



MASTER CATALOG **2018**

VOLUME TWO | **ROTATING TOOLS**



HOLEMAKING | TAPPING | SOLID END MILLING | INDEXABLE MILLING

DUO-LOCK[®] HARVI[™]

Primary Application

HARVI geometries for Duo-Lock[™] target applications where solid carbide end mills are currently used. The Duo-Lock[™] system combines the highest runout accuracy and length repeatability with maximum coupling stability. This enables the Duo-Lock[™] system to use the full potential of Kennametal cutting geometries and grades with the flexibility of a modular system. Significant metal removal rates can be achieved. A wide range of diameters and corner configurations, such as chamfer, radii, and sharp edges, are available from stock.

- Cutting data and tool life comparable to high-performance solid carbide.
- Proprietary HARVI geometries enable roughing and finishing with one tool.
- 1.5 x D standard cutting edge length enables fewer passes.
- Up to 1 x D full slotting increases metal removal rates, increasing productivity significantly.
- Extensive offering of straight and conical shank tools, and integral adapters that include DV, BT, and HSK.

Features and Benefits

Advanced Technology

- New asymmetrical HARVI 4-flute geometry for higher feed-per-tooth rates.
- Variable helix design for chatter-free machining at high feed rates.
- Less pressure on cutting edge through tailored axial and radial rake angles.
- Eccentric relief design increases tool life through higher edge stability.
- Proprietary tapered core for highest tool stability when roughing and finishing.

Tailored Grades

- KCSM15[™] Beyond[™] grade for exceptional tool life in titanium and stainless steels.
- KCPM15[™] Beyond grade for outstanding wear protection in stainless steel to mitigate cratering, depth-of-cut notching, and flank wear.
- Universal KC643M[™] grade for cutting steel, cast iron, stainless steel (wet), and titanium (wet).

Customization

- Intermediate diameters are available between 3/8–1 1/4".
- Chip divider geometry helps reduce power usage and improve chip formation in difficult-to-cut materials.
- Engineered solutions including shank and non-standard length versions available.
- Custom solutions within standard blank dimension are available.

Extensive Standard Offering

- Diameter ranges 3/8–1 1/4".
- Necked, corner radii, chamfer, and square-end tips available.
- Integral adapters to reduce interface for maximum accuracy.
- Steel extensions with Safe-Lock[™] by HAIMER shanks to prevent pullout.
- Cut-to-size extra-long extensions available upon request off the shelf.

High-performance modular solid carbide end mills.



High-Performance Geometries

Highest metal removal rates with up to 1 x D full slotting and up to 1.5 x D side milling at 50% ae capability.

Intelligent Thread
Ensures that stress levels remain below critical values.

3rd Contact Surface

Delivers high stiffness and highest accuracy below .0002" runout.

Unequal Flute Spacing

Reduces vibrations. Improves surface finish.

37° / 39° Variable Helix Technology

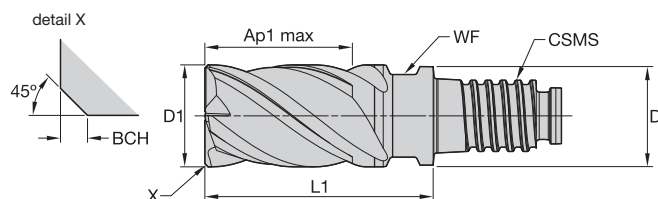
Minimizes chatter and harmonics for smoother machining.

Double Cone

Eliminates expensive presetting processes by providing an axial .0004" repeatability.

DUO-LOCK®
by HAIMER® and Kennametal

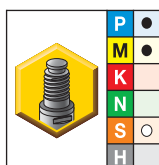
- Asymmetrical flute spacing and variable helix configuration minimize chatter and harmonics for smoother machining.
- Center cutting.
- Single tool for both roughing and finishing, reducing setups.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8
13/32–23/32"	-0,00126"/-0,00232"
23/32–1-3/16"	-0,00157"/-0,00287"
> 1-3/16"	-0,00197"/-0,00350"

UKDV • 4 Flute • Inch

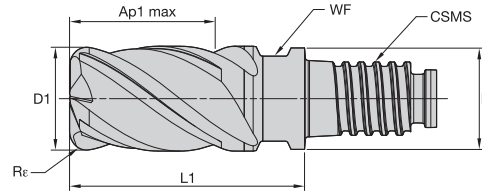


- first choice
- alternate choice

KCPM15	D1	D	Ap1 max	L1	CSMS system size	WF	BCH
UKDV0375Y4CU	3/8	.359	9/16	.843	DL10	.315	—
UKDV0375Y4CV	3/8	.359	9/16	.843	DL10	.315	.020
UKDV0500Y4CU	1/2	.480	3/4	1.126	DL12	.374	—
UKDV0500Y4CV	1/2	.480	3/4	1.126	DL12	.374	.020
UKDV0625Y4CU	5/8	.605	15/16	1.406	DL16	.512	—
UKDV0625Y4CV	5/8	.605	15/16	1.406	DL16	.512	.020
UKDV0750Y4CU	3/4	.730	1 1/8	1.689	DL20	.630	—
UKDV0750Y4CV	3/4	.730	1 1/8	1.689	DL20	.630	.020
UKDV1000Y4CU	1	.961	1 1/2	2.252	DL25	.827	—
UKDV1000Y4CV	1	.961	1 1/2	2.264	DL25	.827	.020
UKDV1250Y4CU	1 1/4	1.211	1 7/8	2.803	DL32	1.102	—
UKDV1250Y4CV	1 1/4	1.211	1 7/8	2.803	DL32	1.102	.020

NOTE: For application data, please see page O10.

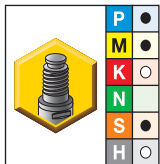
- Asymmetrical flute spacing and variable helix configuration minimize chatter and harmonics for smoother machining.
- Center cutting.
- Single tool for both roughing and finishing, reducing setups.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8
13/32–23/32"	-0,00126"/-0,00232"
23/32–1-3/16"	-0,00157"/-0,00287"
> 1-3/16"	-0,00197"/-0,00350"

■ ULDV • 4 Flute • Inch

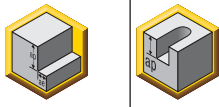


- first choice
- alternate choice

KCSM15	D1	D	Ap1 max	L1	CSMS system size	WF	Re
ULDV0375Y4CQA	3/8	.359	9/16	.843	DL10	.315	.015
ULDV0375Y4CQB	3/8	.359	9/16	.843	DL10	.315	.030
ULDV0375Y4CQC	3/8	.359	9/16	.843	DL10	.315	.060
ULDV0375Y4CQD	3/8	.359	9/16	.843	DL10	.315	.090
ULDV0500Y4CQA	1/2	.480	3/4	1.126	DL12	.374	.015
ULDV0500Y4CQB	1/2	.480	3/4	1.126	DL12	.374	.030
ULDV0500Y4CQC	1/2	.480	3/4	1.126	DL12	.374	.060
ULDV0500Y4CQD	1/2	.480	3/4	1.126	DL12	.374	.090
ULDV0500Y4CQE	1/2	.480	3/4	1.126	DL12	.374	.120
ULDV0625Y4CQA	5/8	.605	15/16	1.406	DL16	.512	.015
ULDV0625Y4CQB	5/8	.605	15/16	1.406	DL16	.512	.030
ULDV0625Y4CQD	5/8	.605	15/16	1.406	DL16	.512	.120
ULDV0625Y4CQE	5/8	.605	15/16	1.406	DL16	.512	.120
ULDV0625Y4CQC	5/8	.605	15/16	1.406	DL16	.512	.060
ULDV0750Y4CQB	3/4	.730	1 1/8	1.689	DL20	.630	.030
ULDV0750Y4CQC	3/4	.730	1 1/8	1.689	DL20	.630	.060
ULDV0750Y4CQD	3/4	.730	1 1/8	1.689	DL20	.630	.090
ULDV0750Y4CQE	3/4	.730	1 1/8	1.689	DL20	.630	.120
ULDV1000Y4CQB	1	.961	1 1/2	2.252	DL25	.827	.030
ULDV1000Y4CQC	1	.961	1 1/2	2.252	DL25	.827	.060
ULDV1000Y4CQD	1	.961	1 1/2	2.252	DL25	.827	.090
ULDV1000Y4CQE	1	.961	1 1/2	2.252	DL25	.827	.120
ULDV1000Y4CQF	1	.961	1 1/2	2.252	DL25	.827	.250
ULDV1250Y4CQD	1 1/4	1.211	1 7/8	2.803	DL32	1.102	.090
ULDV1250Y4CQF	1 1/4	1.211	1 7/8	2.803	DL32	1.102	.250

NOTE: For application data, please see page O11.

■ HARVI • UKDV • Asymmetrical Flute Spacing

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							
				KCPM15			KCPM15			KCPM15										
				Cutting Speed — vc SFM			Cutting Speed — vc SFM			Cutting Speed — vc SFM			frac.	3/8	1/2	5/8	3/4	1	1 1/4	
ap	ae	ap	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500	1.0000	1.2500		
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	1	1.5 x D	0.5 x D	1 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	2	1.5 x D	0.5 x D	1 x D	460	–	620	414	–	558	414	–	558	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	3	1.5 x D	0.5 x D	1 x D	390	–	520	351	–	468	351	–	468	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	4	1.5 x D	0.4 x D	0.75 x D	300	–	490	270	–	441	270	–	441	IPT	.0017	.0022	.0026	.0029	.0034	.0034
	5	1.5 x D	0.4 x D	1 x D	200	–	330	170	–	280.5	160	–	264	IPT	.0016	.0020	.0023	.0026	.0033	.0033
M	6	1.5 x D	0.4 x D	0.75 x D	160	–	250	136	–	212.5	128	–	200	IPT	.0013	.0016	.0019	.0021	.0024	.0024
	1	1.5 x D	0.4 x D	1 x D	300	–	380	240	–	304	210	–	266	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	2	1.5 x D	0.4 x D	1 x D	200	–	260	160	–	208	140	–	182	IPT	.0016	.0020	.0023	.0026	.0033	.0033
S	3	1.5 x D	0.4 x D	1 x D	200	–	230	160	–	184	140	–	161	IPT	.0013	.0016	.0019	.0021	.0024	.0024
	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	128	–	240	96	–	180	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
	3	1.5 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
	4	1.5 x D	0.4 x D	1 x D	160	–	200	128	–	160	96	–	120	IPT	.0014	.0018	.0021	.0024	.0030	.0030

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

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

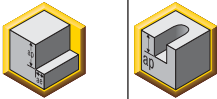
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Above parameters are based on ideal conditions. Please adjust parameters according to system stability.

For side milling with ap larger than 1 x D, reduce fz by 20%!

Cylindrical shanks not recommended for full slotting.

■ HARVI • ULDV • Asymmetrical Flute Spacing

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							
				KCSM15			KCSM15			KCSM15										
				Cutting Speed – vc SFM			Cutting Speed – vc SFM			Cutting Speed – vc SFM			frac.	3/8	1/2	5/8	3/4	1	1 1/4	
	ap	ae	ap	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500	1.2500	1.2500	
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	1	1.5 x D	0.5 x D	1 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	2	1.5 x D	0.5 x D	1 x D	460	–	620	414	–	558	414	–	558	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	3	1.5 x D	0.5 x D	1 x D	390	–	520	351	–	468	351	–	468	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	4	1.5 x D	0.4 x D	0.75 x D	300	–	490	270	–	441	270	–	441	IPT	.0017	.0022	.0026	.0029	.0034	.0034
	5	1.5 x D	0.4 x D	1 x D	200	–	330	170	–	280.5	160	–	264	IPT	.0016	.0020	.0023	.0026	.0033	.0033
M	6	1.5 x D	0.4 x D	0.75 x D	160	–	250	136	–	212.5	128	–	200	IPT	.0013	.0016	.0019	.0021	.0024	.0024
	1	1.5 x D	0.4 x D	1 x D	300	–	380	240	–	304	210	–	266	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	2	1.5 x D	0.4 x D	1 x D	200	–	260	160	–	208	140	–	182	IPT	.0016	.0020	.0023	.0026	.0033	.0033
K	3	1.5 x D	0.4 x D	1 x D	200	–	230	160	–	184	140	–	161	IPT	.0013	.0016	.0019	.0021	.0024	.0024
	1	1.5 x D	0.5 x D	1 x D	390	–	490	351	–	441	351	–	441	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	2	1.5 x D	0.5 x D	1 x D	360	–	460	324	–	414	324	–	414	IPT	.0019	.0025	.0029	.0033	.0041	.0041
S	3	1.5 x D	0.5 x D	1 x D	360	–	430	324	–	387	324	–	387	IPT	.0016	.0020	.0023	.0026	.0033	.0033
	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	128	–	240	96	–	180	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
	3	1.5 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
H	4	1.5 x D	0.4 x D	1 x D	160	–	200	128	–	160	96	–	120	IPT	.0014	.0018	.0021	.0024	.0030	.0030
	1	1.5 x D	0.4 x D	0.75 x D	260	–	460	208	–	368	156	–	276	IPT	.0017	.0022	.0026	.0029	.0034	.0034
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	184	–	312	138	–	234	IPT	.0013	.0016	.0019	.0021	.0024	.0024

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

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

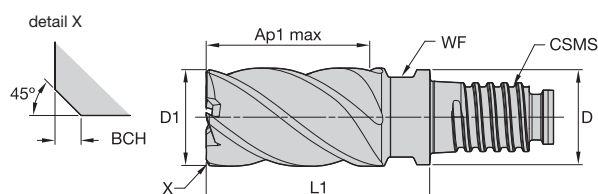
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Above parameters are based on ideal conditions. Please adjust parameters according to system stability.

For side milling with ap larger than 1 x D, reduce fz by 20%!

Cylindrical shanks not recommended for full slotting.

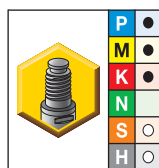
- Unequal flute spacing and variable helix configuration minimize chatter and harmonics for smoother machining.
- Non-center cutting.
- Ramping up to 3°.
- Five-flute geometry able to slot up to 1 x D.
- Single tool for both roughing and finishing, reducing setups.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8
13/32–23/32"	-0,00126"/-0,00232"
23/32–1-3/16"	-0,00157"/-0,00287"
> 1-3/16"	-0,00197"/-0,00350"

UCDV • 5 Flute • Inch

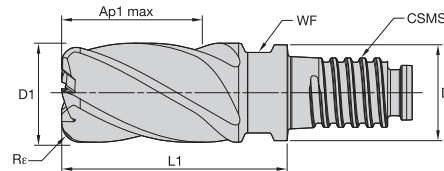


- first choice
- alternate choice

KCPM15	D1	D	Ap1 max	L1	CSMS system size	WF	BCH
UCDV0375Y5CU	3/8	.359	9/16	.843	DL10	.315	—
UCDV0375Y5CV	3/8	.359	9/16	.843	DL10	.315	.020
UCDV0500Y5CU	1/2	.480	3/4	1.126	DL12	.374	—
UCDV0500Y5CV	1/2	.480	3/4	1.126	DL12	.374	.020
UCDV0625Y5CU	5/8	.605	15/16	1.406	DL16	.512	—
UCDV0625Y5CV	5/8	.605	15/16	1.406	DL16	.512	.020
UCDV0750Y5CU	3/4	.730	1 1/8	1.689	DL20	.630	—
UCDV0750Y5CV	3/4	.730	1 1/8	1.689	DL20	.630	.020
UCDV1000Y5CU	1	.961	1 1/2	2.252	DL25	.827	—
UCDV1000Y5CV	1	.961	1 1/2	2.252	DL25	.827	.020
UCDV1250Y5CU	1 1/4	1.211	1 7/8	2.803	DL32	1.102	—
UCDV1250Y5CV	1 1/4	1.211	1 7/8	2.803	DL32	1.102	.020

NOTE: For application data, please see page O14.

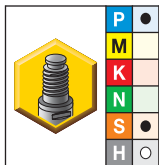
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- Non-center cutting.
- Ramping up to 3°.
- Five-flute geometry able to slot up to 1 x D.
- Single tool for both roughing and finishing, reducing setups.
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D1	tolerance e8
13/32–23/32"	-0,00126"/-0,00232"
23/32–1-3/16"	-0,00157"/-0,00287"
> 1-3/16"	-0,00197"/-0,00350"

■ UDDV • 5 Flute • Inch

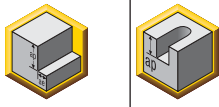


- first choice
- alternate choice

KC643M	D1	D	Ap1 max	L1	CSMS system size	WF	Re
UDDV0375Y5CQA	3/8	.359	9/16	.843	DL10	.315	.015
UDDV0375Y5CQB	3/8	.359	9/16	.843	DL10	.315	.030
UDDV0375Y5CQC	3/8	.359	9/16	.843	DL10	.315	.060
UDDV0375Y5CQD	3/8	.359	9/16	.843	DL10	.315	.090
UDDV0500Y5CQA	1/2	.480	3/4	1.126	DL12	.374	.015
UDDV0500Y5CQB	1/2	.480	3/4	1.126	DL12	.374	.030
UDDV0500Y5CQC	1/2	.480	3/4	1.126	DL12	.374	.060
UDDV0500Y5CQD	1/2	.480	3/4	1.126	DL12	.374	.090
UDDV0500Y5CQE	1/2	.480	3/4	1.126	DL12	.374	.120
UDDV0625Y5CQA	5/8	.605	15/16	1.406	DL16	.512	.015
UDDV0625Y5CQB	5/8	.605	15/16	1.406	DL16	.512	.030
UDDV0625Y5CQC	5/8	.605	15/16	1.406	DL16	.512	.060
UDDV0625Y5CQD	5/8	.605	15/16	1.406	DL16	.512	.090
UDDV0625Y5CQE	5/8	.605	15/16	1.406	DL16	.512	.120
UDDV0750Y5CQB	3/4	.730	1 1/8	1.689	DL20	.630	.030
UDDV0750Y5CQC	3/4	.730	1 1/8	1.689	DL20	.630	.060
UDDV0750Y5CQD	3/4	.730	1 1/8	1.689	DL20	.630	.090
UDDV0750Y5CQE	3/4	.730	1 1/8	1.689	DL20	.630	.120
UDDV1000Y5CQB	1	.961	1 1/2	2.252	DL25	.827	.030
UDDV1000Y5CQC	1	.961	1 1/2	2.252	DL25	.827	.060
UDDV1000Y5CQD	1	.961	1 1/2	2.252	DL25	.827	.090
UDDV1000Y5CQE	1	.961	1 1/2	2.252	DL25	.827	.120
UDDV1000Y5CQF	1	.961	1 1/2	2.252	DL25	.827	.250
UDDV1250Y5CQD	1 1/4	1.211	1 7/8	2.803	DL32	1.102	.090
UDDV1250Y5CQF	1 1/4	1.211	1 7/8	2.803	DL32	1.102	.250

NOTE: For application data, please see page O15.

■ HARVI II • UCDV • Unequal Flute Spacing

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%.							
				adapter reach						D1 — Diameter										
	A		B	KCPM15			KCPM15										KCPM15			
				Cutting Speed — vc SFM			Cutting Speed — vc SFM			Cutting Speed — vc SFM			frac.	3/8	1/2	5/8	3/4	1	1 1/4	
ap	ae	ap	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500	1.2500	1.2500		
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	1	1.5 x D	0.5 x D	1 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	2	1.5 x D	0.5 x D	1 x D	460	–	620	414	–	558	414	–	558	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	3	1.5 x D	0.5 x D	1 x D	390	–	520	351	–	468	351	–	468	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	4	1.5 x D	0.4 x D	0.75 x D	300	–	490	270	–	441	270	–	441	IPT	.0017	.0022	.0026	.0029	.0034	.0034
	5	1.5 x D	0.4 x D	1 x D	200	–	330	170	–	280.5	160	–	264	IPT	.0016	.0020	.0023	.0026	.0033	.0033
M	6	1.5 x D	0.4 x D	0.75 x D	160	–	250	136	–	212.5	128	–	200	IPT	.0013	.0016	.0019	.0021	.0024	.0024
	1	1.5 x D	0.4 x D	1 x D	300	–	380	240	–	304	210	–	266	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	2	1.5 x D	0.4 x D	1 x D	200	–	260	160	–	208	140	–	182	IPT	.0016	.0020	.0023	.0026	.0033	.0033
K	3	1.5 x D	0.4 x D	1 x D	200	–	230	160	–	184	140	–	161	IPT	.0013	.0016	.0019	.0021	.0024	.0024
	1	1.5 x D	0.5 x D	1 x D	390	–	490	351	–	441	351	–	441	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	2	1.5 x D	0.5 x D	1 x D	360	–	460	324	–	414	324	–	414	IPT	.0019	.0025	.0029	.0033	.0041	.0041
S	3	1.5 x D	0.5 x D	1 x D	360	–	430	324	–	387	324	–	387	IPT	.0016	.0020	.0023	.0026	.0033	.0033
	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	128	–	240	96	–	180	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
	3	1.5 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
H	4	1.5 x D	0.4 x D	1 x D	160	–	200	128	–	160	96	–	120	IPT	.0014	.0018	.0021	.0024	.0030	.0030
	1	1.5 x D	0.4 x D	0.75 x D	260	–	460	208	–	368	156	–	276	IPT	.0017	.0022	.0026	.0029	.0034	.0034
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	184	–	312	138	–	234	IPT	.0013	.0016	.0019	.0021	.0024	.0024

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

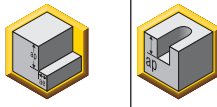
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Above parameters are based on ideal conditions. Please adjust parameters according to system stability.

For side milling with Ap bigger than 1 x D reduce Fz by 20%!

Cylindrical shanks not recommended for full slotting.

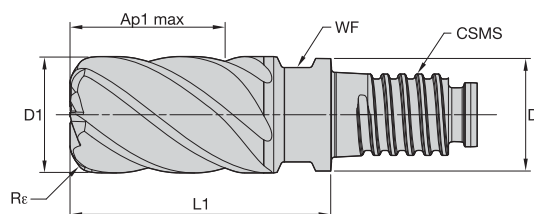
■ HARVI II • UDDV • Unequal Flute Spacing

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						
					KC643M			KC643M			KC643M									
					Cutting Speed – vc SFM			Cutting Speed – vc SFM			Cutting Speed – vc SFM			frac.	3/8	1/2	5/8	3/4	1	1 1/4
ap	ae	ap	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500	1.2500	1.2500		
P	5	1.5 x D	0.4 x D	1 x D	200	–	330	170	–	280.5	160	–	264	IPT	.0016	.0020	.0023	.0026	.0033	.0033
	6	1.5 x D	0.4 x D	0.75 x D	160	–	250	136	–	212.5	128	–	200	IPT	.0013	.0016	.0019	.0021	.0024	.0024
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	128	–	240	96	–	180	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
	3	1.5 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
	4	1.5 x D	0.4 x D	1 x D	160	–	200	128	–	160	96	–	120	IPT	.0014	.0018	.0021	.0024	.0030	.0030
H	1	1.5 x D	0.4 x D	0.75 x D	260	–	460	208	–	368	156	–	276	IPT	.0017	.0022	.0026	.0029	.0034	.0034
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	184	–	312	138	–	234	IPT	.0013	.0016	.0019	.0021	.0024	.0024

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. Please adjust parameters according to system stability.
For side milling with Ap bigger than 1 x D reduce Fz by 20%!
Cylindrical shanks not recommended for full slotting.



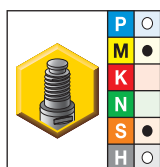
- Unequal flute spacing and variable helix configuration minimize chatter and harmonics for smoother machining.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing, reducing setups.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8
13/32–23/32"	-0,00126"/-0,00232"
23/32–1-3/16"	-0,00157"/-0,00287"
>1-3/16"	-0,00197"/-0,00350"

■ UJDV • 6 Flute with Eccentric Relief Grind • Inch



- first choice
- alternate choice

KCSM15	D1	D	Ap1 max	L1	CSMS system size	WF	Rε
UJDV0375Y6CQA	3/8	.359	9/16	.843	DL10	.315	.015
UJDV0375Y6CQB	3/8	.359	9/16	.843	DL10	.315	.030
UJDV0375Y6CQC	3/8	.359	9/16	.843	DL10	.315	.060
UJDV0375Y6CQD	3/8	.359	9/16	.843	DL10	.315	.090
UJDV0500Y6CQA	1/2	.480	3/4	1.126	DL12	.374	.015
UJDV0500Y6CQB	1/2	.480	3/4	1.126	DL12	.374	.030
UJDV0500Y6CQC	1/2	.480	3/4	1.126	DL12	.374	.060
UJDV0500Y6CQD	1/2	.480	3/4	1.126	DL12	.374	.090
UJDV0500Y6CQE	1/2	.480	3/4	1.126	DL12	.374	.120
UJDV0625Y6CQA	5/8	.605	15/16	1.406	DL16	.512	.015
UJDV0625Y6CQB	5/8	.605	15/16	1.406	DL16	.512	.030
UJDV0625Y6CQC	5/8	.605	15/16	1.406	DL16	.512	.060
UJDV0625Y6CQD	5/8	.605	15/16	1.406	DL16	.512	.090
UJDV0625Y6CQE	5/8	.605	15/16	1.406	DL16	.512	.120
UJDV0750Y6CQB	3/4	.730	1 1/8	1.689	DL20	.630	.030
UJDV0750Y6CQC	3/4	.730	1 1/8	1.689	DL20	.630	.060
UJDV0750Y6CQD	3/4	.730	1 1/8	1.689	DL20	.630	.090
UJDV0750Y6CQE	3/4	.730	1 1/8	1.689	DL20	.630	.120
UJDV1000Y6CQB	1	.961	1 1/2	2.252	DL25	.827	.030
UJDV1000Y6CQC	1	.961	1 1/2	2.252	DL25	.827	.060
UJDV1000Y6CQD	1	.961	1 1/2	2.252	DL25	.827	.090
UJDV1000Y6CQE	1	.961	1 1/2	2.252	DL25	.827	.120
UJDV1000Y6CQF	1	.961	1 1/2	2.252	DL25	.827	.030
UJDV1250Y6CQD	1 1/4	1.211	1 7/8	2.803	DL32	1.102	.090
UJDV1250Y6CQF	1 1/4	1.211	1 7/8	2.803	DL32	1.102	.250

NOTE: For application data, please see page O17.

■ HARVI III • UJDV • Unequal Flute Spacing • Roughing

Material Group																				
				Side Milling (A)		short		medium			long			Recommended feed per tooth (IPT = inch/th) for side milling (A).						
KCSM15			KCSM15			KCSM15														
Cutting Speed – vc SFM			Cutting Speed – vc SFM			Cutting Speed – vc SFM			frac.	3/8	1/2	5/8	3/4	1	1 1/4					
ap	ae	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500	1.2500	1.2500			
P	4	Ap max	0.4 x D	300	–	490	270	–	441	270	–	441	IPT	.0017	.0022	.0026	.0029	.0034	.0034	
	5	Ap max	0.4 x D	200	–	330	170	–	280.5	160	–	264	IPT	.0016	.0020	.0023	.0026	.0033	.0033	
M	1	Ap max	0.4 x D	300	–	380	240	–	304	210	–	266	IPT	.0019	.0025	.0029	.0033	.0041	.0041	
	2	Ap max	0.4 x D	200	–	260	160	–	208	140	–	182	IPT	.0016	.0020	.0023	.0026	.0033	.0033	
	3	Ap max	0.4 x D	200	–	230	160	–	184	140	–	161	IPT	.0013	.0016	.0019	.0021	.0024	.0024	
S	1	Ap max	0.4 x D	160	–	300	128	–	240	96	–	180	IPT	.0019	.0025	.0029	.0033	.0041	.0041	
	2	Ap max	0.4 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022	
	3	Ap max	0.4 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022	
	4	Ap max	0.4 x D	160	–	200	128	–	160	96	–	120	IPT	.0014	.0018	.0021	.0024	.0030	.0030	
H	1	Ap max	0.4 x D	260	–	460	208	–	368	156	–	276	IPT	.0017	.0022	.0026	.0029	.0034	.0034	
	2	Ap max	0.4 x D	230	–	390	184	–	312	138	–	234	IPT	.0013	.0016	.0019	.0021	.0024	.0024	

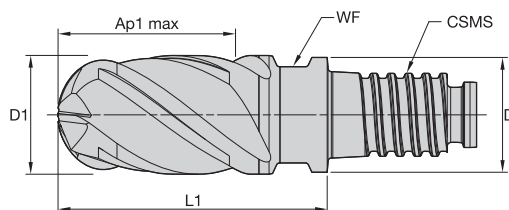
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 Above parameters are based on ideal conditions. Please adjust parameters according to system stability.
 For side milling with Ap bigger than 1 x D, reduce fz by 20%!
 Cylindrical shanks not recommended for full slotting.

■ HARVI III • UJDV • Unequal Flute Spacing • Finishing

Material Group																			
				A		Side Milling (A)		short		medium		long		Recommended feed per tooth (IPT = inch/th) for side milling (A).					
						adapter reach								D1 – Diameter					
						KCSM15		KCSM15		KCSM15									
						Cutting Speed – vc SFM		Cutting Speed – vc SFM		Cutting Speed – vc SFM		frac.	3/8	1/2	5/8	3/4	1	1 1/4	
ap	ae	min	max	min	max	min	max	min	max	dec.	.3750	.5000	.6250	.7500	1.2500	1.2500			
P	4	Ap max	0.06 x D	560	–	940	504	–	846	504	–	846	IPT	.0021	.0026	.0031	.0034	.0041	.0041
	5	Ap max	0.06 x D	370	–	620	314.5	–	527	296	–	496	IPT	.0019	.0024	.0028	.0031	.0040	.0040
M	1	Ap max	0.06 x D	560	–	720	448	–	576	392	–	504	IPT	.0023	.0029	.0035	.0039	.0049	.0049
	2	Ap max	0.06 x D	370	–	500	296	–	400	259	–	350	IPT	.0019	.0024	.0028	.0031	.0040	.0040
	3	Ap max	0.06 x D	370	–	440	296	–	352	259	–	308	IPT	.0016	.0020	.0023	.0025	.0029	.0029
S	1	Ap max	0.06 x D	310	–	560	248	–	448	186	–	336	IPT	.0023	.0029	.0035	.0039	.0049	.0049
	2	Ap max	0.06 x D	160	–	250	128	–	200	96	–	150	IPT	.0012	.0016	.0019	.0021	.0027	.0027
	3	Ap max	0.06 x D	160	–	250	128	–	200	96	–	150	IPT	.0012	.0016	.0019	.0021	.0027	.0027
	4	Ap max	0.06 x D	310	–	370	248	–	296	186	–	222	IPT	.0017	.0022	.0026	.0029	.0036	.0036
H	1	Ap max	0.06 x D	500	–	870	400	–	696	300	–	522	IPT	.0021	.0026	.0031	.0034	.0041	.0041
	2	Ap max	0.06 x D	440	–	750	352	–	600	264	–	450	IPT	.0016	.0020	.0023	.0025	.0029	.0029

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. Please adjust parameters according to system stability.
 For side milling with Ap bigger than 1 x D, reduce fz by 20%!
 Cylindrical shanks not recommended for full slotting.

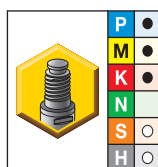
- Asymmetrical flute spacing and variable helix configuration minimize chatter and harmonics for smoother machining.
- Center cutting.
- Single tool for both roughing and finishing, reducing setups.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8
13/32–23/32"	-0,00126"/-0,00232"
23/32–1-3/16"	-0,00157"/-0,00287"

■ UKBV • 4 Flute Ball Nose • Inch

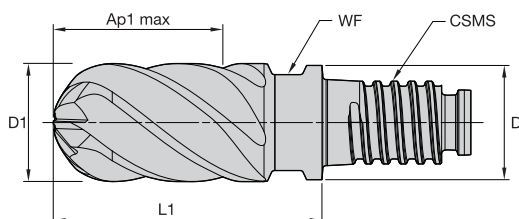


- first choice
- alternate choice

KCPM15	D1	D	Ap1 max	L1	CSMS system size	WF
UKBV0375Y4CN	3/8	.359	9/16	.843	DL10	.315
UKBV0500Y4CN	1/2	.480	3/4	1.126	DL12	.374
UKBV0625Y4CN	5/8	.605	15/16	1.406	DL16	.512
UKBV0750Y4CN	3/4	.730	1 1/8	1.689	DL20	.630
UKBV1000Y4CN	1	.961	1 1/2	2.252	DL25	.827

NOTE: For application data, please see page O20.

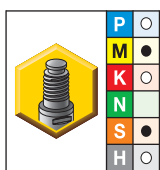
- Unequal flute spacing and variable helix configuration minimize chatter and harmonics for smoother machining.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing, reducing setups.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8
13/32–23/32"	-0,00126"/-0,00232"
23/32–1-3/16"	-0,00157"/-0,00287"

■ UJBV • 6 Flute Ball Nose with Eccentric Relief Grind • Inch



- first choice
- alternate choice

KCSM15	D1	D	Ap1 max	L1	CSMS system size	WF
UJBV0375Y6CN	3/8	.359	9/16	.843	DL10	.315
UJBV0500Y6CN	1/2	.480	3/4	1.126	DL12	.374
UJBV0625Y6CN	5/8	.605	15/16	1.406	DL16	.512
UJBV0750Y6CN	3/4	.730	1 1/8	1.689	DL20	.630
UJBV1000Y6CN	1	.961	1 1/2	2.252	DL25	.827

NOTE: For application data, please see pages O21–O22.

■ HARVI Ball Nose • UKBV • Asymmetrical Flute Spacing • Roughing • Finishing

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							
				KCPM15			KCPM15			KCPM15										
				Cutting Speed – vc SFM			Cutting Speed – vc SFM			Cutting Speed – vc SFM			frac.	3/8	1/2	5/8	3/4	1	1 1/4	
	ap	ae	ap	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500	1.2500	1.2500	
P	0	1.25 x D	0.5 x D	1 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	1	1.25 x D	0.5 x D	1 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	2	1.25 x D	0.5 x D	1 x D	460	–	620	414	–	558	414	–	558	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	3	1.25 x D	0.5 x D	1 x D	390	–	520	351	–	468	351	–	468	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	4	1.25 x D	0.4 x D	0.75 x D	300	–	490	270	–	441	270	–	441	IPT	.0017	.0022	.0026	.0029	.0034	.0034
	5	1.25 x D	0.4 x D	1 x D	200	–	330	170	–	280.5	160	–	264	IPT	.0016	.0020	.0023	.0026	.0033	.0033
M	6	1.25 x D	0.4 x D	0.75 x D	160	–	250	136	–	212.5	128	–	200	IPT	.0013	.0016	.0019	.0021	.0024	.0024
	1	1.25 x D	0.4 x D	1 x D	300	–	380	240	–	304	210	–	266	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	2	1.25 x D	0.4 x D	1 x D	200	–	260	160	–	208	140	–	182	IPT	.0016	.0020	.0023	.0026	.0033	.0033
K	3	1.25 x D	0.4 x D	1 x D	200	–	230	160	–	184	140	–	161	IPT	.0013	.0016	.0019	.0021	.0024	.0024
	1	1.25 x D	0.5 x D	1 x D	390	–	490	351	–	441	351	–	441	IPT	.0023	.0029	.0034	.0037	.0042	.0042
	2	1.25 x D	0.5 x D	1 x D	360	–	460	324	–	414	324	–	414	IPT	.0019	.0025	.0029	.0033	.0041	.0041
S	3	1.25 x D	0.5 x D	1 x D	360	–	430	324	–	387	324	–	387	IPT	.0016	.0020	.0023	.0026	.0033	.0033
	1	1 x D	0.3 x D	0.3 x D	160	–	300	128	–	240	96	–	180	IPT	.0019	.0025	.0029	.0033	.0041	.0041
	2	1 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
	3	1.25 x D	0.3 x D	0.3 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022	.0022
H	4	1.25 x D	0.4 x D	1 x D	160	–	200	128	–	160	96	–	120	IPT	.0014	.0018	.0021	.0024	.0030	.0030
	1	1.25 x D	0.4 x D	0.75 x D	260	–	460	208	–	368	156	–	276	IPT	.0017	.0022	.0026	.0029	.0034	.0034
	2	1.25 x D	0.2 x D	0.5 x D	230	–	390	184	–	312	138	–	234	IPT	.0013	.0016	.0019	.0021	.0024	.0024

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. Please adjust parameters according to system stability.

For side milling with ap larger than 1 x D, reduce fz by 20%!

Cylindrical shanks not recommended for full slotting.

■ HARVI III Ball Nose • UJBV • Unequal Flute Spacing • Roughing

Material Group																		
				Side Milling (A)		short			medium			long			Recommended feed per tooth (IPT = inch/th) for side milling (A).			
		A		adapter reach									D1 – Diameter					
				KCSM15			KCSM15			KCSM15								
				Cutting Speed – vc SFM			Cutting Speed – vc SFM			Cutting Speed – vc SFM			frac.	3/8	1/2	5/8	3/4	1
		ap	ae	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500	1.2500
P	0	Ap max	0.4 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042
	1	Ap max	0.4 x D	490	–	660	441	–	594	441	–	594	IPT	.0023	.0029	.0034	.0037	.0042
	2	Ap max	0.4 x D	460	–	620	414	–	558	414	–	558	IPT	.0023	.0029	.0034	.0037	.0042
	3	Ap max	0.4 x D	390	–	520	351	–	468	351	–	468	IPT	.0019	.0025	.0029	.0033	.0041
	4	Ap max	0.4 x D	300	–	490	270	–	441	270	–	441	IPT	.0017	.0022	.0026	.0029	.0034
	5	Ap max	0.4 x D	200	–	330	170	–	280.5	160	–	264	IPT	.0016	.0020	.0023	.0026	.0033
M	6	Ap max	0.4 x D	160	–	250	136	–	212.5	128	–	200	IPT	.0013	.0016	.0019	.0021	.0024
	1	Ap max	0.4 x D	300	–	380	240	–	304	210	–	266	IPT	.0019	.0025	.0029	.0033	.0041
	2	Ap max	0.4 x D	200	–	260	160	–	208	140	–	182	IPT	.0016	.0020	.0023	.0026	.0033
K	3	Ap max	0.4 x D	200	–	230	160	–	184	140	–	161	IPT	.0013	.0016	.0019	.0021	.0024
	1	Ap max	0.4 x D	390	–	490	351	–	441	351	–	441	IPT	.0023	.0029	.0034	.0037	.0042
	2	Ap max	0.4 x D	360	–	460	324	–	414	324	–	414	IPT	.0019	.0025	.0029	.0033	.0041
S	3	Ap max	0.4 x D	360	–	430	324	–	387	324	–	387	IPT	.0016	.0020	.0023	.0026	.0033
	1	Ap max	0.4 x D	160	–	300	128	–	240	96	–	180	IPT	.0019	.0025	.0029	.0033	.0041
	2	Ap max	0.4 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022
	3	Ap max	0.4 x D	80	–	130	64	–	104	48	–	78	IPT	.0010	.0013	.0015	.0018	.0022
H	4	Ap max	0.4 x D	160	–	200	128	–	160	96	–	120	IPT	.0014	.0018	.0021	.0024	.0030
	1	Ap max	0.4 x D	260	–	460	208	–	368	156	–	276	IPT	.0017	.0022	.0026	.0029	.0034
	2	Ap max	0.4 x D	230	–	390	184	–	312	138	–	234	IPT	.0013	.0016	.0019	.0021	.0024

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. Please adjust parameters according to system stability.

For side milling with Ap bigger than 1 x D, reduce fz by 20%!

Cylindrical shanks not recommended for full slotting.

■ HARVI III Ball Nose • UJBV • Unequal Flute Spacing • Finishing

Material Group																		
		Side Milling (A)		short			medium			long			Recommended feed per tooth (IPT = inch/th) for side milling (A).					
				adapter reach									D1 – Diameter					
				A		KCSM15			KCSM15			KCSM15			frac.	3/8	1/2	5/8
Cutting Speed – vc SFM			Cutting Speed – vc SFM			Cutting Speed – vc SFM												
		ap	ae	min		max	min		max	min		max	dec.	.3750	.5000	.6250	.7500	1.2500
P	0	Ap max	0.06 x D	940	–	1250	846	–	1125	846	–	1125	IPT	.0028	.0035	.0040	.0045	.0050
	1	Ap max	0.06 x D	940	–	1250	846	–	1125	846	–	1125	IPT	.0028	.0035	.0040	.0045	.0050
	2	Ap max	0.06 x D	870	–	1180	783	–	1062	783	–	1062	IPT	.0028	.0035	.0040	.0045	.0050
	3	Ap max	0.06 x D	750	–	1000	675	–	900	675	–	900	IPT	.0023	.0029	.0035	.0039	.0049
	4	Ap max	0.06 x D	560	–	940	504	–	846	504	–	846	IPT	.0021	.0026	.0031	.0034	.0041
	5	Ap max	0.06 x D	370	–	620	314.5	–	527	296	–	496	IPT	.0019	.0024	.0028	.0031	.0040
M	6	Ap max	0.06 x D	310	–	470	263.5	–	399.5	248	–	376	IPT	.0016	.0020	.0023	.0025	.0029
	1	Ap max	0.06 x D	560	–	720	448	–	576	392	–	504	IPT	.0023	.0029	.0035	.0039	.0049
	2	Ap max	0.06 x D	370	–	500	296	–	400	259	–	350	IPT	.0019	.0024	.0028	.0031	.0040
K	3	Ap max	0.06 x D	370	–	440	296	–	352	259	–	308	IPT	.0016	.0020	.0023	.0025	.0029
	1	Ap max	0.06 x D	750	–	940	675	–	846	675	–	846	IPT	.0028	.0035	.0040	.0045	.0050
	2	Ap max	0.06 x D	690	–	870	621	–	783	621	–	783	IPT	.0023	.0029	.0035	.0039	.0049
S	3	Ap max	0.06 x D	690	–	810	621	–	729	621	–	729	IPT	.0019	.0024	.0028	.0031	.0040
	1	Ap max	0.06 x D	310	–	560	248	–	448	186	–	336	IPT	.0023	.0029	.0035	.0039	.0049
	2	Ap max	0.06 x D	160	–	250	128	–	200	96	–	150	IPT	.0012	.0016	.0019	.0021	.0027
	3	Ap max	0.06 x D	160	–	250	128	–	200	96	–	150	IPT	.0012	.0016	.0019	.0021	.0027
H	4	Ap max	0.06 x D	310	–	370	248	–	296	186	–	222	IPT	.0017	.0022	.0026	.0029	.0036
	1	Ap max	0.06 x D	500	–	870	400	–	696	300	–	522	IPT	.0021	.0026	.0031	.0034	.0041
	2	Ap max	0.06 x D	440	–	750	352	–	600	264	–	450	IPT	.0016	.0020	.0023	.0025	.0029

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. Please adjust parameters according to system stability.

For side milling with ap larger than 1 x D, reduce fz by 20%!

Cylindrical shanks not recommended for full slotting.



Duo-Lock™ HARVI™ III

- CHALLENGE**
- Facing steel (1215) material.
 - External emulsion.
 - Current solution solid carbide.

- SOLUTION**
- Duo-Lock Ø 5/8".
 - HARVI III UJDV.
 - Corner radius R = .015".

- CUTTING DATA**
- v_c 699 SFM
 - f_z .0020 IPT
 - a_p .050"
 - a_e .472"

- RESULT**
- 40% higher feed per tooth.
 - 15% increase in cutting speed.
 - Good surface finish and minimum wear on edges.

- BENEFIT**
- Reduced machining time.
 - Increased productivity.
 - Reduced tooling cost.



Duo-Lock™ HARVI

- CHALLENGE**
- Roughing of sensor mounting slot in cast iron.
 - External emulsion.
 - Current solution solid carbide.

- SOLUTION**
- Duo-Lock Ø .630" — cylindrical shank.
 - HARVI UKDV.
 - Corner radius R = .020".

- CUTTING DATA**
- v_c 190 SFM
 - f_z .0026
 - a_p .863"
 - a_e .314"

- RESULT**
- Less wear.
 - More stable process.

- BENEFIT**
- No unpredictable breakage like with competitive solid carbide tool.
 - Stable machining process.



Duo-Lock™ HARVI™ III

- CHALLENGE**
- Finishing contour milling with lightly interrupted cut.
 - Blade machining of X20Cr and X22Cr (M3).
 - External emulsion.
 - Current solution solid carbide.

- SOLUTION**
- Duo-Lock Ø .630" — cylindrical shank.
 - HydroForce™ with reducer sleeve.
 - HARVI III UJDV geometry in KCSM15™.
 - Corner radius R = .157".

- CUTTING DATA**
- v_c 1148 SFM
 - f_z .0047 IPT
 - a_p .020"
 - a_e .157"

- RESULT**
- Tool life increased from 34 to 103 parts.
 - Machining time per part reduced by 50%.

- BENEFIT**
- Increase of productivity.
 - Cost reduction through almost triple tool life.
 - Improved surface finish.



Duo-Lock™ HARVI III

- CHALLENGE**
- Hard machining — side milling.
 - Hardened steel (17–4 PH) — 35 HRC.
 - External emulsion.
 - Current solution solid carbide.

- SOLUTION**
- Duo-Lock Ø 5/8".
 - HARVI III UJDV.
 - Corner radius R = .015".

- CUTTING DATA**
- v_c 736 SFM
 - f_z .0044 IPT
 - a_p .600"
 - a_e .030"

- RESULT**
- 15% increase in cutting speed.
 - Good surface finish and minimum wear on edges.

- BENEFIT**
- Reduced machining time.
 - Increased productivity.
 - Reduced tooling cost.