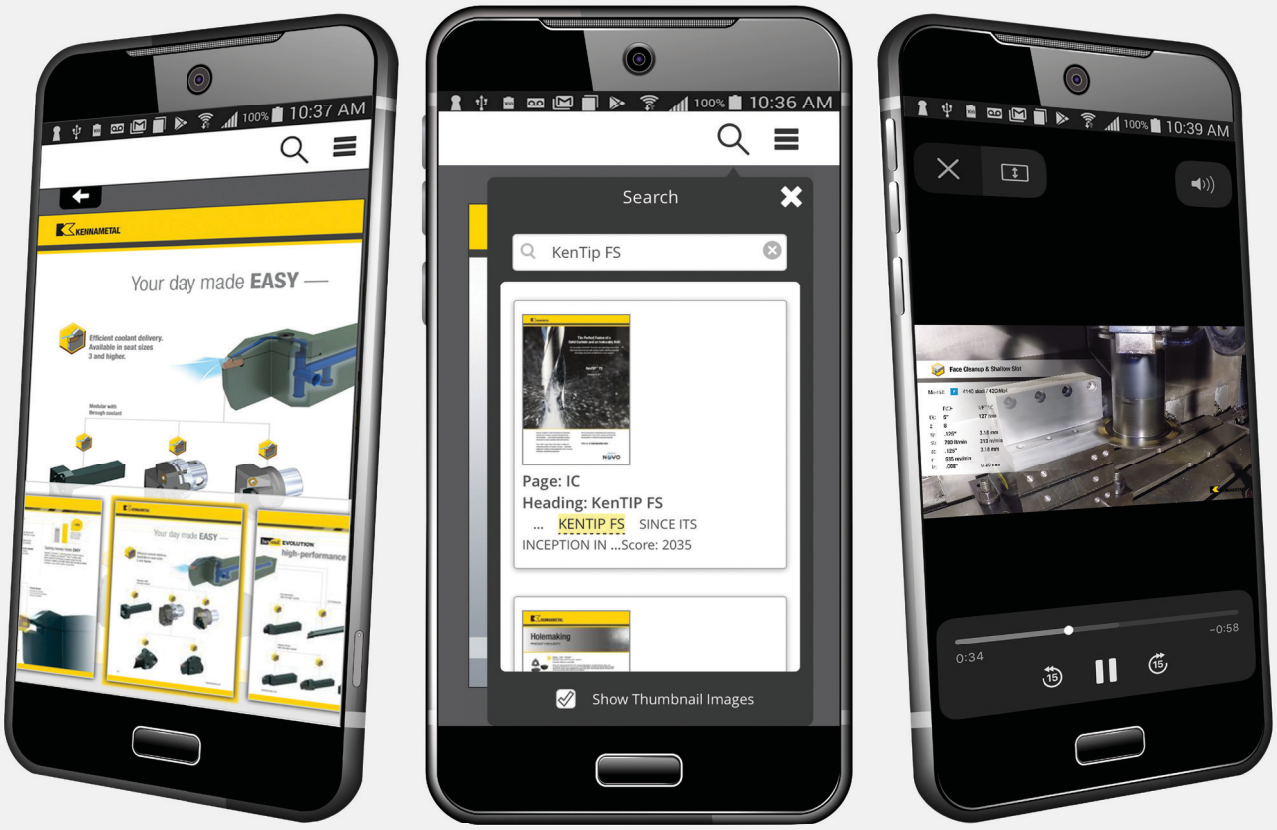
	Ae/D	2.00%	4.00%	5.00%	8.00%	10.00%	20.00%	30.00%	40.00%	50.00%
Speed factor	Kv	2	1.5	1.45	1.4	1.35	1.25	1.2	1	1
Feed factor	KFz	2.4	2.3	2.2	2	1.7	1.25	1.02	1	1

Catalogue App

Browse Pages

Search Products

Watch a Video



Check out our new catalogue app. Available in the Google Play™ Store or the App Store®

OR VISIT **CATALOGS.KENNAMETAL.COM** TODAY.

KENNAMETAL

kennametal.com

Solid Carbide End Mills

HARVI I™ TE • APPLICATION EXAMPLES

CHALLENGE

- Full slotting with interrupted cut.
- P6 high-strength steel (1.4542, UNS S17400.).
- Wet machining.

SOLUTION

- Standard HARVI I TE.
- Ø 12mm with 4 effective cutting edges and chamfered edge.

CUTTING DATA

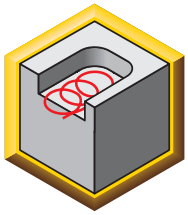
- vc 60 m/min
- Fz 0,019 mm/z
- Ap 3mm
- Ae 12mm

RESULT

- 15 instead of 7 parts with one tool as an initial solution at same productivity.

BENEFIT

- +114% tool life — lower tool cost.
- Less downtime with tool changes.
- Higher process security.



CHALLENGE

- Dynamic milling application.
- Nickel based alloy, AMS5540.
- Wet machining.

SOLUTION

- Standard HARVI I TE.
- Ø 12mm with 4 effective cutting edges and chamfered edge.

CUTTING DATA

- vc 83 m/min
- Fz 0,085 mm/z
- Ap 25mm
- Ae 0,84mm

RESULT

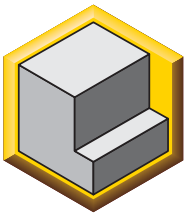
- 18 instead of 12 parts with one tool as a competitive solution at same productivity.

BENEFIT

- +40% tool life — lower tool cost.
- Less downtime with tool changes.
- Higher process security.

Solid Carbide End Mills

HARVI I™ TE • APPLICATION EXAMPLES



CHALLENGE

- Roughing and finishing.
- Full slot 28.6mm depth.
- Martensitic stainless steel.
- Unstable clamping.
- Wet machining.

SOLUTION

- Standard HARVI I TE.
- Ø 20mm with 4 effective cutting edges and sharp edge.

CUTTING DATA

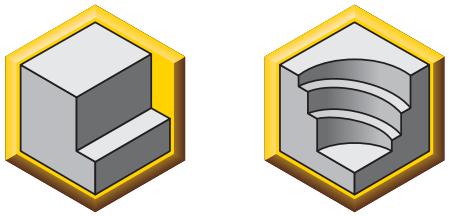
- vc 60 m/min
- Fz 0,08 mm/z
- Ap 20mm
- Ae 0,5mm

RESULT

- +47% material removal rate vs. competitive solution.
- Greater than +40% longer tool life than competitive solution in less manufacturing time.

BENEFIT

- Significantly increased productivity.
- Lower downtime due to tool changes.



CHALLENGE

- Helical interpolation and slotting thin walls.
- Alloy steel 30–36 HRc.
- Wet machining.

SOLUTION

- Standard HARVI I TE.
- Ø 12.7mm with 4 effective cutting edges and sharp edge.

CUTTING DATA

- vc 137 m/min
- Fz 0,06 mm/z
- Ap 7,6 mm
- Ae 12,7mm

RESULT

- Customer proprietary information.

BENEFIT

- 3x tool life compared to initial solution.

Solid Carbide End Mills

HARVI™ I TE • APPLICATION INFORMATION

Materials to Cut	• Steels (P0-P5). • Stainless steels (M1-M3). • Cast iron (K1-K3). • High temp alloys (S1-S4). • Hardened materials (H1-H2).
Cutting Speed	• Refer to application data recommendation.
Feed Rate	• Refer to application data recommendation. • Works in same feed rate range as standard 4FL high-versatility tools, for productivity advantage follow application recommendation.
Depth of Cut	• Refer to application data recommendation.
Coolant	• External coolant preferred for steel, stainless, high-temp alloys, and hardened materials. • Pressurized air applicable for carbon steels. • Minimal quantity lubrication (MQL) and dry applicable for carbon steels.
Adaptation	• Hydraulic chuck with or without sleeve preferred. • Weldon® adaptor for Weldon shank tools preferred for high Ap/high A_e applications, but not recommended for finishing applications. • High-performance collet (HPMC) or milling power chucks applicable. • Shrink adaptor applicable.
Roughing Application	• Yes.
Finishing Application	• Yes.
Milling Strategy	• Traditional milling (full slotting, high A_e side and shoulder milling). • High velocity milling (dynamic milling, trochoidal milling).
Application Range	• Full slotting. • Shoulder milling. • Peel milling and HPC techniques. • Centre cutting. • Linear ramping at unlimited angle and 90° plunging. • Ramping into stainless and high-temperature alloys limited by coolant configuration. • Helical interpolation.
Engineered Solutions	• Available upon request.
Reconditioning Service	• Full reconditioning available with Kennametal reconditioning procedures. • Check services under Kennametal website for detailed information.

HARVI I TE • HELICAL INTERPOLATION EXAMPLES

Helical interpolation are starting operations for pockets and cavities. HARVI I TE capability with large ramping angles save a significant amount of grinding time — in particular, in difficult-to-cut materials like stainless steel and high-temp alloys.

Steel 1.7225/4140/ASM A29		Ramp Angle	Time [sec]
		3°	33
		5°	20
Tool D (mm)	16	10°	10
Cutting Speed Vc (m/min)	180	15°	7
Feed per tooth (mm/th)	0,06	20°	5
RPM	3581	25°	4
Table Feed F (mm/min)	859,4	30°	3
Hole diameter (mm)	24	35°	3
Hole depth (mm)	25	40°	3

Stainless Steel 1.4404/AISI 316L		Ramp Angle	Time [sec]
Tool D (mm)	16	3°	120
Cutting Speed Vc (m/min)	100	5°	72
Feed per tooth (mm/th)	0,03	10°	36
RPM	1989	15°	24
Table Feed F (mm/min)	238,7	20°	18
Hole diameter (mm)	24	25°	15
Hole depth (mm)	25	30°	13

Solid Carbide End Mills

HARVI™ I TE • CAUSES AND REMEDIES FOR MILLING PROBLEMS

PROBLEM	CAUSE	REMEDIES
• Tool pullout.	• High axial forces. • Wrong adaptor. • Unadapted application data.	• Use Weldon® chuck if applicable or adaptor with higher clamping force. • Reduce feed per tooth.
• Unevenly colored chips when slotting deep (>1.25 x D).	• Not enough coolant in cutting zone.	• Adjust coolant method to improve coolant in cutting zone.
• Sudden breakage when milling dry in Shrink Fit or hydraulic adaptor.	• Tool is too hot and loses fit in adaptor.	• Check temperature on adaptor/spindle. • Improve coolant provision or reduce cutting speed; eventually change to HPMC or Weldon, if applicable.
• Material build-up on cutting edge.	• Cold welding of material at cutting edge.	• Increase coolant in cutting zone. • Decrease cutting speed.
• High flank wear.	• Unadapted application data. • High tool runout.	• Decrease feed rate. • Check tool runout.
• Chipping on tool.	• Unadapted application data. • Insufficient coolant. • High tool runout. • Unstable adaptor. • Clamping on coating area.	• Adjust to recommended speeds and feeds. • Adjust coolant method to improve coolant in cutting zone. • Check runout; eventually change to more stable adaptor. • Adjust clamping to clamp on uncoated area only. • Minimise overhang length.

POWERED BY NOVO

KOR™ 5

High-Velocity Aluminium Roughing

Materials

N

Applications

- Ramping
- Trochoidal Milling
- Side Milling/Shoulder Milling: Roughing
- Side Milling/Shoulder Milling: Finishing

kennametal.com/KOR5

KOR 5 Features:

- High efficiency metal removal in aluminium.
- Maximises capabilities of 5-axis machines.
- Dynamic milling, using CAM tool path generation software.

Up to 66% higher table feed than common tools with 3 flutes.

Proprietary flute form, and chipbreaker enabling 3 x D maximum depth of cut, and perfect chip evacuation.

KOR™ 5 — King of Roughing

Internal coolant helps flush chips from cutting zone and reduce heat.

5 cutting edges enable increased feed rates and high metal removal rates.

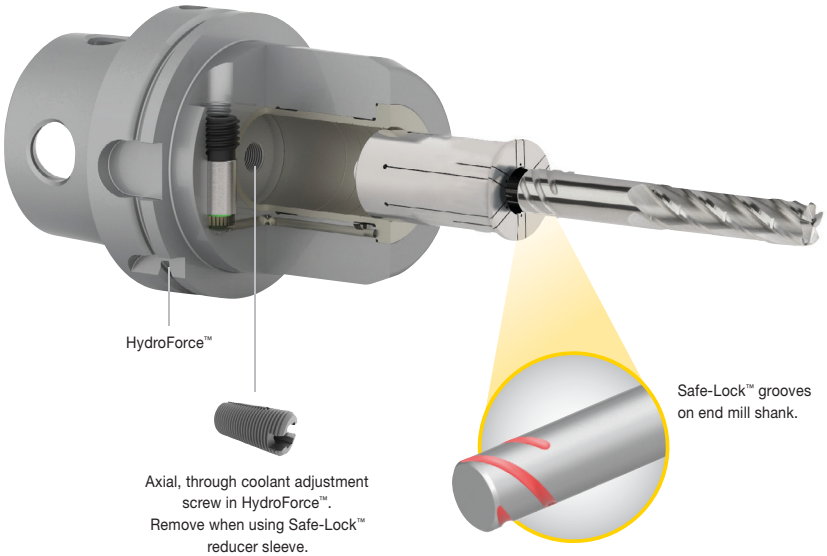
Chipbreakers manage chip removal efficiently.

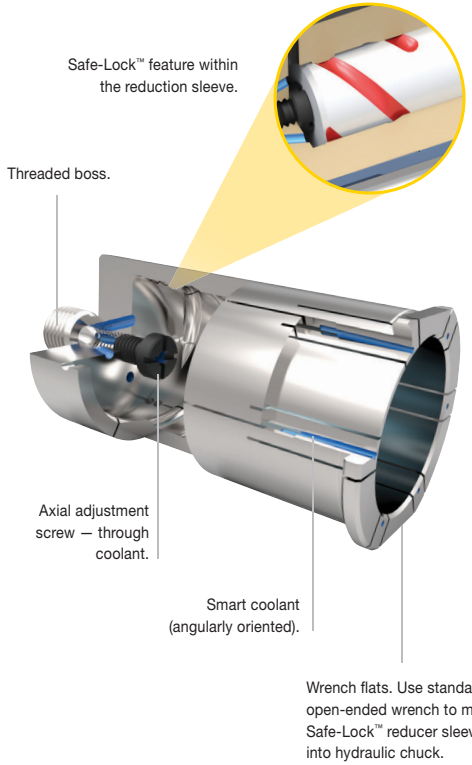
SAFE-LOCK® by HAIMER®

Proprietary flute form ensures coolant flow, chip evacuation, and a 3 x D maximum depth-of-cut.

Up to 66% higher table feed in aluminium applications.

Safe-Lock™ Shank prevents end mill pullout.

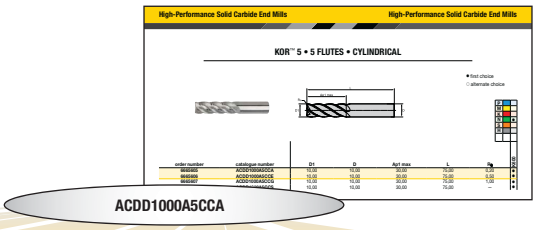




High-Performance Solid Carbide End Mills

KOR™ 5 • CATALOGUE NUMBERING SYSTEM

Each character in our catalogue number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.



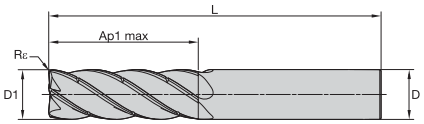
ACDD1000A5CCA

AC	D	D	1000	A	5	C	C	A
End Mill Family	End Mill Shape	Helix Angle	Diameter (mm/inch)	Shank Style	Number of Flutes	LOC/D	Special Characteristics	Radius
AA = Aluminium **AB** = MaxiMet™ — Aluminium **AC** = KOR — Aluminium	**D** = Square End RH	**D** = 31–35		**A** = Metric — Plain **E** = Metric — Plain and Safe-Lock™	**5**	**C**	**C** = Coolant	**A** = Metric — 0,2 **E** = Metric — 0,5 **G** = Metric — 1,0 **J** = Metric — 1,5 **K** = Metric — 2,0 **L** = Metric — 2,5 **S** = Sharp

High-Performance Solid Carbide End Mills

KOR™ 5 • 5 FLUTES • STRAIGHT SHANK

● first choice
○ alternate choice

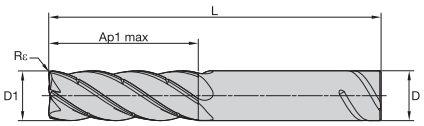


P	M	K	N	S	H
			●		

order number	catalogue number	D1	D	Ap1 max	L	Rε	K600
6665605	ACDD1000A5CCA	10,00	10,00	30,00	75,00	0,20	●
6665606	ACDD1000A5CCE	10,00	10,00	30,00	75,00	0,50	●
6665607	ACDD1000A5CCG	10,00	10,00	30,00	75,00	1,00	●
6665604	ACDD1000A5CCS	10,00	10,00	30,00	75,00	–	●

KOR™ 5 • 5 FLUTES • SAFE-λOCK® SHANK

● first choice
○ alternate choice



P	M	K	N	S	H
			●		

order number	catalogue number	D1	D	Ap1 max	L	Rε	K600
6665609	ACDD1200E5CCA	12,00	12,00	36,00	87,00	0,20	●
6665610	ACDD1200E5CCE	12,00	12,00	36,00	87,00	0,50	●
6665611	ACDD1200E5CCJ	12,00	12,00	36,00	87,00	1,50	●
6665613	ACDD1200E5CCL	12,00	12,00	36,00	87,00	2,50	●
6665608	ACDD1200E5CCS	12,00	12,00	36,00	87,00	–	●
6665618	ACDD1600E5CCE	16,00	16,00	48,00	104,00	0,50	●
6665619	ACDD1600E5CCK	16,00	16,00	48,00	104,00	2,00	●
6665620	ACDD1600E5CCL	16,00	16,00	48,00	104,00	2,50	●
6665614	ACDD1600E5CCS	16,00	16,00	48,00	104,00	–	●
6665622	ACDD2000E5CCE	20,00	20,00	60,00	120,00	0,50	●
6665623	ACDD2000E5CCL	20,00	20,00	60,00	120,00	2,50	●
6665621	ACDD2000E5CCS	20,00	20,00	60,00	120,00	–	●

				NOVO
70	72	24	4	76

High-Performance Solid Carbide End Mills

KOR™ 5 • 5 FLUTES • APPLICATION DATA

Material Group		 Side Milling (A) and Slotting (B)			K600			 Recommended feed per tooth (fz = mm/th)			
		A		B	Cutting Speed — vc m/min			D1 — Diameter			
		ap	ae	ap	min	–	max	mm	10,0	12,0	16,0	20,0
N	1	0,5 x D1	0,5 x D1	0,25 x D1	200	–	2000	fz	0,080	0,120	0,160	0,200
	2	0,5 x D1	0,5 x D1	0,25 x D1	200	–	1500	fz	0,070	0,110	0,140	0,180

NOTE: These guidelines may require variations to achieve optimum results. For better surface finish, reduce feed per tooth.
For cutting aluminium 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 centres, please adjust parameters accordingly on >12mm diameter.

ADJUSTMENT FACTOR TABLE FOR FEED CALCULATION

To calculate application specific cutting data, please use above coefficient for adaptation of feed.
Fz new = Fz * Feed Multiplier

Calculation example:
Application: D = 20mm;
N1 material group;
Ae 2mm
Cutting data recommendation: 200 m/min;
fz = 0,200mm
Adjustment coefficients: Ae = 2 mm equals 10.00 %;
Feed Multiplier = 1.7

Final cutting data recommendation:
Fz new = 0,2mm * 1.7 = 0,34mm

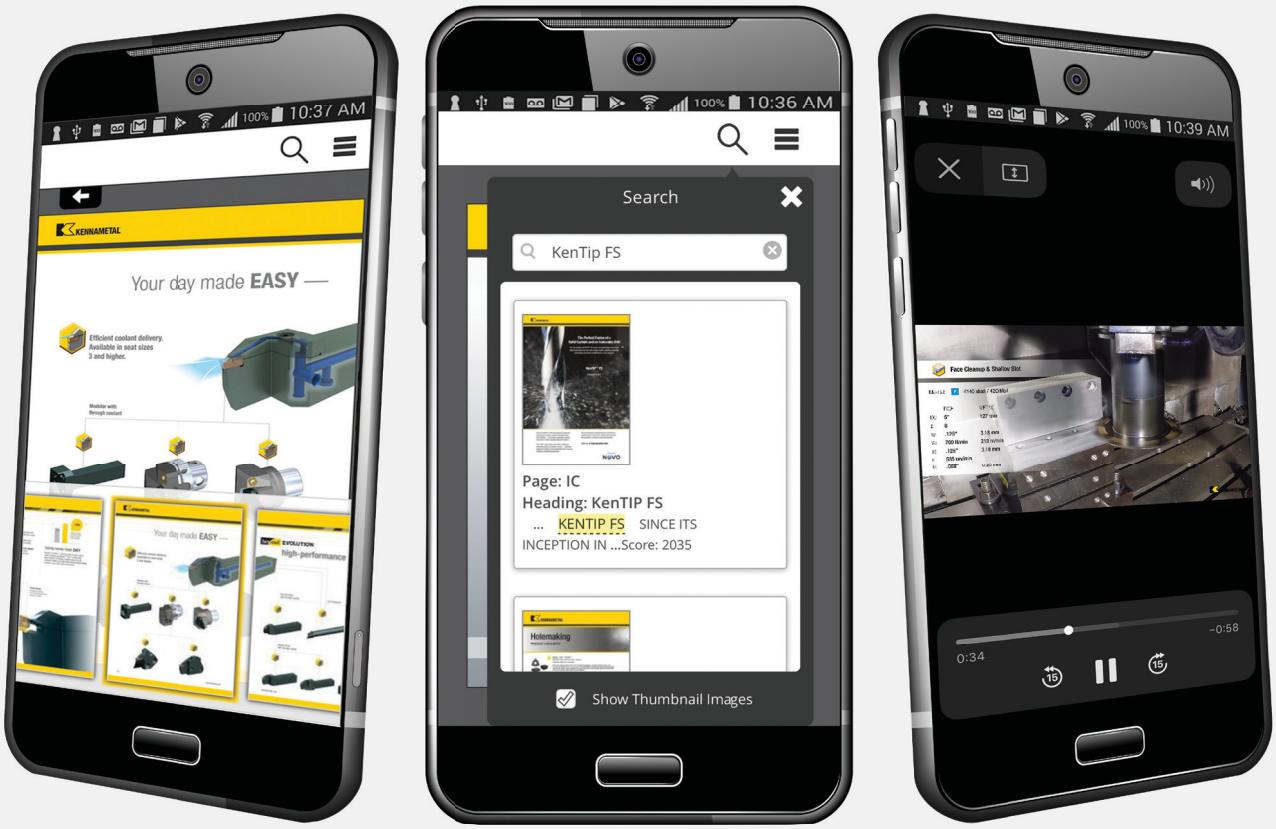
Ae/D1	100%	50%	40%	30%	20%	10%	5%	2%
Max Ap	.25 x D1	.5 x D1	1 x D1	2 x D1	Ap1 Max	Ap1 Max	Ap1 Max	Ap1 Max
Feed Multiplier	.90	1.00	1.02	1.09	1.25	1.70	2.30	3.60

Catalogue App

Browse Pages

Search Products

Watch a Video



Check out our new catalogue app. Available in the Google Play™ Store or the App Store®

OR VISIT **CATALOGS.KENNAMETAL.COM** TODAY.

KENNAMETAL

kennametal.com

POWERED BY NOVO

Duo-Lock™

The ONLY modular system with the performance of a solid carbide end mill

Portfolio Materials

P M K N S H

Portfolio Applications

- Plunge Milling
- Ramping
- Slotting
- Side Milling/ Shoulder Milling
- 3D Milling/Profiling
- Chamfer Milling
- Side Milling/Shoulder Milling: Radius

kennametal.com/Duo-Lock

*KenFeed™

*MaxiMet™

DUO-LOCK®
by HAIMER® and Kennametal

Duo-Lock™ is a new revolutionary coupling for solid carbide end milling applications. This replaceable head design combines a high accuracy in runout and length repeatability with maximum stability, making it a precise and virtually unbreakable interface.

To adapt Duo-Lock™ perfectly to your spindle, a vast array of adaptors and extensions are available.

- Standard length extensions with Safe-Lock™, cylindrical and conical.
- Cut-to-size extensions, cylindrical and conical.
- Integral adaptors with HSK, PSC, DV, and BT back ends.

*NOTE: For application recommendations, see pages 30–33.

Intermediate diameters are available upon request as custom solutions.

Reconditioning will maximise tool life and your investment.

Double cone eliminates expensive presetting processes by providing an axial 10µm repeatability. Length repeatability from insert tip-to-tip within 50µm.

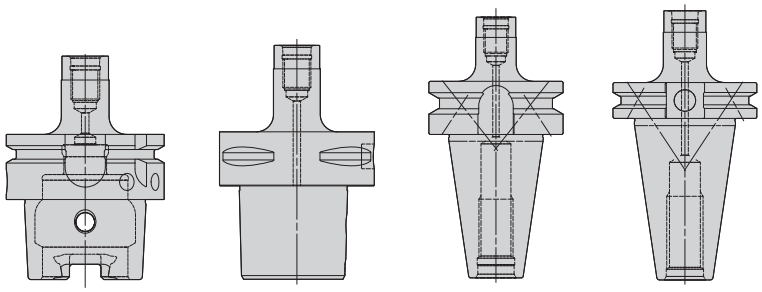
3rd contact surface delivers high stiffness and highest accuracy below 5µm runout.

Vast array of roughing, finishing, profiling, and chamfering tools, and blanks available. Covering all end milling applications.

Intelligent thread ensures stress level to remain below critical values, allowing >25% higher transmittable torque.

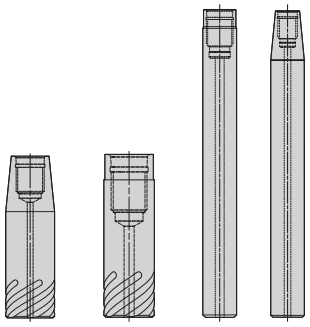
With a Duo-Lock™ wrench the tool change becomes easy and can be done in a few seconds.

Adaptors



HSK PSC BT CV

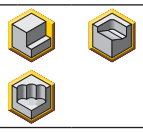
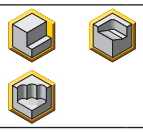
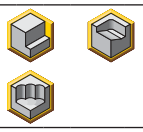
Extensions



SAFE-LOCK® by HAIMER® Cut-to-length

Modular Solid Carbide End Mills

DUO-LOCK™ • TOOL SELECTION GUIDE

	HIGH-PERFORMANCE (HP) ROUGHING & FINISHING					
	—	HARVI™ I	HARVI I	HARVI II	HARVI II	HARVI III
						
Series	**FGDF**	**UKDV**	**ULDV**	**UCDV**	**UDDV**	**UJDV**
Page	59**	O8*	O9*	O12*	O13*	O16*
Tool type						
Rougher	●	●	●	○	○	
Finisher	○	○	○	●	●	●
Chamfering						
Main operation						
Workpiece material						
Primary	P M	P M	S	P M	S	S
Secondary	K S H	K S	P M H	K S H	P H	P M H
Corner style						
Corner radius [Rε]	0,33–0,4mm	—	0,5–4mm	—	0,5–5mm	0,5–4mm
Corner chamfer width [BCH]	—	0,5mm	—	0,5mm	—	—
Cutter diameter [D1]	10–20mm	10–32mm	10–32mm	10–32mm	10–32mm	10–32mm
Length of cut	0,75 x D	1,5 x D	1,5 x D	1,5 x D	1,5 x D	1,5 x D
Maximum cutting depth [Ap1 max]	7,5–15mm	15–48mm	15–48mm	15–48mm	15–48mm	15–48mm
Flute helix angle	42°/45°/48°	37°/39°	37°/39°	37°/39°	37°/39°	37°/39°
Number of flutes [ZU]	3	4	4	5	5	6
Centre cutting	✔	✔	✔	—	—	✔
Additional operations						

* See page in the Kennametal Master Catalogue 2018 • Volume Two • Rotating Tools, A-16-05217.
**See page in the Kennametal Innovations 2019 • 02, A-18-05789.

● Primary
○ Secondary

Modular Solid Carbide End Mills

DUO-LOCK™ • TOOL SELECTION GUIDE

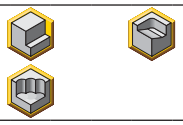
	HP ROUGHING & FINISHING *(CONTINUED)*			HIGH FEED		HP PROFILING	
	MaxiMet™	MaxiMet	MaxiMet	KenFeed™	KenFeed	HARVI™ Ball Nose	HARVI III Ball Nose
		 NEW!		 NEW!			
Series	**ABDF**	**ABDE**	**ABBE**	**KMDA**	**KSDB**	**UKBV**	**UJBV**
Page	O28*	O29*	35	61**	36	O18*	O19*
Tool type							
Rougher	●	●	●	●	●	●	
Finisher	○	●	●	●	●	○	●
Chamfering							
Main operation							
Workpiece material							
Primary	N	N	N	H	S	P M	S
Secondary				P	P M	K S H	P M K H
Corner style							
Corner radius [Rε]	—	0,5–4mm	—	0,36–1,25mm	0,36–1,25mm	—	—
Corner chamfer width [BCH]	—	—	—	—	—	—	—
Cutter diameter [D1]	10–20mm	10–25mm	10–25mm	10–20mm	10–20mm	10–25mm	10–25mm
Length of cut	1,5 x D	1,5 x D	1,5 x D	—	—	1,5 x D	1,5 x D
Maximum cutting depth [Ap1 max]	15–30mm	15–37,5mm	15–37,5mm	0,33–0,67mm	0,33–0,67mm	15–37,5mm	15–37,5mm
Flute helix angle	45°	38°	38°	20°	20°	37°/39°	37°/39°
Number of flutes [ZU]	2	3	3	6	6	4	6
Centre cutting	✔	✔	✔	—	—	✔	✔
Additional operations							

* See page in the Kennametal Master Catalogue 2018 • Volume Two • Rotating Tools, A-16-05217.
**See page in the Kennametal Innovations 2019 • 02, A-18-05789.

● Primary
○ Secondary

Modular Solid Carbide End Mills

DUO-LOCK™ • TOOL SELECTION GUIDE

	HP ROUGHING			
	—	—	—	—
				
Series	**RFDD**	**RQDB**	**RKDF**	**RQBB**
Page	60**	O34*	O35*	O36*
Tool type				
Rougher	●	●	●	●
Finisher				
Chamfering				
Main operation				
Workpiece material				
Primary	P M	P M	S	P M
Secondary	K H	K S H	P M K H	K S H
Corner style				
Corner radius [Rε]	0,4mm	—	0,5–0,75mm	—
Corner chamfer width [BCH]	—	0,5mm	—	—
Cutter diameter [D1]	10–20mm	10–25mm	10–25mm	10–25mm
Length of cut	0,75 x D	1,5 x D	1,5 x D	1,5 x D
Maximum cutting depth [Ap1 max]	7,5–15mm	15–37,5mm	15–37,5mm	15–37,5mm
Flute helix angle	35°	20°	45°	20°
Number of flutes [ZU]	3	4 & 5	4 & 6	4
Centre cutting	✔	—	✔	✔
Additional operations				

* See page in the Kennametal Master Catalogue 2018 • Volume Two • Rotating Tools, A-16-05217.
**See page in the Kennametal Innovations 2019 • 02, A-18-05789.

● Primary
○ Secondary

Modular Solid Carbide End Mills

DUO-LOCK™ • TOOL SELECTION GUIDE

	HP FINISHING		CHAMFERING		DUO-LOCK™ BLANKS
	—	RSM II™	—	—	—
					
Series	**FMDF**	**FSDE**	**XADA**	**XRDA**	**Blanks**
Page	O42*	O43*	O48*	O49*	62**
Tool type					
Rougher					
Finisher	●	●			
Chamfering			●	●	
Main operation					
Workpiece material					
Primary	P M	S	P M	P M	
Secondary	K S H	P M H	K N S H	K N S H	
Corner style			—	—	—
Corner radius [Rε]	0,5–0,75mm	0,5–4mm	—	—	—
Corner chamfer width [BCH]	—	—	—	—	—
Cutter diameter [D1]	10–25mm	10–25mm	10–16mm	10–16mm	10–32mm
Length of cut	1,5 x D	1,5 x D	2–4mm	1,5–4mm	1,5 x D
Maximum cutting depth [Ap1 max]	15–37,5mm	15–37,5mm	2–4mm	1,5–4mm	—
Flute helix angle	45°	36°	0°	0°	—
Number of flutes [ZU]	6	9, 11, 15, & 19	4, 5, & 6	4, 5, & 6	—
Centre cutting	✔	—	—	—	—
Additional operations					

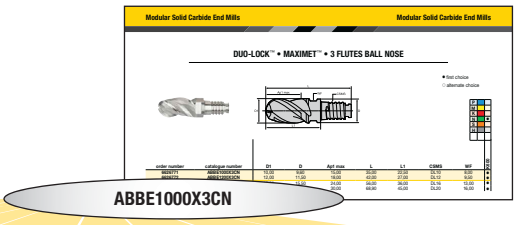
* See page in the Kennametal Master Catalogue 2018 • Volume Two • Rotating Tools, A-16-05217.
**See page in the Kennametal Innovations 2019 • 02, A-18-05789.

● Primary
○ Secondary

Modular Solid Carbide End Mills

DUO-LOCK™ • CATALOGUE NUMBERING SYSTEM

Each character in our catalogue number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

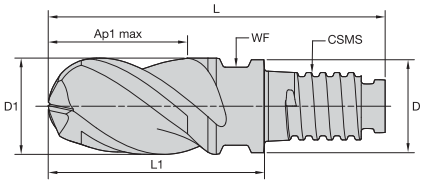


AB	B	E	1000	X	3	C	N	
Series	End Mill Shape	Helix Angle	Diameter	Shank Style	Number of Flutes	Length-of-cut	Shape/ Feature	Corner Configuration
AB = MaxiMet™ – Non-ferrous metals **FG** = Finisher general applications – Steels **FM** = Finisher multi-flute – Steels **FS** = RSM II™ multi-flute – High-temperature alloys **KM** = KenFeed™ – Medium steels **RF** = Rougher – Chipbreaker design **RK** = Rougher – Fine-pitch profile design **RQ** = Rougher – Coarse-pitch profile design **UC** = HARVI™ II – Stainless steels **UD** = HARVI II – High-temperature alloys **UJ** = HARVI III centre cut & eccentric cut – High-temperature alloys **UK** = HARVI I asymmetric fluting – Stainless steels **UL** = HARVI I asymmetric fluting – High-temperature alloys **XA** = Chamfering tool **XR** = Corner rounding tool	**B** = Ball Nose **D** = Square End	**A** = 0–10 **B** = 11–20 **D** = 31–35 **E** = 36–40 **F** = 41–45 **V** = 37/39° variable		**X** = Metric – Duo-Lock™	**2** **3** **4** **5** **6** **9** **B** = 11 **F** = 15 **J** = 19	**A** = 0,75 x D **B** = 1,0 x D **C** = 1,5 x D	**H** = Chamfer **N** = Necked **Q** = Necked & Radius **R** = Radius **U** = Necked + Sharp **V** = Necked + Chamfer	**D** = Metric – 0,4mm **E** = Metric – 0,5mm **F** = Metric – 0,75mm **H** = Metric – 1,25mm **J** = Metric – 1,5mm **N** = Metric – 4,0mm **S** = Sharp **X** = Custom

Modular Solid Carbide End Mills

DUO-LOCK™ • MAXIMET™ • 3 FLUTES BALL NOSE

● first choice
○ alternate choice



P	
M	
K	
N	●
S	
H	

order number	catalogue number	D1	D	Ap1 max	L	L1	CSMS	WF	K600
6626771	ABBE1000X3CN	10,00	9,60	15,00	35,00	22,50	DL10	8,00	●
6626772	ABBE1200X3CN	12,00	11,50	18,00	42,00	27,00	DL12	9,50	●
6626773	ABBE1600X3CN	16,00	15,50	24,00	56,00	36,00	DL16	13,00	●
6626774	ABBE2000X3CN	20,00	19,30	30,00	68,90	45,00	DL20	16,00	●

DUO-LOCK™ • MAXIMET • 3 FLUTES BALL NOSE • APPLICATION DATA



Material Group		Side Milling (A) and Slotting (B)			short			medium			long			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.				
		A		B	adaptor reach													
					K600			K600			K600							
					Cutting Speed — vc m/min			Cutting Speed — vc m/min			Cutting Speed — vc m/min			D1 — Diameter				
		ap	ae	ap	min		max	min		max	min		max	mm	10,0	12,0	16,0	20,0
N	1	1,0 x D	0,5 x D	1,0 x D	500	–	2000	400	–	1600	300	–	1200	fz	0,075	0,090	0,120	0,150
	2	1,0 x D	0,5 x D	1,0 x D	500	–	1500	400	–	1200	300	–	900	fz	0,068	0,081	0,108	0,135
	3	1,0 x D	0,5 x D	1,0 x D	500	–	1500	400	–	1200	300	–	900	fz	0,053	0,063	0,084	0,105
	4	1,0 x D	0,5 x D	1,0 x D	400	–	750	320	–	600	240	–	450	fz	0,053	0,063	0,084	0,105
	5	1,0 x D	0,5 x D	1,0 x D	250	–	1000	200	–	800	150	–	600	fz	0,068	0,081	0,108	0,135
	6	1,0 x D	0,5 x D	1,0 x D	100	–	750	80	–	600	60	–	450	fz	0,075	0,090	0,120	0,150
	7	1,0 x D	0,5 x D	1,0 x D	100	–	750	80	–	600	60	–	450	fz	0,053	0,063	0,084	0,105

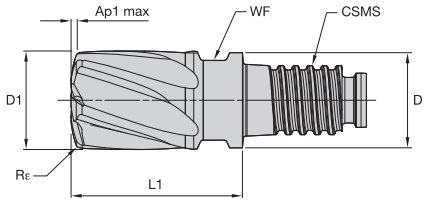
NOTE: These guidelines may require variations to achieve optimum results.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters greater than 12mm.
For better surface finish, reduce feed per tooth.

70	72	34	4	76

Modular Solid Carbide End Mills

DUO-LOCK™ • KENFEED™ • 6 FLUTES

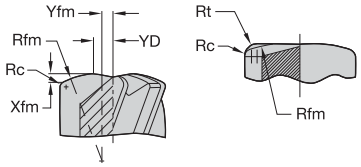
● first choice
○ alternate choice



P	○
M	○
K	
N	
S	●
H	

order number	catalogue number	D1	D	Ap1 max	L1	CSMS	WF	Rε	KC643M
6625741	KSDB1000X6BQX	10,00	9,60	0,53	17,50	DL10	8,00	0,63	●
6625742	KSDB1200X6BQX	12,00	11,50	0,63	21,00	DL12	9,50	0,75	●
6625743	KSDB1600X6BQX	16,00	15,50	0,84	28,00	DL16	13,00	1,00	●
6625744	KSDB2000X6BQX	20,00	19,30	1,05	35,00	DL20	16,00	1,25	●

DUO-LOCK™ • KENFEED • 6 FLUTES • PROGRAMMING DATA



	geometrical parameters									ramping guide for circular and linear interpolation							
										circular interpolation		linear interpolation					
										allowed range of hole diameter		calculated length per ramp angle					
catalogue number	D1	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number of flutes	smallest	largest	1°	2°	3°	4°	5°
KSDB1000X6BQX	10,00	0,53	10,00	1,04	0,625	0,53	1,25	2,20	6	14,40	20,00	30,20	15,09	10,06	7,54	6,02
KSDB1200X6BQX	12,00	0,63	12,00	1,24	0,750	0,63	1,50	2,64	6	17,28	24,00	36,24	18,11	12,07	9,05	7,23
KSDB1600X6BQX	16,00	0,84	16,00	1,66	1,000	0,84	2,00	3,52	6	23,04	32,00	48,31	24,15	16,09	12,06	9,64
KSDB2000X6BQX	20,00	1,05	20,00	2,07	1,250	1,05	2,50	4,40	6	28,80	40,00	60,39	30,19	20,11	15,08	12,05
recommended degree of programmed feed rate to use while ramping												100%	70%	50%	30%	10%

NOTE: YRC = distance from centreline to the crown of the R radius.
RCN = distance from centreline to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.
R = the head radius size.
Rc = the shoulder radius or radius at the corner of the cutter.

DUO-LOCK™ • KENFEED • 6 FLUTES • APPLICATION DATA

Material Group		Side Milling (A)		short			medium			long			Recommended feed per tooth (fz = mm/th) for side milling (A).				
		A		adaptor reach KC643M Cutting Speed — vc m/min			KC643M Cutting Speed — vc m/min			KC643M Cutting Speed — vc m/min			D1 — Diameter				
		ap	ae	min		max	min		max	min		max	mm	10,0	12,0	16,0	20,0
P	5	0,05 x D	0,55 x D	60	–	100	51	–	85	48	–	80	fz	0,290	0,337	0,419	0,485
	6	0,05 x D	0,55 x D	50	–	75	43	–	64	40	–	60	fz	0,242	0,279	0,342	0,389
M	1	0,05 x D	0,55 x D	90	–	115	72	–	92	63	–	81	fz	0,363	0,421	0,523	0,606
	2	0,05 x D	0,55 x D	60	–	80	48	–	64	42	–	56	fz	0,290	0,337	0,419	0,485
	3	0,05 x D	0,55 x D	60	–	70	48	–	56	42	–	49	fz	0,242	0,279	0,342	0,389
S	1	0,05 x D	0,55 x D	50	–	90	40	–	72	30	–	54	fz	0,363	0,421	0,523	0,606
	2	0,05 x D	0,55 x D	25	–	40	20	–	32	15	–	24	fz	0,192	0,223	0,278	0,324
	3	0,05 x D	0,55 x D	25	–	40	20	–	32	15	–	24	fz	0,192	0,223	0,278	0,324
	4	0,05 x D	0,55 x D	50	–	60	40	–	48	30	–	36	fz	0,267	0,310	0,385	0,445

NOTE: These 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 centres, please adjust parameters accordingly on diameters greater than 12mm.
For cutting aluminium with high silicon TiCN coating is recommended.
For better surface finish reduce feed per tooth.
For tools with reach >3 x D, reduce fz by 20%.
For tools with reach >5 x D, reduce fz by 30%.
For tools with reach >10 x D, reduce Vc and fz by 30%.

Modular Solid Carbide End Mills

DUO-LOCK™ • INTELLIGENT THREAD

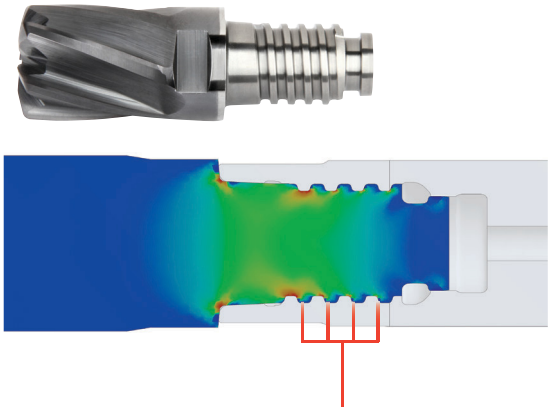
The Duo-Lock™ Intelligent Thread eliminates the force peaks all regular threads have in the first groove.

3 golden rules to success:

1. Clean both sides of the coupling. Thread needs to be free of any lubricant, such as oil, anti seize, grease, etc.
2. Apply recommended torque values.
3. When using Duo-Lock™ cylindrical extensions, never clamp on the coupling.

Finite Element Analysis FEA

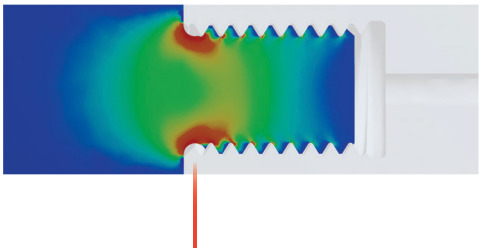
Duo-Lock™ Intelligent Thread



Duo-Lock™ Intelligent Thread at maximum load.

The Duo-Lock™ Intelligent Thread evenly distributes the forces across the entire length of the thread. This allows a greater than 25% torque transmission than known competitors.

Regular threads



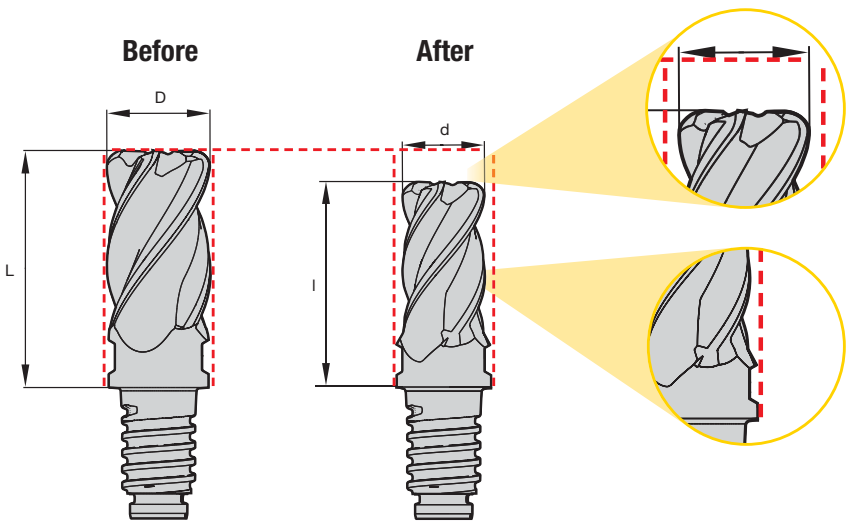
Typical for any regular thread at maximum load.

High force peak in the first groove, limiting the performance of the connection.

DUO-LOCK™ • RECONDITIONING

Wear and/or chipping determines to what extent and how often Duo-Lock™ tips can be reconditioned. To ensure integrity of the wrench flats, the neck portion cannot be modified.

NOTE: The cutting diameter of reconditioned Duo-Lock™ tips might be smaller than the neck diameter, and therefore may not have a clearance anymore. To prevent collisions, precautions need to be taken.



POWERED BY NOVO

KSEM PLUS™

Modular Drill System

Materials

P N S

Applications

- Drilling
- Drilling: Inclined Exit
- Drilling: Stacked Plates

kennametal.com/KSEM-PLUS

Modular drill for diameters 28–101mm (1.102–4") and 10 x D drilling capability.

- Two fully effective cutting edges for excellent productivity.
- Best of both worlds — combining the advantages of a modular drill and an indexable drill.
- Quickly and easily replace drill head without removing tool body from the machine.
- Stable cut in all cutting conditions and materials.

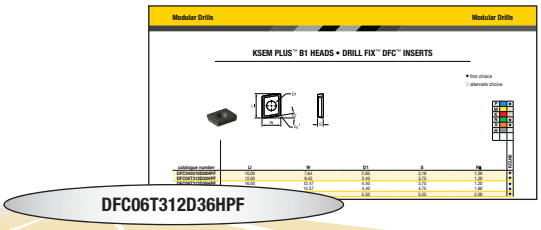
NEW! **HPF insert** featuring HP chipbreaker with additional wiper cutting edge for superior surface finishes. Ground periphery enables tighter hole diameter tolerances.

For best guidance and better hole straightness, use HPF outboard inserts in combination with FEG pilot insert.

Modular Drills

KSEM PLUS™ B1 HEADS • DRILL FIX™ DFC™ INSERTS • CATALOGUE NUMBERING SYSTEM

Each character in our catalogue number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

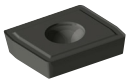


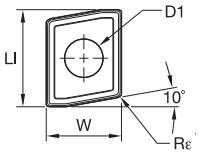
DFC	06	T3	12	D36	HPF
Insert Style	Length of Cutting Edge	Insert Thickness	Corner Radius	Size of Corresponding KSEM™ Plus Head	Geometry
Drill Fix DFC	**04 = 7,64mm** **05 = 9,45mm** **06 = 12,47mm** **07 = 14,57mm** **09 = 19,10mm**	**03** = 3,18mm **T3** = 3,75mm **04** = 4,75mm **05** = 5,25mm	**10** = 1,0mm **12** = 1,2mm **16** = 1,6mm **20** = 2,0mm	**D28** = FDS28 **D32** = FDS32 **D36** = FDS36 & FDS40 **D45** = FDS45 & FDS50 **D56** = FDS56 & Bigger	

Modular Drills

KSEM PLUS™ B1 HEADS • DRILL FIX™ DFC™ INSERTS

● first choice
○ alternate choice





P	●
M	○
K	○
N	●
S	●
H	

catalogue number	LI	W	D1	S	Rε	KCU40
DFC040310D28HPF	10,00	7,64	2,85	3,18	1,00	●
DFC05T312D32HPF	12,00	9,45	3,40	3,75	1,20	●
DFC06T312D36HPF	16,00	12,47	4,40	3,75	1,20	●
DFC070416D45HPF	18,00	14,57	4,40	4,75	1,60	●
DFC090520D56HPF	24,00	19,10	5,50	5,25	2,00	●

70 | 72 | 39 | 4 | 76

Modular Drills

KSEM PLUS™ B1 HEADS • DRILL FIX™ DFC™ • APPLICATION DATA

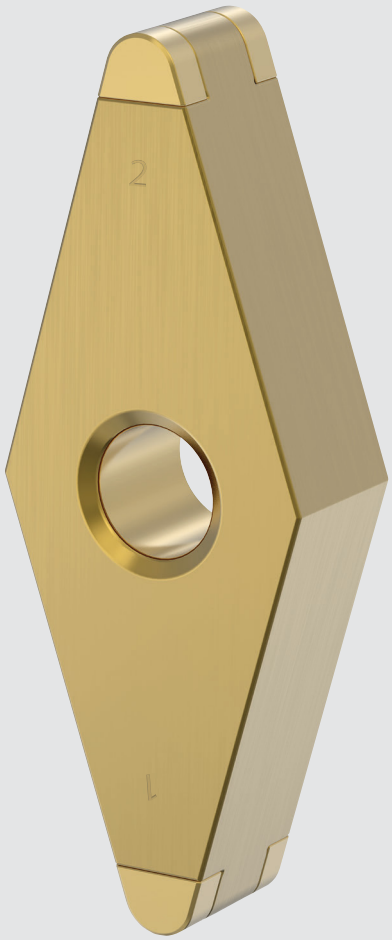
Metric											
Material Group		Condition	Cutting Speed — vc Range — m/min			Recommended Feed Rate (fz) by Diameter					
			min	Starting Value	max	Ø	KSEM 14….17 DFR/DFC04... 28.00–31,74	KSEM 15….18 DFT/DFC05… 31,74–35,99	KSEM 13….22 DFT/DFC06... 36,00–44,99	KSEM 18….28 DFT/DFC07... 45,00–55,99	KSEM 20….34 DFT/DFC09... 56,00–70
P	1	S	115	**235**	290	mm/r	0,130–0,250	0,130–0,250	0,160–0,280	0,160–0,320	0,200–0,360
	2	S	90	**190**	230	mm/r	0,160–0,280	0,160–0,280	0,200–0,360	0,200–0,400	0,200–0,450
	3	S	90	**180**	230	mm/r	0,160–0,280	0,160–0,280	0,200–0,320	0,200–0,400	0,200–0,450
	4	S	90	**140**	220	mm/r	0,160–0,280	0,160–0,280	0,200–0,320	0,200–0,400	0,200–0,450
	5	S	90	**130**	210	mm/r	0,160–0,280	0,160–0,280	0,200–0,320	0,200–0,400	0,200–0,450
	6	S	70	**90**	180	mm/r	0,160–0,280	0,160–0,280	0,200–0,320	0,200–0,400	0,200–0,450
M	1	S	60	**110**	135	mm/r	0,130–0,250	0,130–0,250	0,160–0,280	0,160–0,320	0,200–0,360
	2	S	60	**100**	135	mm/r	0,130–0,250	0,130–0,250	0,160–0,280	0,160–0,320	0,200–0,360
	3	S	50	**90**	135	mm/r	0,130–0,250	0,130–0,250	0,160–0,280	0,160–0,320	0,200–0,360
K	1	S	90	**170**	230	mm/r	0,180–0,300	0,180–0,300	0,216–0,360	0,240–0,420	0,300–0,480
	2	S	90	**160**	220	mm/r	0,180–0,300	0,180–0,300	0,216–0,360	0,240–0,420	0,300–0,480
	3	S	90	**150**	210	mm/r	0,180–0,300	0,180–0,300	0,216–0,360	0,240–0,420	0,300–0,480
N	1	S	150	**240**	360	mm/r	0,120–0,200	0,120–0,200	0,144–0,280	0,160–0,320	0,200–0,400
	2	S	150	**220**	360	mm/r	0,120–0,200	0,120–0,200	0,144–0,280	0,160–0,320	0,200–0,400
	3	S	150	**200**	360	mm/r	0,120–0,200	0,120–0,200	0,144–0,280	0,160–0,320	0,200–0,400
	4	S	150	**200**	360	mm/r	0,120–0,200	0,120–0,200	0,144–0,280	0,160–0,320	0,200–0,400
	5	S	150	**200**	360	mm/r	0,120–0,200	0,120–0,200	0,144–0,280	0,160–0,320	0,200–0,400
	6	S	150	**200**	360	mm/r	0,120–0,200	0,120–0,200	0,144–0,280	0,160–0,320	0,200–0,400
	7	S	110	**220**	260	mm/r	0,120–0,200	0,120–0,200	0,144–0,280	0,160–0,320	0,200–0,400
S	1	S	25	**50**	75	mm/r	0,130–0,250	0,130–0,250	0,160–0,280	0,160–0,320	0,200–0,360
	2	S	20	**40**	60	mm/r	0,130–0,250	0,130–0,250	0,160–0,280	0,160–0,320	0,200–0,360
	3	S	20	**40**	60	mm/r	0,130–0,250	0,130–0,250	0,160–0,280	0,160–0,320	0,200–0,360
	4	S	20	**40**	60	mm/r	0,130–0,250	0,130–0,250	0,160–0,280	0,160–0,320	0,200–0,360

Condition: S = Stable cutting conditions.

POWERED BY NOVO

KBH10B™ & KBH20B™

Hard Turning PcBN Grades



Materials

H

Applications

- Turning
- Facing
- Boring
- ID Facing
- Back Boring
- Chamfer Turning
- Profiling

kennametal.com/PCBN

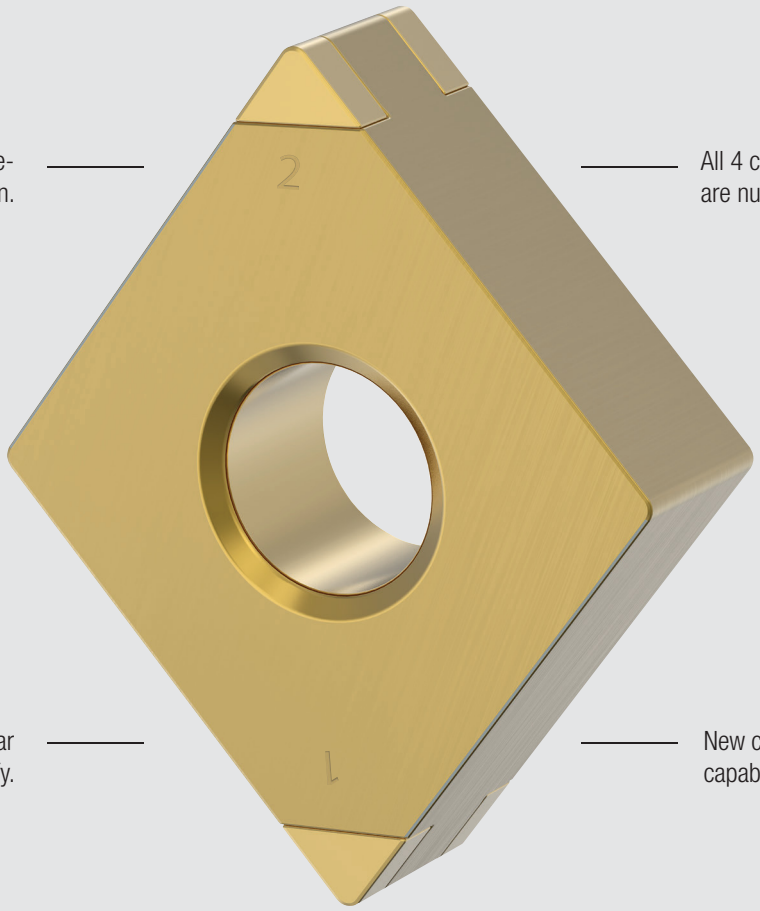
KBH10B

Composition: A low content PcBN grade with a patented binder structure and a PVD TiN/TiAlN/TiN coating for added wear resistance and enhanced wear identification.

Application: Designed for the precision machining of hardened steels (>45 HRC).

It can be effectively applied on bearing steels, hot and cold work tool steels, high speed steels, die steels, case hardened steels, carburised and nitrided irons, and some hard coatings.

Available in a multi-tip format.



KBH20B™

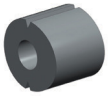
Composition: A low content PcBN grade with a PVD TiN/TiAlN/TiN coating for added wear resistance and enhanced wear identification.

Application: Is the ideal PcBN hard turning grade for continuous to lightly interrupted cutting applications.

The structure, as well as the different edge preparations, enable repeatable workpiece tolerances, excellent surface finishes, and surface integrity. Typical applications are case-hardened steel components such as gears, shafts, and other drive-train components.

Advanced Material Inserts

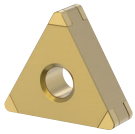
ISO KENLOC™ • DOUBLE-SIDED PCBN • TOOL SELECTION GUIDE

Grade	Smooth Cut	Varying Depth of Cut	Lightly Interrupted Cut
			
KBH10B™ 	S01015		
	S01225		
KBH20B™ 		S01015	
		S01225	

H05 H10 H15 H20

Advanced Material Inserts

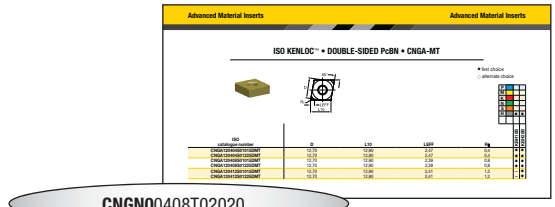
ISO KENLOC™ • DOUBLE-SIDED PCBN • APPLICATION DATA

Insert Shape	Insert Size	Geometry	Corner Radius	Starting Conditions mm		Cutting Parameter 0	0,1	0,2	0,3	0,4
CNGA 	12,7	S01015DMT	0,4	0,08	DOC [mm]					
				0,08	Feed [mm/rev]					
			0,8	0,10	DOC [mm]					
				0,10	Feed [mm/rev]					
			1,2	0,12	DOC [mm]					
				0,14	Feed [mm/rev]					
		S01225DMT	0,4	0,10	DOC [mm]					
				0,12	Feed [mm/rev]					
			0,8	0,12	DOC [mm]					
				0,15	Feed [mm/rev]					
			1,2	0,15	DOC [mm]					
				0,18	Feed [mm/rev]					
DNGA 	12,7	S01015DMT	0,4	0,08	DOC [mm]					
				0,08	Feed [mm/rev]					
			0,8	0,10	DOC [mm]					
				0,10	Feed [mm/rev]					
		S01225DMT	0,4	0,10	DOC [mm]					
				0,12	Feed [mm/rev]					
			0,8	0,12	DOC [mm]					
				0,15	Feed [mm/rev]					
			1,2	0,15	DOC [mm]					
				0,18	Feed [mm/rev]					
TNGA 	9,52	S01015DMT	0,4	0,08	DOC [mm]					
				0,08	Feed [mm/rev]					
			0,8	0,10	DOC [mm]					
				0,10	Feed [mm/rev]					
		S01225DMT	0,8	0,12	DOC [mm]					
				0,15	Feed [mm/rev]					
VNGA 	9,52	S01015DMT	0,4	0,07	DOC [mm]					
				0,07	Feed [mm/rev]					
			0,8	0,08	DOC [mm]					
				0,08	Feed [mm/rev]					
		S01225DMT	0,4	0,08	DOC [mm]					
				0,08	Feed [mm/rev]					
			0,8	0,10	DOC [mm]					
				0,10	Feed [mm/rev]					
			1,2	0,12	DOC [mm]					
				0,15	Feed [mm/rev]					

Advanced Material Inserts

ISO KENLOC™ • DOUBLE-SIDED PCBN • CATALOGUE NUMBERING SYSTEM

Each character in our catalogue number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

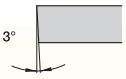
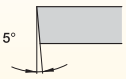
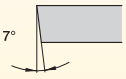
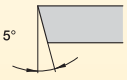
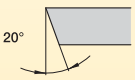
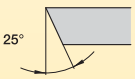
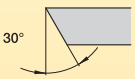
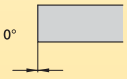
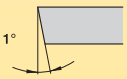


CNGN0408T02020

C — Insert Shape

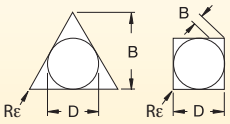
H	Hexagon 120°	
O	Octagon 135°	
P	Pentagon 108°	
R	Round —	
S	Square 90°	
T	Triangular 60°	
C D E M V	Rhomboid 80° 55° 75° 86° 35°	
W	Trigon 80° with enlarged corner angles	
L	Rectangular 90°	
A B N/K	Parallelogram 85° 82° 55°	

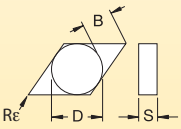
N — Insert Clearance Angle

A	3°	
B	5°	
C	7°	
D	15°	
E	20°	
F	25°	
G	30°	
N	0°	
P	11°	
O	For other clearance angles requiring descriptions.	

G — Tolerance Class

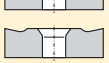
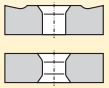
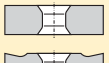
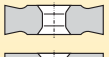
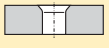
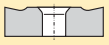
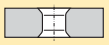
Tolerances apply prior to edge prep and coating





D = Theoretical diameter of the insert inscribed circle
S = Thickness
B = See figures below

N — Insert Features

N	
R	
F	
A	
M	
G	
W	
T	
Q	
U	
B	
H	
C	
J	
X V	Special Design

O — Size

"D" mm	Code for metric cutting edge length "L10" C	D	R	S	T	V	W
3,97	S4	04	03	03	06	—	—
4,76	04	05	04	04	08	08	S3
5,56	05	06	05	05	09	09	03
6,00	—	—	06	—	—	—	—
6,35	06	07	06	06	11	11	04
7,94	08	09	07	07	13	13	05
8,00	—	—	08	—	—	—	—
9,52	09	11	09	09	16	16	06
10,00	—	—	10	—	—	—	—
11,11	11	13	11	11	19	19	07
12,00	—	—	12	—	—	—	—
12,70	12	15	12	12	22	22	08
14,29	14	17	14	14	24	24	09
15,88	16	19	15	15	27	27	10
16,00	—	—	16	—	—	—	—
17,46	17	21	17	17	30	30	11
19,05	19	23	19	19	33	33	13
20,00	—	—	20	—	—	—	—
22,22	22	27	22	22	38	38	15
25,00	—	—	25	—	—	—	—
25,40	25	31	25	25	44	44	17
31,75	32	38	31	31	54	54	21
32,00	—	—	32	—	—	—	—

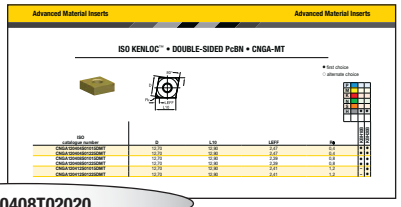
tolerance class*	tolerance on "D"	tolerance on "B"	tolerance on "S"
C	±0,025	±0,013	±0,025
H	±0,013	±0,013	±0,025
E	±0,025	±0,025	±0,025
G	±0,025	±0,025	±0,013
M	See tables on next page		±0,013
U	See tables on next page		±0,013

*Tolerances apply prior to edge prep and coating.

Advanced Material Inserts

ISO KENLOC™ • DOUBLE-SIDED PCBN • CATALOGUE NUMBERING SYSTEM

(continued)



CNGN0**0408T02020**

04	08		T	020	20		
Thickness "S"	Corner Radius "Rε"	Hand of Insert *(optional)*	Cutting Edge *(optional)*	T-Land Width *(optional)*	T-Land Angle *(optional)*	Tip Style *(optional)*	Chipbreaker *(optional)*

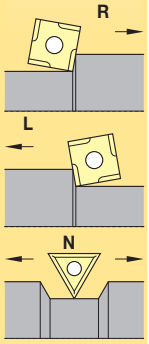
symbol	thick-ness
mm	mm
–	0,79
T0	1,00
01	11,59
T1	1,98
02	2,38
03	3,18
T3	3,97
04	4,76
05	5,56
06	6,35
07	7,94
09	9,52
11	11,11
12	12,70

symbol	corner radius
mm	mm
X0	0,4
01	0,1
02	0,2
04	0,4
08	0,8
12	1,2
16	1,6
20	2,0
24	2,4
28	2,8
32	3,2
00	round insert
M0	

R = Right hand

L = Left hand

N = Neutral



F* Sharp

E Rounded

T* Chamfered

S* Chamfered and Rounded

K Double-Chamfered

P Double-Chamfered and Rounded

*Also available in wiper style.

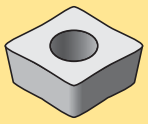
symbol ISO	size mm
010	0,01
020	0,02

symbol	size
10	10°
15	15°
20	20°
25	25°
30	30°

FW = Finishing Wiper

MW = Medium Wiper

symbol	usage
C	full tip
M	mini tip
MT	multi-tip
ST	single tip
DMT	double-sided mini-tip

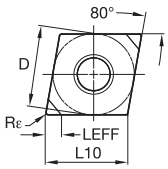


"D"	± Tolerance on "D"			
	Class M Tolerance			Class U Tolerance
	Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C
mm	mm	mm	mm	mm
3,97	0,05	–	–	–
4,76	0,05	–	–	0,08
5,56	0,05	0,05	0,05	0,08
6,35	0,05	0,05	0,05	0,08
7,94	0,05	0,05	0,05	0,08
9,52	0,05	0,05	0,05	0,08
11,11	0,08	0,08	0,08	0,13
12,70	0,08	0,08	0,08	0,13
14,29	0,08	0,08	0,08	0,13
15,88	0,10	0,10	0,10	0,18
17,46	0,10	0,10	0,10	0,18
19,05	0,10	0,10	0,10	0,18
22,22	0,13	–	–	0,25
25,40	0,13	–	–	0,25
31,75	0,15	–	–	0,25

"D"	± Tolerance on "B"			
	Class M Tolerance			Class U Tolerance
	Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C
mm	mm	mm	mm	mm
3,97	0,08	–	–	–
4,76	0,08	–	–	0,13
5,56	0,08	0,11	–	0,13
6,35	0,08	0,11	–	0,13
7,94	0,08	0,11	–	0,13
9,52	0,08	0,11	0,18	0,13
11,11	0,13	0,15	–	–
12,70	0,13	0,15	0,25	0,20
14,29	0,13	0,15	–	–
15,88	0,15	0,18	–	0,27
17,46	0,15	0,18	–	0,27
19,05	0,15	0,18	–	0,27
22,22	0,15	–	–	0,38
25,40	0,18	–	–	0,38
31,75	0,20	–	–	0,38

Advanced Material Inserts

ISO KENLOC™ • DOUBLE-SIDED PCBN • CNGA-MT

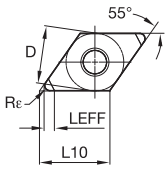


● first choice
○ alternate choice

P			
M			
K			
N			
S			
H		●	●

ISO catalogue number	D	L10	LEFF	Rε	KBH10B	KBH20B
CNGA120404S01015DMT	12,70	12,90	2,47	0,4	●	●
CNGA120404S01225DMT	12,70	12,90	2,47	0,4	●	●
CNGA120408S01015DMT	12,70	12,90	2,39	0,8	●	●
CNGA120408S01225DMT	12,70	12,90	2,39	0,8	●	●
CNGA120412S01015DMT	12,70	12,90	2,41	1,2	–	●
CNGA120412S01225DMT	12,70	12,90	2,41	1,2	–	●

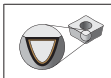
ISO KENLOC • DOUBLE-SIDED PCBN • DNGA-MT



● first choice
○ alternate choice

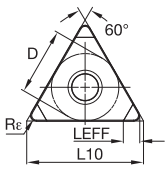
P			
M			
K			
N			
S			
H		●	●

ISO catalogue number	D	L10	LEFF	Rε	KBH10B	KBH20B
DNGA150404S01015DMT	12,70	15,50	2,64	0,4	●	●
DNGA150404S01225DMT	12,70	15,50	2,64	0,4	●	●
DNGA150408S01015DMT	12,70	15,50	2,28	0,8	●	●
DNGA150408S01225DMT	12,70	15,50	2,28	0,8	●	●
DNGA150412S01225DMT	12,70	15,50	2,25	1,2	–	●
DNGA150604S01015DMT	12,70	15,50	2,64	0,4	●	●
DNGA150604S01225DMT	12,70	15,50	2,64	0,4	●	●
DNGA150608S01015DMT	12,70	15,50	2,28	0,8	●	●
DNGA150608S01225DMT	12,70	15,50	2,28	0,8	●	●
DNGA150612S01015DMT	12,70	15,50	2,25	1,2	–	●
DNGA150612S01225DMT	12,70	15,50	2,26	1,2	–	●

				NOVO
71	72	46	4	76

Advanced Material Inserts

ISO KENLOC™ • DOUBLE-SIDED PCBN • TNGA-MT

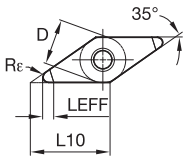


● first choice
○ alternate choice

P			
M			
K			
N			
S			
H		●	●

ISO catalogue number	D	L10	LEFF	Rε	KBH10B	KBH20B
TNGA160404S01015DMT	9,53	16,50	2,56	0,4	●	●
TNGA160408S01015DMT	9,53	16,60	2,27	0,8	●	●
TNGA160408S01225DMT	9,53	16,50	2,27	0,8	●	●

ISO KENLOC • DOUBLE-SIDED PCBN • VNGA-MT



● first choice
○ alternate choice

P			
M			
K			
N			
S			
H		●	●

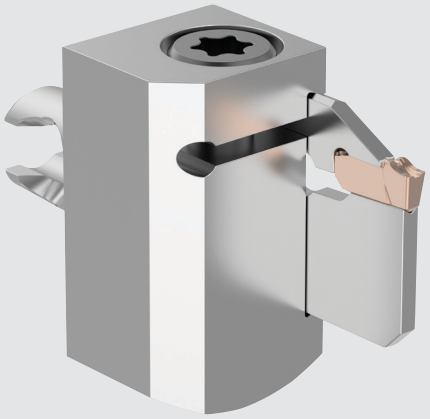
ISO catalogue number	D	L10	LEFF	Rε	KBH10B	KBH20B
VNGA160404S01015DMT	9,53	16,61	3,01	0,4	●	●
VNGA160404S01225DMT	9,53	16,61	3,02	0,4	●	●
VNGA160408S01015DMT	9,53	16,61	2,15	0,8	●	●
VNGA160408S01225DMT	9,53	16,61	2,15	0,8	●	●
VNGA160412S01225DMT	9,53	16,61	2,32	1,2	●	●

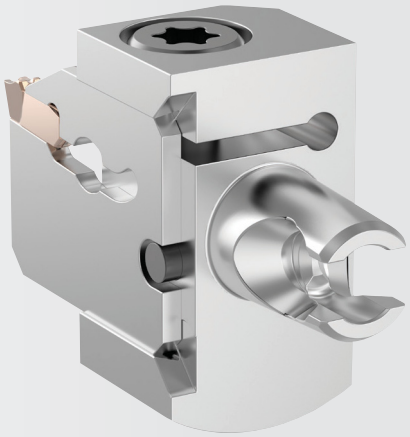
				NOVO
71	72	46	4	76

POWERED BY NOVO

Beyond™ Evolution™

Grooving and Cut-Off





Materials (CF Geometry)

P M N S

Applications

- Cut-Off
- O.D. Deep Grooving
- Grooving

kennametal.com/BeyondEvolution

Beyond™ Evolution™ is the single-sided grooving and cut-off tool that also performs multi-directional turning.

Whether you are using a high- or low-pressure coolant supply, Beyond™ Evolution™, featuring active coolant control, delivers longer tool life and higher Metal Removal Rates (MRR).

Available now:

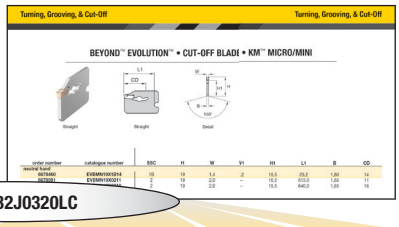
NEW! Cut-off blades compatible with the Kennametal KM™ Micro quick-change tooling system. The Kennametal quick-change heads reduce indexing and setup times on machines by up to 66%.

NEW! Inch widths for the CF (cut-off fine) geometry with sharp corners and increased lead angles. A performance booster for applications in stainless steels or in applications where thin walls are present.

Turning, Grooving, & Cut-Off

BEYOND™ EVOLUTION™ • CATALOGUE NUMBERING SYSTEM • CUT-OFF BLADES

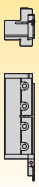
Each character in our catalogue number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



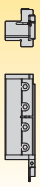
EVBSCL32J0320LC

EV	BS	C	L	32	J	03	20	L	C
Family Name	Tool Style	Support Type	Hand of Pocket	Blade Height	Overall Length	Seat Size (SSC)	Max. Cutting Depth	Hand of Blade	Coolant
Beyond™ Evolution™	**BS** = Blade Standard 2 Pocket **BH** = Blade Heavy 1 Pocket **BM** = Blade KM™ Micro/ Mini	**C** = Reinforced	**N** = Neutral **L** = Left Hand **R** = Right Hand	in millimetres	According to ISO **G** = 90mm **J** = 110mm **M** = 150mm **X** = Special	**1B** **1F** **02** **03** **04** **05** **06** **08** **10**	in millimetres	**L** = Left Hand **R** = Right Hand	**C** = Through Coolant Capable

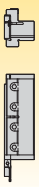
RH Blade RH Pocket



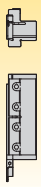
RH Blade LH Pocket



LH Blade RH Pocket

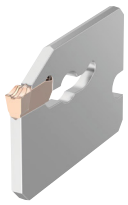


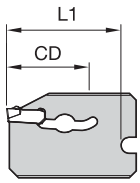
LH Blade LH Pocket



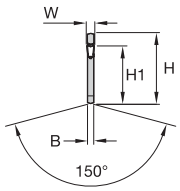
Turning, Grooving, & Cut-Off

BEYOND™ EVOLUTION™ • CUT-OFF BLADE • KM™ MICRO/MINI

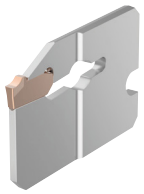

Straight

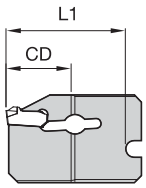


Straight

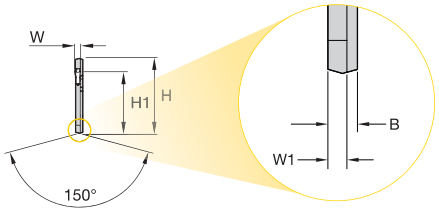


Detail


Reinforced



Reinforced

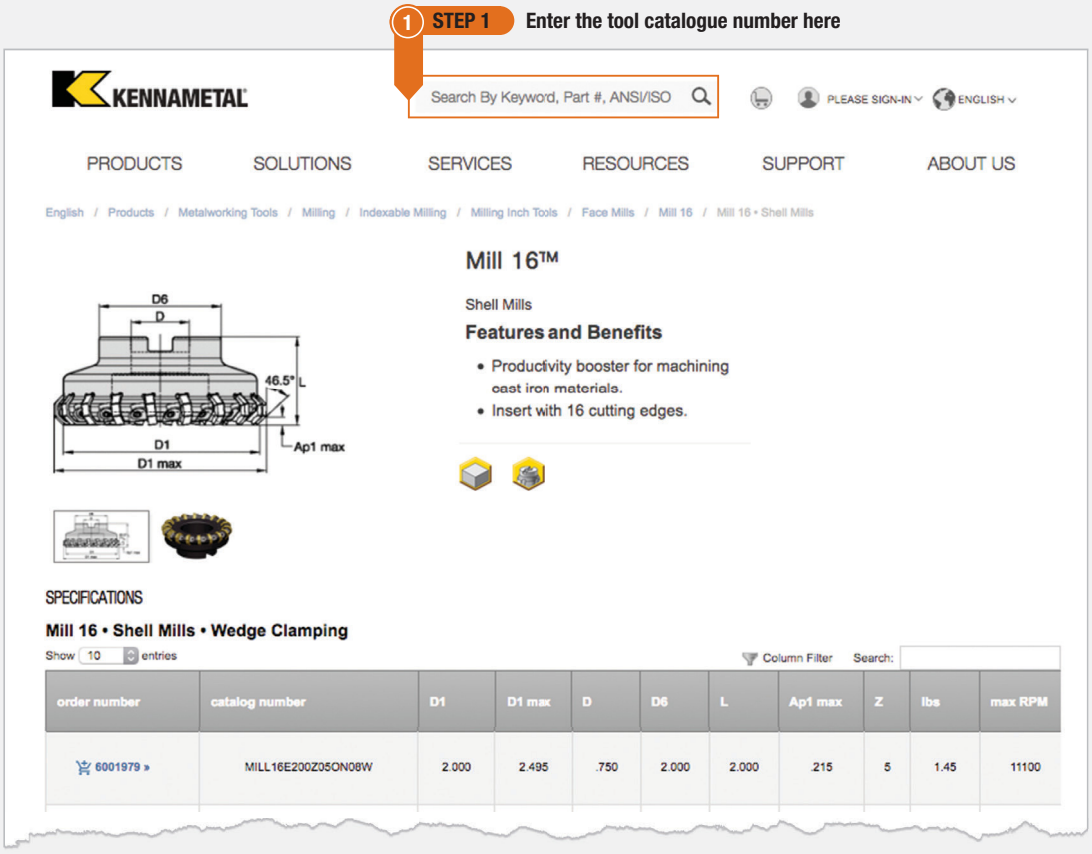


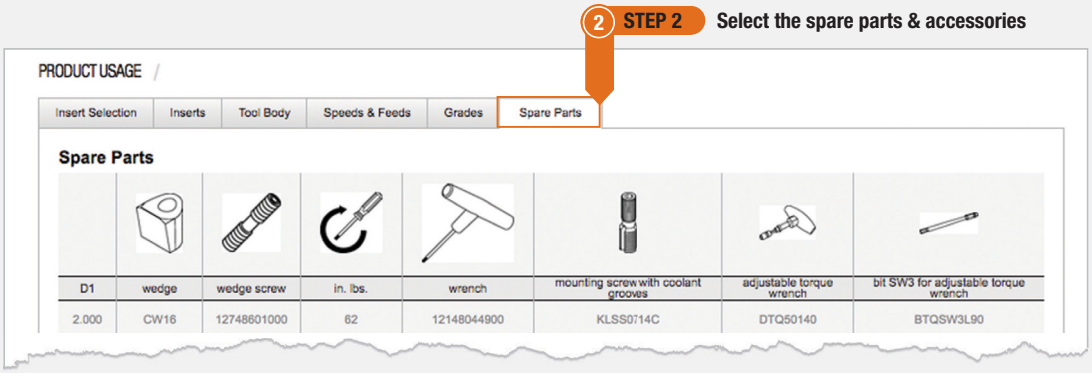
Detail

order number	catalogue number	SSC	H	W	W1	H1	L1	B	CD
neutral hand									
6678460	**EVBMN19X1B14**	1B	19	1,4	1,2	15,5	25,2	1,80	14
6678591	**EVBMN19X0211**	2	19	2,0	–	15,5	20,2	1,65	11
6678592	**EVBMN19X0216**	2	19	2,0	–	15,5	25,2	1,65	16

71	72	51	4	76

Spare Parts & Accessories Information





Lost a screw? Have to replace worn-out clamping wedges?
Need to find and re-order those spare parts?

GO TO **KENNAMETAL.COM** AND FIND WHAT YOU NEED IN SECONDS.

KENNAMETAL

kennametal.com

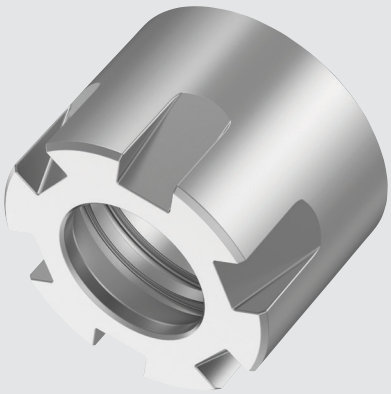
POWERED BY NOVO

ER™ Collet Chucks

Locknuts

Bearing locknut*

Solid locknut



Solid locknut
slim design

kennametal.com/ER-Collet-Chucks

2 standard locknuts to support all collet types.

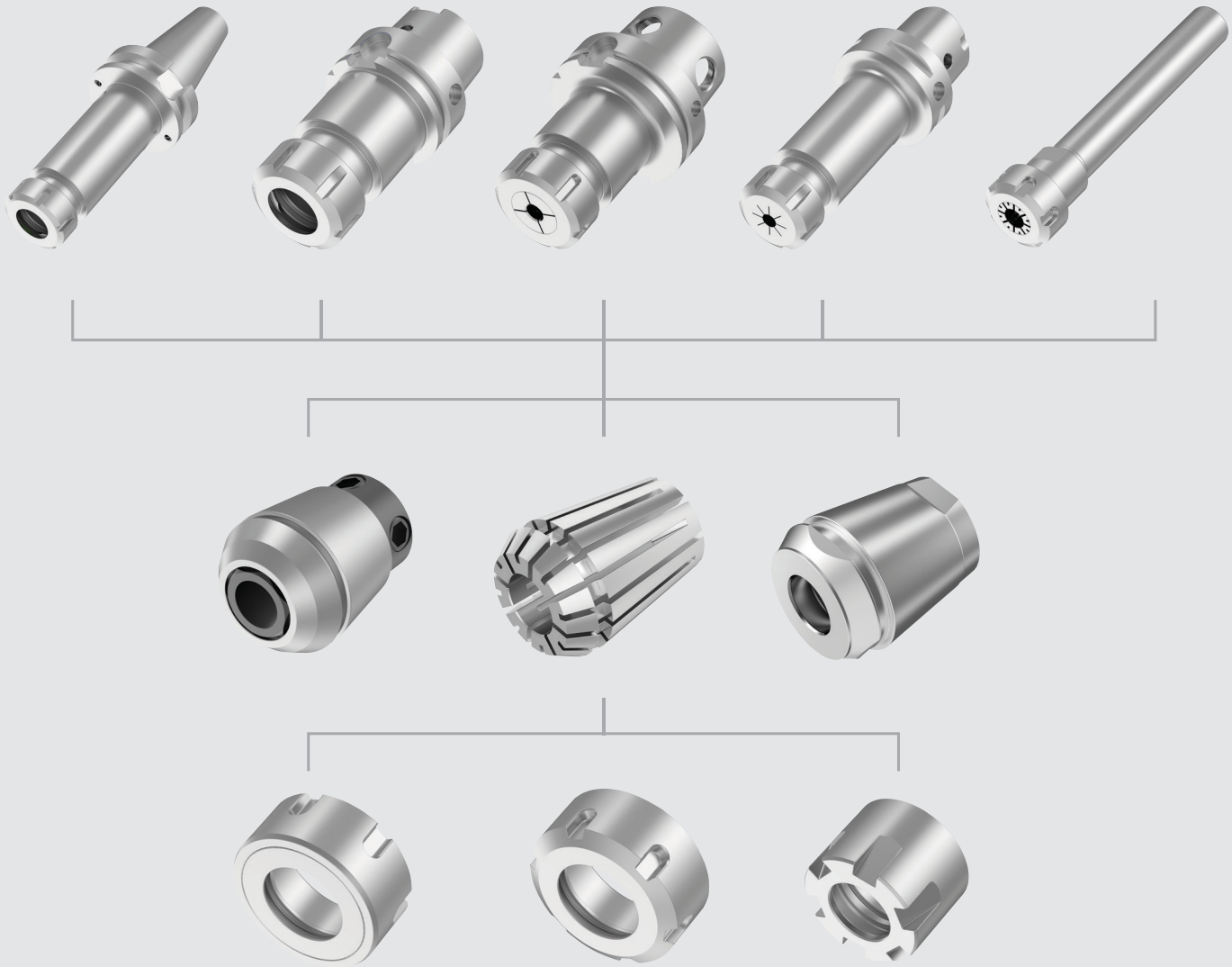
The newly designed solid locknut is balanced-by-design.

It achieves better runout and improves tool life.

The high torque bearing locknut provides additional grip.

Best suitable for challenging applications such as solid end milling.

*The bearing locknut is optional and needs to be ordered separately.



The ER™ Collet Chuck Portfolio, featuring all industry standard spindle connections, supports high-performance round tool applications.

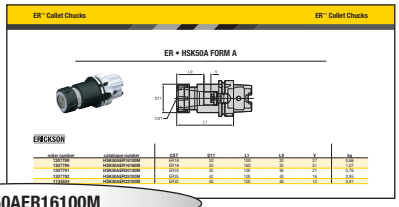
All ER collet chucks are RFID ready for standard ISO data carrier, and ER collect chucks are balanced to G2.5 at 20,000 RPM.

Our new solid ER collets in sizes 25, 32, and 40 allows the adaptation of screw-on milling cutter to any standard rotating collet chuck.

Tooling Systems

ER™ COLLET CHUCK • HSK • CATALOGUE NUMBERING SYSTEM

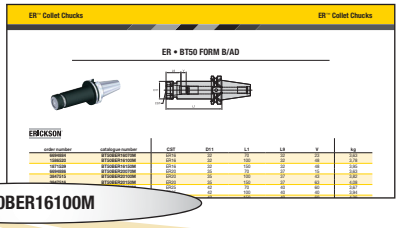
Each character in our catalogue number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.



HSK50AER16100M

HSK	50	A	ER	16	100	M
Shank Style	System Size	Adaptor Form	Toolholder Style	Toolholder Size	Gage Length	Identification Values
HSK = HSK Shank Style DIN 69893-1	**32** = 32 **40** = 40 **50** = 50 **63** = 63 **100** = 100 **125** = 125	**A** = Form A **B** = Form B **C** = Form C **D** = Form D **E** = Form E **F** = Form F	**ER** = DIN 6499 Collet Chuck	**11** = ER11 **16** = ER16 **20** = ER20 **25** = ER25 **32** = ER32 **40** = ER40	**Metric** **100** = 100mm **Inch** **2.50** = 2.50"	**(Blank)** = Inch Values **M** = Metric Values and Metric Retention Threads

ER COLLET CHUCK • STEEP TAPER • CATALOGUE NUMBERING SYSTEM



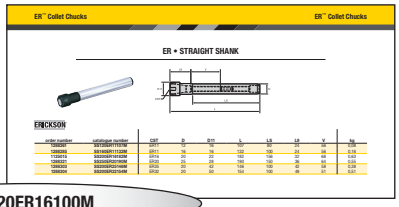
BT50BER16100M

BT	50	B	ER	16	100	M
Shank Style	Shank Size	Special Features	Toolholder Style	Collet Series	Gage Length	Identification Values
BT = JIS B6339 **BTKV** = JIS B6339 Face Contact **CV** = ANSI B5.50 **CVKV** = ANSI B5.50 Face Contact **DV** = DIN 69871	**30** = 30 **40** = 40 **50** = 50	**B** = DIN form B coolant feature **Z** = Deviates from ANSI B5.50 standard — no hub in front of V-Flange **Blank** = (No B or Z) Tool built to DIN form A/AD coolant style	**ER** = DIN 6499 Collet Chuck	**11** = ER11 **16** = ER16 **20** = ER20 **25** = ER25 **32** = ER32 **40** = ER40	**Metric** **100** = 100mm **Inch** **2.50** = 2.50"	**(Blank)** = Inch Values **M** = Metric Values and Metric Retention Threads

Tooling Systems

ER™ COLLET CHUCK • STRAIGHT SHANK • CATALOGUE NUMBERING SYSTEM

Each character in our catalogue number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.

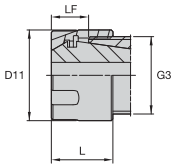


SS120ER16100M

SS	120	ER	16	100	M
Shank Style	Shank Size	Toolholder Style	Collet Series	Gage Length	Identification Values
SS = Straight Shank	**Metric** **120** = 12mm **160** = 16mm **200** = 20mm **250** = 25mm **Inch** **038** = 3/8" **050** = 1/2" **062** = 5/8" **075** = 3/4" **100** = 1" **125** = 1-1/4" **150** = 1-1/2" **175** = 1-3/4" **200** = 2"	**ER** = DIN 6499 Collet Chuck	**11** = ER11 **16** = ER16 **20** = ER20 **25** = ER25 **32** = ER32 **40** = ER40	**Metric** **100** = 100mm **Inch** **2.50** = 2.50"	**(Blank)** = Inch Values **M** = Metric Values and Metric Retention Threads

ER™ Collet Chucks

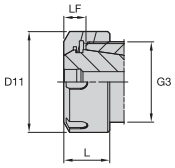
ER • SOLID LOCKNUT • SLIM DESIGN



ERICKSON™

order number	catalogue number	D11	L	LF	G3	Torque (Nm)	kg
6694024	LNSLRER11M	16	12,0	7,5	M13 X 0.75	16	0,01
6694025	LNSLRER16M	22	18,5	11,5	M19 X 1	24	0,02
6694026	LNSLRER20M	28	19,0	11,5	M24 X 1	28	0,03

ER • SOLID LOCKNUT



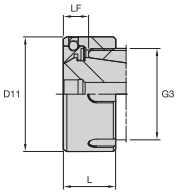
ERICKSON™

order number	catalogue number	D11	L	LF	G3	Torque (Nm)	kg
6459219	LNSRER16M	32	17,7	10,6	M22 X 1.5	56	0,06
6459251	LNSRER20M	35	19,0	11,5	M25 X 1.5	80	0,07
6459253	LNSRER25M	42	20,5	12,0	M32 X 1.5	104	0,10
6459254	LNSRER32M	50	22,8	13,0	M40 X 1.5	136	0,15
6459274	LNSRER40M	63	25,5	15,0	M50 X 1.5	175	0,27

72	56	4	76

ER™ Collet Chucks

ER • BEARING LOCKNUT*



ERICKSON™

order number	catalogue number	D11	L	LF	G3	Torque (Nm)	kg
6459271	**LNAGRER25M**	42	20,5	12,0	M32X1,5	108	0,10
6459273	**LNAGRER32M**	50	22,8	13,0	M40X1,5	136	0,15
6465674	**LNAGRER40M**	63	25,5	15,0	M50X1,5	175	0,32

NOTE: *The bearing locknut is optional and needs to be ordered separately.

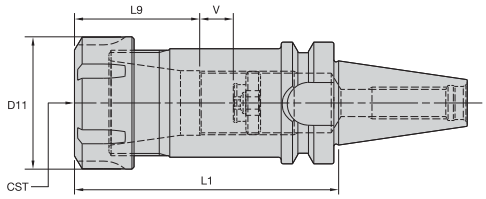
LOCKNUT WRENCHES

ER Size	Wrench Catalogue Number	Wrench Order Number
Solid Locknut Slim Design		
ER11	**ER11WEM**	**1024640**
ER16	**ER16WEM**	**1232471**
ER20	**ER20WEM**	**1322073**
Solid Locknut		
ER16	**ER16WM**	**1136106**
ER20	**ER20WM**	**1024641**
ER25	**ER25WM**	**1136113**
ER32	**ER32WM**	**1136087**
ER40	**ER40WM**	**1136096**
Bearing Locknut		
ER25	**ER25WM**	**1136113**
ER32	**ER32WM**	**1136087**
ER40	**ER40WM**	**1136096**

72	56	4	76

ER™ Collet Chucks

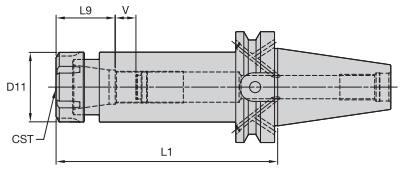
ER • BT30 FORM AD



ERICKSON™

order number	catalogue number	CST	D11	L1	L9	V	kg
6694846	BT30ER11060M	ER11	16	60	24	36	0,41
6694847	BT30ER11100M	ER11	16	100	24	36	0,45
1258023	BT30ER16060M	ER16	32	60	32	33	0,50
1826220	BT30ER16100M	ER16	32	100	32	48	0,66
3847457	BT30ER16150M	ER16	32	150	32	48	0,87
1021296	BT30ER20060M	ER20	35	60	36	31	0,50
3847458	BT30ER20100M	ER20	35	100	36	44	0,75
1258025	BT30ER25060M	ER25	42	60	40	16	0,52
1826221	BT30ER25100M	ER25	42	100	40	40	0,72
1156350	BT30ER32070M	ER32	50	70	46	10	0,67
3847459	BT30ER32100M	ER32	50	100	46	34	0,88
3847460	BT30ER40100M	ER40	63	100	52	10	1,16

ER • BT40 FORM B/AD



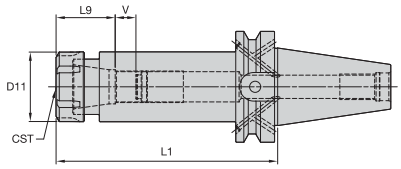
ERICKSON™

order number	catalogue number	CST	D11	L1	L9	V	kg
1315660	BT40BER16060M	ER16	32	60	32	39	1,05
6694848	BT40BER16100M	ER16	32	100	32	38	1,21
1623345	BT40BER16120M	ER16	32	120	32	48	1,29
3847461	BT40BER16150M	ER16	32	150	32	48	1,41
3847462	BT40BER20060M	ER20	35	60	37	38	1,05
6694849	BT40BER20100M	ER20	35	100	37	43	1,30
3847513	BT40BER20120M	ER20	35	120	37	63	1,42
3847514	BT40BER20150M	ER20	35	150	37	63	1,59
1718315	BT40BER25070M	ER25	42	70	40	38	1,15
6694850	BT40BER25100M	ER25	42	100	40	50	1,43
1610709	BT40BER25120M	ER25	42	120	40	60	1,61
3798342	BT40BER25150M	ER25	42	150	40	60	1,90
1538985	BT40BER32070M	ER32	50	70	46	40	1,15
6694881	BT40BER32100M	ER32	50	100	46	44	1,57
1538986	BT40BER32120M	ER32	50	120	46	54	1,82
3798343	BT40BER32150M	ER32	50	150	46	54	2,26
1871535	BT40BER40080M	ER40	63	80	52	9	1,38
1871538	BT40BER40120M	ER40	63	120	52	33	1,05
6694882	BT40BER40150M	ER40	63	150	52	78	2,74

72	56	4	76

ER™ Collet Chucks

ER • BT50 FORM B/AD



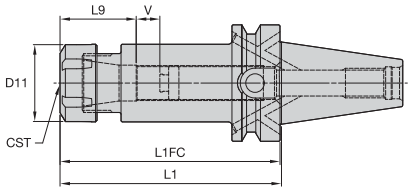
ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
6694884	**BT50BER16070M**	ER16	32	70	32	38	3,63
1586520	**BT50BER16100M**	ER16	32	100	32	48	3,78
1871539	**BT50BER16150M**	ER16	32	150	32	48	3,95
6694886	**BT50BER20070M**	ER20	35	70	36	44	3,65
3847515	**BT50BER20100M**	ER20	35	100	37	43	3,82
3847516	**BT50BER20150M**	ER20	35	150	37	63	4,08
1871540	**BT50BER25070M**	ER25	42	70	40	60	3,67
6694887	**BT50BER25100M**	ER25	42	100	40	40	3,94
1871541	**BT50BER25150M**	ER25	42	150	40	60	4,36
1587031	**BT50BER32070M**	ER32	50	70	46	38	3,65
6694888	**BT50BER32100M**	ER32	50	100	46	44	4,01
1729881	**BT50BER32150M**	ER32	50	150	46	54	4,64
1556433	**BT50BER40080M**	ER40	63	80	52	48	3,79
6694889	**BT50BER40100M**	ER40	63	100	52	52	4,26
1187371	**BT50BER40150M**	ER40	63	150	52	48	5,32
3847517	**BT50BER40200M**	ER40	63	200	52	48	6,33

72	56	4	76

ER™ Collet Chucks

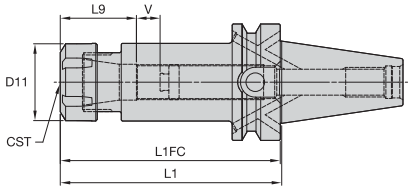
ER • BTKV40 FORM B/AD



ERICKSON

order number	catalogue number	CST	D11	L1	L1FC	L9	V	kg
3857088	BTKV40BER16060M	ER16	32	60	59,0	32	32	1,05
6694890	BTKV40BER16100M	ER16	32	100	99,0	32	38	1,22
3857089	BTKV40BER16120M	ER16	32	120	119,0	32	48	1,31
3857090	BTKV40BER20060M	ER20	35	60	59,0	36	27	1,04
6694891	BTKV40BER20100M	ER20	35	100	99,0	36	44	1,22
3857091	BTKV40BER20120M	ER20	35	120	119,0	36	64	1,43
3857092	BTKV40BER25070M	ER25	42	70	69,0	40	22	1,16
6694892	BTKV40BER25100M	ER25	42	100	99,0	40	40	1,31
3857123	BTKV40BER25120M	ER25	42	120	119,0	40	60	1,61
3857124	BTKV40BER32070M	ER32	50	70	69,0	46	12	1,22
6694893	BTKV40BER32100M	ER32	50	100	99,0	46	44	1,56
3857125	BTKV40BER32120M	ER32	50	120	119,0	46	54	1,85
3857126	BTKV40BER40080M	ER40	63	80	79,0	52	9	1,39
6694894	BTKV40BER40100M	ER40	63	100	99,0	52	38	1,84
3857127	BTKV40BER40120M	ER40	63	120	119,0	52	41	2,27

ER • BTKV50 FORM B/AD



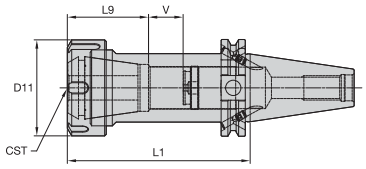
ERICKSON

order number	catalogue number	CST	D11	L1	L1FC	L9	V	kg
6694895	BTKV50BER16070M	ER16	32	70	68,5	32	38	3,70
3857129	BTKV50BER16150M	ER16	32	150	148,5	32	48	3,99
6694896	BTKV50BER20100M	ER20	35	100	98,5	36	44	3,83
3857131	BTKV50BER20150M	ER20	35	150	148,5	36	64	4,13
3857132	BTKV50BER25070M	ER25	42	70	68,5	40	40	3,69
6694897	BTKV50BER25100M	ER25	42	100	98,5	40	40	3,95
3857133	BTKV50BER25150M	ER25	42	150	148,5	40	60	4,38
3857134	BTKV50BER32070M	ER32	50	70	68,5	46	38	3,68
6694898	BTKV50BER32100M	ER32	50	100	98,5	46	44	4,05
3857135	BTKV50BER32150M	ER32	50	150	148,5	46	54	4,67
3857136	BTKV50BER40080M	ER40	63	80	78,5	52	38	3,84
6694899	BTKV50BER40100M	ER40	63	100	98,5	52	48	4,26

72	56	4	76

ER™ Collet Chucks

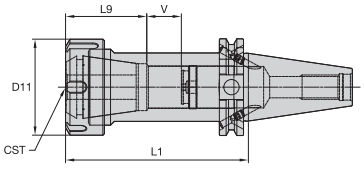
ER • DV40 FORM B/AD



ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
1770957	DV40BER16070M	ER16	28	70	32	48	0,96
6694901	DV40BER16100M	ER16	32	100	32	38	1,08
1770958	DV40BER16120M	ER16	32	120	32	48	1,16
6694905	DV40BER16160M	ER16	32	160	32	38	1,54
6694900	DV40BER20070M	ER20	35	70	35	27	1,01
6694902	DV40BER20100M	ER20	35	100	36	44	1,18
6694906	DV40BER20160M	ER20	35	160	36	44	1,54
1263807	DV40BER25065M	ER25	42	65	40	35	1,04
6694903	DV40BER25100M	ER25	42	100	40	52	1,34
1263808	DV40BER25120M	ER25	42	120	40	60	1,51
6694907	DV40BER25160M	ER25	42	160	40	72	1,91
1263809	DV40BER32070M	ER32	50	70	46	33	1,08
6694904	DV40BER32100M	ER32	50	100	46	54	1,37
1263810	DV40BER32120M	ER32	50	120	46	54	1,55
6694908	DV40BER32160M	ER32	50	160	46	54	2,04
1263811	DV40BER40080M	ER40	63	80	52	34	1,22
1263812	DV40BER40120M	ER40	63	120	52	48	1,57

ER • DV50 FORM B/AD



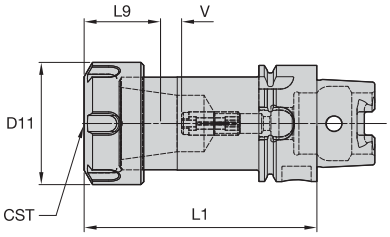
ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
6694909	DV50BER16070M	ER16	32	70	32	38	2,76
1748235	DV50BER16100M	ER16	28	100	32	48	2,81
1972537	DV50BER16150M	ER16	32	150	32	48	3,17
6694910	DV50BER20070M	ER20	35	70	36	44	2,79
6694911	DV50BER20100M	ER20	35	100	36	44	2,95
6694915	DV50BER20150M	ER20	35	150	36	44	3,25
1264126	DV50BER25070M	ER25	42	70	40	50	2,87
6694912	DV50BER25100M	ER25	42	100	40	50	3,12
1264127	DV50BER25150M	ER25	42	150	40	60	3,53
1264128	DV50BER32070M	ER32	50	70	46	54	2,91
6694913	DV50BER32100M	ER32	50	100	46	54	3,29
1264129	DV50BER32150M	ER32	50	150	46	54	3,89
1264130	DV50BER40080M	ER40	63	80	52	48	3,25
6694914	DV50BER40100M	ER40	63	100	52	40	3,67
1264132	DV50BER40150M	ER40	63	150	52	48	4,66

72	56	4	76

ER™ Collet Chucks

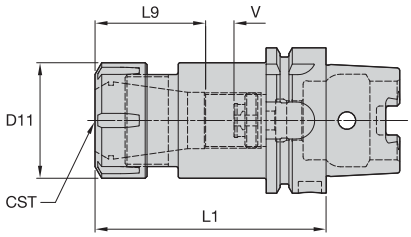
ER • HSK40A FORM A



ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
2260343	HSK40AER16080M	ER16	32	80	27	5	0,42
1833498	HSK40AER25080M	ER25	42	80	31	5	0,50
2260344	HSK40AER32090M	ER32	50	90	46	5	0,61

ER • HSK50A FORM A



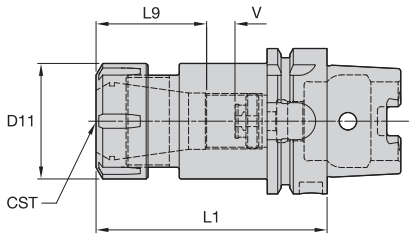
ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
1307789	HSK50AER16100M	ER16	32	100	32	27	0,66
1307790	HSK50AER16160M	ER16	32	160	32	51	1,07
1307791	HSK50AER20100M	ER20	35	100	36	21	0,76
1307792	HSK50AER25100M	ER25	42	100	40	16	0,95
1134534	HSK50AER32100M	ER32	50	100	46	12	0,91

72	56	4	76

ER™ Collet Chucks

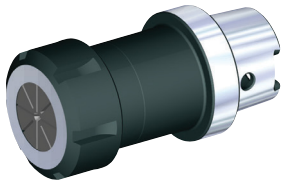
ER • HSK63A FORM A

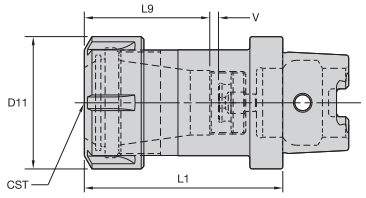


ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
6694027	HSK63AER16080M	ER16	32	80	32	8	0,84
1086425	HSK63AER16100M	ER16	32	100	32	26	0,90
1086426	HSK63AER16160M	ER16	32	160	32	50	1,35
6694028	HSK63AER20080M	ER20	35	80	36	3	0,89
1086427	HSK63AER20100M	ER20	35	100	36	22	1,05
6694041	HSK63AER20160M	ER20	35	160	36	44	1,40
6694029	HSK63AER25080M	ER25	42	80	40	–	1,00
1086855	HSK63AER25100M	ER25	42	100	40	18	1,18
6694042	HSK63AER25160M	ER25	42	160	40	50	1,74
6694030	HSK63AER32080M	ER32	50	80	45	–	1,11
1086566	HSK63AER32100M	ER32	50	100	45	13	1,38
6694043	HSK63AER32160M	ER32	50	160	45	55	2,13
1086856	HSK63AER40120M	ER40	63	120	54	24	1,80
6694044	HSK63AER40160M	ER40	63	160	52	48	2,30

ER • HSK63C FORM C





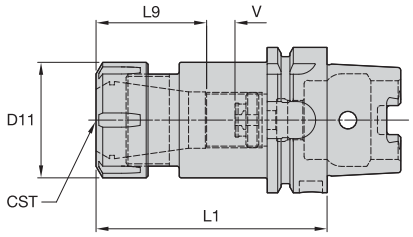
ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
1253908	HSK63CER25070M	ER25	42	70	40	5	0,79
1253910	HSK63CER32075M	ER32	50	75	46	4	0,98
1253911	HSK63CER40080M	ER40	63	80	52	4	1,15

72	56	4	76

ER™ Collet Chucks

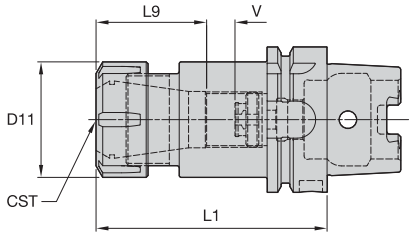
ER • HSK80A FORM A



ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
1727216	HSK80AER16100M	ER16	32	100	32	24	1,38
1778237	HSK80AER16160M	ER16	32	160	32	32	1,79
1751709	HSK80AER25100M	ER25	42	100	40	12	1,67
1727217	HSK80AER32100M	ER32	50	100	46	6	1,88
1727218	HSK80AER40120M	ER40	63	120	52	16	2,67

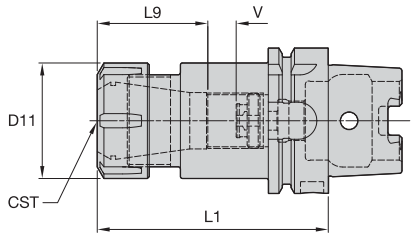
ER • HSK100A FORM A



ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
1086560	HSK100AER16100M	ER16	32	100	32	27	2,28
1086561	HSK100AER16160M	ER16	32	160	32	50	2,85
1086562	HSK100AER20100M	ER20	35	100	36	12	2,35
1086563	HSK100AER25100M	ER25	42	100	40	10	2,51
6694045	HSK100AER25160M	ER25	42	160	40	44	2,71
1086584	HSK100AER32100M	ER32	50	100	45	11	2,70
6694046	HSK100AER32160M	ER32	50	160	45	45	3,46
1086585	HSK100AER40120M	ER40	63	120	52	20	3,52
6694047	HSK100AER40160M	ER40	63	160	52	48	4,29

ER • HSK125A FORM A



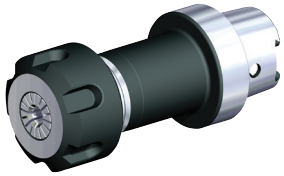
ERICKSON

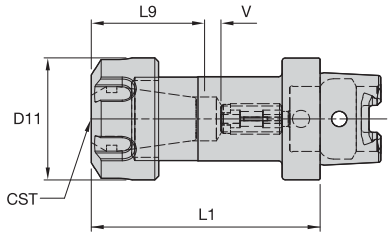
order number	catalogue number	CST	D11	L1	L9	V	kg
5967354	HSK125AER40120M	ER40	63	120	52	17	4,78

72	56	4	76

ER™ Collet Chucks

ER • HSK32C FORM C

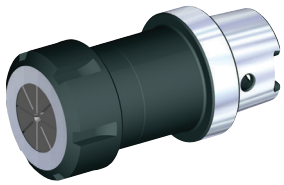


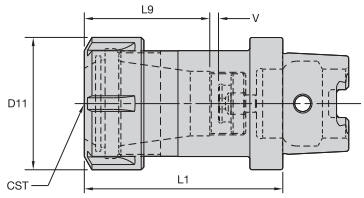


ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
1139068	HSK32CER16060M	ER16	32	60	32	2	0,22

ER • HSK40C FORM C

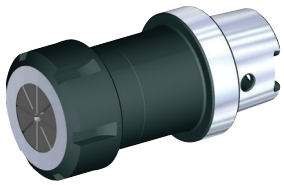


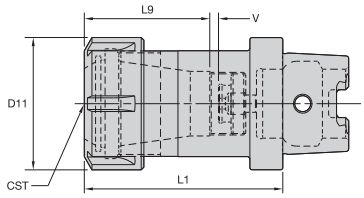


ERICKSON

order number	catalogue number	CST	D11	L1	L9	V	kg
1253864	HSK40CER16060M	ER16	32	60	32	5	0,30
1253866	HSK40CER25070M	ER25	42	70	40	5	0,41
1125645	HSK40CER32075M	ER32	50	80	45	5	0,58

ER • HSK50C FORM C





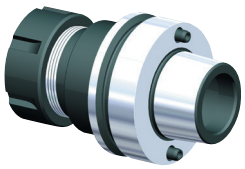
ERICKSON

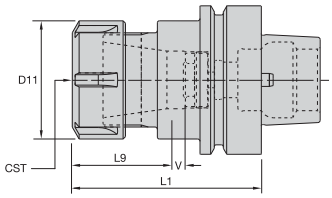
order number	catalogue number	CST	D11	L1	L9	V	kg
1139074	HSK50CER16060M	ER16	32	60	28	5	0,40
1126932	HSK50CER32075M	ER32	50	75	45	5	0,67

72	56	4	76

ER™ Collet Chucks

ER • HSK80F FORM F (PIN)





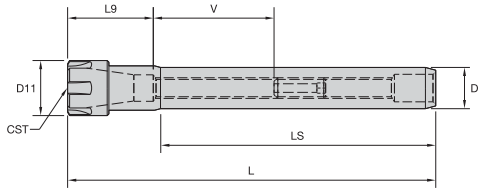
ERICKSON™

order number	catalogue number	CST	D11	L1	L9	V	kg
2952216	HSK80FPER32085M	ER32	50	85	43	4	1,59

72	56	4	76

ER™ Collet Chucks

ER • STRAIGHT SHANK



ERICKSON

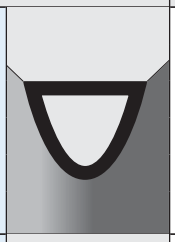
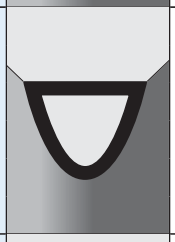
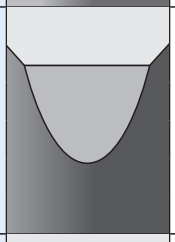
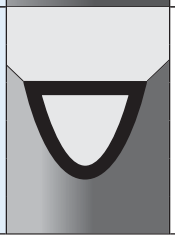
order number	catalogue number	CST	D	D11	L	LS	L9	V	kg
1288261	**SS120ER11107M**	ER11	12	16	107	80	24	56	0,08
1288285	**SS160ER11132M**	ER11	16	16	132	100	24	56	0,16
1125015	**SS200ER16182M**	ER16	20	22	182	156	32	68	0,63
1288321	**SS250ER20190M**	ER20	25	28	190	150	36	64	0,55
1288303	**SS200ER25146M**	ER25	20	42	146	100	42	58	0,38
1288304	**SS200ER32154M**	ER32	20	50	154	100	49	51	0,51

72	56	4	76

Grade Descriptions

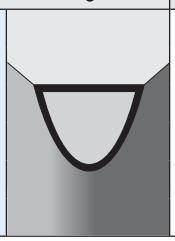
SOLID END MILLING

wear resistance ⟷ toughness

Coating	Grade Description		05	10	15	20	25	30	35	40	45
KCPM15 	Coated carbide grade with thick PVD coating and optimised chemistry and process for increased wear resistance. Outstanding protection in milling stainless steel to mitigate crater, DOCN (depth-of-cut notching), and flank wear. Excellent performance up to 52 HRC.	P									
		M									
		K									
KCSM15 	Coated carbide grade with thick PVD coating and optimised chemistry and process for increased wear resistance. Outstanding protection in milling stainless steel to mitigate crater, DOCN (depth-of-cut notching), and flank wear. Excellent performance up to 52 HRC.										
		M									
		S									
		H									
K600 	Carbide grade made from high-quality, micrograin materials for cutting all types of workpiece materials. Very high toughness ensures a controlled wear rate. The micrograin structure enables extremely sharp cutting edges.										
		N									
KC643M 	Coated fine-grain grade with PVD multilayer (AlTiN). KC643M™ is a very thin and hard PVD coating particularly suited for cutting steel, cast iron, stainless steel (wet), and titanium (wet). This grade can be used for materials with hardness up to 52 HRC.	P									
		M									
		K									
		S									

HOLEMAKING

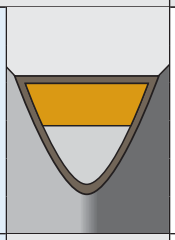
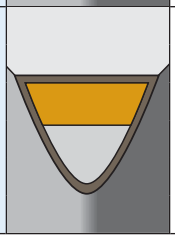
wear resistance ⟷ toughness

Coating	Grade Description		05	10	15	20	25	30	35	40	45
KCU40 	Multilayered PVD TiN-TiAlN-coated fine-grain carbide, offering highest wear resistance in steel, stainless steel, cast iron, and high-temp alloys.	P									
		M									
		K									

Grade Descriptions

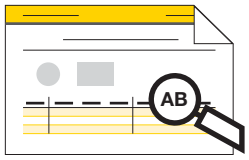
TURNING

wear resistance ⟷ toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45
KBH10B		A low content PcBN grade with a patented binder structure and a PVD TiN/TiAlN/TiN coating for added wear resistance and enhanced wear identification. Designed for the precision machining of hardened steels (>45 HRC). It can be effectively applied on bearing steels, hot and cold work tool steels, high speed steels, die steels, case hardened steels, carburized and nitrided irons, and some hard coatings. Available in a multi-tip format with a wide range of edge preps, insert styles, and wiper geometries.	H									
KBH20B		A low content PcBN grade with a PVD TiN/TiAlN/TiN coating for added wear resistance and enhanced wear identification. KBH20B™ is the ideal PcBN hard turning grade for continuous to lightly interrupted cutting applications. The structure, as well as the different edge preparations, enable repeatable workpiece tolerances, excellent surface finishes, and surface integrity. Typical applications are case-hardened steel components such as gears, shafts, and other drive-train components.	H									

General Information

KEY TO PRODUCT TABLE COLUMN HEADINGS



You may notice a slight change in the appearance of our product tables and specification charts. In this catalogue, Kennametal introduces a set of short-name codes to improve the readability of tables and drawings. These codes replace full-text descriptions. The full list of codes and their definitions can be found below.

SHORT-NAME CODE	FULL TEXT DESCRIPTION
Ap1 max	Maximum Cutting Depth
B	Shank Width
BCH	Corner Chamfer Width
CD	Cutting Depth
CSMS	Connection Style Machine Side
CST	Collet Series
D	Insert: Insert IC Size
D	Milling: Mounting Diameter
D	Toolholder: Shank/Bore Diameter
D1	Milling: Cutter Diameter
D1	Holemaking: Drill Diameter
D1	Toolholder: Clamping Diameter
D1 max	Maximum Drill Diameter
D11	Lock Nut Diameter
G3	Connection Thread Size
H	Shank Height
H1	Cutting Height
kg	Weight Kilograms
L	Overall Length
L1	Gage Length
L1FC	Gage Length Face Contact
L3	Maximum Depth
L4 max	Maximum Drill Depth
L9	Clamping Length
L10	Insert Cutting Edge Length
lbs	Weight Pounds
LEFF	Tip Length Tangent
LF	Functional Length
LI	Insert Length
LS	Shank Length
Rε	Corner Radius
RR	Corner Radius Right Hand
S	Insert Thickness
Torque (ft. lbs.)	Torque Foot Pounds
Torque (Nm)	Torque Newton Meters
V	Adjustment Range
W	Cutting Edge Width or Slot Width
W	Turning: Groove Width
WF	Distance Across Flats
W1	Blade Width
W tol ±	Cutting Width (+/-) Tolerance

Material Cross Reference • DIN

P Steel
M Stainless Steel
K Cast Iron

N Non-Ferrous
S High-Temp Alloys

H Hardened Materials
C CFRP Materials

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	–	–
P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	C15, Ck22, ST37-2, S235JR, 9SMnPb28, GS38
P2	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	ST52, S355JR, C35, GS60, Cf53
P3	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	16MnCr5, Ck45, 21CrMoV5-7, 38SMn28
P4	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
P5	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	X102CrMo17, G-X120Cr29
M1	Austenitic Stainless Steel	–	<600	130–200	–	X5CrNi 18 10, X2CrNiMo 17 13 2, G-X25CrNiSi18 9, X15CrNiSi 20 12
M2	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	X2CrNiMo 13 4, X5NiCr 32 21, X5CrNiNb 18 10, G-X15CrNi 25-20
M3	Duplex Stainless Steel	–	<800	135–275	<30	X8CrNiMo27 5, X2CrNiMoN22 5 3, X20CrNiSi25 4, G-X40CrNiSi27 4
K1	Grey Cast Iron	–	125–500	120–290	<32	GG15, GG25, GG30, GG40, GTW40
K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	GGG40, GTS35
K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	GGG60, GTW55, GTS65
N1	Wrought Aluminium	–	–	–	–	AlMg1, Al99.5, AlCuMg1, AlCuBiPb, AlMgSi1, ALMgSiPb
N2	Low-Silicon Aluminium Alloys and Magnesium Alloys	Si <12,2%	–	–	–	GAlSiCu4, GDAlSi10Mg
N3	High-Silicon Aluminium Alloys and Magnesium Alloys	Si >12,2%	–	–	–	G-ALSi12, G-AlSi17Cu4, G-AlSi21CuNiMg
N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	CuZn40, Ms60, G-CuSn5ZnPb, CuZn37, CuSi3Mn
N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fibreglass	–	–	–	–	Lexan®, Hostalen™, Polystyrol, Makrolon
N6	Carbon, Graphite Composites, CFRP	–	–	–	–	CFK, GFK
N7	Metal Matrix Composites (MMC)	–	–	–	–	–
S1	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	X1NiCrMoCu32 28 7, X12NiCrSi36 16, X5NiCrAlTi31 20, X40CoCrNi20 20
S2	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 188, Stellite® 6,21,31
S3	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	INCONEL® 690, INCONEL 625, Hastelloy®, NIMONIC® 75
S4	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Ti1, TiAl5Sn2, TiAl6V4, TiAl4Mo4Sn2
H1	Hardened Materials	–	–	–	44–48	GX260NiCr42, GX330NiCr42, GX300CrNiSi952, GX300CrMo153, Hardox® 400
H2	Hardened Materials	–	–	–	48–55	–
H3	Hardened Materials	–	–	–	56–60	–
H4	Hardened Materials	–	–	–	>60	–
C1	CFRP, CFRP/CFRP	–	–	–	–	–
C2	CFRP/Non-Ferrous	–	–	–	–	–
C3	CFRP/High Temp	–	–	–	–	–
C4	CFRP/Stainless Steel	–	–	–	–	–
C5	CFRP/Non-Ferrous/High-Temp	–	–	–	–	–

kennametal.com

NOTES

kennametal.com

NOTES

kennametal.com

NOVO™

Digitally access and leverage product data and knowledge to connect systems and processes throughout the entire manufacturing lifecycle.

VISIT **KENNAMETAL.COM/NOVO** AND DOWNLOAD TODAY.

KENNAMETAL®

kennametal.com

METALCUTTING SAFETY

IMPORTANT SAFETY INSTRUCTIONS

Read before using the tools in this catalogue!

Projectile and Fragmentation Hazards:

Modern metalcutting operations involve high spindle and cutter speeds and high temperatures and cutting forces. Hot metal chips may fly off the workpiece during metalcutting. Although cutting tools are designed and manufactured to withstand high cutting forces and temperatures, they can sometimes fragment, particularly if they are subjected to over-stress, severe impact, or other abuse.

To avoid injury:

- Always wear appropriate personal protective equipment, including safety goggles, when operating metalcutting machines or working nearby.
- Always make sure all machine guards are in place.

Breathing and Skin Contact Hazards:

Grinding carbide or other advanced cutting tool materials produces dust or mist containing metallic particles. Breathing this dust or mist — especially over an extended period — can cause temporary or permanent lung disease or make existing medical conditions worse. Contact with this dust or mist can irritate eyes, skin, and mucous membranes and may make existing skin conditions worse.

To avoid injury:

- Always wear breathing protection and safety goggles when grinding.
- Provide ventilation control and collect and properly dispose of dust, mist, or sludge from grinding.
- Avoid skin contact with dust or mist.

For more information, read the applicable Material Safety Data Sheet provided by Kennametal and consult General Industry Safety and Health Regulations, Part 1910, Title 29 of the Code of Federal Regulations.

These safety instructions are general guidelines. Many variables affect machining operations. It is impossible to cover every specific situation. The technical information included in this catalog and recommendations on machining practices may not apply to your particular operation. For more information, consult the Kennametal Metalcutting Safety booklet, available free from Kennametal at 724 539 5747 or fax 724 539 5439. For specific product safety and environmental questions, contact our Corporate Environmental Health and Safety Office at 724 539 5066 or fax 724 539 5372.

KENNAMETAL®

kennametal.com

INNOVATIONS

WORLD HEADQUARTERS
Kennametal Inc.
600 Grant Street I Suite 5100
Pittsburgh, PA 15219 USA
Tel: 1 800 446 7738
ftmill.service@kennametal.com

EUROPEAN HEADQUARTERS
Kennametal Europe GmbH
Rheingoldstrasse 50
CH 8212 Neuhausen am Rheinfall
Switzerland
Tel: +41 52 6750 100
neuhausen.info@kennametal.com

ASIA-PACIFIC HEADQUARTERS
Kennametal Singapore Pte. Ltd.
3A International Business Park
Unit #01-02/03/05, ICON@IBP
Singapore 609935
Tel: +65 6265 9222
k-sg.sales@kennametal.com

INDIA HEADQUARTERS
Kennametal India Limited
CIN: L27109KA1964PLC001546
8/9th Mile, Tumkur Road
Bangalore - 560 073
Tel: +91 080 22198444 or +91 080 43281444
bangalore.information@kennametal.com

KENNAMETAL®

kennametal.com