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INNOVATIONS
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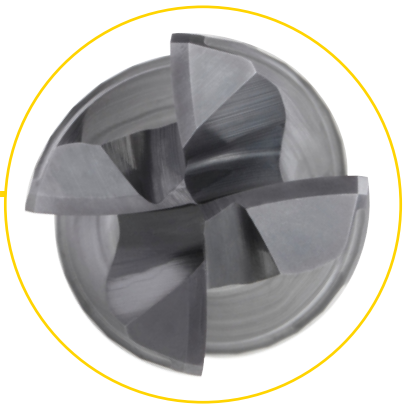
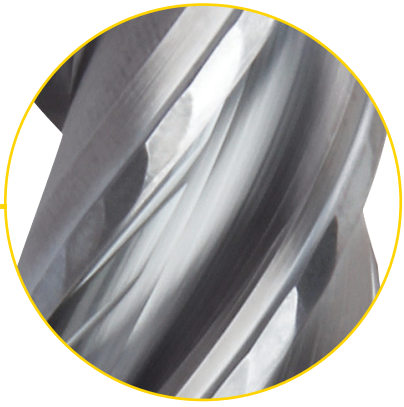
HARVI™ I TE

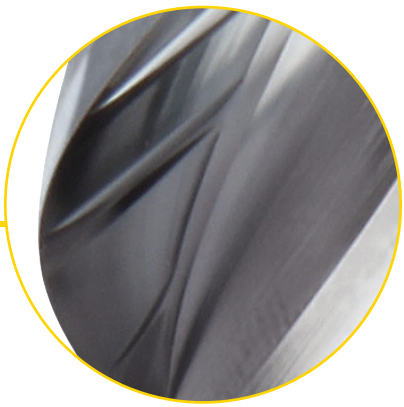
Innovative proprietary design features driving maximum productivity.



Twisted end face.



Faceted eccentric relief.



Chip gashes within flutes.

INNOVATIONS

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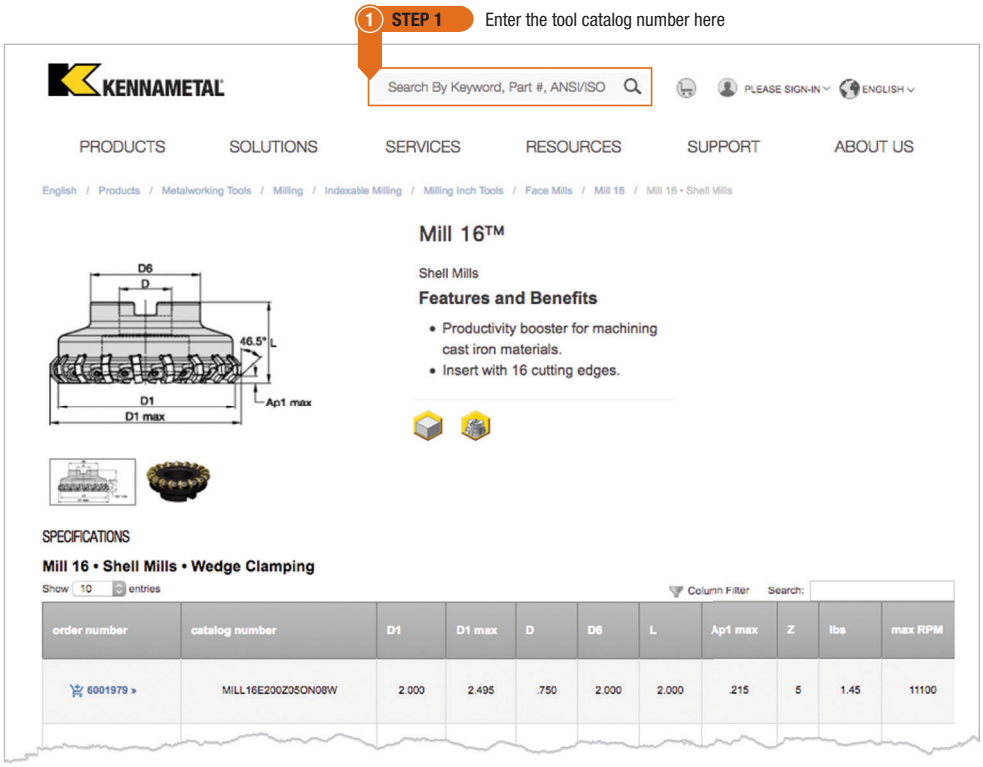
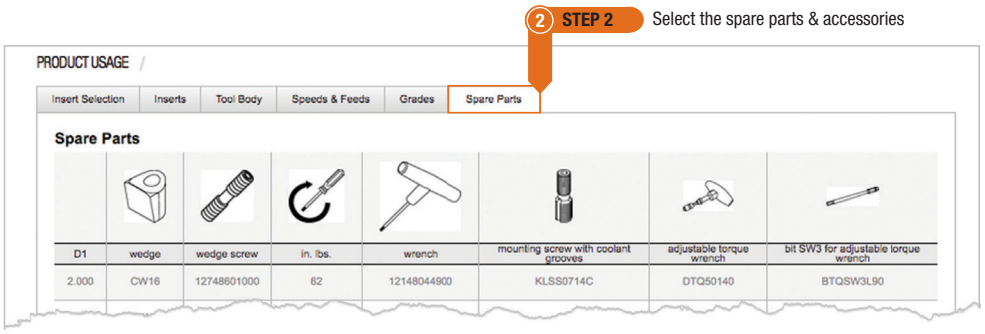
Spare Parts & Accessories Information

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 catalog number of the corresponding tool, and it will display.





NOVO™

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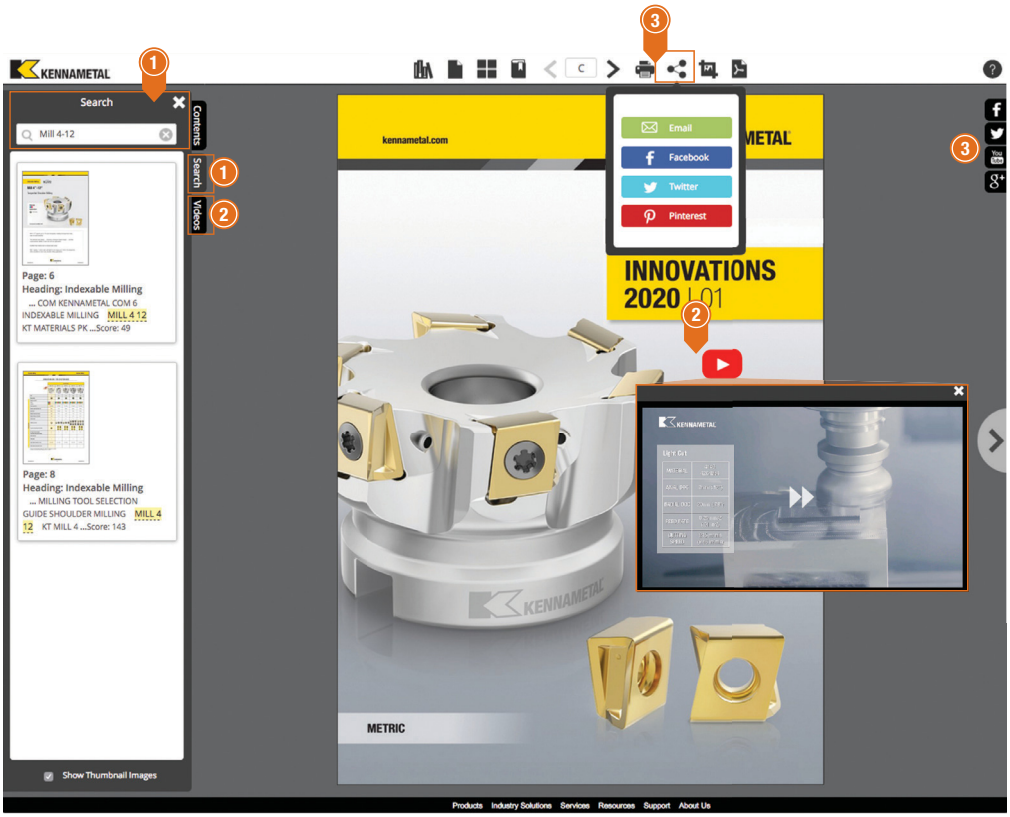

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POWERED BY NOVO

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.

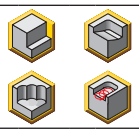
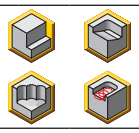
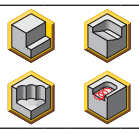
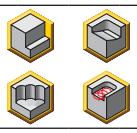
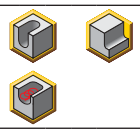
Applicable for a variety of operations, including dynamic milling, and extreme ramping operations.

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

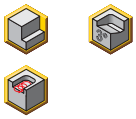
	HIGH-PERFORMANCE (HP) ROUGHING & FINISHING						
	HARVI I	HARVI I	HARVI I	HARVI I	HARVI I	HARVI I Ball Nose	HARVI I TE
							
Series	**HPHV**	**UADE**	**UBDE**	**HPRSHV**	**HPHVT**	**HPHVBN**	**H1TE4SE-4CH-4RA**
Page	P16–P20*	P21*	P21*	P22*	P24*	P23*	13
Tool type							
Rougher	●	●	●	●	●	●	●
Finisher	○	○	○	○	○	○	○
Chamfering							
Main operation							
Workpiece material							
Primary	P M K	P M K	M S	P M K	P S	P M	P M K S
Secondary	S H	S H	P K H		H	K S H	H
Corner style							
Corner radius [Rε]	.015–.250"	.015–.120"	.015–.120"	—	—	—	.010–.250"
Corner chamfer width [BCH]	.015–.020"	—	—	.020"	.020"	—	.015–.020"
Cutter diameter [D1]	1/8–1-1/4"	1/4–1"	1/2–1"	1/2–1"	1/2–1"	1/8–1"	1/8–1-1/4"
Length of cut	1.8–2 x D1	1.25 x D	1.25 x D	1–1.2 x D1	1.25–1.8 x D1	1.5–4 x D1	1.2–4 x D
Maximum cutting depth [Ap1 max]	1/4–2-1/2"	3/8–1-1/8"	5/8–1-1/8"	5/8–1-1/8"	5/8 –1-1/2"	1/2–1-1/2"	1/4–4"
Flute helix angle	38°	38°	38°	38°	38°	38°	36°/39°
Number of flutes [ZU]	4	4	4	4	4	4	4
Center cutting	✔	✔	✔	✔	✔	✔	✔
Additional operations							

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

● Primary
○ Secondary

Solid Carbide End Mills

HARVI™ • TOOL SELECTION GUIDE

	HP ROUGHING & FINISHING *(CONTINUED)*			HP FINISHING		HP ROUGHING
	HARVI II	HARVI II	HARVI II	HARVI II Long	HARVI II Long	HARVI II Trochoidal
						
Series	**UCDE**	**UCDE with Neck**	**UDDE**	**UGDE 3 x D**	**UGDE 5 x D**	**TCDE**
Page	P30–P31*	P32*	P33*	P38*	P39*	75**
Tool type						
Rougher	○	○	○			●
Finisher	●	●	●	●	●	
Chamfering						
Main operation						
Workpiece material						
Primary	P M K	P M S K	P S	P M S	P M S	P M S
Secondary	S H	H		K H	K H	K H
Corner style						
Corner radius [Rε]	.015–.120"	.015–.030"	.015–.120"	.015–.120"	.015–.120"	.015–.060"
Corner chamfer width [BCH]	—	—	—	—	—	—
Cutter diameter [D1]	3/16–1"	1/4–1"	1/2–1"	1/4–1"	1/4–1"	1/4–1"
Length of cut	1.75–3.3 x D1	1.75–2 x D1	1.75–2.5 x D1	3 x D	5 x D	3 x D
Maximum cutting depth [Ap1 max]	5/8–1-3/4"	1/2–1-3/4"	1-1/4–1-3/4"	3/4–3"	1–1/4–5"	7/8–3"
Flute helix angle	38°	38°	38°	43°	43°	40°
Number of flutes [ZU]	5	5	5	5	5	5
Center cutting	—	—	—	—	—	—
Additional operations						

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

● Primary
○ Secondary

Solid Carbide End Mills

HARVI™ • TOOL SELECTION GUIDE

	HP FINISHING					
	HARVI III	HARVI III	HARVI III Ball Nose	HARVI III Ball Nose	HARVI III Aerospace Expansion	HARVI III Aerospace Expansion Ball Nose
						
Series	UJDE	UJDE with Neck	UJBE	UJBE with Neck	UJDE	UJBE
Page	P44–P45*	P46*	P52*	P53*	P60–P65*	P66–P67*
Tool type						
Rougher	○	○	○	○	○	○
Finisher	●	●	●	●	●	●
Chamfering						
Main operation						
Workpiece material						
Primary	M S	M S	M S	M S	M S	M S
Secondary	P H	P H	P H	P H	P H	P H
Corner style						
Corner radius [Rε]	.015–.250"	.015–.120"	—	—	.030–.625"	—
Corner chamfer width [BCH]	—	—	—	—	—	—
Cutter diameter [D1]	3/8–1-1/4"	3/8–1"	3/8–1"	3/8–1"	1/2–1-1/2"	1/2–1-1/2"
Length of cut	1.75–2 x D	1.75–2.25 x D	1.5–2 x D	1.5 x D1	1.3–5.3 x D	1.3–5.3 x D
Maximum cutting depth [Ap1 max]	1–2-1/4"	7/8–1-3/4"	7/8–1-1/2"	1/2–1-1/4"	1–6"	1–6"
Flute helix angle	38°	38°	38°	38°	38°	38°
Number of flutes [ZU]	6	6	6	6	6	6
Center cutting	✔	✔	✔	✔	✔	✔
Additional operations						

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

● Primary
○ Secondary

Solid Carbide End Mills

HARVI™ • TOOL SELECTION GUIDE

	HP FINISHING	HP ROUGHING
	HARVI III Taper Ball Nose	HARVI III Trochoidal
		
Series	UJBE	TJDE
Page	P74*	73**
Tool type		
Rougher	○	●
Finisher	●	○
Chamfering		
Main operation		
Workpiece material		
Primary	M S	M S
Secondary	P H	P K H
Corner style		
Corner radius [Rε]	—	.030–.060"
Corner chamfer width [BCH]	—	—
Cutter diameter [D1]	1/8–7/16"	3/8–1"
Length of cut	5-6 x D	3 x D
Maximum cutting depth [Ap1 max]	1–2"	1-1/8–3"
Flute helix angle	38°	38°
Number of flutes [ZU]	6	6
Center cutting	✔	✔
Additional operations		

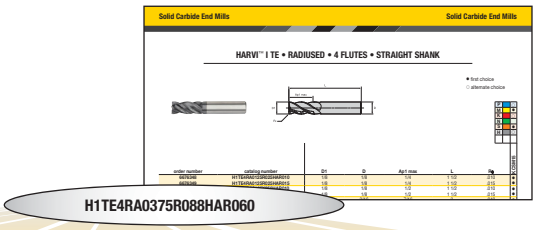
* See page in the Kennametal Master Catalog 2018 • Volume Two • Rotating Tools, A-16-05217.
**See page in the Kennametal Innovations 2019 • 02, A-18-05789.

● Primary
○ Secondary

Solid Carbide End Mills

HARVI™ I TE • CATALOG NUMBERING SYSTEM

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



H1TE	4	RA	0375	R	088	HA	R060		
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

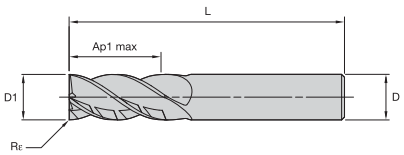
Radius Metric
R020 = 0,2mm
R025 = 0,25mm
R030 = 0,3mm
R040 = 0,4mm
R050 = 0,5mm
R075 = 0,75mm
R100 = 1,0mm
R125 = 1,25mm
R150 = 1,5mm
R200 = 2,0mm
R250 = 2,5mm
R300 = 3,0mm
R400 = 4,0mm
R500 = 5,0mm
R600 = 6,0mm

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 • RADIUSED • 4 FLUTES • STRAIGHT SHANK

● first choice
○ alternate choice



P		○
M		●
K		○
N		
S		●
H		○

order number	catalog number	D1	D	Ap1 max	L	Rε	KCSM15
6676348	H1TE4RA0125R025HAR010	1/8	1/8	1/4	1 1/2	.010	●
6676349	H1TE4RA0125R025HAR015	1/8	1/8	1/4	1 1/2	.015	●
6676350	H1TE4RA0125X050HAR010	1/8	1/8	1/2	1 1/2	.010	●
6676351	H1TE4RA0125X050HAR015	1/8	1/8	1/2	1 1/2	.015	●
6676352	H1TE4RA0156L044HAR010	5/32	3/16	7/16	2	.010	●
6676353	H1TE4RA0188R038HAR010	3/16	3/16	3/8	2	.010	●
6676354	H1TE4RA0188R038HAR030	3/16	3/16	3/8	2	.030	●
6676355	H1TE4RA0188L063HAR010	3/16	3/16	5/8	2 1/4	.010	●
6676356	H1TE4RA0188L063HAR030	3/16	3/16	5/8	2 1/4	.030	●
6676357	H1TE4RA0219R044HAR010	7/32	1/4	7/16	2	.010	●
6676358	H1TE4RA0250S038HAR015	1/4	1/4	3/8	2	.015	●
6676359	H1TE4RA0250S038HAR030	1/4	1/4	3/8	2	.030	●
6676360	H1TE4RA0250R050HAR015	1/4	1/4	1/2	2 1/2	.015	●
6676361	H1TE4RA0250R050HAR030	1/4	1/4	1/2	2 1/2	.030	●
6676362	H1TE4RA0250R050HAR060	1/4	1/4	1/2	2 1/2	.060	●
6676363	H1TE4RA0250R050HAR090	1/4	1/4	1/2	2 1/2	.090	●
6676370	H1TE4RA0250L075HAR015	1/4	1/4	3/4	2 1/2	.015	●
6676371	H1TE4RA0250L075HAR030	1/4	1/4	3/4	2 1/2	.030	●
6676372	H1TE4RA0250L075HAR060	1/4	1/4	3/4	2 1/2	.060	●
6676373	H1TE4RA0250L075HAR090	1/4	1/4	3/4	2 1/2	.090	●
6676374	H1TE4RA0281R063HAR010	5/16	5/16	5/8	2 1/2	.010	●
6676375	H1TE4RA0313S050HAR015	5/16	5/16	1/2	2	.015	●
6676377	H1TE4RA0313S050HAR030	5/16	5/16	1/2	2	.030	●
6676378	H1TE4RA0313S050HAR060	5/16	5/16	1/2	2	.060	●
6676379	H1TE4RA0313R081HAR015	5/16	5/16	13/16	2 1/2	.015	●
6676380	H1TE4RA0313R081HAR030	5/16	5/16	13/16	2 1/2	.030	●
6676381	H1TE4RA0313R081HAR060	5/16	5/16	13/16	2 1/2	.060	●
6676382	H1TE4RA0375R088HAR015	3/8	3/8	7/8	2 1/2	.015	●
6676383	H1TE4RA0375R088HAR030	3/8	3/8	7/8	2 1/2	.030	●
6676384	H1TE4RA0375R088HAR060	3/8	3/8	7/8	2 1/2	.060	●
6676385	H1TE4RA0375R088HAR090	3/8	3/8	7/8	2 1/2	.090	●
6676386	H1TE4RA0375R100HAR015	3/8	3/8	1	3	.015	●
6676387	H1TE4RA0375R100HAR030	3/8	3/8	1	3	.030	●
6676388	H1TE4RA0375R100HAR060	3/8	3/8	1	3	.060	●
6676389	H1TE4RA0375R100HAR090	3/8	3/8	1	3	.090	●
6676390	H1TE4RA0375X150HAR015	3/8	3/8	1 1/2	4	.015	●
6676401	H1TE4RA0375X150HAR030	3/8	3/8	1 1/2	4	.030	●
6676402	H1TE4RA0375X150HAR060	3/8	3/8	1 1/2	4	.060	●
6676403	H1TE4RA0438R100HAR015	7/16	7/16	1	2 3/4	.015	●
6676404	H1TE4RA0438R100HAR030	7/16	7/16	1	2 3/4	.030	●
6676405	H1TE4RA0500S063HAR015	1/2	1/2	5/8	2 1/2	.015	●
6676406	H1TE4RA0500S063HAR030	1/2	1/2	5/8	2 1/2	.030	●
6676407	H1TE4RA0500S063HAR060	1/2	1/2	5/8	2 1/2	.060	●
6676408	H1TE4RA0500R100HAR015	1/2	1/2	1	3	.015	●
6676409	H1TE4RA0500R100HAR030	1/2	1/2	1	3	.030	●
6676410	H1TE4RA0500R100HAR060	1/2	1/2	1	3	.060	●
6676421	H1TE4RA0500R100HAR090	1/2	1/2	1	3	.090	●
6676422	H1TE4RA0500R100HAR120	1/2	1/2	1	3	.120	●
6676423	H1TE4RA0500R125HAR015	1/2	1/2	1 1/4	3 1/4	.015	●
6676424	H1TE4RA0500R125HAR030	1/2	1/2	1 1/4	3 1/4	.030	●
6676425	H1TE4RA0500R125HAR060	1/2	1/2	1 1/4	3 1/4	.060	●
6676426	H1TE4RA0500R125HAR090	1/2	1/2	1 1/4	3 1/4	.090	●
6676427	H1TE4RA0500R125HAR120	1/2	1/2	1 1/4	3 1/4	.120	●
6676428	H1TE4RA0500L150HAR030	1/2	1/2	1 1/2	4	.030	●
6676429	H1TE4RA0500L150HAR060	1/2	1/2	1 1/2	4	.060	●
6676430	H1TE4RA0500X200HAR030	1/2	1/2	2	4	.030	●
6676431	H1TE4RA0500X200HAR060	1/2	1/2	2	4	.060	●
6676432	H1TE4RA0625S075HAR030	5/8	5/8	3/4	3	.030	●
6676433	H1TE4RA0625S075HAR060	5/8	5/8	3/4	3	.060	●
6676434	H1TE4RA0625R125HAR015	5/8	5/8	1 1/4	3 1/2	.015	●

(continued)

88	90	12	4	96

Solid Carbide End Mills

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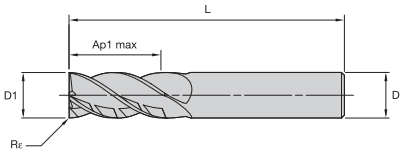
(continued)



● first choice
○ alternate choice

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order number	catalog number	D1	D	Ap1 max	L	Rε	KCSM15
6676435	H1TE4RA0625R125HAR030	5/8	5/8	1 1/4	3 1/2	.030	●
6676436	H1TE4RA0625R125HAR060	5/8	5/8	1 1/4	3 1/2	.060	●
6676437	H1TE4RA0625R125HAR090	5/8	5/8	1 1/4	3 1/2	.090	●
6676438	H1TE4RA0625R125HAR120	5/8	5/8	1 1/4	3 1/2	.120	●
6676439	H1TE4RA0625X225HAR030	5/8	5/8	2 1/4	5	.030	●
6676440	H1TE4RA0625X225HAR060	5/8	5/8	2 1/4	5	.060	●
6676451	H1TE4RA0625X225HAR090	5/8	5/8	2 1/4	5	.090	●
6676452	H1TE4RA0625X225HAR120	5/8	5/8	2 1/4	5	.120	●
6676453	H1TE4RA0750S088HAR030	3/4	3/4	7/8	3 1/2	.030	●
6676454	H1TE4RA0750S088HAR060	3/4	3/4	7/8	3 1/2	.060	●
6676455	H1TE4RA0750R150HAR015	3/4	3/4	1 1/2	4	.015	●
6676456	H1TE4RA0750R150HAR030	3/4	3/4	1 1/2	4	.030	●
6676457	H1TE4RA0750R150HAR060	3/4	3/4	1 1/2	4	.060	●
6676458	H1TE4RA0750R150HAR090	3/4	3/4	1 1/2	4	.090	●
6676459	H1TE4RA0750R150HAR120	3/4	3/4	1 1/2	4	.120	●
6676460	H1TE4RA0750L225HAR030	3/4	3/4	2 1/4	5	.030	●
6676461	H1TE4RA0750L225HAR060	3/4	3/4	2 1/4	5	.060	●
6676462	H1TE4RA0750L225HAR090	3/4	3/4	2 1/4	5	.090	●
6676463	H1TE4RA0750L225HAR120	3/4	3/4	2 1/4	5	.120	●
6676464	H1TE4RA1000S150HAR030	1	1	1 1/2	4 1/2	.030	●
6676465	H1TE4RA1000S150HAR060	1	1	1 1/2	4 1/2	.060	●
6676466	H1TE4RA1000S150HAR090	1	1	1 1/2	4 1/2	.090	●
6676467	H1TE4RA1000S150HAR120	1	1	1 1/2	4 1/2	.120	●
6676468	H1TE4RA1000S150HAR250	1	1	1 1/2	4 1/2	.250	●
6676469	H1TE4RA1000R225HAR030	1	1	2 1/4	5	.030	●
6676470	H1TE4RA1000R225HAR060	1	1	2 1/4	5	.060	●
6676471	H1TE4RA1000R225HAR090	1	1	2 1/4	5	.090	●
6676472	H1TE4RA1000R225HAR120	1	1	2 1/4	5	.120	●
6676473	H1TE4RA1000R225HAR250	1	1	2 1/4	5	.250	●
6676474	H1TE4RA1000L300HAR030	1	1	3	6	.030	●
6676475	H1TE4RA1000L300HAR060	1	1	3	6	.060	●
6676476	H1TE4RA1000X400HAR030	1	1	4	7	.030	●
6676477	H1TE4RA1000X400HAR060	1	1	4	7	.060	●
6676478	H1TE4RA1250R300HAR030	1 1/4	1 1/4	3	7	.030	●
6676479	H1TE4RA1250R300HAR060	1 1/4	1 1/4	3	7	.060	●
6676480	H1TE4RA1250R300HAR120	1 1/4	1 1/4	3	7	.120	●

88	90	12	4	96

Solid Carbide End Mills

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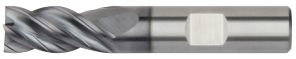

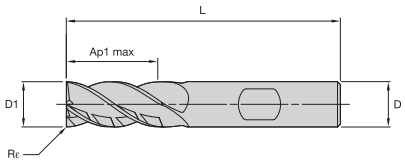

● first choice
○ alternate choice

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order number	catalog number	D1	D	Ap1 max	L	Rε	KCSM15
6676481	H1TE4RA0375R088HBR015	3/8	3/8	7/8	2 1/2	.015	●
6676482	H1TE4RA0375R088HBR030	3/8	3/8	7/8	2 1/2	.030	●
6676483	H1TE4RA0375R088HBR060	3/8	3/8	7/8	2 1/2	.060	●
6676484	H1TE4RA0375R088HBR090	3/8	3/8	7/8	2 1/2	.090	●
6676485	H1TE4RA0375R100HBR015	3/8	3/8	1	3	.015	●
6676486	H1TE4RA0375R100HBR030	3/8	3/8	1	3	.030	●
6676487	H1TE4RA0375R100HBR060	3/8	3/8	1	3	.060	●
6676488	H1TE4RA0375R100HBR090	3/8	3/8	1	3	.090	●
6676489	H1TE4RA0375X150HBR015	3/8	3/8	1 1/2	4	.015	●
6676490	H1TE4RA0375X150HBR030	3/8	3/8	1 1/2	4	.030	●
6676491	H1TE4RA0375X150HBR060	3/8	3/8	1 1/2	4	.060	●
6676492	H1TE4RA0438R100HBR015	7/8	7/16	1	2 3/4	.015	●
6676493	H1TE4RA0438R100HBR030	7/8	7/16	1	2 3/4	.030	●
6676494	H1TE4RA0500S063HBR015	1/2	1/2	5/8	2 1/2	.015	●
6676495	H1TE4RA0500S063HBR030	1/2	1/2	5/8	2 1/2	.030	●
6676496	H1TE4RA0500S063HBR060	1/2	1/2	5/8	2 1/2	.060	●
6676497	H1TE4RA0500R100HBR015	1/2	1/2	1	3	.015	●
6676498	H1TE4RA0500R100HBR030	1/2	1/2	1	3	.030	●
6676499	H1TE4RA0500R100HBR060	1/2	1/2	1	3	.060	●
6676500	H1TE4RA0500R100HBR090	1/2	1/2	1	3	.090	●
6676501	H1TE4RA0500R100HBR120	1/2	1/2	1	3	.120	●
6676502	H1TE4RA0500R125HBR015	1/2	1/2	1 1/4	3 1/4	.015	●
6676503	H1TE4RA0500R125HBR030	1/2	1/2	1 1/4	3 1/4	.030	●
6676504	H1TE4RA0500R125HBR060	1/2	1/2	1 1/4	3 1/4	.060	●
6676505	H1TE4RA0500R125HBR090	1/2	1/2	1 1/4	3 1/4	.090	●
6676506	H1TE4RA0500R125HBR120	1/2	1/2	1 1/4	3 1/4	.120	●
6676507	H1TE4RA0500L150HBR030	1/2	1/2	1 1/2	4	.030	●
6676508	H1TE4RA0500L150HBR060	1/2	1/2	1 1/2	4	.060	●
6676509	H1TE4RA0500X200HBR030	1/2	1/2	2	4	.030	●
6676510	H1TE4RA0500X200HBR060	1/2	1/2	2	4	.060	●
6676511	H1TE4RA0625S075HBR030	5/8	5/8	1/4	3	.030	●
6676512	H1TE4RA0625S075HBR060	5/8	5/8	1/4	3	.060	●
6676513	H1TE4RA0625R125HBR015	5/8	5/8	1 1/4	3 1/2	.015	●
6676514	H1TE4RA0625R125HBR030	5/8	5/8	1 1/4	3 1/2	.030	●
6676515	H1TE4RA0625R125HBR060	5/8	5/8	1 1/4	3 1/2	.060	●
6676516	H1TE4RA0625R125HBR090	5/8	5/8	1 1/4	3 1/2	.090	●
6676517	H1TE4RA0625R125HBR120	5/8	5/8	1 1/4	3 1/2	.120	●
6676518	H1TE4RA0625X225HBR030	5/8	5/8	2 1/4	5	.030	●
6676519	H1TE4RA0625X225HBR060	5/8	5/8	2 1/4	5	.060	●
6676520	H1TE4RA0625X225HBR090	5/8	5/8	2 1/4	5	.090	●
6676521	H1TE4RA0625X225HBR120	5/8	5/8	2 1/4	5	.120	●
6676522	H1TE4RA0750S088HBR030	3/4	3/4	7/8	3 1/2	.030	●
6676523	H1TE4RA0750S088HBR060	3/4	3/4	7/8	3 1/2	.060	●
6676524	H1TE4RA0750R150HBR015	3/4	3/4	1 1/2	4	.015	●
6676525	H1TE4RA0750R150HBR030	3/4	3/4	1 1/2	4	.030	●
6676526	H1TE4RA0750R150HBR060	3/4	3/4	1 1/2	4	.060	●
6676527	H1TE4RA0750R150HBR090	3/4	3/4	1 1/2	4	.090	●
6676528	H1TE4RA0750R150HBR120	3/4	3/4	1 1/2	4	.120	●
6676529	H1TE4RA0750L225HBR030	3/4	3/4	2 1/4	5	.030	●
6676530	H1TE4RA0750L225HBR060	3/4	3/4	2 1/4	5	.060	●
6676551	H1TE4RA0750L225HBR090	3/4	3/4	2 1/4	5	.090	●
6676552	H1TE4RA0750L225HBR120	3/4	3/4	2 1/4	5	.120	●
6676553	H1TE4RA1000S150HBR030	1	1	1 1/2	4 1/2	.030	●
6676554	H1TE4RA1000S150HBR060	1	1	1 1/2	4 1/2	.060	●
6676555	H1TE4RA1000S150HBR090	1	1	1 1/2	4 1/2	.090	●
6676556	H1TE4RA1000S150HBR120	1	1	1 1/2	4 1/2	.120	●
6676557	H1TE4RA1000S150HBR250	1	1	1 1/2	4 1/2	.250	●
6676558	H1TE4RA1000R225HBR030	1	1	2 1/4	5	.030	●
6676560	H1TE4RA1000R225HBR060	1	1	2 1/4	5	.060	●
6676561	H1TE4RA1000R225HBR090	1	1	2 1/4	5	.090	●
6676562	H1TE4RA1000R225HBR120	1	1	2 1/4	5	.120	●
6676563	H1TE4RA1000R225HBR250	1	1	2 1/4	5	.250	●
6676564	H1TE4RA1000L300HBR030	1	1	3	6	.030	●
6676565	H1TE4RA1000L300HBR060	1	1	3	6	.060	●
6676566	H1TE4RA1000X400HBR030	1	1	4	7	.030	●
6676567	H1TE4RA1000X400HBR060	1	1	4	7	.060	●
6676568	H1TE4RA1250R300HBR030	1 1/4	1 1/4	3	7	.030	●
6676569	H1TE4RA1250R300HBR060	1 1/4	1 1/4	3	7	.060	●
6676570	H1TE4RA1250R300HBR120	1 1/4	1 1/4	3	7	.120	●

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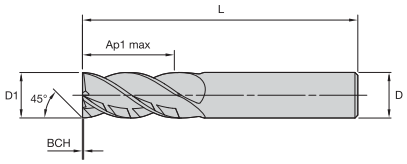

● first choice
○ alternate choice

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S		○
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order number	catalog number	D1	D	Ap1 max	L	BCH	KCPM15
6676987	H1TE4CH0125R025HA	1/8	1/8	1/4	1 1/2	.015	●
6676988	H1TE4CH0125X050HA	1/8	1/8	1/2	2	.015	●
6676989	H1TE4CH0156L044HA	5/32	3/16	7/16	2	.015	●
6676990	H1TE4CH0188S031HA	3/16	3/16	5/16	1 1/2	.015	●
6676991	H1TE4CH0188L063HA	3/16	3/16	5/8	2 1/4	.015	●
6676992	H1TE4CH0219R044HA	7/32	1/4	7/16	2	.015	●
6676993	H1TE4CH0250S038HA	1/4	1/4	3/8	2	.015	●
6676994	H1TE4CH0250L075HA	1/4	1/4	3/4	2 1/2	.015	●
6676995	H1TE4CH0281R063HA	9/32	5/16	5/8	2 1/2	.015	●
6676996	H1TE4CH0313S050HA	5/16	5/16	1/2	2	.015	●
6676997	H1TE4CH0313R075HA	5/16	5/16	3/4	2 1/2	.015	●
6676998	H1TE4CH0375S050HA	3/8	3/8	1/2	2	.020	●
6676999	H1TE4CH0375R088HA	3/8	3/8	7/8	2 1/2	.020	●
6677000	H1TE4CH0438R100HA	7/16	7/16	1	2 3/4	.020	●
6677001	H1TE4CH0500S063HA	1/2	1/2	5/8	2 1/2	.020	●
6677002	H1TE4CH0500R100HA	1/2	1/2	1	3	.020	●
6677003	H1TE4CH0500R125HA	1/2	1/2	1 1/4	3 1/4	.020	●
6677004	H1TE4CH0500L150HA	1/2	1/2	1 1/2	4	.020	●
6677005	H1TE4CH0625S075HA	5/8	5/8	3/4	3	.020	●
6677006	H1TE4CH0625R125HA	5/8	5/8	1 1/4	3 1/2	.020	●
6677007	H1TE4CH0625X225HA	5/8	5/8	2 1/4	5	.020	●
6677008	H1TE4CH0750S088HA	3/4	3/4	7/8	3 1/2	.020	●
6677009	H1TE4CH0750R150HA	3/4	3/4	1 1/2	4	.020	●
6677010	H1TE4CH0750L225HA	3/4	3/4	2 1/4	5	.020	●
6677031	H1TE4CH0750X300HA	3/4	3/4	3	6	.020	●
6677032	H1TE4CH1000S150HA	1	1	1 1/2	4 1/2	.020	●
6677033	H1TE4CH1000R225HA	1	1	2 1/4	5	.020	●
6677034	H1TE4CH1000L300HA	1	1	3	6	.020	●
6677035	H1TE4CH1000X400HA	1	1	4	7	.020	●
6677036	H1TE4CH1250R300HA	1 1/4	1 1/4	3	7	.020	●

88	90	12	4	96

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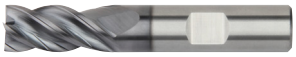

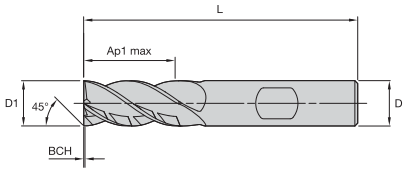

● first choice
○ alternate choice

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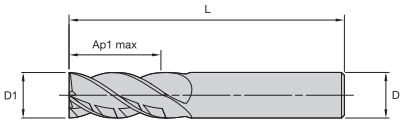
order number	catalog number	D1	D	Ap1 max	L	BCH	KCPM15
6677037	H1TE4CH0375S050HB	3/8	3/8	1/2	2	.020	●
6677038	H1TE4CH0375R088HB	3/8	3/8	7/8	2 1/2	.020	●
6677039	H1TE4CH0438R100HB	7/16	7/16	1	2 3/4	.020	●
6677040	H1TE4CH0500S063HB	1/2	1/2	5/8	2 1/2	.020	●
6677051	H1TE4CH0500R100HB	1/2	1/2	1	3	.020	●
6677052	H1TE4CH0500R125HB	1/2	1/2	1 1/4	3 1/4	.020	●
6677053	H1TE4CH0500L150HB	1/2	1/2	1 1/2	4	.020	●
6677054	H1TE4CH0625S075HB	5/8	5/8	3/4	3	.020	●
6677055	H1TE4CH0625R125HB	5/8	5/8	1 1/4	3 1/2	.020	●
6677056	H1TE4CH0625X225HB	5/8	5/8	2 1/4	5	.020	●
6677057	H1TE4CH0750S088HB	3/4	3/4	7/8	3 1/2	.020	●
6677058	H1TE4CH0750R150HB	3/4	3/4	1 1/2	4	.020	●
6677059	H1TE4CH0750L225HB	3/4	3/4	2 1/4	5	.020	●
6677060	H1TE4CH0750X300HB	3/4	3/4	3	6	.020	●
6677061	H1TE4CH1000S150HB	1	1	1 1/2	4 1/2	.020	●
6677062	H1TE4CH1000R225HB	1	1	2 1/4	5	.020	●
6677063	H1TE4CH1000L300HB	1	1	3	6	.020	●
6677064	H1TE4CH1000X400HB	1	1	4	7	.020	●
6677065	H1TE4CH1250R300HB	1 1/4	1 1/4	3	7	.020	●

88	90	12	4	96

Solid Carbide End Mills

HARVI™ I TE • SQUARE END • 4 FLUTES • STRAIGHT SHANK



● first choice
○ alternate choice

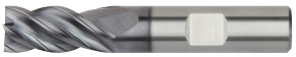
P		●
M		●
K		●
N		
S		○
H		○

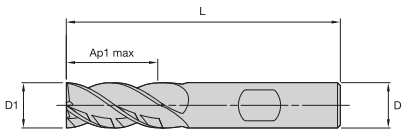
order number	catalog number	D1	D	Ap1 max	L	KCPM15
6676840	H1TE4SE0125R025HA	1/8	1/8	1/4	1 1/2	●
6676911	H1TE4SE0125X050HA	1/8	1/8	1/2	2	●
6676912	H1TE4SE0156L044HA	5/32	3/16	7/16	2	●
6676913	H1TE4SE0188S031HA	3/16	3/16	5/16	1 1/2	●
6676914	H1TE4SE0188L063HA	3/16	3/16	5/8	2 1/4	●
6676915	H1TE4SE0219R044HA	7/32	1/4	7/16	2	●
6676916	H1TE4SE0250S038HA	1/4	1/4	3/8	2	●
6676917	H1TE4SE0250R050HA	1/4	1/4	1/2	2 1/2	●
6676918	H1TE4SE0250L075HA	1/4	1/4	3/4	2 1/2	●
6676919	H1TE4SE0250X100HA	1/4	1/4	1	3	●
6676920	H1TE4SE0281R063HA	9/32	5/16	5/8	2 1/2	●
6676921	H1TE4SE0313S050HA	5/16	5/16	1/2	2	●
6676922	H1TE4SE0313R075HA	5/16	5/16	3/4	2 1/2	●
6676923	H1TE4SE0375S050HA	3/8	3/8	1/2	2	●
6676924	H1TE4SE0375R088HA	3/8	3/8	7/8	2 1/2	●
6676925	H1TE4SE0375R100HA	3/8	3/8	1	3	●
6676926	H1TE4SE0375X150HA	3/8	3/8	1 1/2	4	●
6676927	H1TE4SE0438R100HA	7/16	7/16	1	2 3/4	●
6676928	H1TE4SE0500S063HA	1/2	1/2	5/8	2 1/2	●
6676929	H1TE4SE0500R100HA	1/2	1/2	1	3	●
6676930	H1TE4SE0500R125HA	1/2	1/2	1 1/4	3 1/4	●
6676941	H1TE4SE0500L150HA	1/2	1/2	1 1/2	4	●
6676942	H1TE4SE0500X200HA	1/2	1/2	2	4	●
6676943	H1TE4SE0625S075HA	5/8	5/8	3/4	3	●
6676944	H1TE4SE0625R125HA	5/8	5/8	1 1/4	3 1/2	●
6676945	H1TE4SE0625X225HA	5/8	5/8	2 1/4	5	●
6676946	H1TE4SE0750S088HA	3/4	3/4	7/8	3 1/2	●
6676947	H1TE4SE0750R150HA	3/4	3/4	1 1/2	4	●
6676948	H1TE4SE0750L225HA	3/4	3/4	2 1/4	5	●
6676949	H1TE4SE0750X300HA	3/4	3/4	3	6	●
6676950	H1TE4SE1000S150HA	1	1	1 1/2	4 1/2	●
6676961	H1TE4SE1000R225HA	1	1	2 1/4	5	●
6676962	H1TE4SE1000L300HA	1	1	3	6	●
6676963	H1TE4SE1000X400HA	1	1	4	7	●
6676964	H1TE4SE1250R300HA	1 1/4	1 1/4	3	7	●

				
88	90	12	4	96

Solid Carbide End Mills

HARVI™ I TE • SQUARE END • 4 FLUTES • WELDON® SHANK





● first choice
○ alternate choice

P		●
M		●
K		●
N		
S		○
H		○

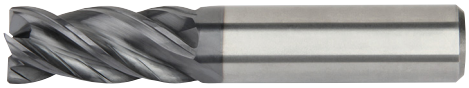
order number	catalog number	D1	D	Ap1 max	L	KCPM15
6676965	H1TE4SE0375S050HB	3/8	3/8	1/2	2	●
6676966	H1TE4SE0375R088HB	3/8	3/8	7/8	2 1/2	●
6676967	H1TE4SE0375R100HB	3/8	3/8	1	3	●
6676968	H1TE4SE0375X150HB	3/8	3/8	1 1/2	4	●
6676969	H1TE4SE0438R100HB	7/16	7/16	1	2 3/4	●
6676970	H1TE4SE0500S063HB	1/2	1/2	5/8	2 1/2	●
6676971	H1TE4SE0500R100HB	1/2	1/2	1	3	●
6676972	H1TE4SE0500R125HB	1/2	1/2	1 1/4	3 1/4	●
6676973	H1TE4SE0500L150HB	1/2	1/2	1 1/2	4	●
6676974	H1TE4SE0500X200HB	1/2	1/2	2	4	●
6676975	H1TE4SE0625S075HB	5/8	5/8	3/4	3	●
6676976	H1TE4SE0625R125HB	5/8	5/8	1 1/4	3 1/2	●
6676977	H1TE4SE0625X225HB	5/8	5/8	2 1/4	5	●
6676978	H1TE4SE0750S088HB	3/4	3/4	7/8	3 1/2	●
6676979	H1TE4SE0750R150HB	3/4	3/4	1 1/2	4	●
6676980	H1TE4SE0750L225HB	3/4	3/4	2 1/4	5	●
6676981	H1TE4SE0750X300HB	3/4	3/4	3	6	●
6676982	H1TE4SE1000S150HB	1	1	1 1/2	4 1/2	●
6676983	H1TE4SE1000R225HB	1	1	2 1/4	5	●
6676984	H1TE4SE1000L300HB	1	1	3	6	●
6676985	H1TE4SE1000X400HB	1	1	4	7	●
6676986	H1TE4SE1250R300HB	1 1/4	1 1/4	3	7	●

88	90	12	4	96

Solid Carbide End Mills

HARVI™ I TE • 4 FLUTES • APPLICATION DATA





Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	KCPM15/KCSM15 Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter frac.	1/8	5/32	3/16	7/32	1/4	9/32	5/16	3/8	7/16	1/2	5/8	3/4	1	1 1/4
								dec.	.1250	.1563	.1875	.2188	.2500	.2813	.3125	.3750	.4375	.5000	.6250	.7500	1.0000	1.2500
P	0	1.5 x D	0.5 x D	1.25 x D	490	–	660	IPT	.0010	.0012	.0015	.0017	.0020	.0023	.0026	.0030	.0034	.0037	.0043	.0048	.0054	.0054
	1	1.5 x D	0.5 x D	1.25 x D	490	–	660	IPT	.0010	.0012	.0015	.0017	.0020	.0023	.0026	.0030	.0034	.0037	.0043	.0048	.0054	.0054
	2	1.5 x D	0.5 x D	1.25 x D	460	–	620	IPT	.0010	.0012	.0015	.0017	.0020	.0023	.0026	.0030	.0034	.0037	.0043	.0048	.0054	.0054
	3	1.5 x D	0.5 x D	1.25 x D	390	–	520	IPT	.0008	.0010	.0012	.0014	.0017	.0019	.0021	.0025	.0029	.0032	.0038	.0042	.0050	.0053
	4	1.5 x D	0.5 x D	1.25 x D	300	–	490	IPT	.0007	.0009	.0011	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0033	.0037	.0042	.0044
	5	1.5 x D	0.5 x D	1.25 x D	200	–	330	IPT	.0007	.0008	.0010	.0012	.0014	.0015	.0017	.0020	.0023	.0025	.0030	.0034	.0040	.0043
	6	1.5 x D	0.5 x D	1.25 x D	160	–	250	IPT	.0006	.0007	.0008	.0010	.0011	.0013	.0014	.0017	.0019	.0021	.0025	.0027	.0031	.0032
M	1	1.5 x D	0.5 x D	1.25 x D	300	–	380	IPT	.0008	.0010	.0012	.0014	.0017	.0019	.0021	.0025	.0029	.0032	.0038	.0042	.0050	.0053
	2	1.5 x D	0.5 x D	1.25 x D	200	–	260	IPT	.0007	.0008	.0010	.0012	.0014	.0015	.0017	.0020	.0023	.0025	.0030	.0034	.0040	.0043
	3	1.5 x D	0.5 x D	1.0 x D	200	–	230	IPT	.0006	.0007	.0008	.0010	.0011	.0013	.0014	.0017	.0019	.0021	.0025	.0027	.0031	.0032
K	1	1.5 x D	0.5 x D	1.0 x D	390	–	490	IPT	.0010	.0012	.0015	.0017	.0020	.0023	.0026	.0030	.0034	.0037	.0043	.0048	.0054	.0054
	2	1.5 x D	0.5 x D	1.0 x D	360	–	460	IPT	.0008	.0010	.0012	.0014	.0017	.0019	.0021	.0025	.0029	.0032	.0038	.0042	.0050	.0053
	3	1.5 x D	0.5 x D	1.0 x D	360	–	430	IPT	.0007	.0008	.0010	.0012	.0014	.0015	.0017	.0020	.0023	.0025	.0030	.0034	.0040	.0043
S	1	1.5 x D	0.3 x D	0.75 x D	160	–	300	IPT	.0008	.0010	.0012	.0014	.0017	.0019	.0021	.0025	.0029	.0032	.0038	.0042	.0050	.0053
	2	1.5 x D	0.3 x D	0.75 x D	160	–	260	IPT	.0007	.0008	.0010	.0012	.0014	.0015	.0017	.0020	.0023	.0025	.0030	.0034	.0040	.0043
	3	1.5 x D	0.5 x D	0.5 x D	80	–	130	IPT	.0004	.0005	.0007	.0008	.0009	.0010	.0011	.0013	.0015	.0017	.0020	.0023	.0027	.0029
	4	1.5 x D	0.5 x D	1.25 x D	160	–	200	IPT	.0005	.0007	.0008	.0010	.0012	.0014	.0016	.0019	.0021	.0023	.0028	.0031	.0036	.0039
H	1	1.5 x D	0.5 x D	1.0 x D	260	–	460	IPT	.0007	.0009	.0011	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0033	.0037	.0042	.0044
	2	1.5 x D	0.2 x D	1.0 x D	230	–	390	IPT	.0006	.0007	.0008	.0010	.0011	.0013	.0014	.0017	.0019	.0021	.0025	.0027	.0031	.0032

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 centers, please adjust parameters accordingly on >1/2" 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 = IPT * KFz

Calculation example:
Application: D = 1 inch;
S4 material group;
A_e 0,02 inch
Cutting data recommendation: 150 SFM;
fz = 0.0036 IPT
Adjustment coefficients: Ae = 0,02 = inch equals 2,00%;
Kv = 2; KFz = 2.4

Final cutting data recommendation:
Vc new = 150 SFM * 2 = 300 SFM
Fz new = .0036 IPT * 2.4 = .0086 IPT

	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

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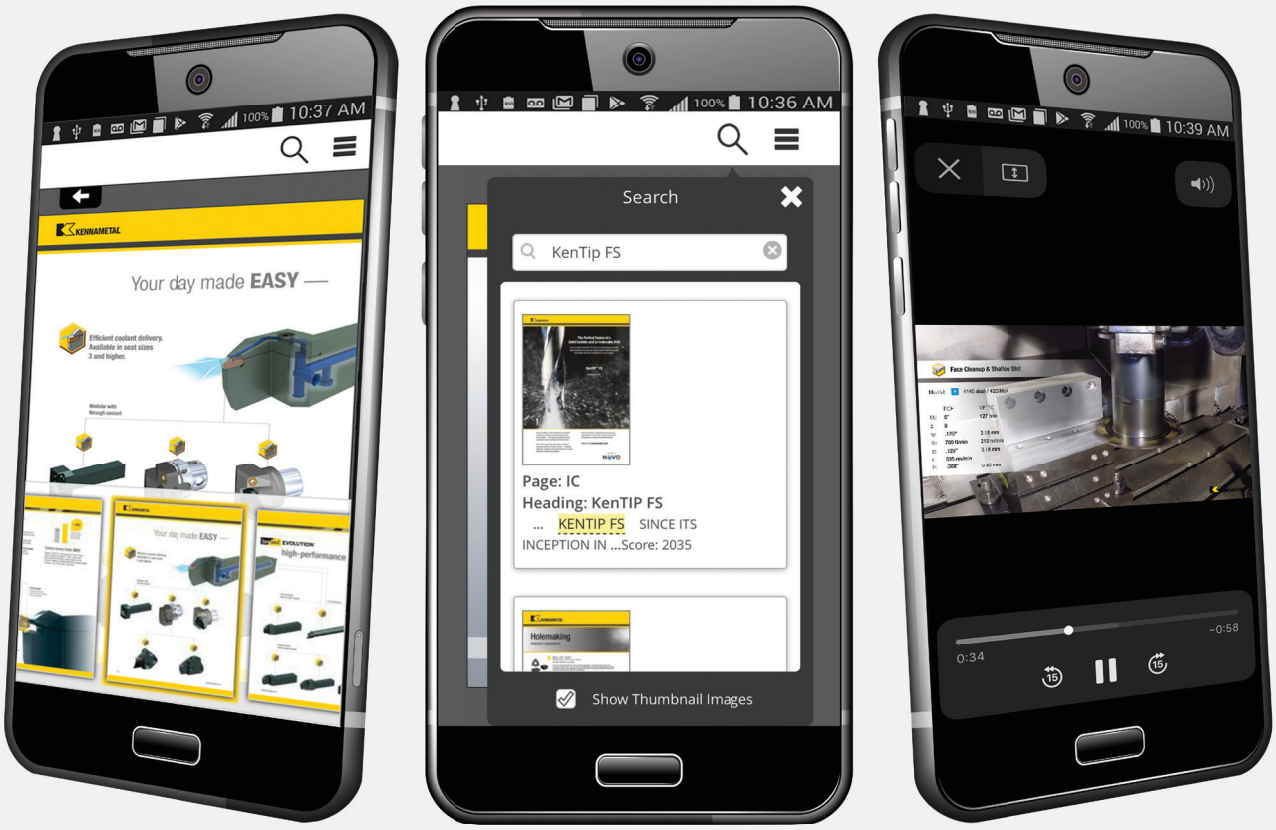

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Solid Carbide End Mills

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 .47" (12mm) with 4 effective cutting edges and chamfered edge.

CUTTING DATA

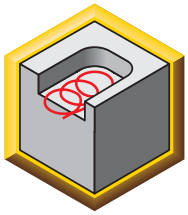
- vc 197 SFM
- Fz .0007 IPT
- Ap .12"
- Ae .47"

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 .47" (12mm) with 4 effective cutting edges and chamfered edge.

CUTTING DATA

- vc 272 SFM
- Fz .0033 IPT
- Ap .98"
- Ae .03"

RESULT

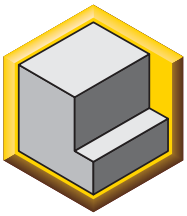
- 18 instead of 12 parts with one tool as a competitive solution at same productivity.

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 1.125" depth.
- Martensitic stainless steel.
- Unstable clamping.
- Wet machining.

SOLUTION

- Standard HARVI I TE.
- Ø .79" (20mm) with 4 effective cutting edges and sharp edge.

CUTTING DATA

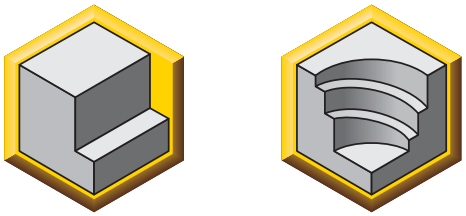
- vc 197 SFM
- Fz .003 IPT
- Ap .79"
- Ae .02"

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 .5" (12.7mm) with 4 effective cutting edges and sharp edge.

CUTTING DATA

- vc 450 SFM
- Fz .0025 IPT
- Ap .3"
- Ae .5"

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® adapter for Weldon shank tools preferred for high Ap/high Ae applications, but not recommended for finishing applications. • High-performance collet (HPMC) or milling power chucks applicable. • Shrink adapter applicable.
Roughing Application	• Yes.
Finishing Application	• Yes.
Milling Strategy	• Traditional milling (full slotting, high Ae side and shoulder milling). • High velocity milling (dynamic milling, trochoidal milling).
Application Range	• Full slotting. • Shoulder milling. • Peel milling and HPC techniques. • Center 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°	33.1
		5°	19.9
Tool D (in)	5/8	10°	10.0
Cutting Speed Vc (SFM)	591	15°	6.7
Feed per tooth (IPT)	.0024	20°	5.1
RPM	4	25°	4.1
Table Feed F (in/min)	34.1	30°	3.5
Hole diameter (mm)	24	35°	3
Hole depth (mm)	25	40°	2.7

Stainless Steel 1.4404/AISI 316L		Ramp Angle	Time [sec]
Tool D (in)	5/8	3°	119.1
Cutting Speed Vc (SFM)	329	5°	71.5
Feed per tooth (IPT)	.0012	10°	35.9
RPM	2005	15°	24.1
Table Feed F (in/min)	9.48	20°	18.2
Hole diameter (mm)	24	25°	14.8
Hole depth (mm)	25	30°	12.5

Solid Carbide End Mills

HARVI™ I TE • CAUSES AND REMEDIES FOR MILLING PROBLEMS

PROBLEM	CAUSE	REMEDIES
• Tool pullout.	• High axial forces. • Wrong adapter. • Unadapted application data.	• Use Weldon® chuck if applicable or adapter 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 adapter.	• Tool is too hot and loses fit in adapter.	• Check temperature on adapter/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 adapter. • 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 adapter. • Adjust clamping to clamp on uncoated area only. • Minimize overhang length.

POWERED BY NOVO

KOR™ 5

High-Velocity Aluminum 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 aluminum.
- Maximizes 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.

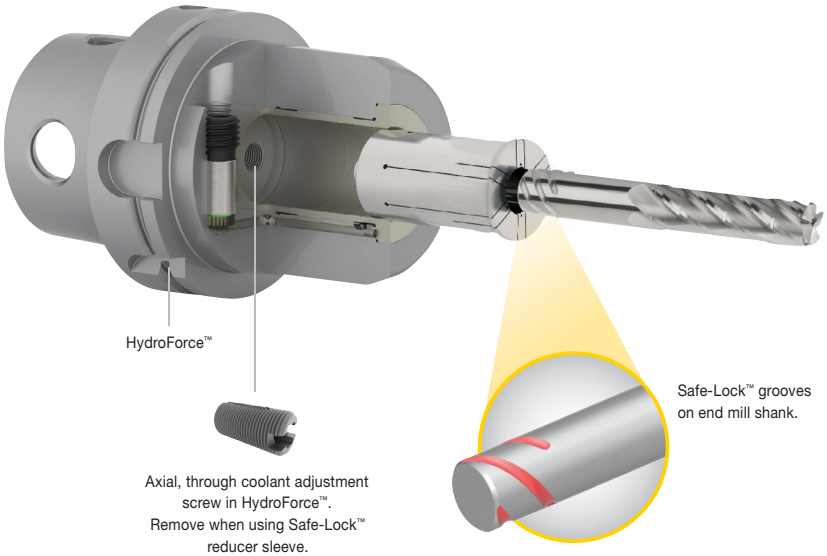
Chipbreakers manage chip removal efficiently.

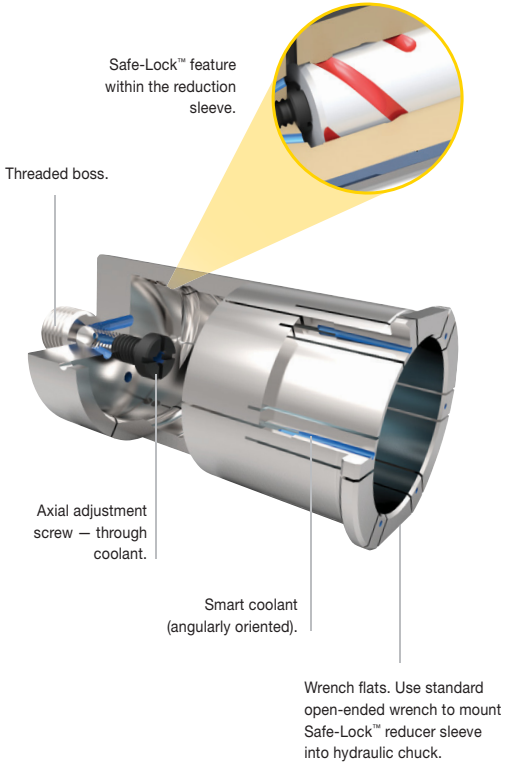
SAFE-LOCK® by HAIMER®

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

Up to 66% higher table feed in aluminum applications.

Safe-Lock™ Shank prevents end mill pullout.

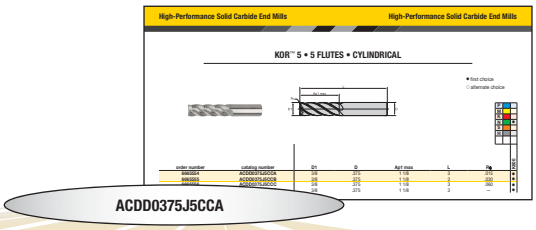




High-Performance Solid Carbide End Mills

KOR™ 5 • CATALOG NUMBERING SYSTEM

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

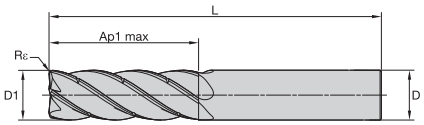


AC	D	D	0375	J	5	C	C	A
End Mill Family	End Mill Shape	Helix Angle	Diameter (mm/inch)	Shank Style	Number of Flutes	LOC/D	Special Characteristics	Radius
AA = Aluminum **AB** = MaxiMet™ — Aluminum **AC** = KOR — Aluminum	**D** = Square End RH	**D** = 31–35		**J** = Inch — Plain **N** = Inch — Plain and Safe-Lock™	**5**	**C**	**C** = Coolant	**A** = Inch — .015 **B** = Inch — .030 **C** = Inch — .060 **D** = Inch — .090 **E** = Inch — .120 **S** = Sharp

High-Performance Solid Carbide End Mills

KOR™ 5 • 5 FLUTES • STRAIGHT SHANK

● first choice
○ alternate choice

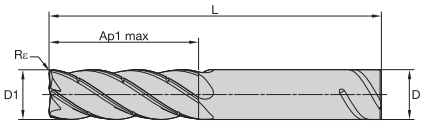


P	
M	
K	
N	●
S	
H	

order number	catalog number	D1	D	Ap1 max	L	Rε	K600
6665554	ACDD0375J5CCA	3/8	.375	1 1/8	3	.015	●
6665555	ACDD0375J5CCB	3/8	.375	1 1/8	3	.030	●
6665556	ACDD0375J5CCC	3/8	.375	1 1/8	3	.060	●
6665553	ACDD0375J5CCS	3/8	.375	1 1/8	3	–	●

KOR 5 • 5 FLUTES • SAFE-λOCK® SHANK

● first choice
○ alternate choice



P	
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N	●
S	
H	

order number	catalog number	D1	D	Ap1 max	L	Rε	K600
6665558	ACDD0500N5CCA	1/2	.500	1 1/2	3 1/2	.015	●
6665559	ACDD0500N5CCB	1/2	.500	1 1/2	3 1/2	.030	●
6665560	ACDD0500N5CCC	1/2	.500	1 1/2	3 1/2	.060	●
6665557	ACDD0500N5CCS	1/2	.500	1 1/2	3 1/2	–	●
6665572	ACDD0625N5CCB	5/8	.625	1 7/8	4	.030	●
6665573	ACDD0625N5CCC	5/8	.625	1 7/8	4	.060	●
6665574	ACDD0625N5CCD	5/8	.625	1 7/8	4	.090	●
6665571	ACDD0625N5CCS	5/8	.625	1 7/8	4	–	●
6665576	ACDD0750N5CCB	3/4	.750	2 1/4	5	.030	●
6665577	ACDD0750N5CCC	3/4	.750	2 1/4	5	.060	●
6665578	ACDD0750N5CCD	3/4	.750	2 1/4	5	.090	●
6665579	ACDD0750N5CCE	3/4	.750	2 1/4	5	.120	●
6665575	ACDD0750N5CCS	3/4	.750	2 1/4	5	–	●
6665601	ACDD1000N5CCB	1	1.000	3	5 1/2	.030	●
6665602	ACDD1000N5CCC	1	1.000	3	5 1/2	.060	●
6665603	ACDD1000N5CCD	1	1.000	3	5 1/2	.090	●
6665580	ACDD1000N5CCS	1	1.000	3	5 1/2	–	●

				NOVO
88	90	28	4	96

High-Performance Solid Carbide End Mills

KOR™ 5 • 5 FLUTES • APPLICATION DATA



Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	K600 Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) frac.	D1 — Diameter 3/8	1/2	5/8	3/4	1
								dec.	.3750	.5000	.6250	.7500	1.0000
N	1	0.5 x D1	0.5 x D1	0.25 x D1	640	–	6560	IPT	0.0030	0.0050	0.0060	0.0080	0.0090
N	2	0.5 x D1	0.5 x D1	0.25 x D1	640	–	4920	IPT	0.0025	0.0045	0.0055	0.0070	0.0085

NOTE: These guidelines may require variations to achieve optimum results. For better surface finish, reduce feed per tooth.
For cutting aluminum with high silicon, TiCN coating is recommended.
Ap for milling machine with ceramic bearings spindle, multiply by 0,5.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

ADJUSTMENT FACTOR TABLE FOR FEED CALCULATION

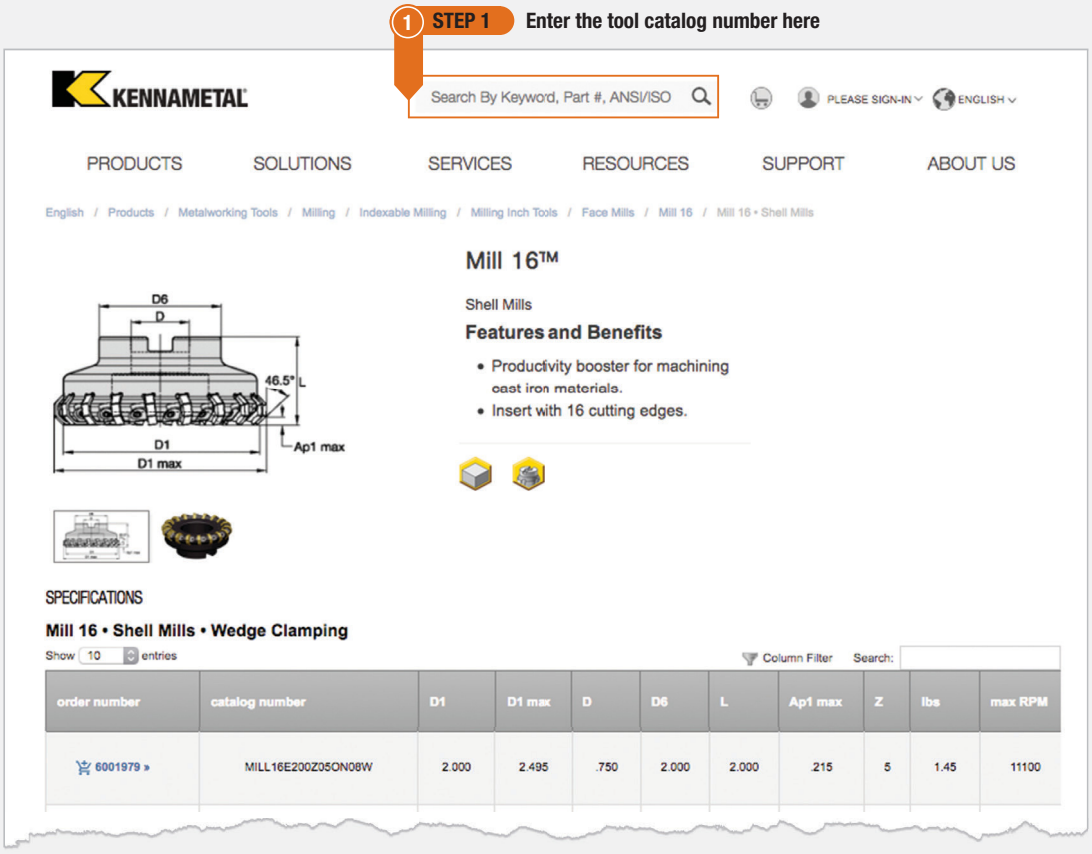
To calculate application specific cutting data, please use above coefficient for adaptation of feed.
Fz new = IPT * Feed Multiplier

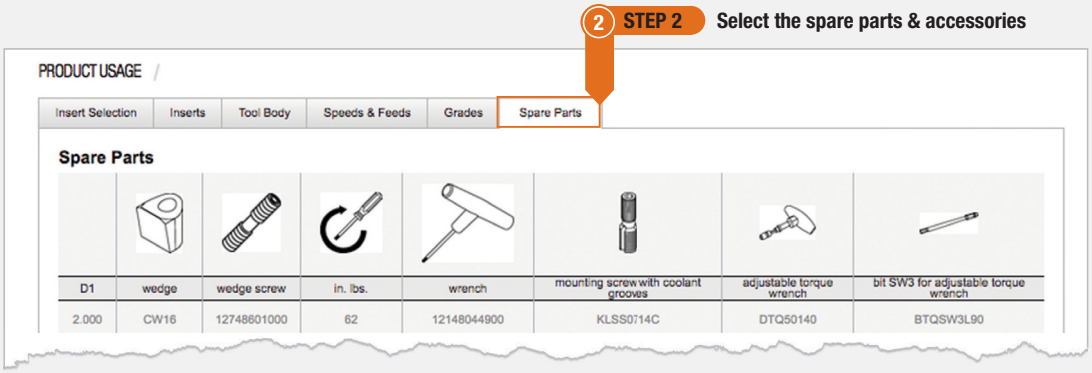
Calculation example:
Application: D = 1";
N1 material group;
Ae 0.1"
Cutting data recommendation: 640 SFM;
fz = 0.0090 IPT
Adjustment coefficients: Ae = 0.1" equals 10.00 %;
Feed Multiplier = 1.7

Final cutting data recommendation:
FZ new = .0090 IPT * 1.7 = .0153 IPT

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

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

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 adapters and extensions are available.

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

*NOTE: For application recommendations, see pages 34–37.

Intermediate diameters are available upon request as custom solutions.

Reconditioning will maximize tool life and your investment.

Double cone eliminates expensive presetting processes by providing an axial .0004" (10µm) repeatability. Length repeatability from insert tip-to-tip within .002" (50µm).

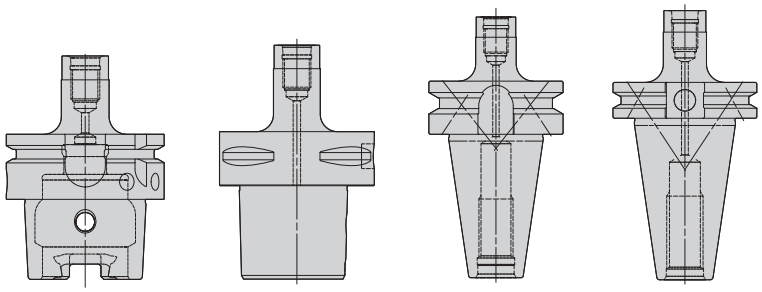
3rd contact surface delivers high stiffness and highest accuracy below .0002" (5µm) runout.

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.

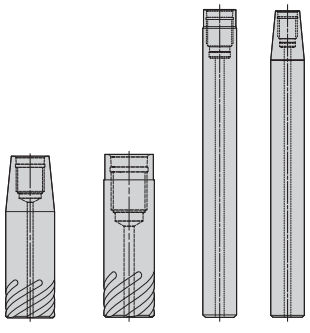
With a Duo-Lock™ wrench the tool change becomes easy and can be done in a few seconds.

Adapters



HSK PSC BT CV

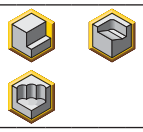
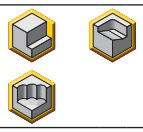
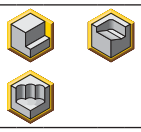
Extensions



SAFE-λOCK® 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]	.015– .030"	—	.015–.250"	—	.015–.250"	.015–.250"
Corner chamfer width [BCH]	—	.020"	—	.020"	—	—
Cutter diameter [D1]	3/8–3/4"	3/8–1-1/4"	3/8–1-1/4"	3/8–1-1/4"	3/8–1-1/4"	3/8–1-1/4"
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]	9/32–3/4"	9/16–1-7/8"	9/16–1-7/8"	9/16–1-7/8"	9/16–1-7/8"	9/16–1-7/8"
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
Center cutting	✔	✔	✔	—	—	✔
Additional operations						

* See page in the Kennametal Master Catalog 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

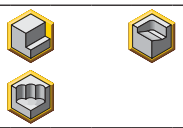
	HP ROUGHING & FINISHING *(CONTINUED)*			HIGH FEED		HP PROFILING	
	MaxiMet™	MaxiMet	MaxiMet	KenFeed™	KenFeed	HARVI™ Ball Nose	HARVI III Ball Nose
		 NEW!		 NEW!			
Series	**ABDF**	**ABDE**	**ABBE**	**KMDA**	**KSDB**	**UKBV**	**UJBV**
Page	O28*	O29*	39	61**	40	O18*	O19*
Tool type							
Rougher	●	●	●	●	●	●	
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]	—	.015–.250"	—	.020–.040"	.020– .040"	—	—
Corner chamfer width [BCH]	—	—	—	—	—	—	—
Cutter diameter [D1]	3/8–3/4"	3/8–1"	3/8–1"	3/8–3/4"	3/8–3/4"	3/8–1"	3/8–1"
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]	9/16–1-1/8"	9/16–1-1/2"	9/16–1-1/2"	.023–.040"	.023–.040"	9/16–1-1/2"	9/16–1-1/2"
Flute helix angle	45°	38°	38°	20°	20°	37°/39°	37°/39°
Number of flutes [ZU]	2	3	3	6	6	4	6
Center cutting	✔	✔	✔	—	—	✔	✔
Additional operations							

* See page in the Kennametal Master Catalog 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]	.015"	—	.015–.030"	—
Corner chamfer width [BCH]	—	.020"	—	—
Cutter diameter [D1]	3/8–3/4"	3/8–1"	3/8–1"	3/8–1"
Length of cut	0.75 x D	1.5 x D	1.5 x D	1.5 x D
Maximum cutting depth [Ap1 max]	9/32–3/4"	9/16–1-1/2"	9/16–1-1/2"	9/16–1-1/2"
Flute helix angle	35°	20°	45°	20°
Number of flutes [ZU]	3	4 & 5	4 & 6	4
Center cutting	✔	—	✔	✔
Additional operations				

* See page in the Kennametal Master Catalog 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]	.015–.030"	.015–.250"	—	—	—
Corner chamfer width [BCH]	—	—	—	—	—
Cutter diameter [D1]	3/8–1"	3/8–1"	3/8–5/8"	3/8–5/8"	3/8–1 1/4"
Length of cut	1.5 x D	1.5 x D	.075–.178"	.030–.120"	1,5 x D
Maximum cutting depth [Ap1 max]	9/16–1-1/2"	9/16–1-1/2"	.075–.178"	.030–.120"	—
Flute helix angle	45°	36°	0°	0°	—
Number of flutes [ZU]	6	9, 11, 15, & 19	4, 5, & 6	4, 5, & 6	—
Center cutting	✔	—	—	—	—
Additional operations					

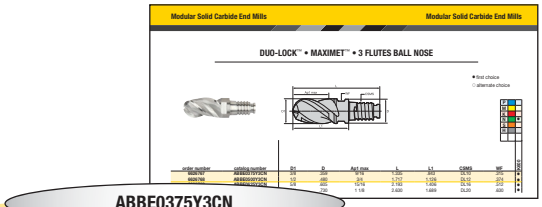
* See page in the Kennametal Master Catalog 2018 • Volume Two • Rotating Tools, A-16-05217.
**See page in the Kennametal Innovations 2019 • 02, A-18-05789.

● Primary
○ Secondary

Modular Solid Carbide End Mills

DUO-LOCK™ • CATALOG NUMBERING SYSTEM

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



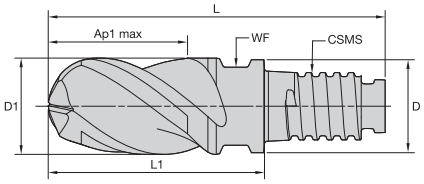
ABBE0375Y3CN

AB	B	E	0375	Y	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 center 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		**Y** = Inch — 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	**A** = Inch — .015" **B** = Inch — .030" **C** = Inch — .060" **D** = Inch — .090" **E** = Inch — .120" **F** = Inch — .250" **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	catalog number	D1	D	Ap1 max	L	L1	CSMS	WF	K600
6626767	ABBE0375Y3CN	3/8	.359	9/16	1.335	.843	DL10	.315	●
6626768	ABBE0500Y3CN	1/2	.480	3/4	1.717	1.126	DL12	.374	●
6626769	ABBE0625Y3CN	5/8	.605	15/16	2.193	1.406	DL16	.512	●
6626770	ABBE0750Y3CN	3/4	.730	1 1/8	2.630	1.689	DL20	.630	●

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



Material Group		Side Milling (A) and Slotting (B)			short			medium			long			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.				
		A		B	adapter reach									D1 — Diameter				
					K600			K600			K600							
					Cutting Speed — vc SFM			Cutting Speed — vc SFM			Cutting Speed — vc SFM			frac.	3/8	1/2	5/8	3/4
		ap	ae	ap	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500
N	1	1.0 x D	0.5 x D	1.0 x D	1640	–	6560	1312	–	5248	984	–	3936	IPT	.0028	.0038	.0047	.0056
	2	1.0 x D	0.5 x D	1.0 x D	1640	–	4920	1312	–	3936	984	–	2952	IPT	.0023	.0030	.0038	.0045
	3	1.0 x D	0.5 x D	1.0 x D	1640	–	4920	1312	–	3936	984	–	2952	IPT	.0020	.0026	.0033	.0039
	4	1.0 x D	0.5 x D	1.0 x D	1310	–	2460	1048	–	1968	786	–	1476	IPT	.0020	.0026	.0033	.0039
	5	1.0 x D	0.5 x D	1.0 x D	820	–	3280	656	–	2624	492	–	1968	IPT	.0025	.0034	.0042	.0051
	6	1.0 x D	0.5 x D	1.0 x D	330	–	2460	264	–	1968	198	–	1476	IPT	.0028	.0038	.0047	.0056
	7	1.0 x D	0.5 x D	1.0 x D	330	–	2460	264	–	1968	198	–	1476	IPT	.0020	.0026	.0033	.0039

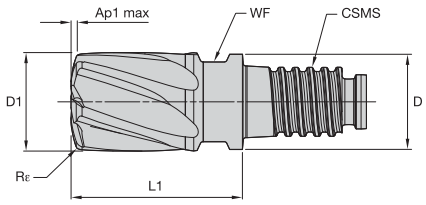
NOTE: These guidelines may require variations to achieve optimum results.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".
For better surface finish, reduce feed per tooth.

				NOVO
88	90	38	4	96

Modular Solid Carbide End Mills

DUO-LOCK™ • KENFEED™ • 6 FLUTES

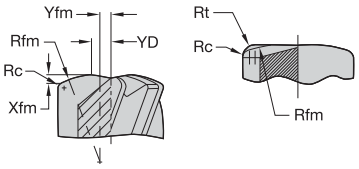
● first choice
○ alternate choice



P	○
M	○
K	
N	
S	●
H	

order number	catalog number	D1	D	Ap1 max	L1	CSMS	WF	Rε	KC643M
6626700	KSDB0375Y6BQX	3/8	.359	.020	.655	DL10	.315	.023	●
6626761	KSDB0500Y6BQX	1/2	.480	.027	1.126	DL12	.374	.031	●
6626763	KSDB0625Y6BQX	5/8	.605	.034	1.406	DL16	.512	.039	●
6626764	KSDB0750Y6BQX	3/4	.730	.040	1.689	DL20	.630	.047	●

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				
catalog number	D1	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number of flutes	smallest	largest	1°	2°	3°	4°	5°
KSDB0375Y6BQX	3/8	.020	3/8	.0399	.0235	.0200	.0469	.0788	6	.5325	.75	1.14	.57	.38	.29	.23
KSDB0500Y6BQX	1/2	.027	1/2	.0538	.0320	.0266	.0625	.1050	6	.7100	1.00	1.52	.76	.51	.38	.30
KSDB0625Y6BQX	5/8	.034	5/8	.0672	.0400	.0333	.0781	.1313	6	.8875	1.25	1.91	.95	.63	.48	.38
KSDB0750Y6BQX	3/4	.040	3/4	.0798	.0470	.0399	.0938	.1575	6	1.0650	1.50	2.29	1.14	.76	.57	.46
recommended degree of programmed feed rate to use while ramping												100%	70%	50%	30%	10%

NOTE: YRC = distance from center line to the crown of the R radius.
RCN = distance from centerline 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 (IPT = inch/th) for side milling (A).				
		A		adapter reach									D1 — Diameter				
				KC643M			KC643M			KC643M							
				Cutting Speed — vc SFM			Cutting Speed — vc SFM			Cutting Speed — vc SFM			frac.	3/8	1/2	5/8	3/4
		ap	ae	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500
P	5	0.05 x D	0.55 x D	200	–	330	170	–	281	160	–	264	IPT	.0110	.0139	.0164	.0185
	6	0.05 x D	0.55 x D	160	–	250	136	–	213	128	–	200	IPT	.0092	.0115	.0134	.0149
M	1	0.05 x D	0.55 x D	300	–	380	240	–	304	210	–	266	IPT	.0137	.0173	.0205	.0232
	2	0.05 x D	0.55 x D	200	–	260	160	–	208	140	–	182	IPT	.0110	.0139	.0164	.0185
	3	0.05 x D	0.55 x D	200	–	230	160	–	184	140	–	161	IPT	.0092	.0115	.0134	.0149
S	1	0.05 x D	0.55 x D	160	–	300	128	–	240	96	–	180	IPT	.0137	.0173	.0205	.0232
	2	0.05 x D	0.55 x D	80	–	130	64	–	104	48	–	78	IPT	.0073	.0092	.0109	.0124
	3	0.05 x D	0.55 x D	80	–	130	64	–	104	48	–	78	IPT	.0073	.0092	.0109	.0124
	4	0.05 x D	0.55 x D	160	–	200	128	–	160	96	–	120	IPT	.0101	.0128	.0151	.0170

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 centers, please adjust parameters accordingly on diameters greater than 1/2".
For cutting aluminum, 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

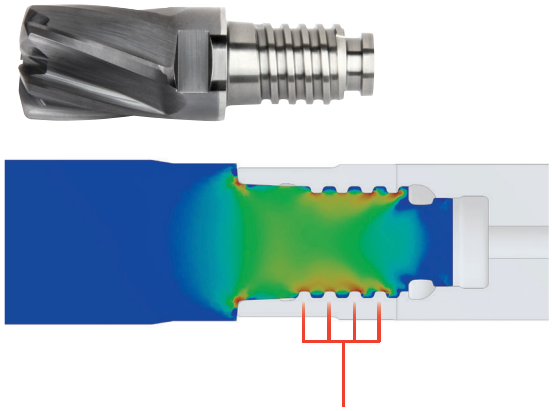
The Duo-Lock™ Intelligent Thread eliminates the force peaks all regular threads have in the first groove.

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

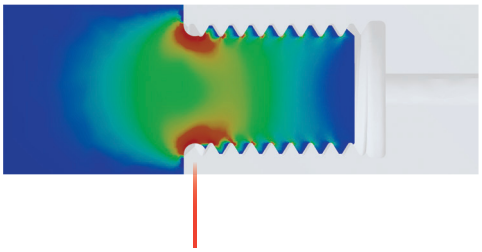
Duo-Lock™ Intelligent Thread



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



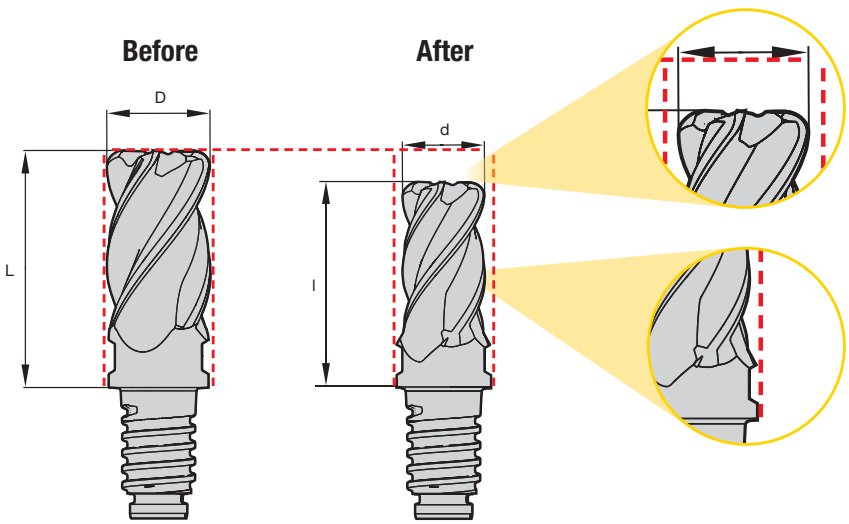
Typical for any regular thread at maximum load.

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 1.102–4" (28–101mm) 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.

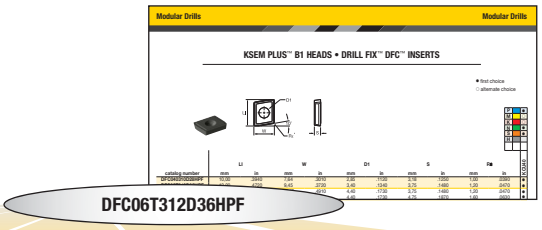
NEW! **HPF insert** featuring HP chipbreaker with additional wiper cutting edge for superior surface finishes. Ground periphery enables tighter hole diameter tolerances.

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 • CATALOG NUMBERING SYSTEM

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

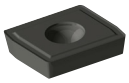


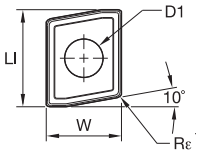
DFC	06	T3	12	D36	HPF
Insert Style	Length of Cutting Edge	Insert Thickness	Corner Radius	Size of Corresponding KSEM PLUS™ Head	Geometry
Drill Fix DFC	**04** = 7,64mm **05** = 9,45mm **06** = 12,47mm **07** = 14,57mm **09** = 19,10mm	**03** = 3,18mm **T3** = 3,75mm **04** = 4,75mm **05** = 5,25mm	**10** = 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

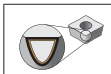
● first choice
○ alternate choice





P	●
M	○
K	○
N	●
S	●
H	

	LI		W		D1		S		Rε		KCU40
catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	
DFC040310D28HPF	10,00	.3940	7,64	.3010	2,85	.1120	3,18	.1250	1,00	.0390	●
DFC05T312D32HPF	12,00	.4720	9,45	.3720	3,40	.1340	3,75	.1480	1,20	.0470	●
DFC06T312D36HPF	16,00	.6300	12,47	.4910	4,40	.1730	3,75	.1480	1,20	.0470	●
DFC070416D45HPF	18,00	.7090	14,57	.5740	4,40	.1730	4,75	.1870	1,60	.0630	●
DFC090520D56HPF	24,00	.9450	19,10	.7520	5,50	.2170	5,25	.2070	2,00	.0790	●

				NOVO
88	90	43	4	96

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

Inch

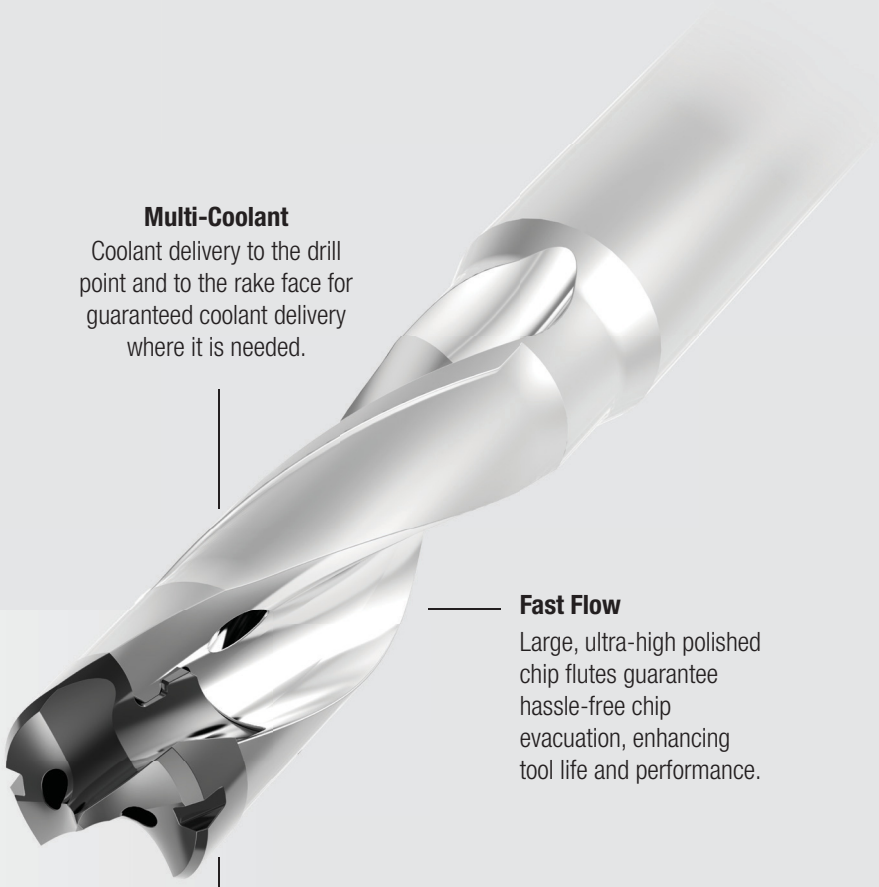
Material Group		Condition	Cutting Speed — vc Range — SFM			Recommended Feed Rate (fz) by Diameter					
			min	Starting Value	max	Ø	KSEM 14....17 DFR/DFC04... 1.102–1.249	KSEM 15....18 DFT/DFC05... 1.250–1.416	KSEM 13....22 DFT/DFC06... 1.417–1.771	KSEM 18....28 DFT/DFC07... 1.772–2.204	KSEM 20....34 DFT/DFC09... 2.205–4.0295
P	1	S	370	**775**	944	IPR	0.005–0.010	0.005–0.010	0.006–0.011	0.006–0.013	0.008–0.014
	2	S	295	**623**	755	IPR	0.006–0.011	0.006–0.011	0.008–0.014	0.008–0.016	0.008–0.018
	3	S	295	**591**	755	IPR	0.006–0.011	0.006–0.011	0.008–0.014	0.008–0.016	0.008–0.018
	4	S	295	**459**	722	IPR	0.006–0.011	0.006–0.011	0.008–0.014	0.008–0.016	0.008–0.018
	5	S	295	**427**	689	IPR	0.006–0.011	0.006–0.011	0.008–0.014	0.008–0.016	0.008–0.018
	6	S	230	**295**	591	IPR	0.006–0.011	0.006–0.011	0.008–0.014	0.008–0.016	0.008–0.018
M	1	S	197	**361**	443	IPR	0.005–0.010	0.005–0.010	0.006–0.011	0.006–0.013	0.008–0.014
	2	S	197	**328**	443	IPR	0.005–0.010	0.005–0.010	0.006–0.011	0.006–0.013	0.008–0.014
	3	S	164	**295**	443	IPR	0.005–0.010	0.005–0.010	0.006–0.011	0.006–0.013	0.008–0.014
K	1	S	295	**558**	755	IPR	0.007–0.012	0.007–0.012	0.009–0.014	0.009–0.017	0.012–0.019
	2	S	295	**525**	722	IPR	0.007–0.012	0.007–0.012	0.009–0.014	0.009–0.017	0.012–0.019
	3	S	295	**492**	689	IPR	0.007–0.012	0.007–0.012	0.009–0.014	0.009–0.017	0.012–0.019
N	1	S	492	**787**	1181	IPR	0.005–0.008	0.005–0.008	0.006–0.011	0.006–0.013	0.008–0.016
	2	S	492	**722**	1181	IPR	0.005–0.008	0.005–0.008	0.006–0.011	0.006–0.013	0.008–0.016
	3	S	492	**722**	1181	IPR	0.005–0.008	0.005–0.008	0.006–0.011	0.006–0.013	0.008–0.016
	4	S	492	**722**	1181	IPR	0.005–0.008	0.005–0.008	0.006–0.011	0.006–0.013	0.008–0.016
	5	S	492	**722**	1181	IPR	0.005–0.008	0.005–0.008	0.006–0.011	0.006–0.013	0.008–0.016
	6	S	492	**656**	1181	IPR	0.005–0.008	0.005–0.008	0.006–0.011	0.006–0.013	0.008–0.016
	7	S	361	**722**	853	IPR	0.005–0.008	0.005–0.008	0.006–0.011	0.006–0.013	0.008–0.016
S	1	S	82	**164**	246	IPR	0.005–0.010	0.005–0.010	0.006–0.011	0.006–0.013	0.008–0.014
	2	S	66	**131**	197	IPR	0.005–0.010	0.005–0.010	0.006–0.011	0.006–0.013	0.008–0.014
	3	S	66	**131**	197	IPR	0.005–0.010	0.005–0.010	0.006–0.011	0.006–0.013	0.008–0.014
	4	S	66	**131**	197	IPR	0.005–0.010	0.005–0.010	0.006–0.011	0.006–0.013	0.008–0.014

Condition: S = Stable cutting conditions.

POWERED BY NOVO

KenTIP™ FS

Modular Drilling



Multi-Coolant
Coolant delivery to the drill point and to the rake face for guaranteed coolant delivery where it is needed.

Fast Flow
Large, ultra-high polished chip flutes guarantee hassle-free chip evacuation, enhancing tool life and performance.

Quick Release
Every drill body comes with a KenTIP smart wrench. Insert exchange in the machine becomes easy and saves idle time. And that saves money.

Materials

P M K

Applications

- Drilling
- Drilling: Cross Hole
- Drilling: Inclined Exit
- Drilling: Stacked Plates

kennametal.com/KenTIPFS

KenTIP™ FS covers more applications and provides better performance than any other modular system, delivering substantial cost savings and process simplifications on your shop floor.

KenTIP FS inserts cover the entire front part of the drill.

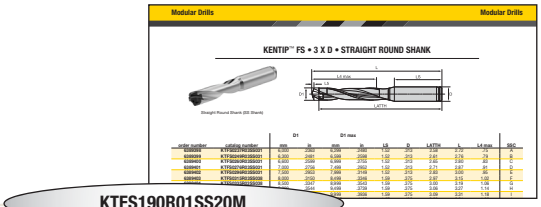
The coupling is completely protected from chip flow and contact with workpiece.

NEW! **Inch bodies** with SCF shank now available from diameters .315–1.0236" (8–26mm).

Modular Drills

KENTIP™ FS • CATALOG NUMBERING SYSTEM

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

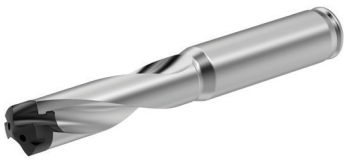


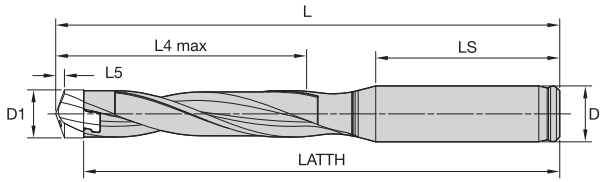
KTFS190R01SS20M

KTFS	190	R01	SS	20	M
Drill Platform	D1 Diameter Reference	Length	Shank Type	Shank Size D	Standard
KenTIP FS	**Metric** = 19,00mm **Inch** = .748"	**R01** = 1.5 x D **R03** = 3 x D **R05** = 5 x D **R08** = 8 x D **R12** = 12 x D	**SCF** = Flanged round shank with flat **SS** = Straight round shank	**Metric** = 20,0mm **Inch** = .750"	**M** = Metric **Blank** = Inch

Modular Drills

KENTIP™ FS • 3 X D • STRAIGHT ROUND SHANK





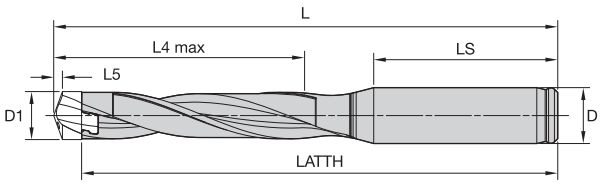
NOTE: L5 is dependent on the insert.

		D1		D1 max							
order number	catalog number	mm	in	mm	in	LS	D	LATTH	L	L4 max	SSC
6389398	KTFS0237R03SS031	6,000	.2363	6,299	.2480	1.52	.313	2.58	2.72	.75	A
6389399	KTFS0249R03SS031	6,300	.2481	6,599	.2598	1.52	.313	2.61	2.76	.79	B
6389400	KTFS0260R03SS031	6,600	.2599	6,999	.2755	1.52	.313	2.65	2.80	.83	C
6389401	KTFS0276R03SS031	7,000	.2756	7,499	.2952	1.52	.313	2.71	2.87	.91	D
6389402	KTFS0296R03SS031	7,500	.2953	7,999	.3149	1.52	.313	2.83	3.00	.95	E
6389403	KTFS0315R03SS038	8,000	.3150	8,499	.3346	1.59	.375	2.97	3.15	1.02	F
6389404	KTFS0335R03SS038	8,500	.3347	8,999	.3543	1.59	.375	3.00	3.19	1.06	G
6389405	KTFS0355R03SS038	9,000	.3544	9,499	.3739	1.59	.375	3.06	3.27	1.14	H
6389406	KTFS0375R03SS038	9,500	.3740	9,999	.3936	1.59	.375	3.09	3.31	1.18	I
6372000	KTFS0394R03SS044	10,000	.3937	10,499	.4133	1.67	.438	3.32	3.54	1.26	J
6372011	KTFS0414R03SS044	10,500	.4134	10,999	.4330	1.67	.438	3.34	3.58	1.30	K
6372012	KTFS0434R03SS044	11,000	.4331	11,499	.4527	1.67	.438	3.41	3.66	1.38	L
6372013	KTFS0453R03SS050	11,500	.4528	11,999	.4724	1.79	.500	3.59	3.86	1.42	M
6372014	KTFS0473R03SS050	12,000	.4725	12,499	.4921	1.79	.500	3.66	3.94	1.50	N
6372015	KTFS0493R03SS050	12,500	.4922	12,999	.5117	1.79	.500	3.69	3.98	1.54	O
6372016	KTFS0512R03SS056	13,000	.5118	13,499	.5314	1.79	.563	3.80	4.09	1.61	P
6372017	KTFS0532R03SS056	13,500	.5315	13,999	.5511	1.79	.563	3.83	4.13	1.65	Q
6372018	KTFS0552R03SS056	14,000	.5512	14,499	.5708	1.79	.563	3.89	4.21	1.73	R
6372019	KTFS0571R03SS063	14,500	.5709	14,999	.5905	1.91	.625	4.12	4.45	1.77	S
6372020	KTFS0591R03SS063	15,000	.5906	15,999	.6299	1.91	.625	4.22	4.57	1.89	T
6372021	KTFS0630R03SS063	16,000	.6300	16,999	.6692	1.91	.625	4.28	4.65	2.01	U
6372022	KTFS0670R03SS075	17,000	.6693	17,999	.7086	2.00	.750	4.57	4.96	2.13	V
6389273	KTFS0709R03SS075	18,000	.7087	18,999	.7480	2.00	.750	4.67	5.08	2.24	W
6389274	KTFS0749R03SS075	19,000	.7481	19,999	.7873	2.00	.750	4.76	5.20	2.36	X

88	90	47	4	96

Modular Drills

KENTIP™ FS • 5 X D • STRAIGHT ROUND SHANK



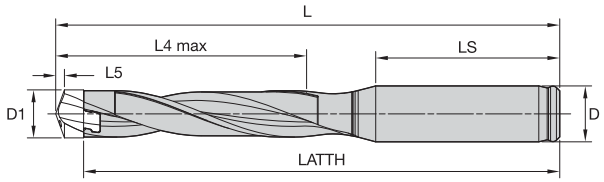
NOTE: L5 is dependent on the insert.

		D1		D1 max							
order number	catalog number	mm	in	mm	in	LS	D	LATTH	L	L4 max	SSC
6389407	KTFS0237R05SS031	6,000	.2363	6,299	.2480	1.52	.313	3.09	3.23	1.26	A
6389408	KTFS0249R05SS031	6,300	.2481	6,599	.2598	1.52	.313	3.12	3.27	1.30	B
6389409	KTFS0260R05SS031	6,600	.2599	6,999	.2755	1.52	.313	3.20	3.35	1.38	C
6389410	KTFS0276R05SS031	7,000	.2756	7,499	.2952	1.52	.313	3.30	3.46	1.50	D
6389421	KTFS0296R05SS031	7,500	.2953	7,999	.3149	1.52	.313	3.46	3.63	1.58	E
6389422	KTFS0315R05SS038	8,000	.3150	8,499	.3346	1.59	.375	3.64	3.82	1.69	F
6389423	KTFS0335R05SS038	8,500	.3347	8,999	.3543	1.59	.375	3.70	3.90	1.77	G
6389424	KTFS0355R05SS038	9,000	.3544	9,499	.3739	1.59	.375	3.81	4.02	1.89	H
6389425	KTFS0375R05SS038	9,500	.3740	9,999	.3936	1.59	.375	3.88	4.09	1.97	I
6372023	KTFS0394R05SS044	10,000	.3937	10,499	.4133	1.67	.438	4.14	4.37	2.09	J
6372024	KTFS0414R05SS044	10,500	.4134	10,999	.4330	1.67	.438	4.21	4.45	2.17	K
6372025	KTFS0434R05SS044	11,000	.4331	11,499	.4527	1.67	.438	4.32	4.57	2.28	L
6372026	KTFS0453R05SS050	11,500	.4528	11,999	.4724	1.79	.500	4.54	4.80	2.36	M
6372027	KTFS0473R05SS050	12,000	.4725	12,499	.4921	1.79	.500	4.65	4.92	2.48	N
6372028	KTFS0493R05SS050	12,500	.4922	12,999	.5117	1.79	.500	4.72	5.00	2.56	O
6372029	KTFS0512R05SS056	13,000	.5118	13,499	.5314	1.79	.563	4.86	5.16	2.68	P
6372030	KTFS0532R05SS056	13,500	.5315	13,999	.5511	1.79	.563	4.93	5.24	2.76	Q
6372051	KTFS0552R05SS056	14,000	.5512	14,499	.5708	1.79	.563	5.04	5.35	2.87	R
6372052	KTFS0571R05SS063	14,500	.5709	14,999	.5905	1.91	.625	5.30	5.63	2.95	S
6372053	KTFS0591R05SS063	15,000	.5906	15,999	.6299	1.91	.625	5.48	5.83	3.15	T
6372054	KTFS0630R05SS063	16,000	.6300	16,999	.6692	1.91	.625	5.62	5.98	3.35	U
6372055	KTFS0670R05SS075	17,000	.6693	17,999	.7086	2.00	.750	5.99	6.38	3.54	V
6389275	KTFS0709R05SS075	18,000	.7087	18,999	.7480	2.00	.750	6.17	6.57	3.74	W
6389276	KTFS0749R05SS075	19,000	.7481	19,999	.7873	2.00	.750	6.34	6.77	3.94	X

				NOVO
88	90	47	4	96

Modular Drills

KENTIP™ FS • 8 X D • STRAIGHT ROUND SHANK



NOTE: L5 is dependent on the insert.

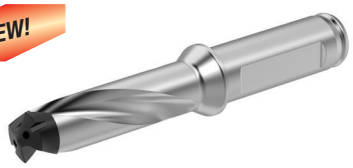
		D1		D1 max							
order number	catalog number	mm	in	mm	in	LS	D	LATTH	L	L4 max	SSC
6389426	KTFS0237R08SS031	6,000	.2363	6,299	.2480	1.52	.313	3.80	3.94	1.97	A
6389427	KTFS0249R08SS031	6,300	.2481	6,599	.2598	1.52	.313	3.91	4.06	2.09	B
6389428	KTFS0260R08SS031	6,600	.2599	6,999	.2755	1.52	.313	4.02	4.17	2.21	C
6389429	KTFS0276R08SS031	7,000	.2756	7,499	.2952	1.52	.313	4.17	4.33	2.36	D
6389430	KTFS0296R08SS031	7,500	.2953	7,999	.3149	1.52	.313	4.40	4.58	2.52	E
6389431	KTFS0315R08SS038	8,000	.3150	8,499	.3346	1.59	.375	4.62	4.80	2.68	F
6389432	KTFS0335R08SS038	8,500	.3347	8,999	.3543	1.59	.375	4.77	4.96	2.84	G
6389433	KTFS0355R08SS038	9,000	.3544	9,499	.3739	1.59	.375	4.91	5.12	2.99	H
6389434	KTFS0375R08SS038	9,500	.3740	9,999	.3936	1.59	.375	5.06	5.28	3.15	I
6372056	KTFS0394R08SS044	10,000	.3937	10,499	.4133	1.67	.438	5.36	5.59	3.31	J
6372057	KTFS0414R08SS044	10,500	.4134	10,999	.4330	1.67	.438	5.51	5.75	3.47	K
6372058	KTFS0434R08SS044	11,000	.4331	11,499	.4527	1.67	.438	5.65	5.91	3.62	L
6372059	KTFS0453R08SS050	11,500	.4528	11,999	.4724	1.79	.500	5.96	6.22	3.78	M
6372060	KTFS0473R08SS050	12,000	.4725	12,499	.4921	1.79	.500	6.10	6.38	3.94	N
6372062	KTFS0493R08SS050	12,500	.4922	12,999	.5117	1.79	.500	6.25	6.54	4.09	O
6372063	KTFS0512R08SS056	13,000	.5118	13,499	.5314	1.79	.563	6.44	6.73	4.25	P
6372064	KTFS0532R08SS056	13,500	.5315	13,999	.5511	1.79	.563	6.58	6.89	4.41	Q
6372065	KTFS0552R08SS056	14,000	.5512	14,499	.5708	1.79	.563	6.73	7.05	4.57	R
6372066	KTFS0571R08SS063	14,500	.5709	14,999	.5905	1.91	.625	7.07	7.40	4.72	S
6372067	KTFS0591R08SS063	15,000	.5906	15,999	.6299	1.91	.625	7.37	7.72	5.04	T
6372068	KTFS0630R08SS063	16,000	.6300	16,999	.6692	1.91	.625	7.63	7.99	5.35	U
6372069	KTFS0670R08SS075	17,000	.6693	17,999	.7086	2.00	.750	8.11	8.50	5.67	V
6389277	KTFS0709R08SS075	18,000	.7087	18,999	.7480	2.00	.750	8.41	8.82	5.98	W
6389278	KTFS0749R08SS075	19,000	.7481	19,999	.7873	2.00	.750	8.70	9.13	6.30	X

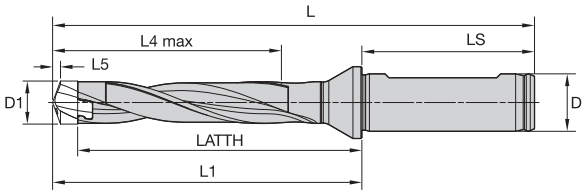
				NOVO
88	90	47	4	96

Modular Drills

KENTIP™ FS • 3 X D • FLANGED SHANK WITH FLAT

NEW!





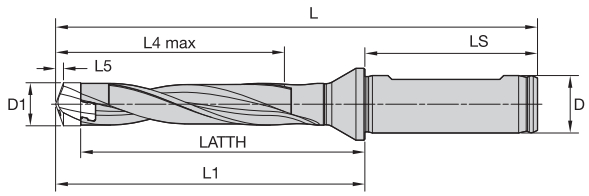
NOTE: L5 is dependent on the insert.

order number	catalog number	D1 mm	D1 in	D1 max mm	D1 max in	LS	D	LATTH	L	L1	L4 max	SSC
6688250	KTFS0315R03SCF050	8,000	.3150	8,499	.3346	1.77	.500	1.67	3.62	1.85	1.02	F
6688271	KTFS0335R03SCF050	8,500	.3347	8,999	.3543	1.77	.500	1.70	3.66	1.89	1.06	G
6688272	KTFS0355R03SCF050	9,000	.3544	9,499	.3739	1.77	.500	1.76	3.74	1.97	1.14	H
6688273	KTFS0375R03SCF050	9,500	.3740	9,999	.3936	1.77	.500	1.79	3.78	2.01	1.18	I
6688274	KTFS0394R03SCF063	10,000	.3937	10,499	.4133	1.89	.625	1.98	4.09	2.20	1.26	J
6688275	KTFS0414R03SCF063	10,500	.4134	10,999	.4330	1.89	.625	2.00	4.13	2.24	1.30	K
6688276	KTFS0434R03SCF063	11,000	.4331	11,499	.4527	1.89	.625	2.07	4.21	2.32	1.38	L
6688277	KTFS0453R03SCF063	11,500	.4528	11,999	.4724	1.89	.625	2.10	4.25	2.36	1.42	M
6688278	KTFS0473R03SCF063	12,000	.4725	12,499	.4921	1.89	.625	2.17	4.33	2.44	1.50	N
6688279	KTFS0493R03SCF063	12,500	.4922	12,999	.5117	1.89	.625	2.20	4.37	2.48	1.54	O
6688280	KTFS0512R03SCF063	13,000	.5118	13,499	.5314	1.89	.625	2.26	4.45	2.56	1.61	P
6688291	KTFS0532R03SCF063	13,500	.5315	13,999	.5511	1.89	.625	2.29	4.49	2.60	1.65	Q
6688292	KTFS0552R03SCF063	14,000	.5512	14,499	.5708	1.89	.625	2.36	4.57	2.68	1.73	R
6688293	KTFS0571R03SCF063	14,500	.5709	14,999	.5905	1.89	.625	2.40	4.61	2.72	1.77	S
6688294	KTFS0591R03SCF075	15,000	.5906	15,999	.6299	1.97	.750	2.61	4.92	2.95	1.89	T
6688295	KTFS0630R03SCF075	16,000	.6300	16,999	.6692	1.97	.750	2.70	5.04	3.07	2.01	U
6688296	KTFS0670R03SCF075	17,000	.6693	17,999	.7086	1.97	.750	2.80	5.16	3.19	2.13	V
6688297	KTFS0709R03SCF100	18,000	.7087	18,999	.7480	2.20	1.000	3.02	5.63	3.43	2.24	W
6688298	KTFS0749R03SCF100	19,000	.7481	19,999	.7873	2.20	1.000	3.11	5.75	3.54	2.36	X
6389333	KTFS0788R03SCF100	20,000	.7874	20,999	.8267	2.20	1.000	3.20	5.87	3.66	2.48	Y
6389334	KTFS0827R03SCF100	21,000	.8268	21,999	.8661	2.20	1.000	3.30	5.98	3.78	2.60	Z
6389335	KTFS0867R03SCF100	22,000	.8662	22,999	.9054	2.20	1.000	3.39	6.10	3.90	2.72	ZA
6389336	KTFS0906R03SCF100	23,000	.9055	23,999	.9448	2.20	1.000	3.49	6.22	4.02	2.84	ZB
6389337	KTFS0945R03SCF100	24,000	.9449	24,999	.9842	2.20	1.000	3.59	6.34	4.13	2.95	ZC
6389338	KTFS0985R03SCF100	25,000	.9843	26,000	1.0236	2.20	1.000	3.68	6.46	4.25	3.07	ZD

88 | 90 | 47 | 4 | 96

Modular Drills

KENTIP™ FS • 5 X D • FLANGED SHANK WITH FLAT



NOTE: L5 is dependent on the insert.

		D1		D1 max								
order number	catalog number	mm	in	mm	in	LS	D	LATTH	L	L1	L4 max	SSC
6688300	KTFS0315R05SCF050	8,000	.3150	8,499	.3346	1.77	.500	2.34	4.29	2.52	1.69	F
6688301	KTFS0335R05SCF050	8,500	.3347	8,999	.3543	1.77	.500	2.41	4.37	2.60	1.77	G
6688302	KTFS0355R05SCF050	9,000	.3544	9,499	.3739	1.77	.500	2.51	4.49	2.72	1.89	H
6688303	KTFS0375R05SCF050	9,500	.3740	9,999	.3936	1.77	.500	2.58	4.57	2.80	1.97	I
6688304	KTFS0394R05SCF063	10,000	.3937	10,499	.4133	1.89	.625	2.80	4.92	3.03	2.09	J
6688305	KTFS0414R05SCF063	10,500	.4134	10,999	.4330	1.89	.625	2.87	5.00	3.11	21.65	K
6688306	KTFS0434R05SCF063	11,000	.4331	11,499	.4527	1.89	.625	2.98	5.12	3.23	2.28	L
6688307	KTFS0453R05SCF063	11,500	.4528	11,999	.4724	1.89	.625	3.04	5.20	3.31	2.36	M
6688308	KTFS0473R05SCF063	12,000	.4725	12,499	.4921	1.89	.625	3.15	5.32	3.43	2.48	N
6688309	KTFS0493R05SCF063	12,500	.4922	12,999	.5117	1.89	.625	3.22	5.39	3.50	2.56	O
6688310	KTFS0512R05SCF063	13,000	.5118	13,499	.5314	1.89	.625	3.33	5.51	3.62	2.68	P
6688311	KTFS0532R05SCF063	13,500	.5315	13,999	.5511	1.89	.625	3.39	5.59	3.70	2.76	Q
6688312	KTFS0552R05SCF063	14,000	.5512	14,499	.5708	1.89	.625	3.50	5.71	3.82	2.87	R
6688313	KTFS0571R05SCF063	14,500	.5709	14,999	.5905	1.89	.625	3.57	5.79	3.90	2.95	S
6688314	KTFS0591R05SCF075	15,000	.5906	15,999	.6299	1.97	.750	3.87	6.18	4.21	3.15	T
6688315	KTFS0630R05SCF075	16,000	.6300	16,999	.6692	1.97	.750	4.04	6.38	4.41	3.35	U
6688316	KTFS0670R05SCF075	17,000	.6693	17,999	.7086	1.97	.750	4.22	6.57	4.61	3.54	V
6688317	KTFS0709R05SCF100	18,000	.7087	18,999	.7480	2.20	1.000	4.51	7.13	4.92	3.74	W
6688318	KTFS0749R05SCF100	19,000	.7481	19,999	.7873	2.20	1.000	4.69	7.32	5.12	3.94	X
6389339	KTFS0788R05SCF100	20,000	.7874	20,999	.8267	2.20	1.000	4.86	7.52	5.32	4.13	Y
6389340	KTFS0827R05SCF100	21,000	.8268	21,999	.8661	2.20	1.000	5.03	7.72	5.51	4.33	Z
6389341	KTFS0867R05SCF100	22,000	.8662	22,999	.9054	2.20	1.000	5.20	7.91	5.71	4.53	ZA
6389342	KTFS0906R05SCF100	23,000	.9055	23,999	.9448	2.20	1.000	5.38	8.11	5.91	4.72	ZB
6389343	KTFS0945R05SCF100	24,000	.9449	24,999	.9842	2.20	1.000	5.56	8.31	6.10	4.92	ZC
6389344	KTFS0985R05SCF100	25,000	.9843	26,000	1.0236	2.20	1.000	5.73	8.50	6.30	5.12	ZD

88	90	47	4	96

Modular Drills

KENTIP™ FS • 8 X D • FLANGED SHANK WITH FLAT

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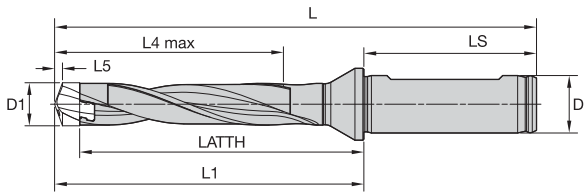


NOTE: L5 is dependent on the insert.

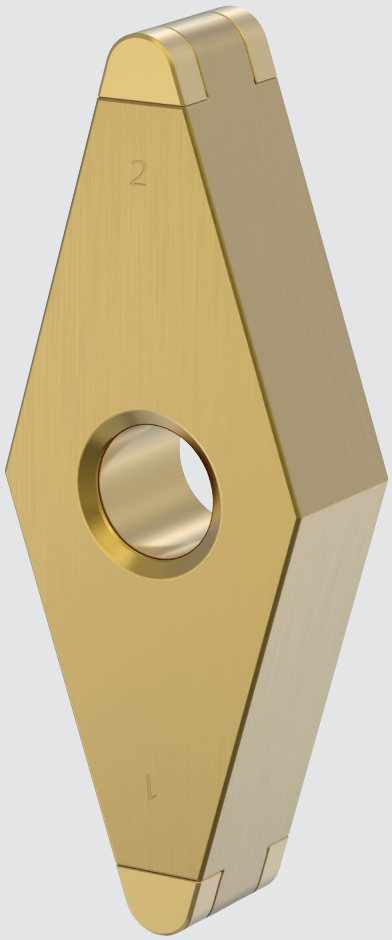
order number	catalog number	D1 mm	D1 in	D1 max mm	D1 max in	LS	D	LATTH	L	L1	L4 max	SSC
6688319	KTFS0315R08SCF050	8,000	.3150	8,499	.3346	1.77	.500	3.32	5.28	3.50	3.32	F
6688320	KTFS0335R08SCF050	8,500	.3347	8,999	.3543	1.77	.500	3.47	5.43	3.66	3.47	G
6688331	KTFS0355R08SCF050	9,000	.3544	9,499	.3739	1.77	.500	3.61	5.59	3.82	3.61	H
6688332	KTFS0375R08SCF050	9,500	.3740	9,999	.3936	1.77	.500	3.76	5.75	3.98	3.76	I
6688333	KTFS0394R08SCF063	10,000	.3937	10,499	.4133	1.89	.625	4.02	6.14	4.25	4.02	J
6688334	KTFS0414R08SCF063	10,500	.4134	10,999	.4330	1.89	.625	4.17	6.30	4.41	4.17	K
6688335	KTFS0434R08SCF063	11,000	.4331	11,499	.4527	1.89	.625	4.32	6.46	4.57	4.32	L
6688336	KTFS0453R08SCF063	11,500	.4528	11,999	.4724	1.89	.625	4.46	6.61	4.72	4.46	M
6688337	KTFS0473R08SCF063	12,000	.4725	12,499	.4921	1.89	.625	4.61	6.77	4.88	4.61	N
6688338	KTFS0493R08SCF063	12,500	.4922	12,999	.5117	1.89	.625	4.76	6.93	5.04	4.76	O
6688339	KTFS0512R08SCF063	13,000	.5118	13,499	.5314	1.89	.625	4.90	7.09	5.20	4.90	P
6688340	KTFS0532R08SCF063	13,500	.5315	13,999	.5511	1.89	.625	5.05	7.24	5.35	5.05	Q
6688341	KTFS0552R08SCF063	14,000	.5512	14,499	.5708	1.89	.625	5.19	7.40	5.51	5.19	R
6688342	KTFS0571R08SCF063	14,500	.5709	14,999	.5905	1.89	.625	5.34	7.56	5.67	5.34	S
6688343	KTFS0591R08SCF075	15,000	.5906	15,999	.6299	1.97	.750	5.76	8.07	6.10	5.76	T
6688344	KTFS0630R08SCF075	16,000	.6300	16,999	.6692	1.97	.750	6.05	8.39	6.42	6.05	U
6688345	KTFS0670R08SCF075	17,000	.6693	17,999	.7086	1.97	.750	6.34	8.70	6.73	6.34	V
6688346	KTFS0709R08SCF100	18,000	.7087	18,999	.7480	2.20	1.000	6.76	9.37	7.17	6.76	W
6688347	KTFS0749R08SCF100	19,000	.7481	19,999	.7873	2.20	1.000	7.05	9.69	7.48	7.05	X
6389345	KTFS0788R08SCF100	20,000	.7874	20,999	.8267	2.20	1.000	7.34	10.00	7.80	6.61	Y
6389346	KTFS0827R08SCF100	21,000	.8268	21,999	.8661	2.20	1.000	7.63	10.32	8.11	6.93	Z
6389347	KTFS0867R08SCF100	22,000	.8662	22,999	.9054	2.20	1.000	7.92	10.63	8.43	7.24	ZA
6389348	KTFS0906R08SCF100	23,000	.9055	23,999	.9448	2.20	1.000	8.22	10.94	8.74	7.56	ZB
6389349	KTFS0945R08SCF100	24,000	.9449	24,999	.9842	2.20	1.000	8.51	11.26	9.06	7.87	ZC
6389350	KTFS0985R08SCF100	25,000	.9843	26,000	1.0236	2.20	1.000	8.80	11.57	9.37	8.19	ZD

88 | 90 | 47 | 4 | 96

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

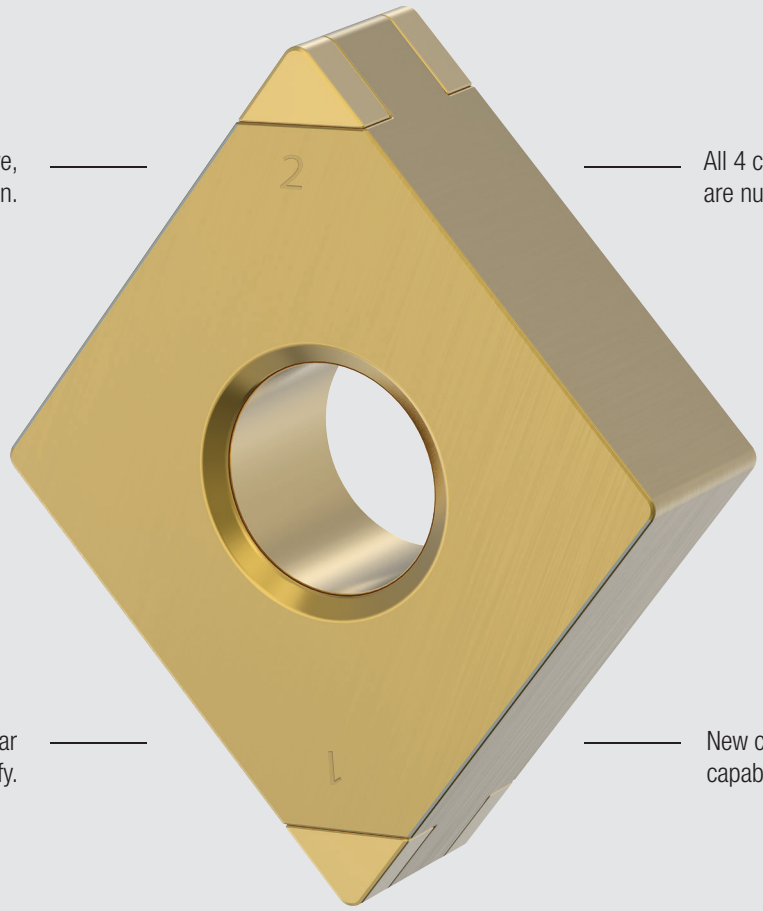
KBH10B

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, carburized and nitrided irons, and some hard coatings.

Available in a multi-tip format.



KBH20B™

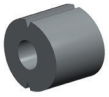
Composition: A low content PcBN grade with a PVD TiN/TiAlN/TiN coating for added wear resistance and enhanced wear identification.

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

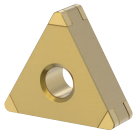
ISO KENLOC™ • DOUBLE-SIDED PCBN • TOOL SELECTION GUIDE

Grade	Smooth Cut Metric/Inch 	Varying Depth of Cut Metric/Inch 	Lightly Interrupted Cut Metric/Inch 
KBH10B™ 	S01015/S0415		
	S01225/S0525		
KBH20B™ 		S01015/S0415	
		S01225/S0525	

H05 H10 H15 H20

Advanced Material Inserts

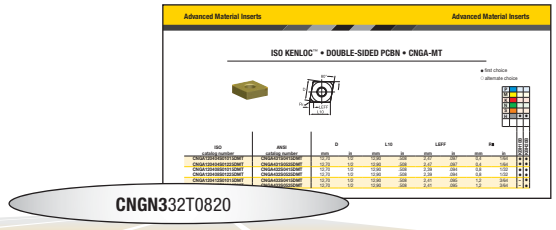
ISO KENLOC™ • DOUBLE-SIDED PCBN • APPLICATION DATA

Insert Shape	Insert size	Geometry	Corner Radius	Starting Conditions		Cutting Parameter				
	in (mm)	in (mm)	in (mm)	in (mm)		0	.0040 (0,1)	.0080 (0,2)	.0120 (0,3)	.016 (0,4)
CNGA 	1/2 (12,7)	**S0415DMT (S01015DMT)**	.016 (0,4)	.0031 (0,08)	DOC [in (mm)]					
				.0031 (0,08)	Feed [inch/rev (mm/rev)]					
			.031 (0,8)	.0040 (0,10)	DOC [in (mm)]					
				.0040 (0,10)	Feed [inch/rev (mm/rev)]					
			.047 (1,2)	.0047 (0,12)	DOC [in (mm)]					
				.0055 (0,14)	Feed [inch/rev (mm/rev)]					
		S0525DMT (S01225DMT)	.016 (0,4)	.0040 (0,10)	DOC [in (mm)]					
				.0047 (0,12)	Feed [inch/rev (mm/rev)]					
			.031 (0,8)	.0047 (0,12)	DOC [in (mm)]					
				.0059 (0,15)	Feed [inch/rev (mm/rev)]					
			.047 (1,2)	.0059 (0,15)	DOC [in (mm)]					
				.0071 (0,18)	Feed [inch/rev (mm/rev)]					
DNGA 	1/2 (12,7)	**S0415DMT (S01015DMT)**	.016 (0,4)	.0031 (0,08)	DOC [in (mm)]					
				.0031 (0,08)	Feed [inch/rev (mm/rev)]					
			.031 (0,8)	.0040 (0,10)	DOC [in (mm)]					
				.0040 (0,10)	Feed [inch/rev (mm/rev)]					
		S0525DMT (S01225DMT)	.016 (0,4)	.0040 (0,10)	DOC [in (mm)]					
				.0047 (0,12)	Feed [inch/rev (mm/rev)]					
			.031 (0,8)	.0047 (0,12)	DOC [in (mm)]					
				.0059 (0,15)	Feed [inch/rev (mm/rev)]					
			.047 (1,2)	.0059 (0,15)	DOC [in (mm)]					
				.0071 (0,18)	Feed [inch/rev (mm/rev)]					
TNGA 	3/8 (9,52)	**S0415DMT (S01015DMT)**	.016 (0,4)	.0031 (0,08)	DOC [in (mm)]					
				.0031 (0,08)	Feed [inch/rev (mm/rev)]					
			.031 (0,8)	.0040 (0,10)	DOC [in (mm)]					
				.0040 (0,10)	Feed [inch/rev (mm/rev)]					
		S0525DMT (S01225DMT)	.031 (0,8)	.0047 (0,12)	DOC [in (mm)]					
				.0059 (0,15)	Feed [inch/rev (mm/rev)]					
VNGA 	3/8 (9,52)	**S0415DMT (S01015DMT)**	.016 (0,4)	.0027 (0,07)	DOC [in (mm)]					
				.0027 (0,07)	Feed [inch/rev (mm/rev)]					
			.031 (0,8)	.0031 (0,08)	DOC [in (mm)]					
				.0031 (0,08)	Feed [inch/rev (mm/rev)]					
		S0525DMT (S01225DMT)	.016 (0,4)	.0031 (0,08)	DOC [in (mm)]					
				.0031 (0,08)	Feed [inch/rev (mm/rev)]					
			.031 (0,8)	.0040 (0,10)	DOC [in (mm)]					
				.0040 (0,10)	Feed [inch/rev (mm/rev)]					
			.047 (1,2)	.0047 (0,12)	DOC [in (mm)]					
				.0059 (0,15)	Feed [inch/rev (mm/rev)]					

Advanced Material Inserts

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

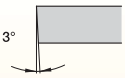
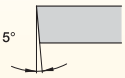
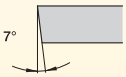
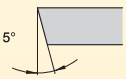
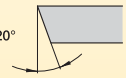
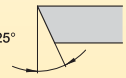
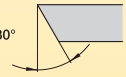
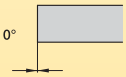
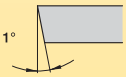
Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.



C — Insert Shape

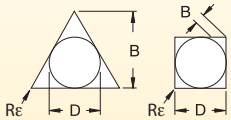
H	Hexagon 120°	
O	Octagon 135°	
P	Pentagon 108°	
R	Round —	
S	Square 90°	
T	Triangular 60°	
C D E M V	Rhomboid 80° 55° 75° 86° 35°	
W	Trigon 80° with enlarged corner angles	
L	Rectangular 90°	
A B N/K	Parallelogram 85° 82° 55°	

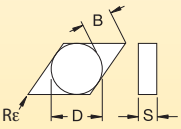
N — Insert Clearance Angle

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

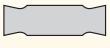
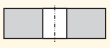
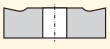
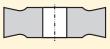
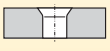
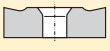
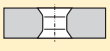
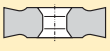
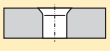
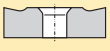
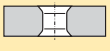
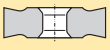
Tolerances apply prior to edge prep and coating





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

3 — Size

"D" inch	"D" inch	Code for inch cutting edge length "L10" C	D	R	S	T	V	W
1.2 (5)	5/32	S4	04	03	03	06	—	—
1.5 (6)	3/16	04	05	04	04	08	08	S3
1.8 (7)	7/32	05	06	05	05	09	09	03
—	.236	—	—	06	—	—	—	—
2	1/4	06	07	06	06	11	11	04
2.5	5/16	08	09	07	07	13	13	05
—	.315	—	—	08	—	—	—	—
3	3/8	09	11	09	09	16	16	06
—	.394	—	—	10	—	—	—	—
3.5	7/16	11	13	11	11	19	19	07
—	.472	—	—	12	—	—	—	—
4	1/2	12	15	12	12	22	22	08
4.5	9/16	14	17	14	14	24	24	09
5	5/8	16	19	15	15	27	27	10
—	.630	—	—	16	—	—	—	—
5.5	11/16	17	21	17	17	30	30	11
6	3/4	19	23	19	19	33	33	13
—	.787	—	—	20	—	—	—	—
7	7/8	22	27	22	22	38	38	15
—	.984	—	—	25	—	—	—	—
8	1	25	31	25	25	44	44	17
10	1-1/4	32	38	31	31	54	54	21
—	1.260	—	—	32	—	—	—	—

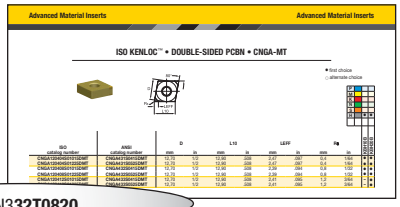
tolerance class*	tolerance on "D"	tolerance on "B"	tolerance on "S"
C	±.0010"	±.0005"	±.001"
H	±.0005"	±.0005"	±.001"
E	±.0010"	±.0010"	±.001"
G	±.0010"	±.0010"	±.005"
M	See tables on next page		±.005"
U	See tables on next page		±.005"

*Tolerances apply prior to edge prep and coating.

Advanced Material Inserts

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

(continued)



CNGN3**32T0820**

3	2		T	08	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)*

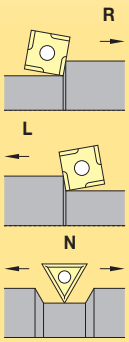
symbol	thick-ness
inch	inch
.5 (1)	1/32
.6	.040
1 (2)	1/16
1.2	5.64
1.5 (3)	3/32
2	1/8
2.5	5/32
3	3/16
3.5	7/32
4	1/4
5	5/16
6	3/8
7	7/16
8	1/2

symbol	corner radius
inch	inch
X0	.0015
0	.004
.5	.008
1	1/64
2	1/32
3	3/64
4	1/16
5	5/64
6	3/32
7	7/64
8	1/8
—	round insert
—	

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.

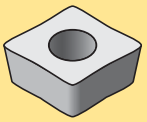
symbol ANSI	inch size
04	.004
08	.008

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

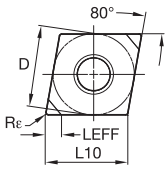


"D"	± Tolerance on "D"			
	Class M Tolerance			Class U Tolerance
	Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C
inch	inch	inch	inch	inch
5/32	.002	–	–	–
3/16	.002	–	–	.003
7/32	.002	.002	.002	.003
1/4	.002	.002	.002	.003
5/16	.002	.002	.002	.003
3/8	.002	.002	.002	.003
7/16	.003	.003	.003	.005
1/2	.003	.003	.003	.005
9/16	.003	.003	.003	.005
5/8	.004	.004	.004	.007
11/16	.004	.004	.004	.007
3/4	.004	.004	.004	.007
7/8	.005	–	–	.010
1	.005	–	–	.010
1 1/4	.006	–	–	.010

"D"	± Tolerance on "B"			
	Class M Tolerance			Class U Tolerance
	Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C
inch	inch	inch	inch	inch
5/32	.003	–	–	–
3/16	.003	–	–	.005
7/32	.003	.004	–	.005
1/4	.003	.004	–	.005
5/16	.003	.004	–	.005
3/8	.003	.004	.007	.005
7/16	.005	.006	–	–
1/2	.005	.006	.010	.008
9/16	.005	.006	–	–
5/8	.006	.007	–	.011
11/16	.006	.007	–	.011
3/4	.006	.007	–	.011
7/8	.006	–	–	.015
1	.007	–	–	.015
1 1/4	.008	–	–	.015

Advanced Material Inserts

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

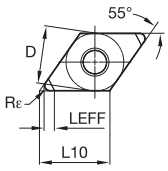


● first choice
○ alternate choice

P	
M	
K	
N	
S	
H	● ●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	LEFF mm	LEFF in	Rε mm	Rε in	KBH10B	KBH20B
CNGA120404S01015DMT	CNGA431S0415DMT	12,70	1/2	12,90	.508	2,47	.097	0,4	1/64	●	●
CNGA120404S01225DMT	CNGA431S0525DMT	12,70	1/2	12,90	.508	2,47	.097	0,4	1/64	●	●
CNGA120408S01015DMT	CNGA432S0415DMT	12,70	1/2	12,90	.508	2,39	.094	0,8	1/32	●	●
CNGA120408S01225DMT	CNGA432S0525DMT	12,70	1/2	12,90	.508	2,39	.094	0,8	1/32	●	●
CNGA120412S01015DMT	CNGA433S0415DMT	12,70	1/2	12,90	.508	2,41	.095	1,2	3/64	–	●
CNGA120412S01225DMT	CNGA433S0525DMT	12,70	1/2	12,90	.508	2,41	.095	1,2	3/64	–	●

ISO KENLOC • DOUBLE-SIDED PCBN • DNGA-MT



● first choice
○ alternate choice

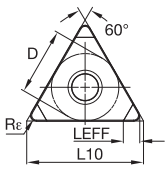
P	
M	
K	
N	
S	
H	● ●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	LEFF mm	LEFF in	Rε mm	Rε in	KBH10B	KBH20B
DNGA150404S01015DMT	DNGA431S0415DMT	12,70	1/2	15,50	.610	2,64	.104	0,4	1/64	●	●
DNGA150404S01225DMT	DNGA431S0525DMT	12,70	1/2	15,50	.610	2,64	.104	0,4	1/64	●	●
DNGA150408S01015DMT	DNGA432S0415DMT	12,70	1/2	15,50	.610	2,28	.090	0,8	1/32	●	●
DNGA150408S01225DMT	DNGA432S0525DMT	12,70	1/2	15,50	6.104	2,28	.090	0,8	1/32	●	●
DNGA150412S01225DMT	DNGA433S0525DMT	12,70	1/2	15,50	.610	2,25	.089	1,2	3/64	–	●
DNGA150604S01015DMT	DNGA441S0415DMT	12,70	1/2	15,50	.610	2,64	.104	0,4	1/64	●	●
DNGA150604S01225DMT	DNGA441S0525DMT	12,70	1/2	15,50	.610	2,64	.104	0,4	1/64	●	●
DNGA150608S01015DMT	DNGA442S0415DMT	12,70	1/2	15,50	.610	2,28	.090	0,8	1/32	●	●
DNGA150608S01225DMT	DNGA442S0525DMT	12,70	1/2	15,50	.610	2,28	.090	0,8	1/32	●	●
DNGA150612S01015DMT	DNGA443S0415DMT	12,70	1/2	15,50	.610	2,25	.089	1,2	3/64	–	●
DNGA150612S01225DMT	DNGA443S0525DMT	12,70	1/2	15,50	.610	2,26	.089	1,2	3/64	–	●

				NOVO
89	90	58	4	96

Advanced Material Inserts

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

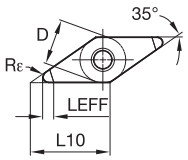


● first choice
○ alternate choice

P		
M		
K		
N		
S		
H	●	●

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	LEFF mm	LEFF in	Rε mm	Rε in	KBH10B	KBH20B
TNGA160404S01015DMT	TNGA331S0415DMT	9,53	3/8	16,50	.650	2,56	.101	0,4	1/64	●	●
TNGA160408S01015DMT	TNGA332S0415DMT	9,53	3/8	16,60	.650	2,27	.089	0,8	1/32	●	●
TNGA160408S01225DMT	TNGA332S0525DMT	9,53	3/8	16,50	.650	2,27	.089	0,8	1/32	●	●

ISO KENLOC • DOUBLE-SIDED PCBN • VNGA-MT



● first choice
○ alternate choice

P		
M		
K		
N		
S		
H	●	●

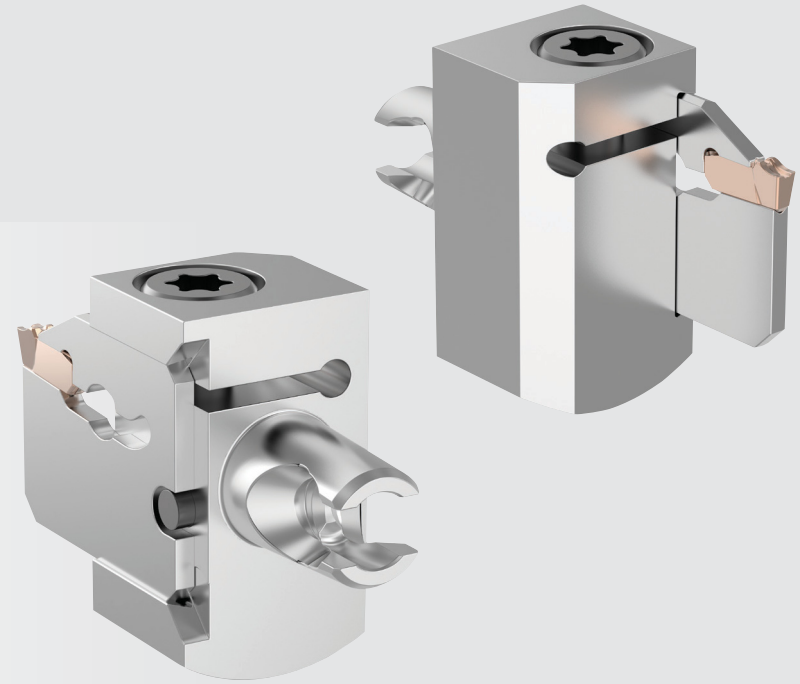
ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	LEFF mm	LEFF in	Rε mm	Rε in	KBH10B	KBH20B
VNGA160404S01015DMT	VNGA331S0415DMT	9,53	3/8	16,61	.654	3,01	.118	0,4	1/64	●	●
VNGA160404S01225DMT	VNGA331S0525DMT	9,53	3/8	16,61	.654	3,02	.119	0,4	1/64	●	●
VNGA160408S01015DMT	VNGA332S0415DMT	9,53	3/8	16,61	.654	2,15	.084	0,8	1/32	●	●
VNGA160408S01225DMT	VNGA332S0525DMT	9,53	3/8	16,61	.654	2,15	.084	0,8	1/32	●	●
VNGA160412S01225DMT	VNGA333S0525DMT	9,53	3/8	16,61	.654	2,32	.091	1,2	3/64	●	●

				NOVO
89	90	58	4	96

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:

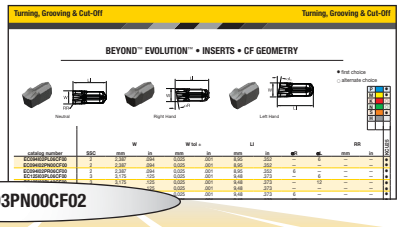
NEW! Cut-off blades compatible with the Kennametal KM™ Micro quick-change tooling system. The Kennametal quick-change heads reduce indexing and setup times on machines by up to 66%.

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™ • CATALOG NUMBERING SYSTEM • INSERTS

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



EC030M03PN00CF02

E	C	030	M	03	P	N	00	CF	02
Family Name	Insert Type	Cutting Edge Width	Unit	Seat Size (SSC)	Tolerance	Hand of Insert	Approach Angle	Chip-breaker	Corner Radius
Beyond™ Evolution™	**C** = Cut-Off	**Metric** = 1/10mm **Inch** = 1/100"	**M** = Metric **I** = Inch		**P** = Periphery Ground	**N** = Neutral **L** = Left Hand **R** = Right Hand	**00** = Neutral **06** = 6° **12** = 12°	**CL** = Cut-Off Low Feed **CF** = Cut-Off Fine **CM** = Cut-Off Medium **CR** = Cut-Off Rough	

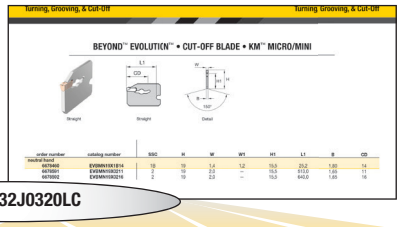
Seat Size (SSC)	mm	inch
1B	1,4	.055
02	2,0	.079
03	3,0	.118
04	4,0	.157
05	5,0	.197
06	6,0	.236
08	8,0	.315

Corner Radius	mm	inch
00	0,0	.000
01	0,1	.004
02	0,2	.008
04	0,4	.016

Turning, Grooving, & Cut-Off

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

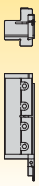
Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



EVBSCL32J0320LC

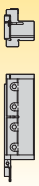
EV	BS	C	L	32	J	03	20	L	C
Family Name	Tool Style	Support Type	Hand of Pocket	Blade Height	Overall Length	Seat Size (SSC)	Max. Cutting Depth	Hand of Blade	Coolant
Beyond™ Evolution™	**BS** = Blade Standard 2 Pocket **BH** = Blade Heavy 1 Pocket **BM** = Blade KM™ Micro/ Mini	**C** = Reinforced	**N** =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

RH Blade RH Pocket

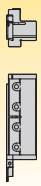


RH Blade LH Pocket

LH Blade RH Pocket



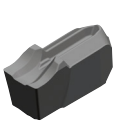
LH Blade LH Pocket



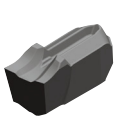
Turning, Grooving, & Cut-Off

BEYOND™ EVOLUTION™ • INSERTS • CF GEOMETRY

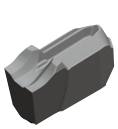
● first choice
○ alternate choice



Neutral



Right Hand

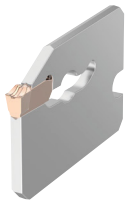


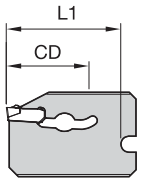
Left Hand

P		●
M		●
K		○
N		○
S		●
H		

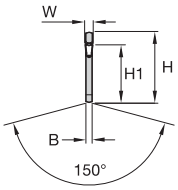
catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	LI mm	LI in	αR	αL	RR mm	RR in	KCU25
EC094I02PL06CF00	2	2,387	.094	0,025	.001	8,95	.352	–	6	–	–	●
EC094I02PN00CF00	2	2,387	.094	0,025	.001	8,95	.352	–	–	–	–	●
EC094I02PR06CF00	2	2,387	.094	0,025	.001	8,95	.352	6	–	–	–	●
EC125I03PL06CF00	3	3,175	.125	0,025	.001	9,48	.373	–	6	–	–	●
EC125I03PL12CF00	3	3,175	.125	0,025	.001	9,48	.373	–	12	–	–	●
EC125I03PN00CF00	3	3,175	.125	0,025	.001	9,48	.373	–	–	–	–	●
EC125I03PR06CF00	3	3,175	.125	0,025	.001	9,48	.373	6	–	–	–	●
EC125I03PR12CF00	3	3,175	.125	0,025	.001	9,48	.373	12	–	–	–	●
EC188I04PL06CF00	4	4,762	.188	0,025	.001	10,02	.395	–	6	–	–	●
EC188I04PN00CF00	4	4,761	.188	0,025	.001	10,02	.395	–	–	–	–	●
EC188I04PR06CF00	4	4,762	.188	0,025	.001	10,02	.395	6	–	–	–	●

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

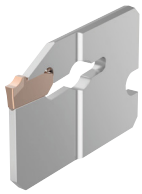

Straight

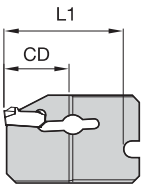


Straight

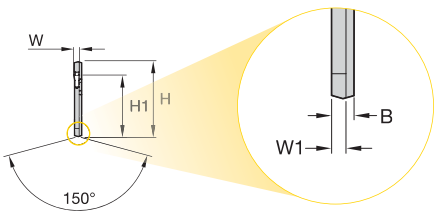


Detail


Reinforced



Reinforced



Detail

order number	catalog 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

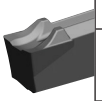
89	90	63	4	96

Turning, Grooving, & Cut-Off

BEYOND™ EVOLUTION™ • RECOMMENDED FEED RATES

● first choice
○ alternate choice

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Geometry	Description	Insert Geometry	Seat Size (SSC)	Corner Radius in (mm)	Starting Conditions in (mm)	Cut-Off Feed Rates inch/rev (mm/rev) .002 (0,05) – .004 (0,10) – .006 (0,15) – .008 (0,20) – .010 (0,25) – .012 (0,30) – .014 (0,35) – .016 (0,40)
CF	First choice in stainless steel, non-ferrous, and high-temperature materials. Apply also press-to-size inserts in steel where smooth cutting is present or precision-ground inserts for applications with thin walls.		1B	0.000 (0,0)	0.002 (0,05)	
				0.004 (0,1)	0.002 (0,06)	
			2	0.000 (0,0)	0.002 (0,06)	
				0.008 (0,2)	0.003 (0,07)	
			3	0.000 (0,0)	0.003 (0,08)	
				0.008 (0,2)	0.004 (0,09)	
			4	0.000 (0,0)	0.003 (0,08)	
				0.008 (0,2)	0.004 (0,11)	
			5	0.000 (0,0)	0.004 (0,09)	
				0.012 (0,3)	0.005 (0,13)	

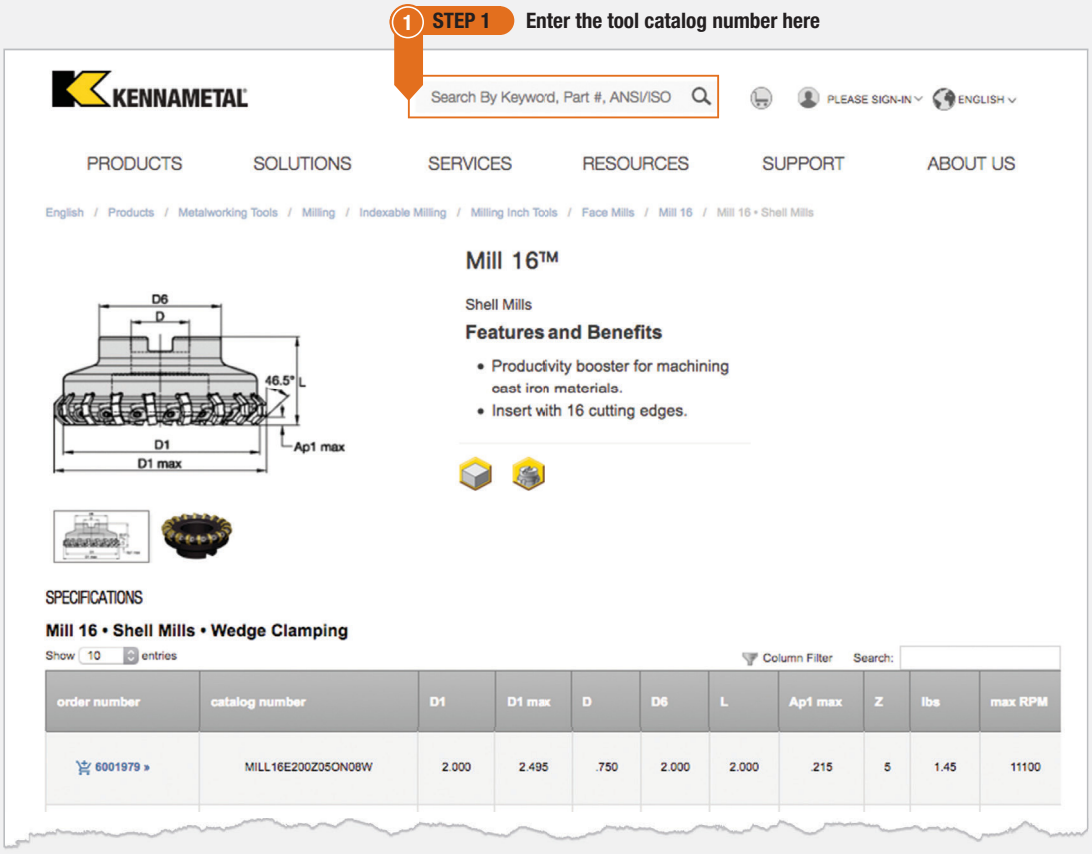
NOTE: For cut-off inserts with a lead angle, maximum feed rate should be reduced by up to 40%. For more information on how to select a geometry reference, see the Kennametal Master Catalog 2018, Volume I, page C12.

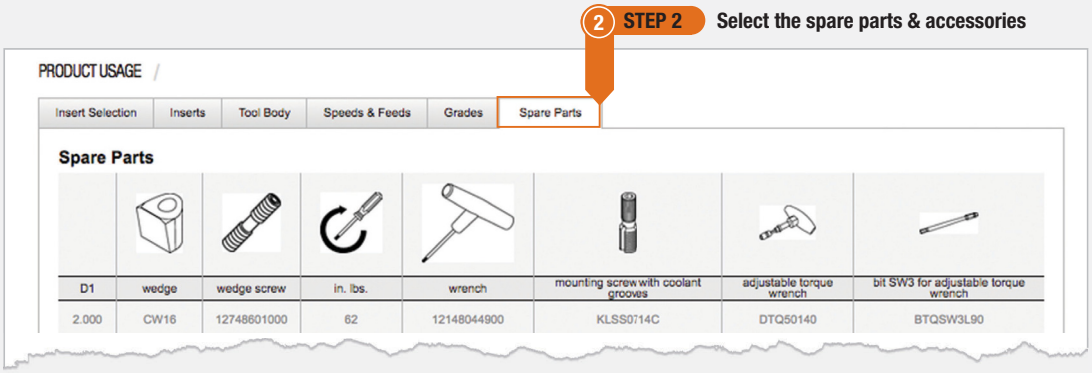
Maximum Feed Rate Values

Data above is for P and K material groups. **Maximum** feed rates should be adjusted by multiplying max feed rate values by following factors for shown material groups.

Material Group	Feed Factor
M	.8
N	1.2
S	.8
H	.5

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

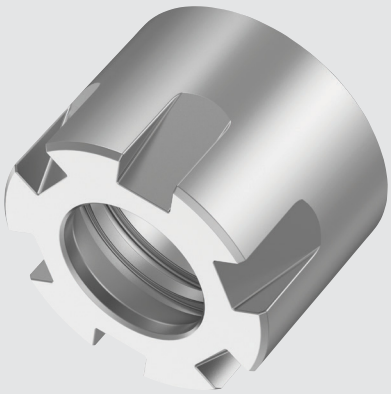
POWERED BY NOVO

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.

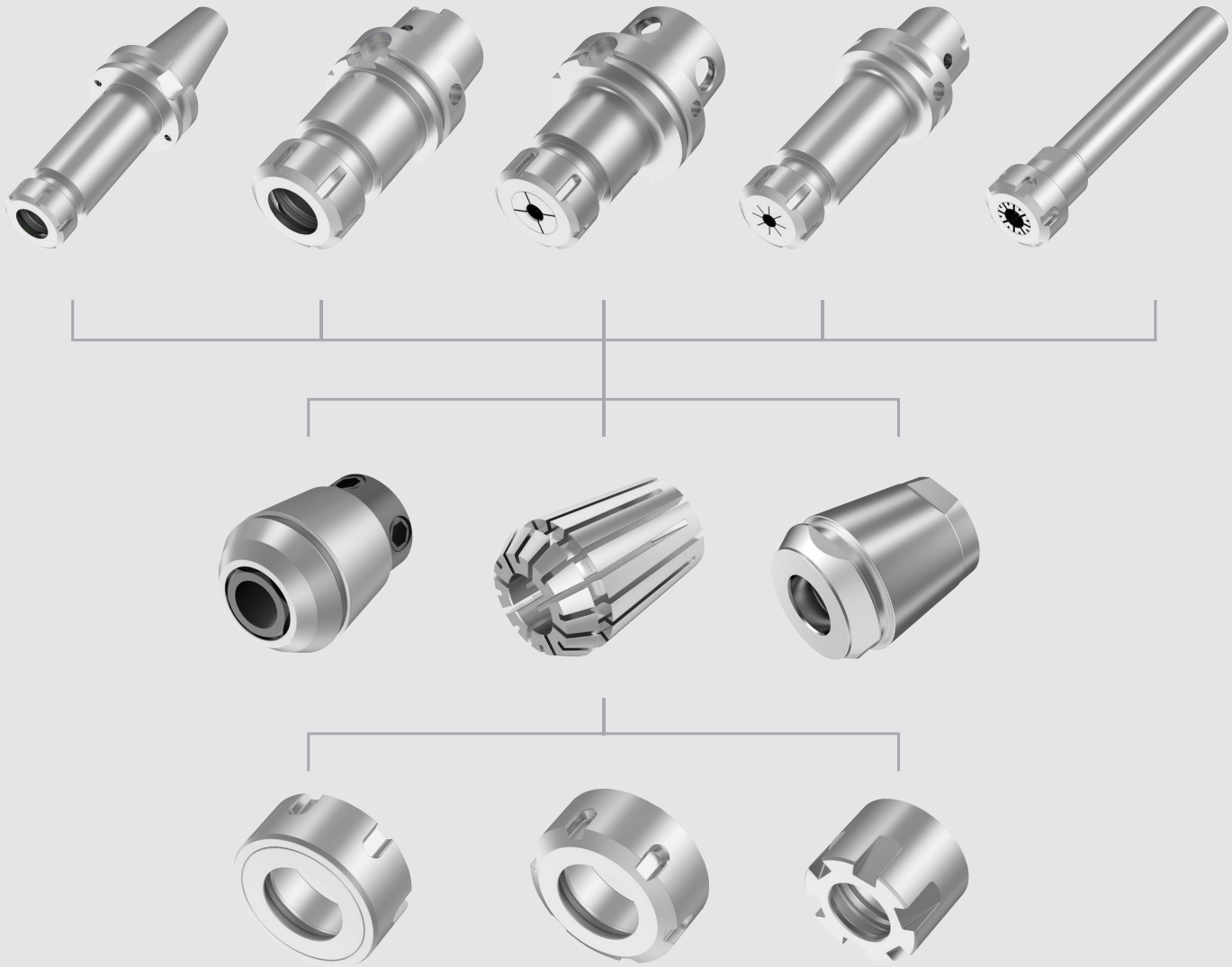
The newly designed solid locknut is balanced-by-design.

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.

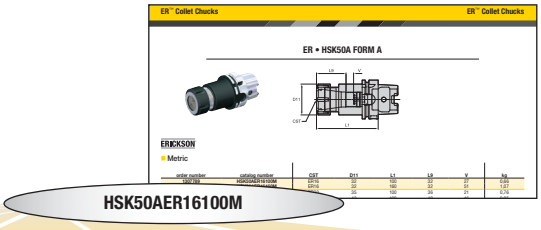
All ER collet chucks are RFID ready for standard ISO data carrier, and ER collect chucks are balanced to G2.5 at 20,000 RPM.

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 • CATALOG NUMBERING SYSTEM

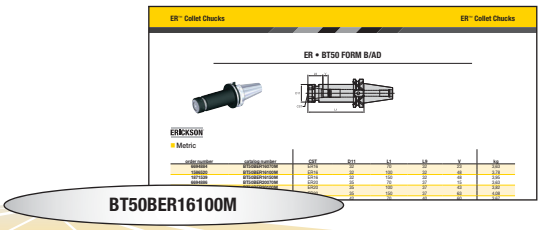
Each character in our catalog number signifies a specific trait of that product.
Use the following key columns and corresponding images to easily identify which attributes apply.



HSK50AER16100M

HSK	50	A	ER	16	100	M
Shank Style	System Size	Adapter 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 • CATALOG NUMBERING SYSTEM



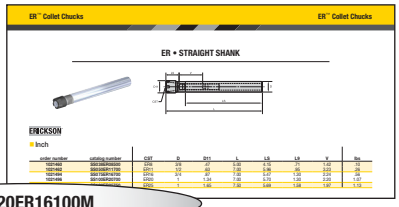
BT50BER16100M

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 • CATALOG NUMBERING SYSTEM

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

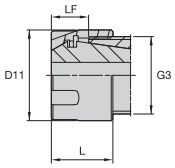


SS120ER16100M

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

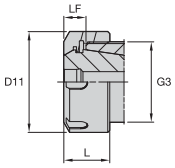
ER • SOLID LOCKNUT • SLIM DESIGN



ERICKSON

		D11		L		LF			Torque	Torque		
order number	catalog number	mm	in	mm	in	mm	in	G3	(Nm)	(ft. lbs.)	kg	lbs
6694024	LNSLRER11M	16	.63	12,0	.47	7,5	.30	M13 X 0.75	16	11.8	0,01	.02
6694025	LNSLRER16M	22	.87	18,5	.73	11,5	.45	M19 X 1	24	17.7	0,02	.04
6694026	LNSLRER20M	28	1.10	19,0	.75	11,5	.45	M24 X 1	28	20.7	0,03	.07

ER • SOLID LOCKNUT



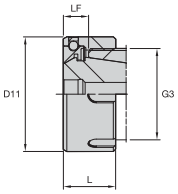
ERICKSON

		D11		L		LF			Torque	Torque		
order number	catalog number	mm	in	mm	in	mm	in	G3	(Nm)	(ft. lbs.)	kg	lbs
6459219	LNSRER16M	32	1.26	17,7	.70	10,6	.41	M22 X 1.5	56	42	0,06	.13
6459251	LNSRER20M	35	1.38	19,0	.75	11,5	.45	M25 X 1.5	80	59	0,07	.16
6459253	LNSRER25M	42	1.65	20,5	.81	12,0	.47	M32 X 1.5	104	77	0,10	.22
6459254	LNSRER32M	50	1.97	22,8	.90	13,0	.51	M40 X 1.5	136	100	0,15	.32
6459274	LNSRER40M	63	2.48	25,5	1.00	15,0	.59	M50 X 1.5	175	129	0,27	.60

90	70	4	96

ER™ Collet Chucks

ER • BEARING LOCKNUT*



ERICKSON

order number	catalog number	D11 mm	D11 in	L mm	L in	LF mm	LF in	G3	Torque (Nm)	Torque (ft. lbs.)	kg	lbs
6459271	**LNAGRER25M**	42	1.65	20,5	.81	12,0	.47	M32X1,5	108	80	0,10	.23
6459273	**LNAGRER32M**	50	1.97	22,8	.90	13,0	.51	M40X1,5	136	100	0,15	.33
6465674	**LNAGRER40M**	63	2.48	25,5	1.00	15,0	.59	M50X1,5	175	129	0,32	.71

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

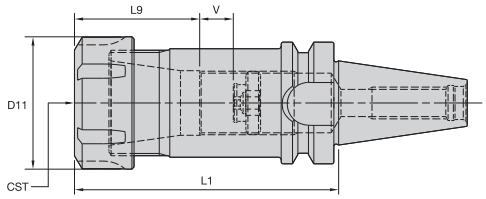
LOCKNUT WRENCHES

ER Size	Wrench Catalog 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**

90	70	4	96

ER™ Collet Chucks

ER • BT30 FORM AD

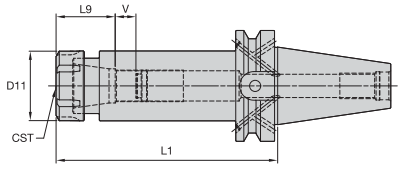


ERICKSON

■ Metric

order number	catalog 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

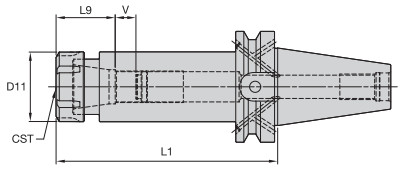
■ Metric

order number	catalog 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

90	70	4	96

ER™ Collet Chucks

ER • BT50 FORM B/AD



ERICKSON™

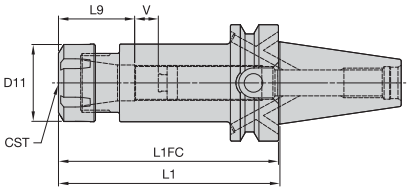
■ Metric

order number	catalog number	CST	D11	L1	L9	V	kg
6694884	BT50BER16070M	ER16	32	70	32	23	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	37	15	3,63
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	29	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	20	4,28
1187371	BT50BER40150M	ER40	63	150	52	48	5,32
3847517	BT50BER40200M	ER40	63	200	52	48	6,33

90 | 70 | 4 | 96

ER™ Collet Chucks

ER • BTKV40 FORM B/AD

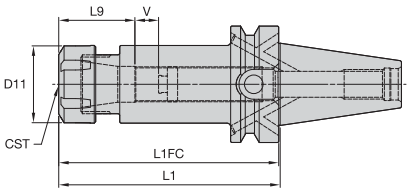


ERICKSON

■ Metric

order number	catalog 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

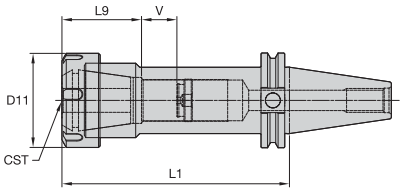
■ Metric

order number	catalog 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

90	70	4	96

ER™ Collet Chucks

ER • CV40 FORM AD

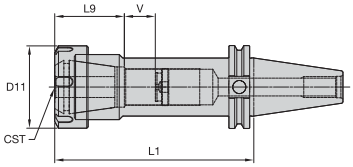


ERICKSON

■ Inch

order number	catalog number	CST	D11	L1	L9	V	lbs
1901019	CV40ER16250	ER16	1.26	2.50	1.26	1.91	2.38
6693875	CV40ER16400	ER16	1.26	4.00	1.26	1.57	2.69
1901046	CV40ER16500	ER16	1.26	5.00	1.26	1.58	2.92
6693880	CV40ER16600	ER16	1.26	6.00	1.26	1.50	3.15
1261618	CV40ER20250	ER20	1.38	2.50	1.42	1.73	2.37
6693876	CV40ER20400	ER20	1.38	4.00	1.42	1.73	2.86
2249531	CV40ER20600	ER20	1.38	6.00	1.42	1.73	3.52
2249532	CV40ER25250	ER25	1.65	2.50	1.57	.75	2.37
6693877	CV40ER25400	ER25	1.65	4.00	1.57	1.97	3.13
2249703	CV40ER25600	ER25	1.65	6.00	1.57	2.37	4.16
1261619	CV40ER32275	ER32	1.97	2.75	1.81	1.65	2.37
6693878	CV40ER32400	ER32	1.97	4.00	1.81	1.73	3.19
1901045	CV40ER32600	ER32	1.97	6.00	1.81	2.13	4.30
2249704	CV40ER40300	ER40	2.48	3.00	2.05	.47	2.82
6693879	CV40ER40400	ER40	2.48	4.00	2.05	1.50	3.90
2249705	CV40ER40600	ER40	2.48	6.00	2.05	1.89	4.46

ER • CV50 FORM AD



ERICKSON

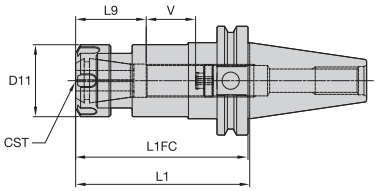
■ Inch

order number	catalog number	CST	D11	L1	L9	V	lbs
2249706	CV50ER16250	ER16	1.26	2.50	1.26	1.69	6.89
2249707	CV50ER16400	ER16	1.26	4.00	1.26	1.50	7.07
2249708	CV50ER16600	ER16	1.26	6.00	1.26	1.50	7.65
2249709	CV50ER20250	ER20	1.38	2.50	1.42	1.73	6.99
1261782	CV50ER20400	ER20	1.38	4.00	1.42	1.73	7.26
2249710	CV50ER20600	ER20	1.38	6.00	1.42	1.73	7.85
2249711	CV50ER25250	ER25	1.65	2.50	1.57	1.46	6.91
2249712	CV50ER25400	ER25	1.65	4.00	1.57	2.37	7.64
2249713	CV50ER25600	ER25	1.65	6.00	1.57	2.37	8.49
2249714	CV50ER32275	ER32	1.97	2.75	1.81	1.42	6.97
1261783	CV50ER32400	ER32	1.97	4.00	1.81	2.13	7.84
2249715	CV50ER32600	ER32	1.97	6.00	1.81	2.13	9.43
6694001	CV50ER32800	ER32	1.97	8.00	1.81	2.13	10.56
2249716	CV50ER40300	ER40	2.48	3.00	2.05	1.26	7.23
2249717	CV50ER40600	ER40	2.48	6.00	2.05	3.86	10.60
6694002	CV50ER40800	ER40	2.48	8.00	2.05	3.86	13.06

90	70	4	96

ER™ Collet Chucks

ER • CVKV40 FORM AD

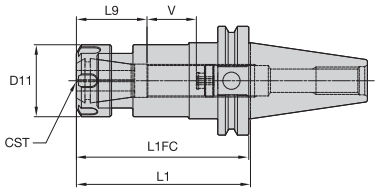


ERICKSON™

■ Inch

order number	catalog number	CST	D11	L1	L1FC	L9	V	lbs
3860218	CVKV40ER16250	ER16	1.26	2.50	2.46	1.26	1.30	2.43
6694003	CVKV40ER16400	ER16	1.26	4.00	3.96	1.26	1.50	2.74
3860220	CVKV40ER16500	ER16	1.26	5.00	4.96	1.26	1.50	2.89
6694008	CVKV40ER16600	ER16	1.26	6.00	5.96	1.26	1.50	3.20
3860221	CVKV40ER20250	ER20	1.38	2.50	2.46	1.42	1.02	2.36
6694004	CVKV40ER20400	ER20	1.38	4.00	3.96	1.42	1.73	2.36
3860222	CVKV40ER20600	ER20	1.38	6.00	5.96	1.42	1.73	3.57
3860223	CVKV40ER25250	ER25	1.65	2.50	2.46	1.57	.63	2.40
6694005	CVKV40ER25400	ER25	1.65	4.00	3.96	1.57	1.97	3.14
3860224	CVKV40ER25600	ER25	1.65	6.00	5.96	1.57	2.36	4.17
3860225	CVKV40ER32275	ER32	1.97	2.75	2.71	1.81	.43	2.50
6694006	CVKV40ER32400	ER32	1.97	4.00	3.96	1.81	1.73	3.17
3860226	CVKV40ER32600	ER32	1.97	6.00	5.96	1.81	2.13	4.30
3860227	CVKV40ER40300	ER40	2.48	3.00	2.96	2.05	.28	2.83
6694007	CVKV40ER40450	ER40	2.48	4.50	4.46	2.05	1.89	4.42
3860228	CVKV40ER40600	ER40	2.48	6.00	5.96	2.05	1.89	8.19

ER • CVKV50 FORM AD



ERICKSON™

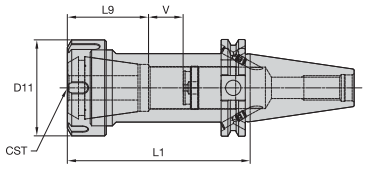
■ Inch

order number	catalog number	CST	D11	L1	L1FC	L9	V	lbs
3860229	CVKV50ER16250	ER16	1.26	2.50	2.44	1.26	1.69	7.02
3860230	CVKV50ER16400	ER16	1.26	4.00	3.94	1.26	1.50	7.20
6694010	CVKV50ER16600	ER16	1.26	6.00	5.94	1.26	1.50	7.73
3860231	CVKV50ER20250	ER20	1.38	2.50	2.44	1.42	1.65	6.94
3860232	CVKV50ER20400	ER20	1.38	4.00	3.94	1.42	2.13	7.38
6694021	CVKV50ER20600	ER20	1.38	6.00	5.94	1.42	1.73	7.97
3860233	CVKV50ER25250	ER25	1.65	2.50	2.44	1.57	1.38	6.93
3860234	CVKV50ER25400	ER25	1.65	4.00	3.94	1.57	2.36	7.66
6694022	CVKV50ER25600	ER25	1.65	6.00	5.94	1.57	3.15	8.68
3860235	CVKV50ER32275	ER32	1.97	2.75	2.69	1.81	1.22	7.00
3860236	CVKV50ER32400	ER32	1.97	4.00	3.94	1.81	2.13	7.87
6694023	CVKV50ER32600	ER32	1.97	6.00	5.94	1.81	2.13	9.31
3860237	CVKV50ER40300	ER40	2.48	3.00	2.94	2.05	1.10	7.31
6694009	CVKV50ER40450	ER40	2.48	4.50	4.44	2.05	1.89	8.52
3860238	CVKV50ER40600	ER40	2.48	6.00	5.94	2.05	3.86	10.69

90	70	4	96

ER™ Collet Chucks

ER • DV40 FORM B/AD

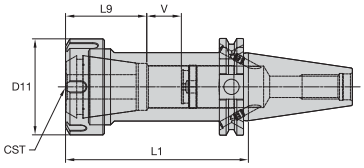


ERICKSON

■ Metric

order number	catalog 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

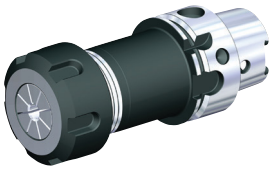
■ Metric

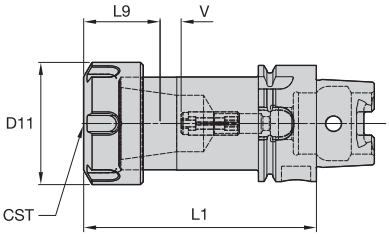
order number	catalog number	CST	D11	L1	L9	V	kg
6694909	DV50BER16070M	ER16	32	70	32	38	2,76
1748235	DV50BER16100M	ER16	28	100	32	48	2,81
1972537	DV50BER16150M	ER16	32	150	32	48	3,17
6694910	DV50BER20070M	ER20	35	70	36	44	2,79
6694911	DV50BER20100M	ER20	35	100	36	44	2,95
6694915	DV50BER20150M	ER20	35	150	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

90	70	4	96

ER™ Collet Chucks

ER • HSK40A FORM A



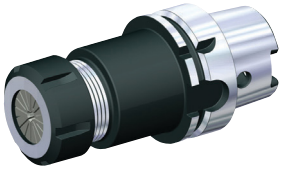


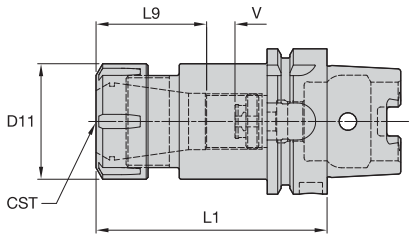
ERICKSON

■ Metric

order number	catalog 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

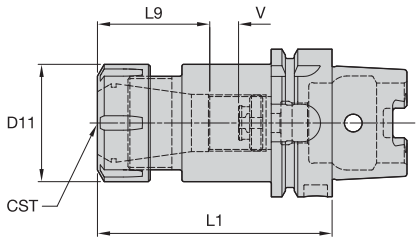
■ Metric

order number	catalog 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

90	70	4	96

ER™ Collet Chucks

ER • HSK63A FORM A

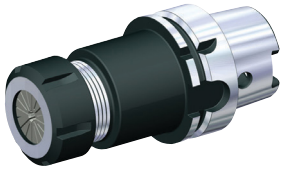


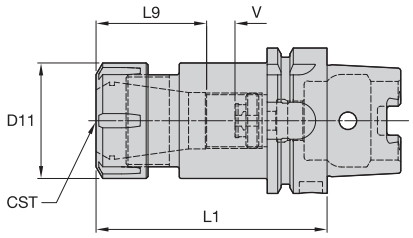
ERICKSON

■ Metric

order number	catalog 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 • HSK80A FORM A





ERICKSON

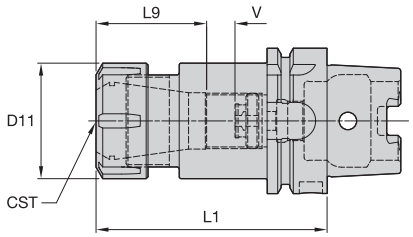
■ Metric

order number	catalog 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

90	70	4	96

ER™ Collet Chucks

ER • HSK100A FORM A

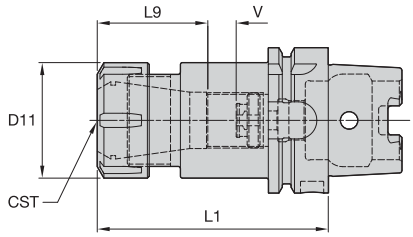


ERICKSON

■ Metric

order number	catalog 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	40	4,72

ER • HSK125A FORM A



ERICKSON

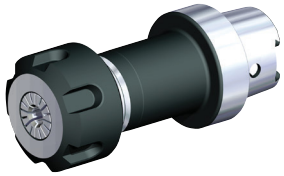
■ Metric

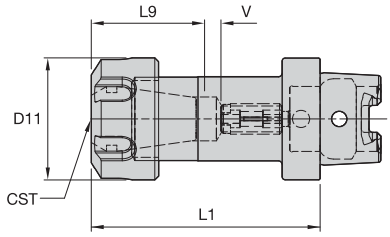
order number	catalog number	CST	D11	L1	L9	V	kg
5967354	HSK125AER40120M	ER40	63	120	52	17	4,78

90	70	4	96

ER™ Collet Chucks

ER • HSK32C FORM C



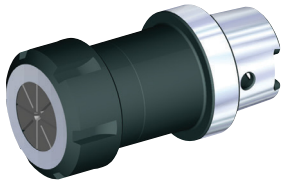


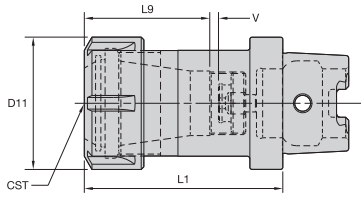
ERICKSON

■ Metric

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

ER • HSK40C FORM C



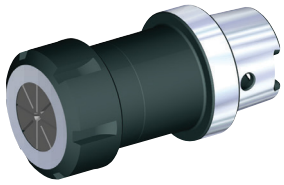


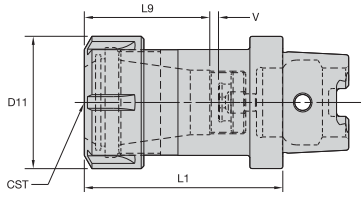
ERICKSON

■ Metric

order number	catalog 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

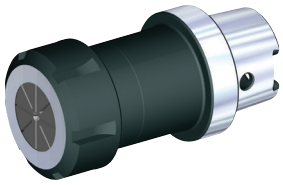
■ Metric

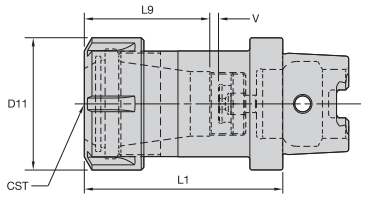
order number	catalog number	CST	D11	L1	L9	V	kg
1139074	HSK50CER16060M	ER16	32	60	28	5	0,40
1126932	HSK50CER32075M	ER32	50	75	45	5	0,67

90	70	4	96

ER™ Collet Chucks

ER • HSK63C FORM C





ERICKSON

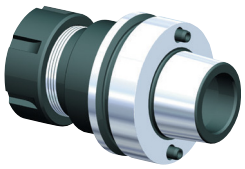
Metric

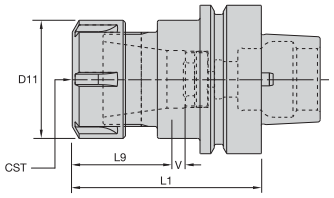
order number	catalog number	CST	D11	L1	L9	V	kg
1253908	HSK63CER25070M	ER25	42	70	40	5	0,79
1253910	HSK63CER32075M	ER32	50	75	45	5	0,98
1253911	HSK63CER40080M	ER40	63	80	54	3	1,15

90	70	4	96

ER™ Collet Chucks

ER • HSK80F FORM F (PIN)





ERICKSON

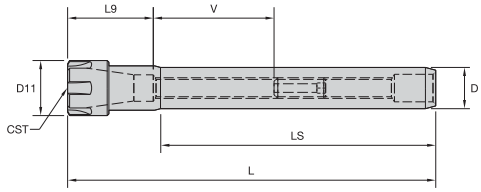
Metric

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

90	70	4	96

ER™ Collet Chucks

ER • STRAIGHT SHANK

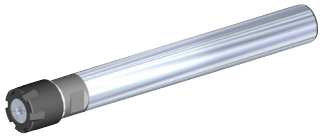


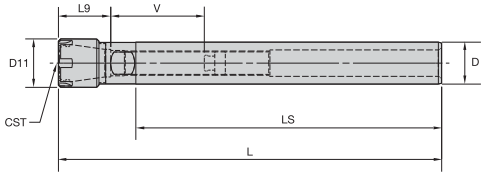
ERICKSON

Metric

order number	catalog 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

ER • STRAIGHT SHANK





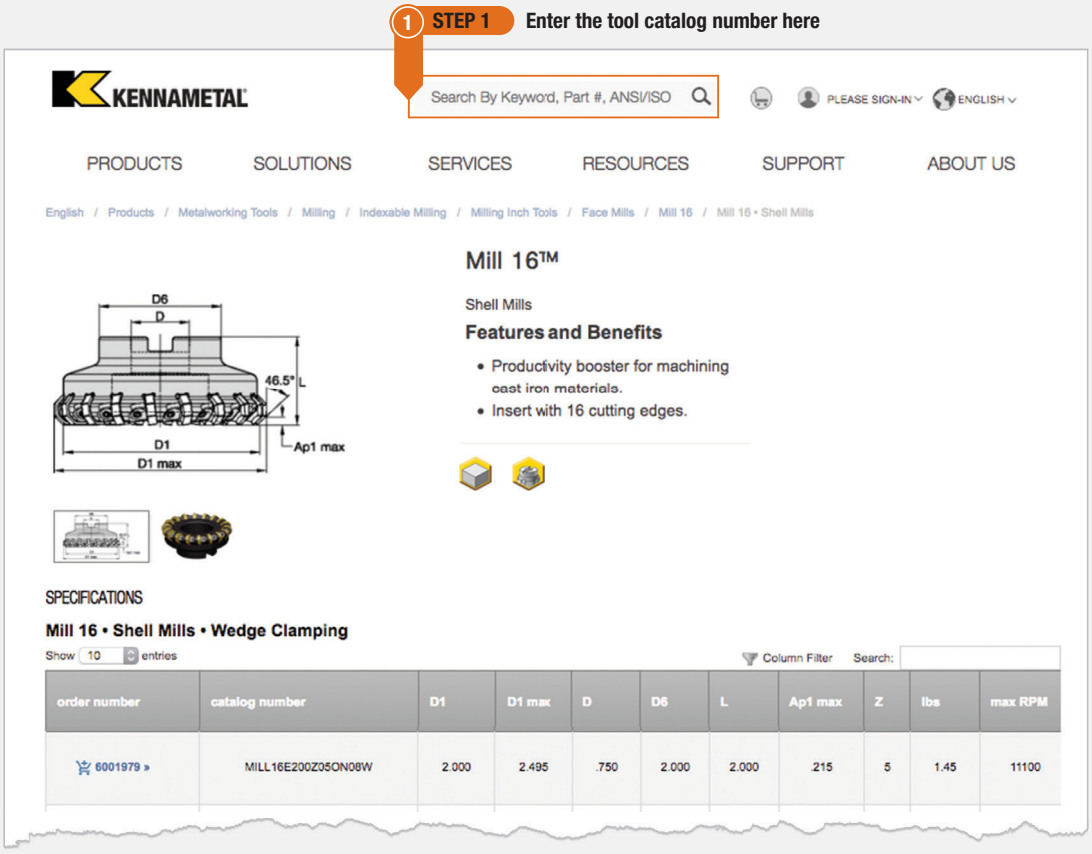
ERICKSON

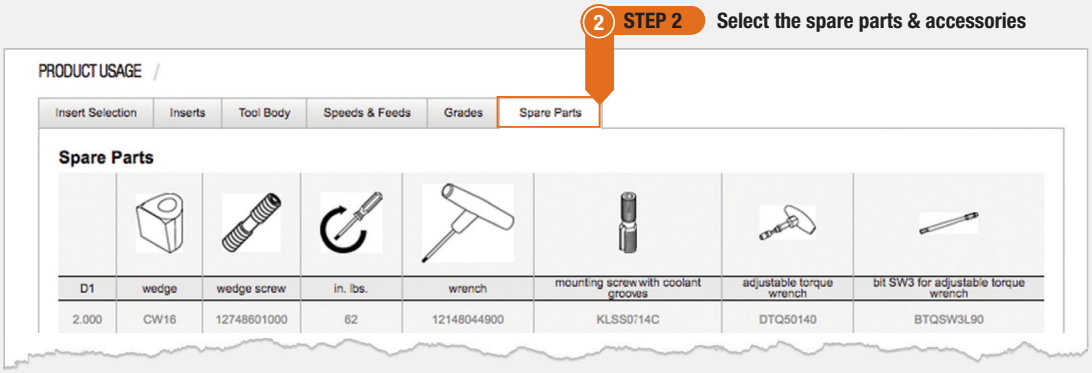
Inch

order number	catalog number	CST	D	D11	L	LS	L9	V	lbs
1021460	SS038ER08500	ER8	3/8	.47	5.00	4.15	.71	1.42	.10
1021462	SS050ER11700	ER11	1/2	.63	7.00	5.96	.95	3.23	.26
1021494	SS075ER16700	ER16	3/4	.87	7.00	5.47	1.30	2.24	.56
1021496	SS100ER20700	ER20	1	1.34	7.00	5.70	1.30	2.20	1.07
1021498	SS100ER25750	ER25	1	1.65	7.50	5.69	1.58	1.97	1.13

90	70	4	96

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.

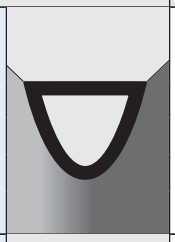
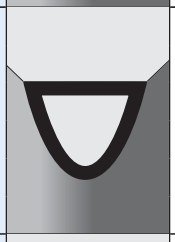
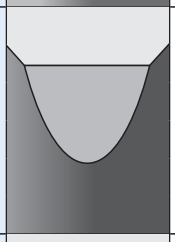
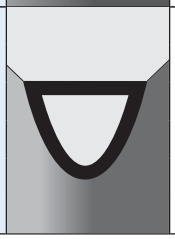
KENNAMETAL

kennametal.com

Grade Descriptions

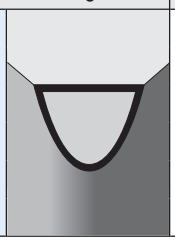
SOLID END MILLING

wear resistance ⟷ toughness

Coating	Grade Description		05	10	15	20	25	30	35	40	45
KCPM15 	Coated carbide grade with thick PVD coating and optimized 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 optimized 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

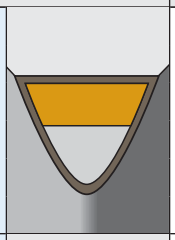
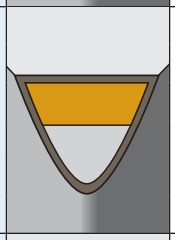
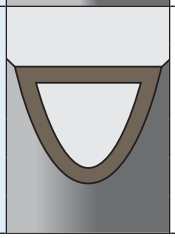
wear resistance ⟷ toughness

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

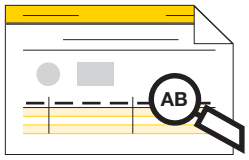
TURNING

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			■	■	■				
KCU25		An advanced PVD grade with hard AlTiN coating and fine-grain unalloyed substrate. The new and improved coating improves edge stability with wide range speed and feed capabilities. The KCU25™ grade is ideal for general machining of most steels, stainless steels, high-temp alloys, titanium, irons, and non-ferrous materials in a wide range of speeds and feeds with improved edge toughness for interrupted cut and high feed rates.	P				■	■	■			
			M				■	■	■			
			K				■	■	■			
			N				■	■	■			
			S				■	■	■			

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 catalog, 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
αL	Cutting Edge Angle Left Hand
αR	Cutting Edge Angle Right Hand
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
LATTH	Drill Attachment 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 • ANSI

P	Steel	N	Non-Ferrous	H	Hardened Materials
M	Stainless Steel	S	High-Temp Alloys	C	CFRP Materials
K	Cast Iron				

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	–	A36, 1008, 1010, 1018 through 1029; 1108, 1117
P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	10L18, 1200 Series, 1213, 12L14
P2	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	1035, 1045, 10L45, 1050, 10L50, 1080, 1137, 1144, 11L44, 1525, 1545, 1572
P3	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
P4	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
P5	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
M1	Austenitic Stainless Steel	–	<600	130–200	–	200 Series, 301, 302, 304, 304L, 309
M2	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	310, 316, 316L, 321, 347, 384 ASTM Cast XM-1, XM-5, XM-7, XM-21
M3	Duplex Stainless Steel	–	<800	135–275	<30	323, 329, F55, 2205, S329000
K1	Gray Cast Iron	–	125–500	120–290	<32	class 20, 25, 30, 35, 40, 45, 50, 55, 60, G1800, G3000, G3500, G4000
K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	60-40-18, 65-45-12, 80-55-06; SAE J434: D4018, D4512, D5506; ASTM A47: Grade 32510, 35018; SAE J158: Grade M3210, M4504, M5003, M5503, M7002; ASTMA842: Grade 250, 300, 350, 400, 450
K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	ASTM A536:100-70-03, 120-90-02, SAE J434: D7003, SAE J158: Grade M8501AST A897: 125-80-10, 150-100-7, 175-125-4, 200-150-1, 230-185
N1	Wrought Aluminum	–	–	–	–	2025, 5050, 7050, 1000, 2017
N2	Low-Silicon Aluminum Alloys and Magnesium Alloys	Si <12,2%	–	–	–	2024, 6061, 7075
N3	High-Silicon Aluminum Alloys and Magnesium Alloys	Si >12,2%	–	–	–	–
N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	C81500
N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass	–	–	–	–	–
N6	Carbon, Graphite Composites, CFRP	–	–	–	–	Graphite, CFK, CFRP
N7	Metal Matrix Composites (MMC)	–	–	–	–	C63000
S1	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	A-286, INCOLOY® 800 Series, A608, A567, Discaloy™, INVAR®, N-155, 16-25-6, 19-9 DL; Cast: ASTM A-297, A-351, A-567, A-608
S2	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 25 (L605), Haynes 188, J-1570, Stellite™, AiResist 213; Cast: AiResist 13, Haynes 21, MAR-M302, MAR-M509, NASA Co-W-Re, WI-52
S3	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	Astroloy™, Hastelloy® B/C/ C-276 /X, INCONEL® 600 and 700 Series, IN102, INCOLOY 900 Series, Rene 41, Waspalloy, Monel®, K-500, MAR-M20, NIMONIC®, UDIMET®
S4	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Pure: Ti 98.8, Ti 98.9,Ti 99.9; Alloyed: Ti 5Al-2.5Sn, Ti6Al-4V, Ti6Al-2Sn-4Zr-2Mo, Ti-3Al-8V-6Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al
H1	Hardened Materials	–	–	–	44–48	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H2	Hardened Materials	–	–	–	48–55	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H3	Hardened Materials	–	–	–	56–60	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H4	Hardened Materials	–	–	–	>60	Tool Steel H10, H11, H13, D2, D3, 4340, P20
C1	CFRP, CFRP/CFRP	–	–	–	–	–
C2	CFRP/Non-Ferrous	–	–	–	–	–
C3	CFRP/High-Temp	–	–	–	–	–
C4	CFRP/Stainless Steel	–	–	–	–	–
C5	CFRP/Non-Ferrous/High-Temp	–	–	–	–	–

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	Gray 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 Aluminum	–	–	–	–	AlMg1, Al99.5, AlCuMg1, AlCuBiPb, AlMgSi1, ALMgSiPb
N2	Low-Silicon Aluminum Alloys and Magnesium Alloys	Si <12,2%	–	–	–	GAlSiCu4, GDAlSi10Mg
N3	High-Silicon Aluminum 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, Fiberglass	–	–	–	–	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	–	–	–	–	–

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METALCUTTING SAFETY

IMPORTANT SAFETY INSTRUCTIONS

Read before using the tools in this catalog!

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.

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