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KENNAMETAL®

INNOVATIONS 2019 | 01

INCH

Hydraulic Chuck Portfolio

Achieving optimum performance
for round-tool applications.

HydroForce™

High Performance

Slim Line

INNOVATIONS

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CAS — Customer Application Support

Get Fast and Reliable Answers to Your Toughest Problems

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

Easy Access to Proven Metalworking Expertise!

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

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Tooling Systems

POWERED BY NOVO

Hydraulic Chucks

Applications

- Drilling
- Reaming
- Helix Angle Tapping: 45°
- 3D Profiling
- Side Milling
- Slotting
- Ramping
- Plunge Milling

kennametal.com/Hydraulic-Chucks

HydroForce
For any application, providing an unparalleled combination of accuracy and clamping force.

High Performance
Universal solution for drilling and tapping.

Slim Line
For long-reach applications and narrow conditions.

Optimum performance for round-tool applications.

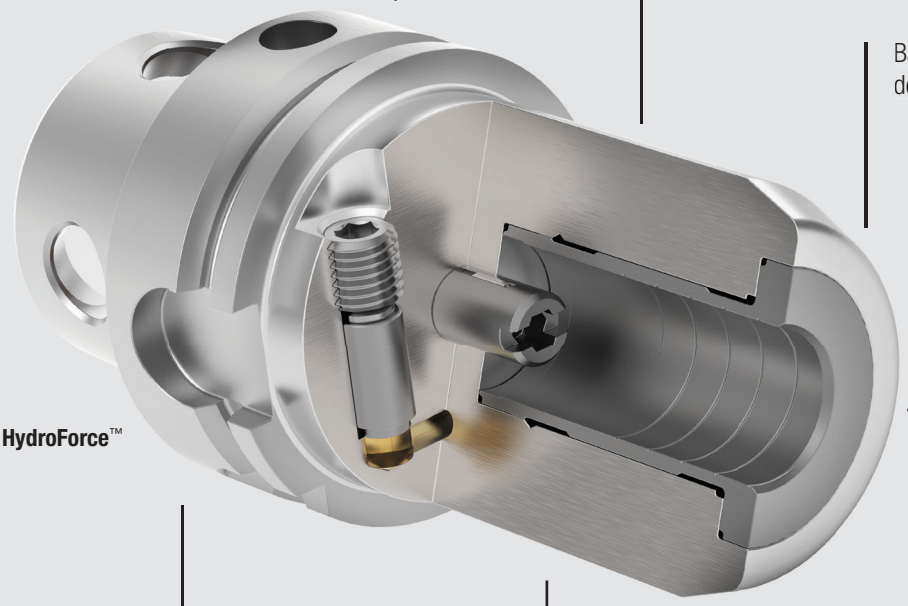
Activation of the chuck is achieved by turning the piston screw, which pressurizes the hydraulic fluid and exerts force on a thin-walled membrane along the length of the clamping bore.

This highly concentric clamping force not only holds the tool shank more securely, but also produces a dampening effect that reduces vibration and helps eliminate micro-cracking on cutting edges.

Highest clamping force in the industry.

Diameter 3/4" and 1-1/4" (20 and 32mm): Runout of 3 µm or less at 2.5x diameter overhang [6 µm for diameter 2" (50mm)].

Balanced G2.5 at 25.000 RPM, delivering precision.



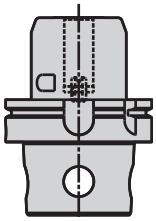
HydroForce™

3 clamping bore sizes for all applications. 3/4", 1-1/4", and 2" (20, 32, and 50mm).

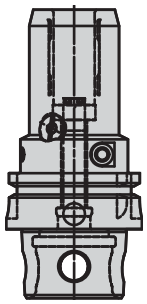
Short projection length and 40% thicker front wall enabling high cutting parameters and optimum surface quality.

3x higher clamping force than High-Performance Line.

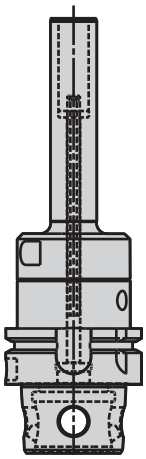
Portfolio



HydroForce™ with KM4X™ back end.



High Performance with KM4X back end.



Slim Line with KM4X back end.

Accessories

Reducer sleeves

HydroForce Safe-Lock™ reducer sleeves with pullout protection.

Hydraulic extensions

HYDRAULIC CHUCKS • TOOL SELECTION GUIDE

STEP 1

	HYDRAULIC CHUCK PORTFOLIO		
	HYDROFORCE™	HIGH PERFORMANCE	SLIM LINE
Rigidity	High Rigidity	Moderate Rigidity	Low Rigidity
Range	3/4, 1-1/4, 2" (20, 32, 50mm)	1/4–1-1/4" (6–32mm)	1/4–1-1/4" (6–20mm)
Application recommendation			

STEP 2

	HYDROFORCE HIGH TORQUE							
	KM™	KM4X™	PSC	HSK A	BT	BTKV	CV	CVKV
Page(s)	10, 13	15	19	20	33	36	25	32
Connection size	KM63TS KM63XMZ	KM4X63 KM4X100	PSC63	HSK63A HSK100A HSK125A	BT40 BT50	BTKV40 BTKV50	CV40 CV50	CVKV40 CVKV50
Rigidity	High Rigidity							
Application recommendation								

STEP 2

	HIGH PERFORMANCE						
	KM	KM4X	PSC	HSK A	HSK C	BT	CV
Page(s)	11, 13	16, 17	19	21, 22	24	33, 34	26, 27
Connection size	KM40TS KM63TS KM63XMZ	KM4X63 KM4X100	PSC50 PSC63	HSK40A HSK63A HSK80A HSK100A	HSK32C HSK40C HSK50C HSK63C	BT30 BT40 BT50	CV40 CV50
Rigidity	Moderate Rigidity						
Application recommendation							

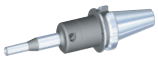
NOTE: For accessories, spare parts, and technical information, visit **kennametal.com** or **kennametal.com/novo**.

HYDRAULIC CHUCKS • TOOL SELECTION GUIDE

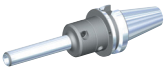
STEP 1

	HYDRAULIC CHUCK PORTFOLIO		
	HYDROFORCE™	HIGH PERFORMANCE	SLIM LINE
Rigidity	High Rigidity	Moderate Rigidity	Low Rigidity
Range	3/4, 1-1/4, 2" (20, 32, 50mm)	1/4–1-1/4" (6–32mm)	1/4–1-1/4" (6–20mm)
Application recommendation			

STEP 2

	SLIM LINE, XS				
	KM™	KM4X™	HSK A	BT	CV
					
Page(s)	12, 14	18	23	35	28, 29, 30
Connection size	KM63TS KM63XMZ	KM4X63 KM4X100	HSK40A HSK63A HSK100A	BT40 BT50	CV40 CV50
Rigidity	Low Rigidity				
Application recommendation					

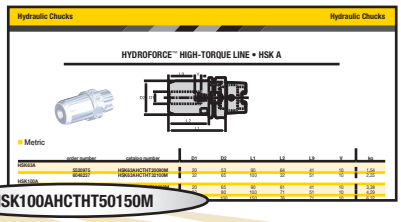
STEP 2

	SLIM LINE				
	KM	KM4X	HSK A	BT	CV
					
Page(s)	12, 14	18	23	35	31
Connection size	KM63TS KM63XMZ	KM4X63 KM4X100	HSK40A HSK63A HSK100A	BT40 BT50	CV40 CV50
Rigidity	Low Rigidity				
Application recommendation					

NOTE: For accessories, spare parts, and technical information, visit **kennametal.com** or **kennametal.com/novo**.

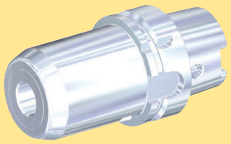
HYDRAULIC CHUCKS • CATALOG NUMBERING SYSTEM

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.

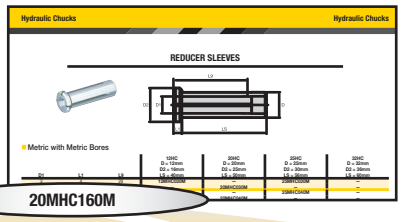


HSK100AHCTHT50150M

HSK	100	A	HCTHT	50	150	M
Connection Style Machine Side (CSMS)	Connection Size	System Flange Form	Hydraulic Chuck Type	Clamping Diameter	Tool Length	Value
KM™ KM4X™ HSK DV CV BT PSC	30 32 40 50 63 80 100 125	**A** = Form A **C** = Form C **B** = Coolant	**HCTHT** = HydroForce™ **HCSL** = Slim Line **HCSLT** = Slim Line T **HC** = High Performance	50 = 50mm 075 = 3/4"	150 = 150mm 413 = 4.13"	**M** = Metric **Blank** = Inch



REDUCER SLEEVES • CATALOG NUMBERING SYSTEM



20MHC160M

20	M	HC	160	M
Connection Size	Value	Sleeve Style	Sleeve Bore Size	Value
12 = 12mm 20 = 20mm 32 = 32mm 50 = 1/2" 75 = 3/4" 12 = 1 1/4"	**M** = Metric **Blank** = Inch	**HC** = Hydraulic Chuck **HCSFC** = Safe-Lock™	100 = 10mm 160 = 16mm 250 = 25mm 0125 = 1/8" 0500 = 1/2" 1000 = 1"	**M** = Metric **Blank** = Inch

HydroForce™

KENNAMETAL

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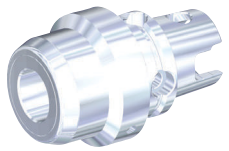
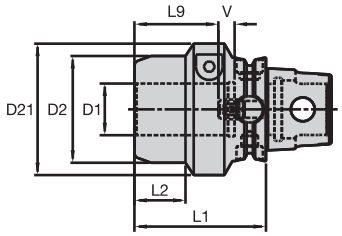
HYDROFORCE™ HIGH-TORQUE LINE • KM-TS™





Metric

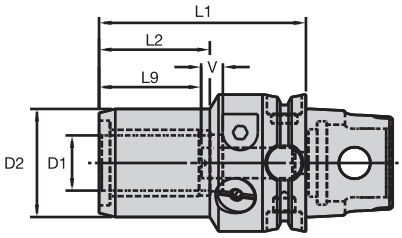
CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
KM63TS	5520979	KM63TSHCTHT32080M	32	65	80	80	31	51	10	2,00

Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
KM63TS	5521070	KM63TSHCTHT125315	1 1/4	2.559	3.150	3.150	1.220	2.012	.394	4.42

81 8 6 84

HIGH-PERFORMANCE LINE • KM-TS™



Metric

CSMS	order number	catalog number	D1	D2	L1	L2	L9	V	kg
KM40TS									
	3960498	KM40TSHC06065M	6	26	65	34	27	10	0,43
	3960499	KM40TSHC08065M	8	28	65	34	27	10	0,44
	3960500	KM40TSHC10070M	10	30	70	38	31	10	0,49
	3960501	KM40TSHC12075M	12	32	75	41	36	10	0,53
KM50TS									
	4007723	KM50TSHC06065M	6	26	65	30	27	10	0,63
	4007724	KM50TSHC08065M	8	28	65	30	27	10	0,65
	4007725	KM50TSHC10070M	10	30	70	36	31	10	0,69
	4007726	KM50TSHC12075M	12	32	75	40	36	10	0,73
	4007727	KM50TSHC14075M	14	34	75	43	36	10	0,72
	4007728	KM50TSHC16080M	16	38	80	47	39	10	0,83
	4007729	KM50TSHC18080M	18	40	80	47	39	10	0,85
	4007730	KM50TSHC20085M	20	42	85	48	41	10	0,94
KM63TS									
	2388650	KM63TSHC06070M	6	26	70	33	27	10	1,08
	2388651	KM63TSHC08070M	8	28	70	33	27	10	1,10
	2388652	KM63TSHC10075M	10	30	75	36	31	10	1,17
	2388653	KM63TSHC12080M	12	32	80	41	36	10	1,21
	2388654	KM63TSHC14080M	14	34	80	43	36	10	1,18
	2388655	KM63TSHC16080M	16	38	80	48	39	10	1,17
	2388656	KM63TSHC18080M	18	40	80	47	39	10	1,19
	2388657	KM63TSHC20085M	20	42	85	48	41	10	1,32
	2388658	KM63TSHC25095M	25	50	95	51	47	10	1,64
	2388659	KM63TSHC32100M	32	60	100	59	51	10	1,92

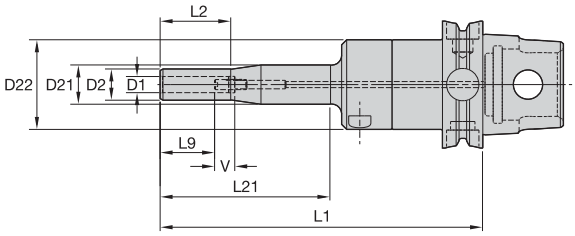
Inch

CSMS	order number	catalog number	D1	D2	L1	L2	L9	V	lbs
KM40TS									
	3960497	KM40TSHC050300	1/2	1.244	3.000	1.752	1.417	.394	1.16
KM63TS									
	2388643	KM63TSHC025288 *	1/4	1.011	2.875	1.299	1.063	.394	2.53
	2388644	KM63TSHC038300 *	3/8	1.168	3.000	1.417	1.220	.394	2.64
	2388645	KM63TSHC050325	1/2	1.243	3.250	1.614	1.417	.394	2.79
	2388646	KM63TSHC062325	5/8	1.479	3.250	1.870	1.535	.394	2.70
	2388647	KM63TSHC075338	3/4	1.636	3.375	1.890	1.614	.394	2.97
	2388648	KM63TSHC100375	1	1.959	3.750	2.008	1.850	.394	3.60
	2388649	KM63TSHC125400	1 1/4	2.352	4.000	2.323	2.008	.394	4.34

NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

81	8	6	84

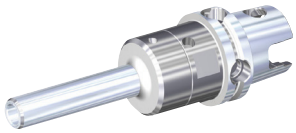
SLIM LINE, XS • KM-TS™

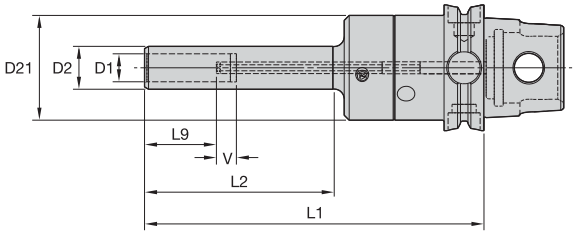


Metric

CSMS	order number	catalog number	D1	D2	D21	D22	L1	L2	L21	L9	V	kg
KM63TS												
	3055503	KM63TSHCSLT06160M	6	14	20	44	160	35	85	27	10	1,35
	3055504	KM63TSHCSLT08160M	8	16	20	44	160	35	85	27	10	1,36

SLIM LINE • KM-TS



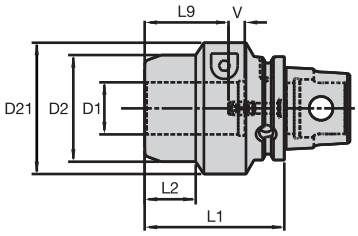


Metric

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
KM63TS										
	3055505	KM63TSHCSLT10160M	10	18	44	160	85	31	10	1,34
	3055506	KM63TSHCSL12170M	12	20	44	170	95	36	10	1,38
	3055507	KM63TSHCSL14170M	14	22	52	170	95	36	10	1,64
	3055508	KM63TSHCSL16170M	16	24	52	170	95	39	10	1,66
	3055509	KM63TSHCSL18170M	18	26	52	170	95	39	10	1,70
	3055510	KM63TSHCSL20170M	20	28	52	170	95	41	10	1,74

81	8	6	84

HYDROFORCE™ HIGH-TORQUE LINE • KM-XMZ™



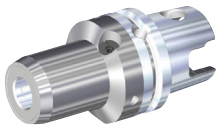
Metric

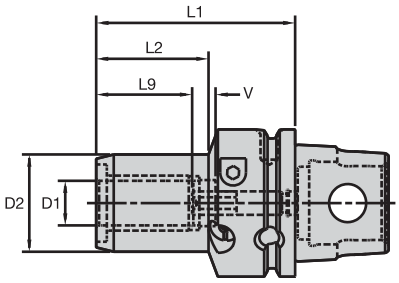
CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
KM63XMZ										
	5520978	KM63XMZHCTHT32085M	32	65	80	85	31	51	10	2,27

Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
KM63XMZ										
	5521079	KM63XMZHCTHT125315	1 1/4	2.559	3.150	3.150	1.260	2.012	.394	4.59

HIGH-PERFORMANCE LINE • KM-XMZ





Metric

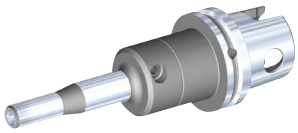
CSMS	order number	catalog number	D1	D2	L1	L2	L9	V	kg
KM63XMZ									
	1514516	KM63XMZHC2085Y	20	42	85	48	41	10	1,36
	1514517	KM63XMZHC32100Y	32	60	100	59	51	10	1,97

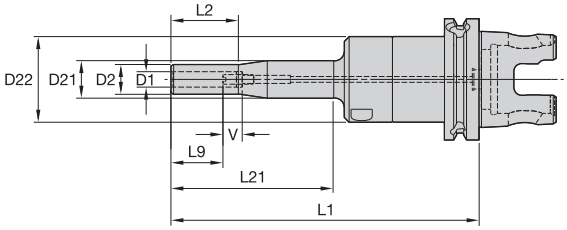
Inch

CSMS	order number	catalog number	D1	D2	L1	L2	L9	V	lbs
KM63XMZ									
	1514514	KM63XMZHC075335Y	3/4	1.637	3.347	1.890	1.614	.394	3.04
	1514515	KM63XMZHC125394Y	1 1/4	2.352	3.937	2.323	2.008	.394	4.36

81	8	6	84

SLIM LINE, XS • KM-XMZ™

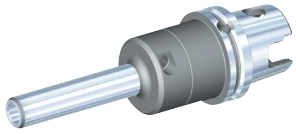


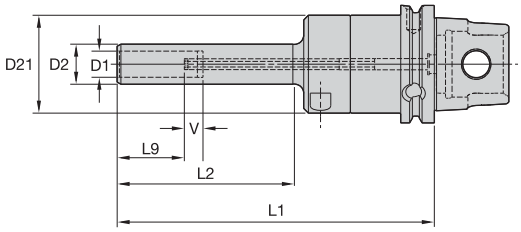


Metric

CSMS	order number	catalog number	D1	D2	D21	D22	L1	L2	L21	L9	V	kg
KM63XMZ												
	3055511	KM63XMZHCSLT06160MY	6	14	20	44	160	35	85	27	10	1,37
	3055512	KM63XMZHCSLT08160MY	8	16	20	44	160	35	85	27	10	1,38

SLIM LINE • KM-XMZ





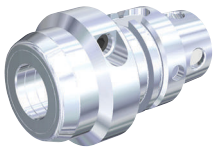
Metric

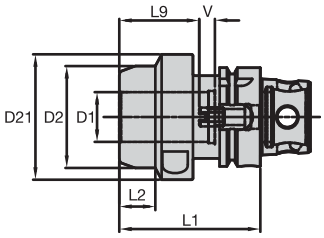
CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
KM63XMZ										
	3055513	KM63XMZHCSLT10160MY	10	18	44	160	85	31	10	1,36
	3055514	KM63XMZHCSL12170MY	12	20	44	170	95	36	10	1,40
	3055515	KM63XMZHCSL14170MY	14	22	52	170	95	36	10	1,68
	3055516	KM63XMZHCSL16170MY	16	24	52	170	95	39	10	1,70
	3055517	KM63XMZHCSL18170MY *	18	26	52	170	95	39	10	1,74
	3055518	KM63XMZHCSL20170MY	20	28	52	170	95	41	10	1,77

NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

81	8	6	84

HYDROFORCE™ HIGH-TORQUE LINE • KM4X™





Metric

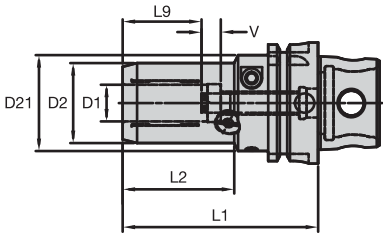
CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
KM4X63										
	5520990	KM4X63HCTHT20090M	20	53	–	90	64	41	10	1,63
	6048253	KM4X63HCTHT32090M	32	65	80	90	23	51	10	2,05
KM4X100										
	5520991	KM4X100HCTHT20085M	20	65	–	85	56	41	10	3,53
	5520992	KM4X100HCHT32095M	32	80	–	95	66	51	10	4,37
NEW	6381972	KM4X100HCTHT50135M	50	100	105	135	56	71	10	6,87

Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
KM4X63										
	5521071	KM4X63HCTHT075350	3/4	2.067	–	3.500	2.478	1.618	.394	3.57
	6048254	KM4X63HCTHT125354	1 1/4	2.559	3.150	3.543	.906	2.008	.394	4.53
KM4X100										
	5521072	KM4X100HCTHT125375	1 1/4	3.150	–	3.750	2.630	2.012	.394	9.66
	6381973	KM4X100HCTHT200531	2	3.937	4.134	5.315	2.205	2.795	.398	15.09

81	8	6	84

HIGH-PERFORMANCE LINE • KM4X™

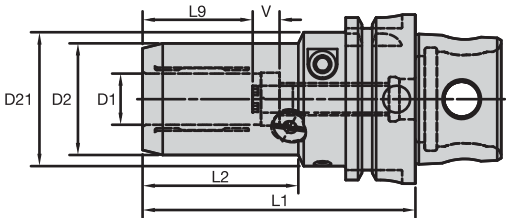


Metric

CSMS		order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
KM4X63											
	NEW	6480229	KM4X63HC06080M	6	26	50	80	33	27	10	1,09
	NEW	6480499	KM4X63HC06150M	6	26	50	150	105	27	10	1,35
	NEW	6480230	KM4X63HC08080M	8	28	50	80	34	27	10	1,10
	NEW	6480500	KM4X63HC08150M	8	28	50	150	105	27	10	1,42
	NEW	6480491	KM4X63HC10085M	10	30	50	85	39	31	10	1,14
	NEW	6480501	KM4X63HC10150M	10	30	50	150	105	31	10	1,48
	NEW	6480492	KM4X63HC12090M	12	32	50	90	45	36	10	1,18
	NEW	6480502	KM4X63HC12150M	12	32	50	150	105	36	10	1,54
	NEW	6480493	KM4X63HC14090M	14	34	50	90	46	36	10	1,19
	NEW	6480503	KM4X63HC14150M	14	34	50	150	105	36	10	1,59
	NEW	6480494	KM4X63HC16095M	16	38	50	95	52	39	10	1,29
	NEW	6480504	KM4X63HC16150M	16	38	50	150	105	39	10	1,76
	NEW	6480495	KM4X63HC18095M	18	40	50	95	—	39	10	1,31
	NEW	6480505	KM4X63HC18150M	18	40	50	150	105	39	10	1,83
	NEW	6480496	KM4X63HC20100M	20	42	50	100	58	41	10	1,39
	NEW	6480506	KM4X63HC20150M	20	42	50	150	105	41	10	1,91
	NEW	6480497	KM4X63HC25120M	25	50	50	120	51	47	10	2,06
	NEW	6480498	KM4X63HC32125M	32	60	63	125	59	51	10	2,34
KM4X100											
		5437081	KM4X100HC06085M	6	26	63	85	33	27	10	2,85
		5437082	KM4X100HC06150M	6	26	63	150	90	27	10	3,26
		5437083	KM4X100HC08085M	8	28	63	85	33	27	10	2,87
		5437084	KM4X100HC08150M	8	28	63	150	90	27	10	3,32
		5437085	KM4X100HC10090M	10	30	63	90	38	31	10	2,91
		5437086	KM4X100HC10150M	10	30	63	150	94	31	10	3,29
		5437087	KM4X100HC12095M	12	32	63	95	41	36	10	2,97
		5437088	KM4X100HC12150M	12	32	63	150	100	36	10	3,24
		5437089	KM4X100HC14095M	14	34	63	95	42	36	10	2,96
		5437110	KM4X100HC14150M	14	34	63	150	92	36	10	3,40
		5437111	KM4X100HC16100M	16	38	63	100	48	39	10	3,06
		5437112	KM4X100HC16150M	16	38	63	150	96	39	10	3,50
		5437113	KM4X100HC18100M	18	40	63	100	48	39	10	3,08
		5437114	KM4X100HC18150M	18	40	63	150	96	39	10	3,57
		5437115	KM4X100HC20105M	20	42	63	105	54	41	10	3,15
		5437116	KM4X100HC20150M	20	42	63	150	100	41	10	3,60
		5437117	KM4X100HC25115M	25	50	63	115	51	47	10	3,54
		5437118	KM4X100HC25200M	25	50	63	200	137	47	10	4,79
		5437119	KM4X100HC32120M	32	60	63	120	59	51	10	3,82
		5437120	KM4X100HC32200M	32	60	63	200	139	51	10	5,55

81	8	6	84

HIGH-PERFORMANCE LINE • KM4X™

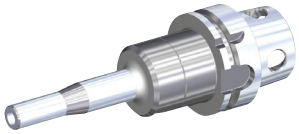


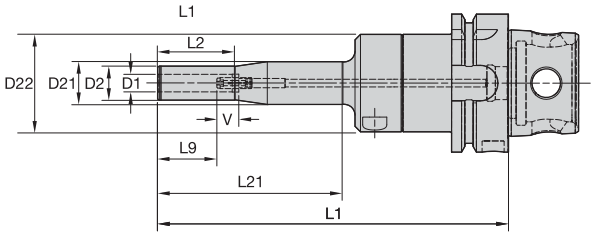
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
KM4X63										
	5549163	**KM4X63HC025325**	1/4	1.011	1.963	3.250	1.299	1.063	.394	2.50
	5549164	**KM4X63HC038338**	3/8	1.168	1.963	3.380	1.535	1.220	.394	2.56
	5549165	**KM4X63HC050350**	1/2	1.242	1.963	3.500	1.752	1.417	.394	2.56
	5549166	**KM4X63HC062375**	5/8	1.479	1.963	3.750	2.028	1.535	.394	2.86
	5549167	**KM4X63HC075400**	3/4	1.636	1.963	4.000	2.280	1.614	.394	2.96
	5549168	**KM4X63HC100475**	1	1.953	2.474	4.750	2.008	1.850	.394	4.59
	5549169	**KM4X63HC125500**	1 1/4	2.346	2.474	5.000	2.323	2.008	.394	5.32
KM4X100										
	5437276	**KM4X100HC025338**	1/4	1.011	2.474	3.380	1.299	1.063	.394	6.29
	5437277	**KM4X100HC038350**	3/8	1.168	2.474	3.500	1.496	1.220	.394	6.35
	5437278	**KM4X100HC050375**	1/2	1.243	2.474	3.750	1.614	1.417	.394	6.59
	5437279	**KM4X100HC062400**	5/8	1.479	2.474	4.000	1.850	1.535	.394	6.82
	5437350	**KM4X100HC075425**	3/4	1.637	2.474	4.250	2.126	1.614	.394	7.10
	5437351	**KM4X100HC100475**	1	1.964	2.474	4.750	2.008	1.850	.394	8.07
	5437352	**KM4X100HC125500**	1 1/4	2.357	2.474	5.000	2.323	2.008	.394	8.80

81	8	6	84

SLIM LINE, XS • KM4X™

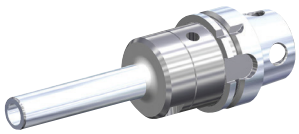


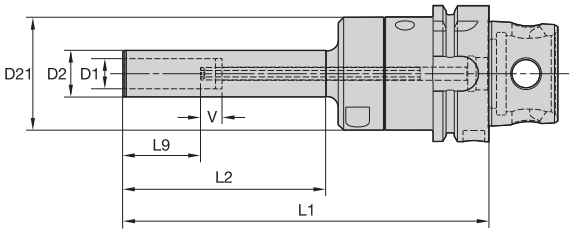


Metric

CSMS	order number	catalog number	D1	D2	D21	D22	L1	L2	L21	L9	V	kg
KM4X63												
	5479913	KM4X63HCSLT06160M	6	14	20	44	160	35	85	27	10	1,38
	5479914	KM4X63HCSLT08160M	8	16	20	44	160	35	85	27	10	1,39
KM4X100												
	5437138	KM4X100HCSLT06200M	6	14	20	44	200	35	85	27	10	3,37
	5437139	KM4X100HCSLT08200M	8	16	20	44	200	35	85	27	10	3,37

SLIM LINE • KM4X



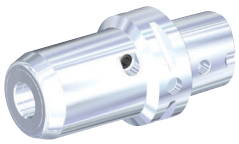


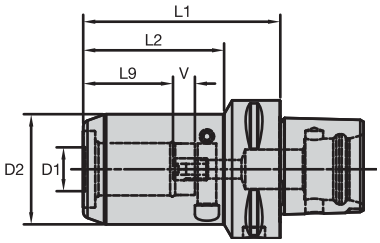
Metric

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
KM4X63										
	5479915	KM4X63HCSLT10160M	10	18	44	160	85	31	10	1,37
	5479912	KM4X63HCSL12170M	12	20	44	170	95	36	10	1,41
	5549202	KM4X63HCSL14170M	14	22	52	170	95	36	10	1,64
	5549203	KM4X63HCSL16170M	16	24	52	170	95	39	10	1,66
	5549204	KM4X63HCSL18170M	18	26	52	170	95	39	10	1,70
	5549205	KM4X63HCSL20170M	20	28	52	170	95	41	10	1,74
KM4X100										
	5437400	KM4X100HCSLT10200M	10	18	44	200	85	31	10	3,36
	5437401	KM4X100HCSL12200M	12	20	44	200	95	36	10	3,27
	5437402	KM4X100HCSL14200M	14	22	52	200	95	36	10	3,64
	5437403	KM4X100HCSL16200M	16	24	52	200	95	39	10	3,65
	5437404	KM4X100HCSL18200M	18	26	52	200	95	39	10	3,69
	5437405	KM4X100HCSL20200M	20	28	52	200	95	41	10	3,72

81	8	6	84

HYDROFORCE™ HIGH-TORQUE LINE • PSC





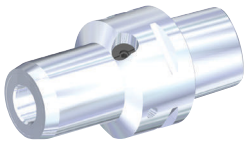
Metric

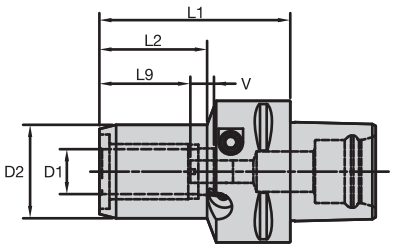
CSMS	order number	catalog number	D1	D2	L1	L2	L9	V	kg
PSC63									
	6048239	PSC63HCTHT20090M	20	50	90	64	41	10	1,64
	6048251	PSC63HCTHT32095M	32	80	95	95	51	10	3,08

Inch

CSMS	order number	catalog number	D1	D2	L1	L2	L9	V	lbs
PSC63									
	6048240	PSC63HCTHT075350	3/4	1.980	3.500	2.490	1.614	.394	3.61
	6048252	PSC63HCTHT125375	1 1/4	3.150	3.750	3.750	2.008	.394	6.83

HIGH-PERFORMANCE LINE • PSC



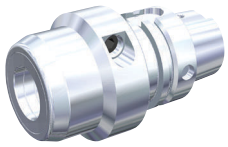


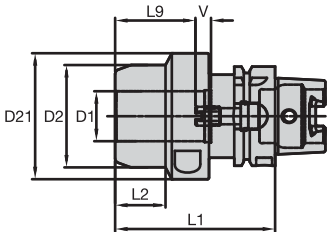
Metric

CSMS	order number	catalog number	D1	D2	L1	L2	L9	V	kg
PSC50									
	6338251	PSC50HC06065M	6	26	65	30	27	10	0,69
	6338148	PSC50HC08065M	8	28	65	30	27	10	0,71
	6338147	PSC50HC10070M	10	30	70	36	31	10	0,75
	6338146	PSC50HC12075M	12	32	75	40	36	10	0,80
	6338149	PSC50HC14075M	14	34	75	43	36	10	0,79
	6338145	PSC50HC16080M	16	38	80	47	39	10	0,90
	6338150	PSC50HC18080M	18	40	80	47	39	10	0,92
	6338144	PSC50HC20085M	20	42	80	47	41	10	1,01
PSC63									
	4092131	PSC63HC06070M	6	26	70	33	27	10	1,15
	4113745	PSC63HC08070M	8	28	70	33	27	10	1,17
	4113746	PSC63HC10075M	10	30	75	36	31	10	1,24
	4113747	PSC63HC12080M	12	32	80	41	36	10	1,28
	4113748	PSC63HC14080M	14	34	80	43	36	10	1,27
	4113749	PSC63HC16080M	16	38	80	48	39	10	1,26
	4113750	PSC63HC18080M	18	40	80	47	39	10	1,29
	4113751	PSC63HC20085M	20	42	85	48	41	10	1,41
	4113752	PSC63HC25095M	25	50	95	51	47	10	1,74
	4113803	PSC63HC32100M	32	60	100	59	51	10	2,02

81	8	6	84

HYDROFORCE™ HIGH-TORQUE LINE • HSK A





Metric

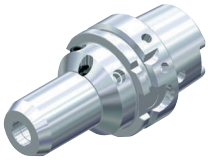
CSMS		order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
HSK63A											
		5520975	HSK63AHCTHT20090M	20	53	–	90	64	41	10	1,54
		6048237	HSK63AHCTHT32100M	32	65	80	100	32	51	10	2,25
HSK100A											
		5520976	HSK100AHCTHT20090M	20	65	–	90	61	41	10	3,38
		5520977	HSK100AHCTHT32100M	32	80	–	100	71	51	10	4,29
	NEW	6381929	HSK100AHCTHT50150M	50	100	105	150	76	71	10	6,32
HSK125A											
		5883440	HSK125AHCTHT20095M	20	65	–	95	66	41	10	4,77
		5883511	HSK125AHCTHT32105M	32	80	–	105	76	51	10	5,76
	NEW	6381971	HSK125AHCTHT50155M	50	100	105	155	86	71	10	9,79

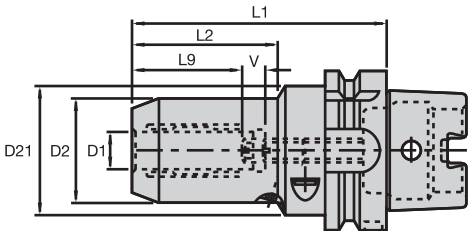
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
HSK63A										
	5520958	HSK63AHCTHT075350	3/4	2.067	–	3.500	2.478	1.618	.394	3.39
	6048238	HSK63AHCTHT125400	1 1/4	2.559	3.150	4.000	1.260	2.008	.394	5.11
HSK100A										
	5520959	HSK100AHCTHT125400	1 1/4	3.150	–	4.000	2.860	2.012	.394	9.61
	6381930	HSK100AHCTHT200590	2	3.937	4.134	5.906	2.402	2.799	.394	17.92
HSK125A										
	5883512	HSK125AHCTHT125420	1 1/4	3.150	–	4.201	3.061	2.012	.394	12.87
	6045345	HSK125AHCTHT200610	2	3.937	4.134	6.102	3.386	2.799	.394	22.13

81 8 6 84

HIGH-PERFORMANCE LINE • HSK A



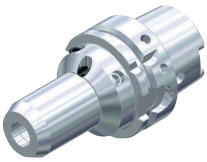


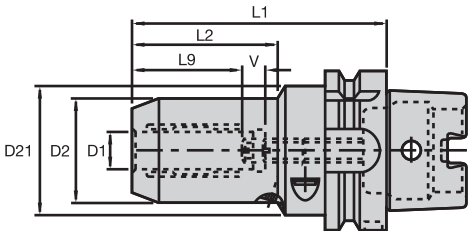
Metric

CSMS		order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
HSK40A											
		1960118	HSK40AHC06080M	6	26	32	80	35	27	10	0,45
		1960119	HSK40AHC08080M	8	28	32	80	36	27	10	0,46
		1960120	HSK40AHC10085M	10	30	32	85	40	31	10	0,51
		1960121	HSK40AHC12090M	12	32	32	90	43	36	10	0,54
	NEW	6482791	HSK40AHC14100M	14	34	50	100	42	36	10	0,77
	NEW	6482792	HSK40AHC16100M	16	38	50	100	47	39	10	0,82
	NEW	6482793	HSK40AHC18100M	18	40	50	100	47	39	10	0,84
	NEW	6482794	HSK40AHC20100M	20	42	50	100	48	41	10	0,86
HSK50A											
		1245473	HSK50AHC06080M	6	26	40	80	35	27	10	0,80
		1245474	HSK50AHC08080M	8	28	40	80	36	27	10	0,90
		1245475	HSK50AHC10085M	10	30	40	85	41	31	10	0,71
		1245476	HSK50AHC12090M	12	32	40	90	47	36	10	1,30
HSK63A											
		1245440	HSK63AHC06080M	6	26	50	80	33	27	10	1,00
	NEW	6482800	HSK63AHC06150M	6	26	50	150	105	27	10	1,27
		1245441	HSK63AHC08080M	8	28	50	80	34	27	10	1,10
	NEW	6482801	HSK63AHC08150M	8	28	50	150	105	27	10	1,33
		1245477	HSK63AHC10085M	10	30	50	85	39	31	10	1,10
	NEW	6482802	HSK63AHC10150M	10	30	50	150	105	31	10	1,39
		1245478	HSK63AHC12090M	12	32	50	90	45	36	10	2,00
	NEW	6482803	HSK63AHC12150M	12	32	50	150	105	36	10	1,45
		1245479	HSK63AHC14090M	14	34	50	90	46	36	10	2,00
	NEW	6482804	HSK63AHC14150M	14	34	50	150	105	36	10	1,51
		1245480	HSK63AHC16095M	16	38	50	95	52	39	10	2,00
	NEW	6482805	HSK63AHC16150M	16	38	50	150	105	39	10	1,67
		1245481	HSK63AHC18095M	18	40	50	95	52	39	10	2,10
	NEW	6482806	HSK63AHC18150M	18	40	50	150	105	39	10	1,75
		1191019	HSK63AHC20100M	20	42	50	100	58	41	10	2,10
	NEW	6482807	HSK63AHC20150M	20	42	50	150	105	41	10	1,83
		1245482	HSK63AHC25120M	25	50	63	120	51	47	10	1,99
		1192226	HSK63AHC32125M	32	60	63	125	59	51	10	2,27
HSK80A											
		1960133	HSK80AHC08085M	8	28	50	85	36	27	10	1,52
		1960135	HSK80AHC12095M	12	32	50	95	43	36	10	1,61
		1960136	HSK80AHC14095M	14	34	50	95	43	36	10	1,63
		1960137	HSK80AHC16100M	16	38	50	100	46	39	10	1,74
		1960138	HSK80AHC18100M	18	40	50	100	48	39	10	1,75
		1960139	HSK80AHC20105M	20	42	50	105	54	41	10	1,83
		1960140	HSK80AHC25115M	25	50	63	115	51	47	10	2,43
		1960141	HSK80AHC32125M	32	60	63	125	59	51	10	2,83
HSK100A											
		1245483	HSK100AHC06085M	6	26	63	85	33	27	10	2,57
		2229193	HSK100AHC06150M	6	26	63	150	90	27	10	2,96
		1245484	HSK100AHC08085M	8	28	63	85	33	27	10	2,59
		2215823	HSK100AHC08150M	8	28	63	150	90	27	10	3,03
		1245485	HSK100AHC10090M	10	30	63	90	38	31	10	2,64
		2229194	HSK100AHC10150M	10	30	63	150	94	31	10	3,00
		1245486	HSK100AHC12095M	12	32	63	95	41	36	10	2,68
		2229195	HSK100AHC12150M	12	32	63	150	100	36	10	2,94
		1245487	HSK100AHC14095M	14	34	63	95	42	36	10	2,68
		2229196	HSK100AHC14150M	14	34	63	150	92	36	10	3,11
		1245488	HSK100AHC16100M	16	38	63	100	48	39	10	2,78
		2229197	HSK100AHC16150M	16	38	63	150	96	39	10	3,20
		1245489	HSK100AHC18100M	18	40	63	100	48	39	10	2,80
		2229198	HSK100AHC18150M	18	40	63	150	96	39	10	3,28
		1245490	HSK100AHC20105M	20	42	63	105	54	41	10	2,87
		2229199	HSK100AHC20150M	20	42	63	150	100	41	10	3,31
		1245491	HSK100AHC25115M	25	50	63	115	51	47	10	3,26
		2229200	HSK100AHC25200M	25	50	63	200	137	47	10	4,50
		1245492	HSK100AHC32120M	32	60	63	120	59	51	10	3,55
		2229201	HSK100AHC32200M	32	60	63	200	139	51	10	5,27

81	8	6	84

HIGH-PERFORMANCE LINE • HSK A



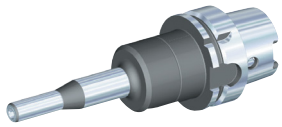


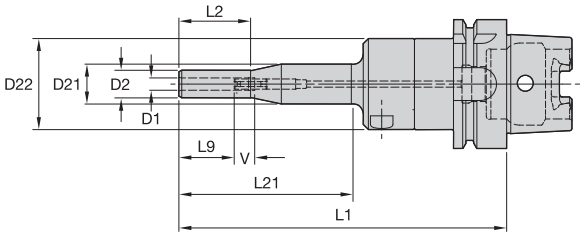
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
HSK40A										
	6482795	**HSK40AHC025315**	1/4	1.009	1.254	3.150	1.378	1.063	.394	.98
	6482796	**HSK40AHC038335**	3/8	1.167	1.254	3.346	1.575	1.220	.394	1.11
	6482797	**HSK40AHC050354**	1/2	1.242	1.254	3.543	2.758	1.417	.394	1.19
	6482798	**HSK40AHC062394**	5/8	1.478	1.963	3.937	1.831	1.535	.394	1.79
	6482799	**HSK40AHC075394**	3/4	1.635	1.963	3.937	1.890	1.614	.394	1.93
HSK63A										
	1246525	**HSK63AHC038338**	3/8	1.169	1.963	3.380	1.535	1.221	.394	2.40
	1246528	**HSK63AHC050350**	1/2	1.244	1.963	3.500	1.752	1.417	.394	4.40
	1246532	**HSK63AHC062375**	5/8	1.480	1.963	3.750	2.028	1.535	.394	4.40
	1246534	**HSK63AHC075400**	3/4	1.638	1.963	4.000	2.284	1.614	.394	4.60
	1246536	**HSK63AHC100475**	1	1.953	2.474	4.750	2.008	1.850	.394	4.41
	1246540	**HSK63AHC125500**	1 1/4	2.347	2.474	5.000	2.323	1.969	.394	5.30
HSK100A										
	1246557	**HSK100AHC038350**	3/8	1.169	2.474	3.500	1.378	1.221	.394	5.84
	1246560	**HSK100AHC050375**	1/2	1.244	2.474	3.750	1.595	1.417	.394	5.95
	1246563	**HSK100AHC062400**	5/8	1.480	2.474	4.000	1.870	1.535	.394	6.17
	1246567	**HSK100AHC075425**	3/4	1.638	2.474	4.250	2.126	1.614	.394	6.39
	1246569	**HSK100AHC100475**	1	1.953	2.474	4.750	2.008	1.811	.394	7.28
	1246573	**HSK100AHC125500**	1 1/4	2.358	2.474	5.000	2.323	1.969	.394	7.94

81	8	6	84

SLIM LINE, XS • HSK A

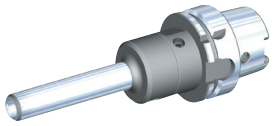


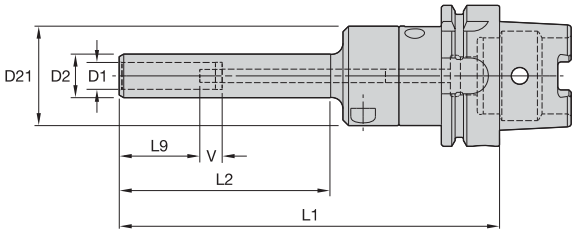


Metric

CSMS	order number	catalog number	D1	D2	D21	D22	L1	L2	L21	L9	V	kg
HSK40A												
	3061264	HSK40AHCSLT06160M	6	14	20	44	160	35	85	27	10	0,81
	3061265	HSK40AHCSLT08160M	8	16	20	44	160	35	85	27	10	0,82
HSK63A												
	2639015	HSK63AHCSLT06160M	6	14	20	44	160	35	85	27	10	1,29
	2868501	HSK63AHCSLT08160M	8	16	20	44	160	35	85	27	10	1,30
HSK100A												
	3061086	HSK100AHCSLT06200M	6	14	20	44	200	35	85	27	10	3,08
	3061087	HSK100AHCSLT08200M	8	16	20	44	200	35	85	27	10	3,09

SLIM LINE • HSK A





Metric

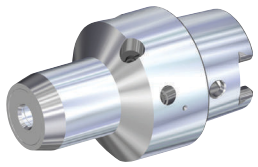
CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
HSK40A										
	3061266	HSK40AHCSLT10160M	10	18	44	160	85	31	10	0,80
	3061267	HSK40AHCSLT12170M	12	20	44	170	95	36	10	0,86
	3061268	HSK40AHCSLT14170M	14	22	52	170	95	36	10	1,02
HSK63A										
	2638477	HSK63AHCSLT10160M	10	18	44	160	85	31	10	1,28
	2458200	HSK63AHCSL12170M	12	20	44	170	95	36	10	1,33
	2541833	HSK63AHCSL14170M	14	22	52	170	95	36	10	1,56
	2458202	HSK63AHCSL16170M	16	24	52	170	95	39	10	1,58
	2541834	HSK63AHCSL18170M	18	26	52	170	95	39	10	1,62
	2458203	HSK63AHCSL20170M	20	28	52	170	95	41	10	1,66
HSK100A										
	3061088	HSK100AHCSLT10200M	10	18	44	200	85	31	10	3,07
	3061089	HSK100AHCSL12200M	12	20	44	200	95	36	10	2,99
	3061090	HSK100AHCSL14200M	14	22	52	200	95	36	10	3,36
	3061091	HSK100AHCSL16200M	16	24	52	200	95	39	10	3,37
	3061092	HSK100AHCSL18200M	18	26	52	200	95	39	10	3,41
	3061263	HSK100AHCSL20200M	20	28	52	200	95	41	10	3,45

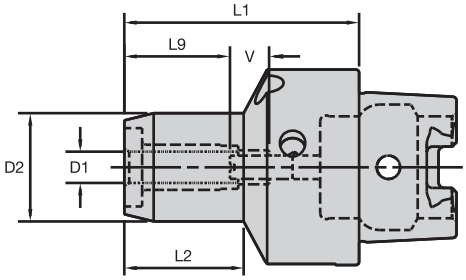
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
HSK63A										
	2508159	HSK63AHCSL050669	1/2	.807	2.065	6.693	3.740	1.417	.394	3.40
	2508160	HSK63AHCSL075669	3/4	1.063	2.065	6.693	3.740	1.614	.394	3.65

81	8	6	84

HIGH-PERFORMANCE LINE • HSK C



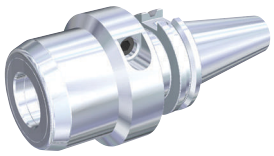


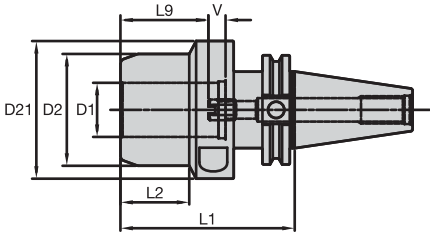
Metric

CSMS	order number	catalog number	D1	D2	L1	L2	L9	V	kg
HSK32C									
	1245412	**HSK32CHC06060M**	6	26	60	33	27	10	0,27
	1245413	**HSK32CHC08060M**	8	28	60	33	27	10	0,29
	1245414	**HSK32CHC10065M**	10	30	65	38	31	10	0,33
	1245415	**HSK32CHC12070M**	12	32	70	43	36	10	0,36
HSK40C									
	1245493	**HSK40CHC06060M**	6	26	60	33	27	10	0,37
	1245494	**HSK40CHC08060M**	8	28	60	33	27	10	0,38
	1245495	**HSK40CHC10065M**	10	30	65	39	31	10	0,42
	1245496	**HSK40CHC12070M**	12	32	70	44	36	10	0,46
HSK50C									
	1245497	**HSK50CHC06060M**	6	26	60	31	27	10	0,53
	1245498	**HSK50CHC08060M**	8	28	60	31	27	10	0,55
	1245499	**HSK50CHC10065M**	10	30	65	36	31	10	0,59
	1245500	**HSK50CHC12075M**	12	32	75	46	36	10	0,65
	1245501	**HSK50CHC14075M**	14	34	75	47	36	10	0,90
	1245502	**HSK50CHC16080M**	16	38	80	53	39	10	1,00
	1245503	**HSK50CHC18080M**	18	40	80	54	39	10	1,00
	1245504	**HSK50CHC20080M**	20	42	80	54	40	10	1,10
HSK63C									
	1245506	**HSK63CHC08060M**	8	28	60	26	27	10	0,90
	1245507	**HSK63CHC10065M**	10	30	65	32	31	10	0,89
	1245508	**HSK63CHC12075M**	12	32	75	43	36	10	0,96
	1245509	**HSK63CHC14075M**	14	34	75	43	36	10	0,97
	1245510	**HSK63CHC16080M**	16	38	80	49	39	10	1,06
	1245511	**HSK63CHC18080M**	18	40	80	50	39	10	1,09
	1245512	**HSK63CHC20080M**	20	42	80	51	41	10	1,10
	1191022	**HSK63CHC32100M**	32	60	100	60	51	10	1,87

81	8	6	84

HYDROFORCE™ HIGH-TORQUE LINE • CV AD



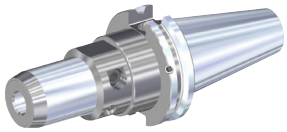


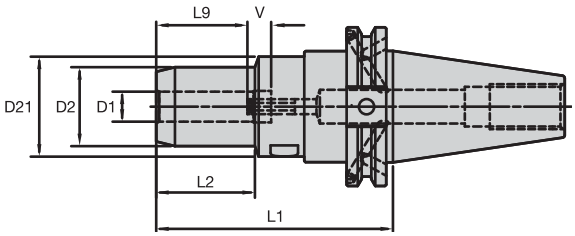
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
CV40										
	5521075	CV40HCTHT075275	3/4	2.283	—	2.750	2.000	1.618	.394	3.41
	5647194	CV40HCTHT125400	1 1/4	2.559	3.150	4.000	1.575	2.012	.394	5.59
CV50										
	5521076	CV50HCTHT125315	1 1/4	3.150	—	3.150	2.400	2.012	.394	9.48
	6381926	CV50HCTHT200400	2	3.937	4.134	4.000	1.457	2.799	.394	13.28

81	8	6	84

HIGH-PERFORMANCE LINE • CV AD/B



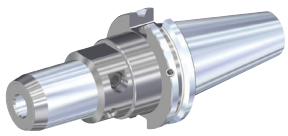


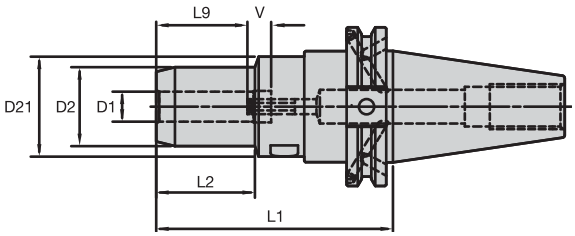
Metric

CSMS		order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
CV40											
		1605145	CV40BHC06M350	6	26	40	89	33	27	10	1,24
	NEW	6480602	CV40BHC06M600	6	26	40	152	100	27	10	1,48
		1605149	CV40BHC08M350	8	28	40	89	33	27	10	1,25
	NEW	6480604	CV40BHC08M600	8	28	40	152	100	27	10	1,54
		1605150	CV40BHC10M375	10	30	40	95	39	31	10	1,30
	NEW	6480606	CV40BHC10M600	10	30	40	152	100	31	10	1,60
		2079279	CV40BHC12M375	12	32	40	95	40	36	10	1,32
	NEW	6480608	CV40BHC12M600	12	32	40	152	100	36	10	1,67
		2079280	CV40BHC14M400	14	34	50	102	46	41	10	1,45
	NEW	6480610	CV40BHC14M600	14	34	50	152	100	41	10	1,77
		2079281	CV40BHC16M400	16	38	50	102	47	41	10	1,52
	NEW	6480612	CV40BHC16M600	16	38	50	152	100	41	10	1,93
		2079282	CV40BHC18M400	18	40	50	102	47	41	10	1,54
	NEW	6480614	CV40BHC18M600	18	40	50	152	100	41	10	2,01
		2079523	CV40BHC20M400	20	42	50	102	48	41	10	1,56
	NEW	6480616	CV40BHC20M600	20	42	50	152	100	41	10	2,08
		1605216	CV40BHC25M462	25	50	63	117	51	51	10	2,13
		1605217	CV40BHC32M462	32	60	63	117	59	51	10	2,31
CV50											
		2079529	CV50BHC06M350	6	26	63	89	33	27	10	3,47
	NEW	6480618	CV50BHC06M600	6	26	63	152	100	27	10	3,66
		2079530	CV50BHC08M350	8	28	63	89	33	27	10	3,49
	NEW	6480620	CV50BHC08M600	8	28	63	152	100	27	10	3,72
		2079531	CV50BHC10M375	10	30	63	95	37	31	10	3,57
	NEW	6480622	CV50BHC10M600	10	30	63	152	100	31	10	3,78
		2079532	CV50BHC12M375	12	32	63	95	40	36	10	3,54
	NEW	6480624	CV50BHC12M600	12	32	63	152	100	36	10	3,84
		2079563	CV50BHC14M400	14	34	63	102	46	41	10	3,57
	NEW	6480626	CV50BHC14M600	14	34	63	152	100	41	10	3,88
		2079564	CV50BHC16M400	16	38	63	102	47	41	10	3,64
	NEW	6480628	CV50BHC16M600	16	38	63	152	100	41	10	4,03
		2079565	CV50BHC18M400	18	40	63	102	47	41	10	3,67
	NEW	6480630	CV50BHC18M600	18	40	63	152	100	41	10	4,11
		2079566	CV50BHC20M400	20	42	63	102	48	41	10	3,68
	NEW	6480631	CV50BHC20M600	20	42	63	152	100	41	10	4,18
		1605226	CV50BHC25M462	25	50	63	117	51	51	10	4,12
		1605227	CV50BHC32M462	32	60	63	117	59	51	10	4,31

81 8 6 84

HIGH-PERFORMANCE LINE • CV AD/B



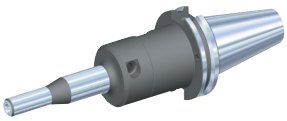


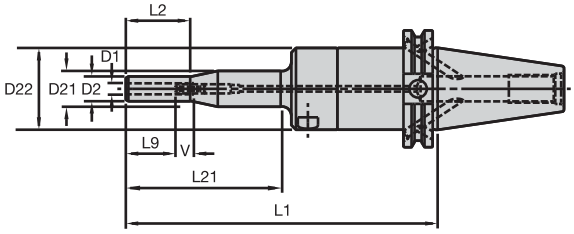
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
CV40										
	1605101	CV40BHC025350	1/4	1.012	1.569	3.500	1.299	1.060	.394	2.73
	6480509	CV40BHC025600	1/4	1.009	1.569	6.000	3.937	1.063	.394	3.25
	1605102	CV40BHC038375	3/8	1.169	1.569	3.750	1.535	1.220	.394	2.86
	6480510	CV40BHC038600	3/8	1.167	1.569	6.000	3.937	1.220	.394	3.52
	1605103	CV40BHC050375	1/2	1.244	1.569	3.750	1.575	1.420	.394	2.90
	6480591	CV40BHC050600	1/2	1.242	1.569	6.000	3.937	1.417	.394	3.64
	1605104	CV40BHC062400	5/8	1.480	1.963	4.000	1.831	1.540	.394	3.20
	6480592	CV40BHC062600	5/8	1.478	1.963	6.000	3.949	1.535	.394	4.26
	1605105	CV40BHC075400	3/4	1.638	1.963	4.000	1.890	1.610	.394	3.43
	6480593	CV40BHC075600	3/4	1.635	1.963	6.000	3.937	1.614	.394	4.63
	1605106	CV40BHC100462	1	1.959	2.474	4.625	2.008	1.810	.394	4.72
	1605107	CV40BHC125462	1 1/4	2.358	2.474	4.625	2.323	1.970	.394	5.08
CV50										
	2079524	CV50BHC025350	1/4	1.012	2.474	3.500	1.299	1.060	.394	7.65
	6480594	CV50BHC025600	1/4	1.009	2.474	6.000	3.937	1.063	.394	8.07
	2079525	CV50BHC038375	3/8	1.169	2.474	3.750	1.457	1.220	.394	7.88
	6480595	CV50BHC038600	3/8	1.167	2.474	6.000	3.937	1.220	.394	8.33
	2079526	CV50BHC050375	1/2	1.244	2.474	3.750	1.575	1.417	.394	7.80
	6480596	CV50BHC050600	1/2	1.242	2.474	6.000	3.937	1.417	.394	8.45
	2079527	CV50BHC062400	5/8	1.480	2.474	4.000	1.831	1.540	.394	8.04
	6480597	CV50BHC062600	5/8	1.478	2.474	6.000	3.937	1.535	.394	8.91
	2079528	CV50BHC075400	3/4	1.638	2.474	4.000	1.890	1.610	.394	8.13
	6480598	CV50BHC075600	3/4	1.635	2.474	6.000	3.937	1.614	.394	9.25
	1605143	CV50BHC100462	1	1.965	2.474	4.625	2.008	1.810	.394	9.12
	1605144	CV50BHC125462	1 1/4	2.358	2.474	4.625	2.323	1.970	.394	9.53

81 8 6 84

SLIM LINE TAPERED • CV AD/B





Metric

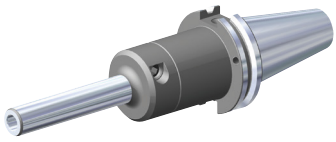
CSMS	order number	catalog number	D1	D2	D21	D22	L1	L2	L21	L9	V	kg
CV40												
	3019245	CV40BHCSLT06M669	6	14	20	44	170	35	85	27	10	1,64
	3019246	CV40BHCSLT08M669	8	16	20	44	170	35	85	27	10	1,65
CV50												
	3019251	CV50BHCSLT06M787	6	14	20	44	200	35	85	27	10	4,18
	3019252	CV50BHCSLT08M787	8	16	20	44	200	35	85	27	10	4,18

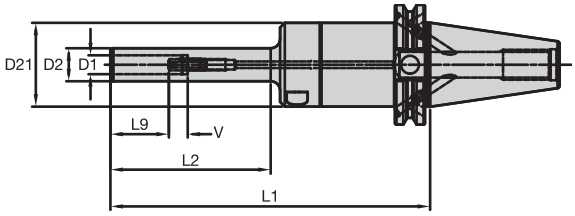
Inch

CSMS	order number	catalog number	D1	D2	D21	D22	L1	L2	L21	L9	V	lbs
CV40												
	3019257	CV40BHCSLT025669	1/4	.543	.768	1.750	6.693	1.378	3.346	1.063	.394	3.61
CV50												
	3019260	CV50BHCSLT025787	1/4	.543	.768	1.750	7.870	1.378	3.346	1.063	.394	8.81

81	8	6	84

SLIM LINE TAPERED • CV AD/B





Metric

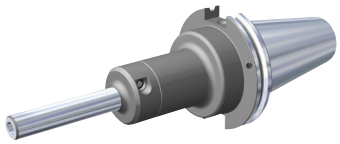
CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
CV40	3019247	CV40BHCSLT10M669	10	18	44	170	85	31	10	1,63

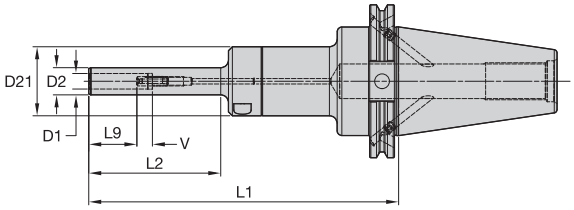
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
CV40	3019258	CV40BHCSLT038669	3/8	.689	1.750	6.690	3.346	1.220	.394	3.60

81	8	6	84

SLIM LINE, XS • CV AD/B





Metric

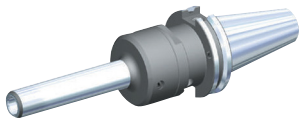
CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
CV50	3019253	CV50BHCSLT10M787	10	18	44	200	85	31	10	4,17

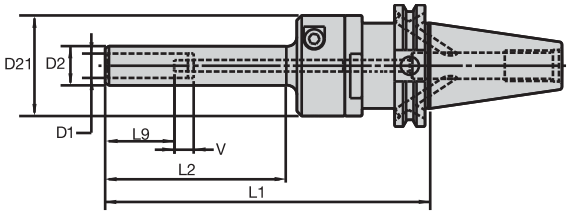
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
CV50	3019261	CV50BHCSLT038787	3/8	.689	1.750	7.870	3.346	1.220	.394	8.79

81	8	6	84

SLIM LINE • CV AD/B





Metric

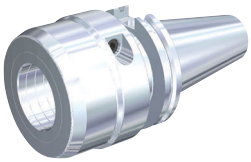
CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
CV40										
	2495136	CV40BHCSL12M669	12	20	44	170	95	36	10	1,55
	3019248	CV40BHCSL14M669	14	22	52	170	95	36	10	1,74
	3019249	CV40BHCSL16M669	16	24	52	170	95	39	10	1,76
	3019250	CV40BHCSL18M669	18	26	52	170	95	39	10	1,80
	2495141	CV40BHCSL20M669	20	28	52	170	95	41	10	1,84
CV50										
	2508155	CV50BHCSL12M787	12	20	44	200	95	36	10	3,94
	3019254	CV50BHCSL14M787	14	22	52	200	95	36	10	4,25
	3019255	CV50BHCSL16M787	16	24	52	200	95	39	10	4,27
	3019256	CV50BHCSL18M787	18	26	52	200	95	39	10	4,31
	2508156	CV50BHCSL20M787	20	28	52	200	95	41	10	4,32

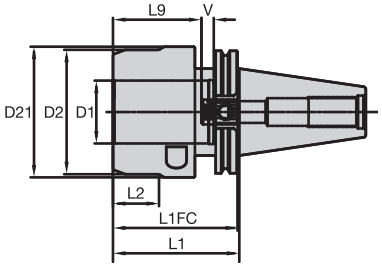
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
CV40										
	2508153	CV40BHCSL050669	1/2	.807	2.065	6.693	3.740	1.417	.394	3.79
	3019259	CV40BHCSL062669	5/8	.925	2.065	6.693	3.740	1.535	.394	3.88
	2508154	CV40BHCSL075669	3/4	1.063	2.065	6.693	3.740	1.614	.394	4.04
CV50										
	2508157	CV50BHCSL050787	1/2	.807	2.065	7.874	3.740	1.417	.394	9.26
	3019262	CV50BHCSL062787	5/8	.925	2.065	7.874	3.740	1.535	.394	9.34
	2508158	CV50BHCSL075787	3/4	1.063	2.065	7.874	3.740	1.614	.394	9.50

81 8 6 84

HYDROFORCE™ HIGH-TORQUE LINE • CVKV AD



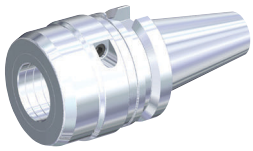


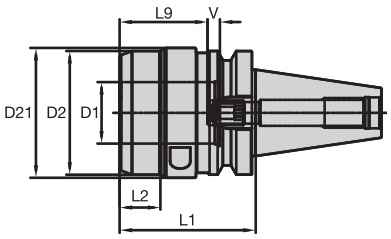
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L1FC	L2	L9	V	lbs
CVKV40											
	5521077	CVKV40HCTHT075275	3/4	2.283	—	2.750	2.711	2.000	1.618	.394	3.43
CVKV50											
	5521078	CVKV50HCTHT125315	1 1/4	3.150	—	3.150	3.091	2.400	2.012	.394	9.52
	6381927	CVKV50HCTHT200400	2	3.937	4.134	4.000	3.941	1.457	2.799	.394	13.33

81	8	6	84

HYDROFORCE™ HIGH-TORQUE LINE • BT AD





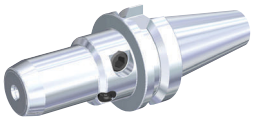
Metric

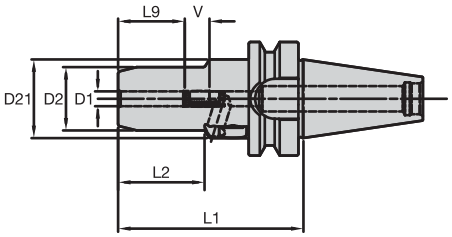
CSMS		order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
BT40											
		5520971	BT40HCTHT20070M	20	58	—	70	43	41	10	1,67
BT50											
		5520972	BT50HCTHT32090M	32	80	—	90	52	51	10	5,09
	NEW	6381924	BT50HCTHT50110M	50	100	105	110	33	71	10	6,88

Inch

CSMS	order number	catalog number	D1	D2	L1	L2	L9	V	lbs
BT40									
	5521073	BT40HCTHT075275	3/4	2.283	2.750	1.687	1.618	.394	3.70
BT50									
	5521074	BT50HCTHT125350	1 1/4	3.150	3.500	2.004	2.012	.394	11.14

HIGH-PERFORMANCE LINE • BT AD





Metric

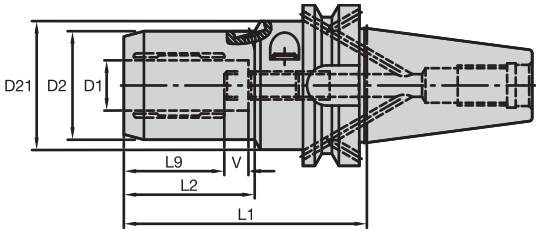
CSMS		order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
BT30											
	NEW	6480632	BT30HC06075M	6	26	32	75	35	27	10	0,59
	NEW	6480633	BT30HC08075M	8	28	32	75	35	27	10	0,60
	NEW	6480634	BT30HC10080M	10	30	32	80	38	31	10	0,65
	NEW	6480635	BT30HC12085M	12	32	32	85	40	36	10	0,69
	NEW	6480636	BT30HC14100M	14	34	50	100	43	36	10	1,00
	NEW	6480637	BT30HC16100M	16	38	50	100	47	39	10	1,05
	NEW	6480638	BT30HC18100M	18	40	50	100	47	39	10	1,07
	NEW	6480639	BT30HC20100M	20	42	50	100	48	41	10	1,09

Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
BT30										
	6480599	BT30HC025295	1/4	1.009	1.254	2.953	1.378	1.063	.394	1.29
	6480600	BT30HC038315	3/8	1.167	1.254	3.150	1.575	1.220	.394	1.42
	6480601	BT30HC050335	1/2	1.242	1.254	3.346	1.693	1.417	.394	1.50

81	8	6	84

HIGH-PERFORMANCE LINE • BT AD/B



Metric

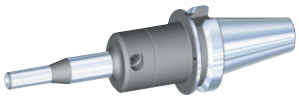
CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
BT40										
	1315341	**BT40BHC06080M**	6	26	50	80	33	27	10	1,28
	1315342	**BT40BHC08080M**	8	28	50	80	34	27	10	1,30
	1315343	**BT40BHC10085M**	10	30	50	85	35	31	10	1,35
	1315344	**BT40BHC12090M**	12	32	50	90	41	36	10	1,39
	1315345	**BT40BHC14090M**	14	34	50	90	42	36	10	1,40
	1315347	**BT40BHC16090M**	16	38	50	90	47	39	10	1,44
	1315348	**BT40BHC18090M**	18	40	50	90	47	39	10	1,47
	1315349	**BT40BHC20095M**	20	42	50	95	48	41	10	1,54
	1315350	**BT40BHC25115M**	25	50	63	115	51	46	10	2,16
	1315351	**BT40BHC32120M**	32	60	63	120	59	50	10	2,45
BT50										
	1315352	**BT50BHC06090M**	6	26	50	90	33	27	10	2,50
	1315353	**BT50BHC08090M**	8	28	50	90	34	27	10	2,50
	1315354	**BT50BHC10095M**	10	30	50	95	39	31	10	2,50
	1315355	**BT50BHC12100M**	12	32	50	100	45	36	10	2,50
	1315356	**BT50BHC14100M**	14	34	50	100	42	36	10	3,00
	1315357	**BT50BHC16100M**	16	38	50	100	47	39	10	3,00
	1315358	**BT50BHC18100M**	18	40	50	100	47	39	10	3,00
	1315359	**BT50BHC20105M**	20	42	50	105	48	41	10	4,06
	1315360	**BT50BHC25115M**	25	50	63	115	51	46	10	4,00
	1315778	**BT50BHC32120M**	32	60	63	120	59	50	10	4,00

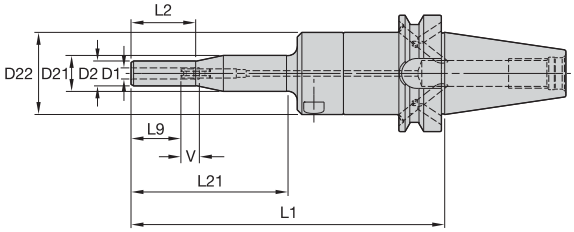
Inch

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	lbs
BT40										
	6480603	**BT40BHC025315**	1/4	1.009	1.963	3.150	1.378	1.063	.394	2.83
	6480605	**BT40BHC038335**	3/8	1.167	1.963	3.346	1.496	1.220	.394	3.02
	6480607	**BT40BHC050354**	1/2	1.242	1.963	3.543	1.575	1.417	.394	3.15
	6480609	**BT40BHC062354**	5/8	1.478	1.963	3.543	1.831	1.535	.394	3.20
	6480611	**BT40BHC075374**	3/4	1.635	1.963	3.740	1.890	1.614	.394	3.46
	6480613	**BT40BHC100453**	1	1.965	2.461	4.528	2.008	1.850	.394	4.67
	6480615	**BT40BHC125472**	1 1/4	2.358	2.470	4.724	2.323	2.008	.394	5.37
BT50										
	6480617	**BT50BHC025354**	1/4	1.009	1.963	3.543	1.378	1.063	.394	8.37
	6480619	**BT50BHC038374**	3/8	1.167	1.963	3.740	1.496	1.220	.394	8.54
	6480621	**BT50BHC050394**	1/2	1.242	1.963	3.937	1.575	1.417	.394	8.67
	6480623	**BT50BHC062394**	5/8	1.478	1.963	3.937	1.831	1.535	.394	8.74
	6480625	**BT50BHC075413**	3/4	1.635	1.963	4.134	1.890	1.614	.394	8.99
	6480627	**BT50BHC100453**	1	1.965	2.474	4.530	2.008	1.850	.394	9.98
	6480629	**BT50BHC125472**	1 1/4	2.358	2.474	4.724	2.323	2.008	.394	10.64

81	8	6	84

SLIM LINE, XS • BT AD/B

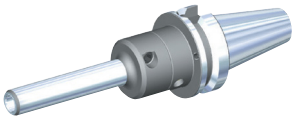


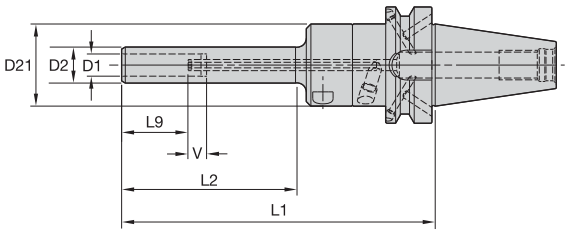


Metric

CSMS	order number	catalog number	D1	D2	D21	D22	L1	L2	L21	L9	V	kg
BT40												
	3019236	**BT40BHCSLT06170M**	6	14	20	44	170	35	85	27	10	1,69
	3019237	**BT40BHCSLT08170M**	8	16	20	44	170	35	85	27	10	1,70
BT50												
	3019242	**BT50BHCSLT06200M**	6	14	20	44	200	35	85	27	10	4,43
	3019243	**BT50BHCSLT08200M**	8	16	20	44	200	35	85	27	10	4,44

SLIM LINE • BT AD/B



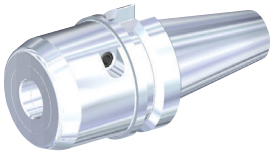


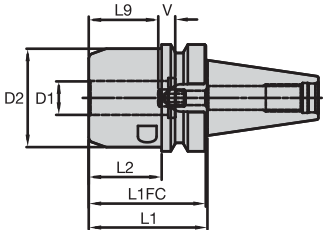
Metric

CSMS	order number	catalog number	D1	D2	D21	L1	L2	L9	V	kg
BT40										
	3019238	**BT40BHCSLT10170M**	10	18	44	170	85	31	10	1,68
	2634575	**BT40BHCSL12170M**	12	20	44	170	95	36	10	1,61
	2634576	**BT40BHCSL14170M**	14	22	52	170	95	36	10	1,83
	2634577	**BT40BHCSL16170M**	16	24	52	170	95	39	10	1,86
	2634578	**BT40BHCSL18170M**	18	26	52	170	95	39	10	1,90
	2634579	**BT40BHCSL20170M**	20	28	52	170	95	41	10	1,94
BT50										
	3019244	**BT50BHCSLT10200M**	10	18	44	200	85	31	10	4,42
	2634540	**BT50BHCSL12200M**	12	20	44	200	95	36	10	4,34
	2634541	**BT50BHCSL14200M**	14	22	52	200	95	36	10	4,66
	2634542	**BT50BHCSL16200M**	16	24	52	200	95	39	10	4,68
	2634573	**BT50BHCSL18200M**	18	26	52	200	95	39	10	4,72
	2634574	**BT50BHCSL20200M**	20	28	52	200	95	41	10	4,76

81	8	6	84

HYDROFORCE™ HIGH-TORQUE LINE • BTKV AD





Metric

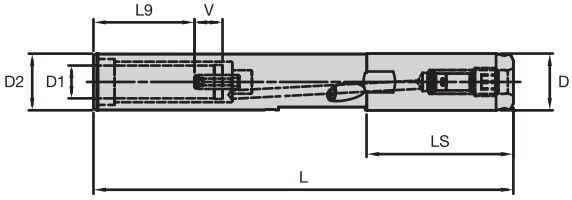
CSMS	order number	catalog number	D1	D2	L1	L1FC	L2	L9	V	kg
BTKV40										
	5520993	**BTKV40HCTHT20070M**	20	58	70	69	43	41	10	1,62
BTKV50										
	5520994	**BTKV50HCTHT32090M**	32	80	90	89	52	51	10	5,13
NEW	**6381925**	**BTKV50HCTHT50110M**	50	100	110	109	35	71	10	6,87

Inch

CSMS	order number	catalog number	D1	D2	L1	L1FC	L2	L9	V	lbs
BTKV40										
	6048260	**BTKV40HCTHT125315**	1 1/4	3.150	3.150	3.110	3.110	2.008	.394	5.03

81	8	6	84

HYDRAULIC EXTENSIONS



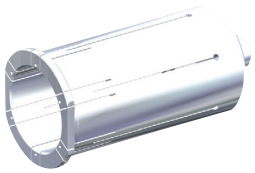
Metric

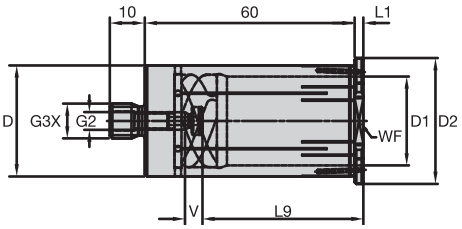
order number	catalog number	D1	D	D2	L	LS	L9	V	kg
6340072	SS200HCT12150M	12	20	20	150	53	36	10	0,30

Inch

order number	catalog number	D1	D	D2	L	LS	L9	V	lbs
6340073	SS075HCT050590	.501	.750	.787	5.906	2.067	1.417	.394	.63

HYDROFORCE™ SAFE-λOCK® REDUCER SLEEVES





Metric

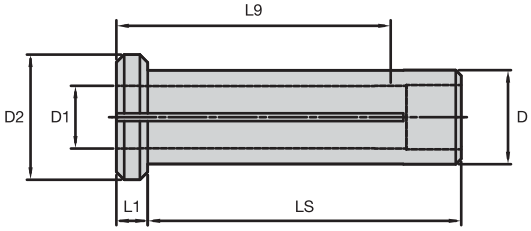
order number	catalog number	D1	D	D2	L1	L9	V	G3X	G2	WF
5998607	32MHCSFC120M	12	32	36	2,5	41	4	M12	M6	32
5998608	32MHCSFC140M	14	32	36	2,5	41	4	M12	M6	32
5998609	32MHCSFC160M	16	32	36	2,5	44	4	M12	M6	32
5998610	32MHCSFC200M	20	32	36	2,5	46	4	M12	M6	32
5998751	32MHCSFC250M	25	32	36	2,5	47	4	M12	M6	32

Inch

order number	catalog number	D1	D	D2	L1	L9	V	G3X	G2	WF
5998754	12HCSFC0500	.500	1.250	1.417	.098	1.614	.154	M12	M6	1.260
5998755	12HCSFC0625	.625	1.250	1.417	.098	1.732	.154	M12	M6	1.260
5998756	12HCSFC0750	.750	1.250	1.417	.098	1.811	.154	M12	M6	1.260
5998757	12HCSFC1000	1.000	1.250	1.417	.098	1.850	.154	M12	M6	1.260

81	8	6	84

REDUCER SLEEVES

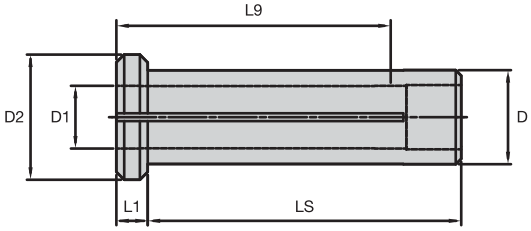


Metric with Metric Bores

CSMS	order number	catalog number	D1	D	D2	L1	L9	LS
12M								
	3026450	12MHC030M	3	12	16	4	29	40
	3026451	12MHC040M	4	12	16	4	29	40
	3026452	12MHC050M	5	12	16	4	29	40
	3026643	12MHC060M	6	12	16	4	36	40
	3026644	12MHC070M	7	12	16	4	37	40
	3026645	12MHC080M	8	12	16	4	37	40
	3026646	12MHC090M	9	12	16	4	37	40
	3026647	12MHC100M	10	12	16	4	40	40
20M								
	3026648	20MHC030M	3	20	25	4	28	50
	3026649	20MHC040M	4	20	25	4	28	50
	3026650	20MHC050M	5	20	25	4	28	50
	3026651	20MHC060M	6	20	25	4	36	50
	3026652	20MHC070M	7	20	25	4	37	50
	3026653	20MHC080M	8	20	25	4	37	50
	3026654	20MHC090M	9	20	25	4	38	50
	3026655	20MHC100M	10	20	25	4	40	50
	3026656	20MHC110M	11	20	25	4	40	50
	3026657	20MHC120M	12	20	25	4	45	50
	3026658	20MHC130M	13	20	25	4	45	50
	3026659	20MHC140M	14	20	25	4	45	50
	3026660	20MHC150M	15	20	25	4	45	50
	3026661	20MHC160M	16	20	25	4	48	50
25M								
	3026662	25MHC030M	3	25	30	4	29	56
	3026663	25MHC040M	4	25	30	4	29	56
	3026664	25MHC050M	5	25	30	4	29	56
	3026665	25MHC060M	6	25	30	4	37	56
	3026666	25MHC070M	7	25	30	4	37	56
	3026667	25MHC080M	8	25	30	4	37	56
	3026668	25MHC090M	9	25	30	4	38	56
	3026669	25MHC100M	10	25	30	4	40	56
	3026670	25MHC120M	12	25	30	4	46	56
	3026671	25MHC140M	14	25	30	4	47	56
	3026672	25MHC160M	16	25	30	4	48	56
	3026673	25MHC180M	18	25	30	4	48	56
	3026674	25MHC200M	20	25	30	4	49	56
32M								
	3026675	32MHC060M	6	32	36	4	37	60
	3026676	32MHC070M	7	32	36	4	37	60
	3026677	32MHC080M	8	32	36	4	37	60
	3026678	32MHC090M	9	32	36	4	37	60
	3026679	32MHC100M	10	32	36	4	40	60
	3026680	32MHC110M	11	32	36	4	41	60
	3026681	32MHC120M	12	32	36	4	45	60
	3026682	32MHC130M	13	32	36	4	45	60
	3026683	32MHC140M	14	32	36	4	46	60
	3026684	32MHC150M	15	32	36	4	46	60
	3026685	32MHC160M	16	32	36	4	48	60
	3026686	32MHC170M	17	32	36	4	48	60
	3026687	32MHC180M	18	32	36	4	49	60
	3026691	32MHC190M	19	32	36	4	49	60
	3026688	32MHC200M	20	32	36	4	50	60
	3026689	32MHC220M	22	32	36	4	51	60
	3026690	32MHC250M	25	32	36	4	57	60

81	8	6	84

REDUCER SLEEVES

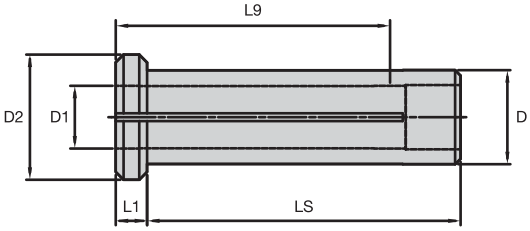


Metric with Inch Bores

CSMS	order number	catalog number	D1	D	D2	L1	L9	LS
20M								
	1093566	**20HCM0188**	3/16	20	25	4	28	50
	1093567	**20HCM0250**	1/4	20	25	4	36	50
	1093568	**20HCM0312**	5/16	20	25	4	37	50
	1093569	**20HCM0375**	3/8	20	25	4	38	50
	1093570	**20HCM0438**	7/16	20	25	4	40	50
	1093571	**20HCM0500**	1/2	20	25	4	45	50
	1093572	**20HCM0562**	9/16	20	25	4	45	50
	1093573	**20HCM0625**	5/8	20	25	4	48	50
32M								
	1093594	**32HCM0500**	1/2	32	36	4	45	60
	1093595	**32HCM0562**	9/16	32	36	4	46	60
	1093596	**32HCM0625**	5/8	32	36	4	46	60
	1093597	**32HCM0688**	11/16	32	36	4	48	60
	1093598	**32HCM0750**	3/4	32	36	4	50	60
	1093599	**32HCM0875**	7/8	32	36	4	51	60
	1093600	**32HCM1000**	1	32	36	4	56	60

81 8 6 84

REDUCER SLEEVES



Inch with Metric Bores

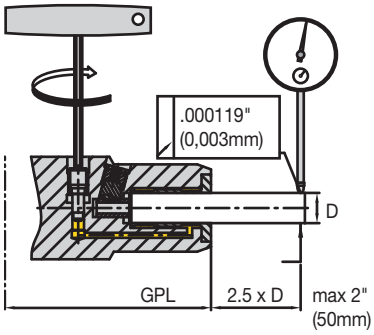
CSMS	order number	catalog number	D1	D	D2	L1	L9	LS
12M								
	1093539	12HC180M	18	32	36	4	49	60
	1093540	12HC200M	20	32	36	4	50	60
	1093541	12HC250M	25	32	36	4	57	60
50M								
	2248993	50HC030M	3	13	16	4	29	40
	1606050	50HC040M	4	13	16	4	29	40
	2248994	50HC050M	5	13	16	4	29	40
	1606061	50HC060M	6	13	16	4	36	40
	1606062	50HC080M	8	13	16	4	37	40
	1606064	50HC100M	10	13	16	4	40	40
75M								
	2248995	75HC030M	3	19	25	4	28	50
	2248996	75HC040M	4	19	25	4	28	50
	2248997	75HC050M	5	19	25	4	28	50
	1093271	75HC060M	6	19	25	4	36	50
	1093272	75HC080M	8	19	25	4	37	50
	1093273	75HC100M	10	19	25	4	40	50
	1093524	75HC120M	12	19	25	4	45	50
	1093525	75HC140M	14	19	25	4	45	50
	1093526	75HC160M	16	19	25	4	48	50

Inch with Inch Bores

CSMS	order number	catalog number	D1	D	D2	L1	L9	LS
12M								
	1093527	12HC0500	1/2	32	36	4	45	60
	1093528	12HC0562	9/16	32	36	4	46	60
	1093529	12HC0625	5/8	32	36	4	46	60
	1093530	12HC0688	11/16	32	36	4	48	60
	1093533	12HC0750	3/4	32	36	4	50	60
	2248952	12HC0812	13/16	32	36	4	50	60
	1093535	12HC0875	7/8	32	36	4	51	60
	1093536	12HC1000	1	32	36	4	55	60
50M								
	2248951	50HC0125	1/8	13	16	4	29	40
	1606046	50HC0188	3/16	13	16	4	29	40
	1606047	50HC0250	1/4	13	16	4	36	40
	1606048	50HC0312	5/16	13	16	4	37	40
	1606049	50HC0375	3/8	13	16	4	40	40
75M								
	1937870	75HC0125	1/8	19	24	4	28	50
	1093496	75HC0188	3/16	19	24	4	29	50
	1093497	75HC0250	1/4	19	24	4	38	50
	1093498	75HC0312	5/16	19	24	4	41	50
	1093500	75HC0375	3/8	19	24	4	41	50
	1093501	75HC0438	7/16	19	24	4	41	50
	1093268	75HC0500	1/2	19	24	4	46	50
	1093269	75HC0562	9/16	19	24	4	46	50
	1093270	75HC0625	5/8	19	24	4	46	50

81	8	6	84

RUNOUT ACCURACY



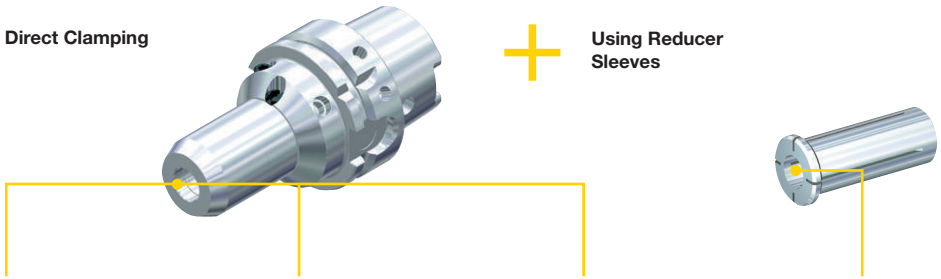
type	clamping Ø D	shank	GPL ≤ mm	≤ mm	≤ inch
HydroForce™	Ø 1/4–1-1/4" (6–32mm)	BT, DV, CV, BTKV, CVKV HSK, KM™, PSC	110	0,003	0.000119
	Ø >1-1/4" (>32mm)	BT, DV, CV, BTKV, CVKV HSK, KM, PSC	155	0,006	0.000237
HP	Ø 1/4–1-1/4" (6–32mm)	BT, DV, CV, BTKV, CVKV HSK, KM, PSC	200	0,003	0.000119
Slim	Ø 1/4–3/4" (6–20mm)	BT, DV, CV, BTKV, CVKV HSK, KM, PSC	200	0,006	0.000237
Extensions	Ø 1/4–3/4" (6–20mm)	SS	160	0,003	0.000119

NOTE: HC reducer can double the runout.

TRANSMITTABLE TORQUE VALUES

clamping Ø		HP		Slim + Extensions		HydroForce	
mm	in	Nm	ft. lbs.	Nm	ft. lbs.	Nm	ft. lbs.
6	1/4	12	9	26	19	–	–
8	5/16	30	22	50	37	–	–
10	3/8	40	30	80	59	–	–
12	1/2	70	52	115	85	–	–
14	9/16	100	74	160	118	–	–
16	5/8	135	100	200	148	–	–
18	11/16	180	133	220	184	–	–
20	3/4	220	162	230	170	800	590
25	1	500	369	–	–	–	–
32	1-1/4	700	516	–	–	2000	1475
50	2	–	–	–	–	2000	1475

CLAMPING RECOMMENDATION



DIN 6535	Direct Clamping			Using Reducer Sleeves
	Ø 1/4–3/4" (6–20mm)	Ø 1" (25mm)	Ø 1-1/4" (32mm)	
HA	●	●	●	●
HB	●	○	○	●
	○	○	○	●

NOTE: Highest accuracy obtained with cylindrical shanks.

● Recommended
○ Not Recommended

KENNAMETAL

Hydraulic Chucks

CUTTING TOOL SHANK REQUIREMENTS

type	Ø shank	shank tolerance	roundness	shank surface quality
Metric	3–4mm	h4	0,003mm	Ra min 0,3
	5mm	h6		
	6–50mm	h6		
Inch	1/8–5/32"	-0.0001"	0.0001"	Ra min 0.012
	3/16"	-0.0002"		
	1/4–9/16"	-0.0004"		
	3/4–2"	-0.0005"		

NOTE: Example for inch: Ø 3/4" drill shank tolerance should be between Ø .7500"/.7495".

CLAMPING LENGTH ADJUSTMENT

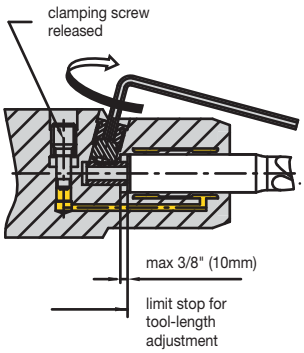
Radial operated

HP:

All back ends

Slim:

All back ends
1/2–3/4" (12–20mm)



Axial operated

HydroForce™:

All back ends

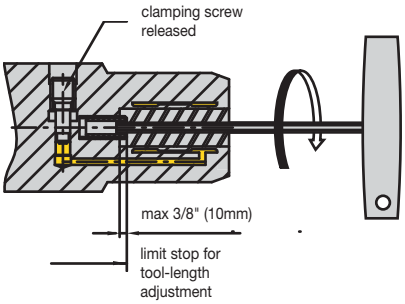
Slim:

All back ends Ø
1/4–3/8" (6–10mm)

HSK40 A & C Ø
1/4–3/4" (6–20mm)

Extensions:

All back ends

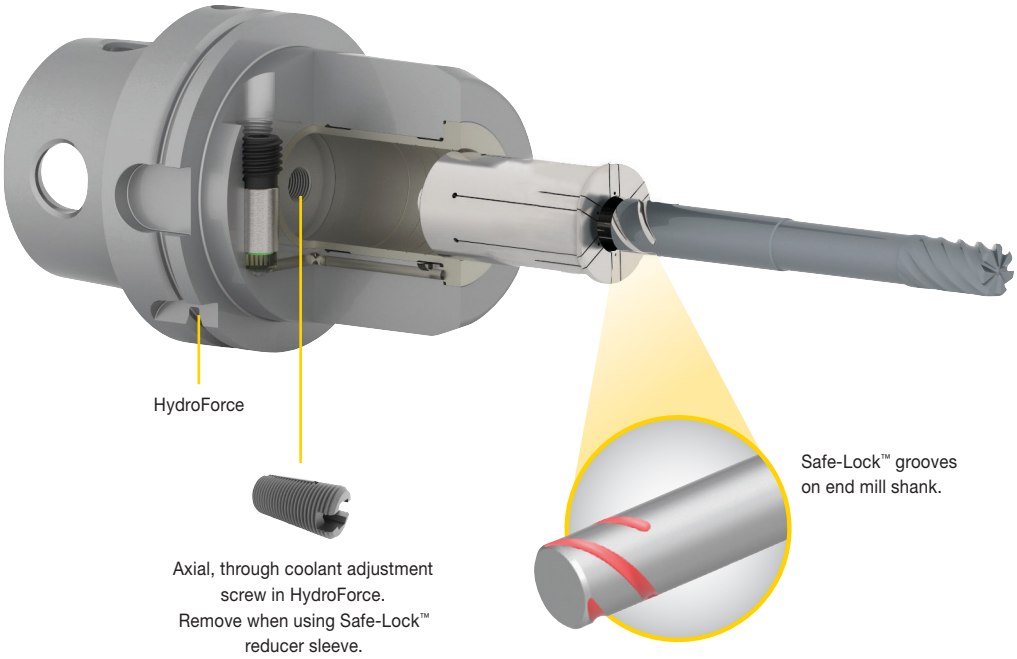


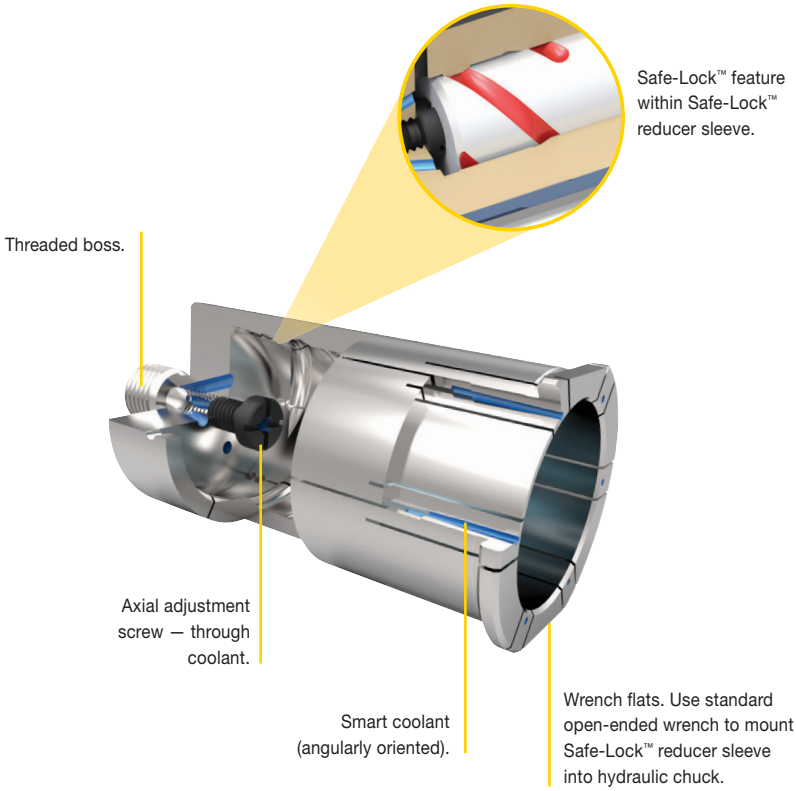
WRENCHES FOR ACTUATION & STOP SCREW ADJUSTMENT

Ø		HP and Extension				HydroForce				Slim							
										Ø 1/2–3/4" (12–20mm)				Ø 1/4–3/8" (6–10mm) and HSK40 Ø 1/4–3/4" (6–20mm)			
metric	inch	actuation wrench	size (mm)	stop screw wrench	size (mm)	actuation wrench	size (mm)	stop screw wrench	size (mm)	actuation wrench	size (mm)	stop screw wrench	size (mm)	actuation wrench	size (mm)	stop screw wrench	size (mm)
6	1/4	**170.135**	5	**170.002**	2.5	–	–	–	–	**170.135**	5	–	–	**170.135**	5	**170.002**	2.5
8	5/16	**170.135**	5	**170.002**	2.5	–	–	–	–	**170.135**	5	–	–	**170.135**	5	**170.002**	2.5
10	3/8	**170.135**	5	**170.002**	2.5	–	–	–	–	**170.135**	5	–	–	**170.135**	5	**170.003**	3
12	1/2	**170.135**	5	**170.002**	2.5	–	–	–	–	**170.135**	5	**170.002**	2.5	**170.135**	5	**170.003**	3
14	9/16	**170.135**	5	**170.003**	3	–	–	–	–	**170.135**	5	**170.002**	2.5	**170.135**	5	**170.003**	3
16	5/8	**170.135**	5	**170.003**	3	–	–	–	–	**170.135**	5	**170.002**	2.5	**170.135**	5	**170.005**	5
18	11/16	**170.135**	5	**170.003**	3	–	–	–	–	**170.135**	5	**170.002**	2.5	**170.135**	5	**170.005**	5
20	3/4	**170.135**	5	**170.003**	3	**170.135**	5	**170.005**	5	**170.135**	5	**170.002**	2.5	**170.135**	5	**170.005**	5
25	1	**170.136**	6	**170.004**	4	–	–	–	–	–	–	–	–	–	–	–	–
32	1-1/4	**170.136**	6	**170.004**	4	**170.136**	6	**170.006**	6	–	–	–	–	–	–	–	–
50	2	–	–	–	–	**170.136**	6	**170.010**	10	–	–	–	–	–	–	–	–

Hydraulic Chucks

HYDROFORCE™ & SAFE-λOCK® REDUCER SLEEVES

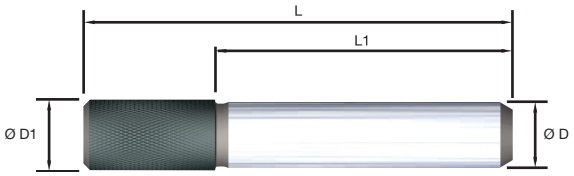


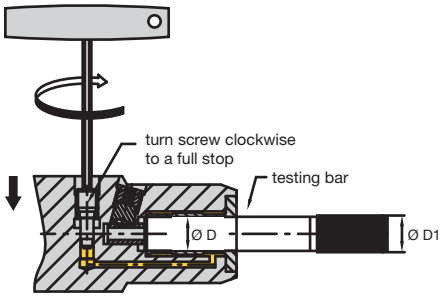


MANUAL CLAMPING FUNCTION TEST

Clamping function should be checked with a test pin on a regular basis:

- Remove dirt in the bore with a nylon cleaning brush.
- Insert the test pin into the clamping bore as far as the stop pin/stop screw allow.
- Tighten the hydraulic chuck actuating screw to full stop manually to activate full clamping force.
- Attempt to rotate the test pin by hand. If it rotates freely, please send for repair.



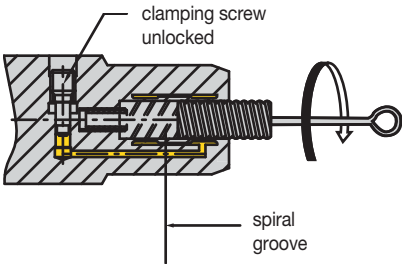


order number	catalog number	D Clamping Ø	D1	L	L1
		mm	mm	mm	mm
1191037	280.200	6	6.8	61	41
1191038	280.201	8	8.8	61	41
1191039	280.202	10	10.8	65	45
1191040	280.203	12	12.8	70	50
1245409	280.204	14	14.8	70	50
1191041	280.205	16	16.8	73	53
1245410	280.206	18	18.8	73	53
1191042	280.207	20	20.8	75	55
1245411	280.208	25	25.8	81	61
1191043	280.209	32	32.8	85	65

order number	catalog number	D Clamping Ø	D1	L	L1
		in	mm	mm	mm
1247558	280.260	1/4	7,2	61	41
1247566	280.262	3/8	10,3	65	45
1247570	280.264	1/2	13,5	70	50
1247572	280.266	5/8	16,7	73	53
1247575	280.268	3/4	19,9	75	55
1247577	280.269	1	26,2	81	61
1241382	280.270	1-1/4	32,6	85	65

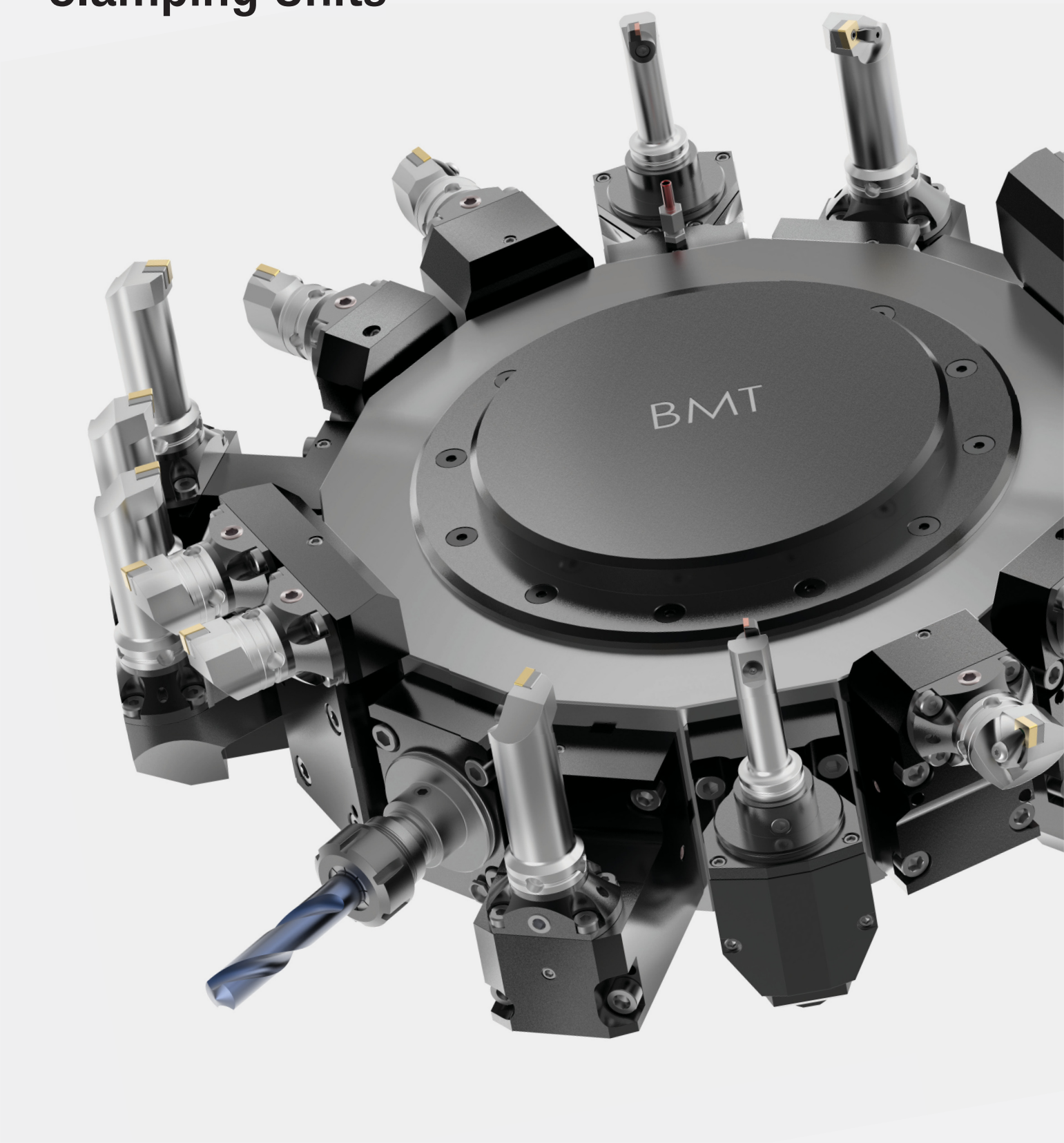
CLEANING RECOMMENDATION

- For optimum torque transmission and runout.
- Easy handling to keep the bore clean and oil-free.
- Recommended bore cleaning after each tool change.



order number	catalog number	D1	
		mm	in
1138729	192.950	6	1/4
1138736	192.951	8	5/16
1138744	192.952	10	3/8
1138752	192.953	12	1/2
1138759	192.954	14	9/16
1138766	192.955	16	5/8
1138914	192.956	18	11/16
1138853	192.957	20	3/4
1138922	192.958	25	1
1138930	192.959	32	1 1 /4

Turret Adapted Clamping Units



KENNAMETAL

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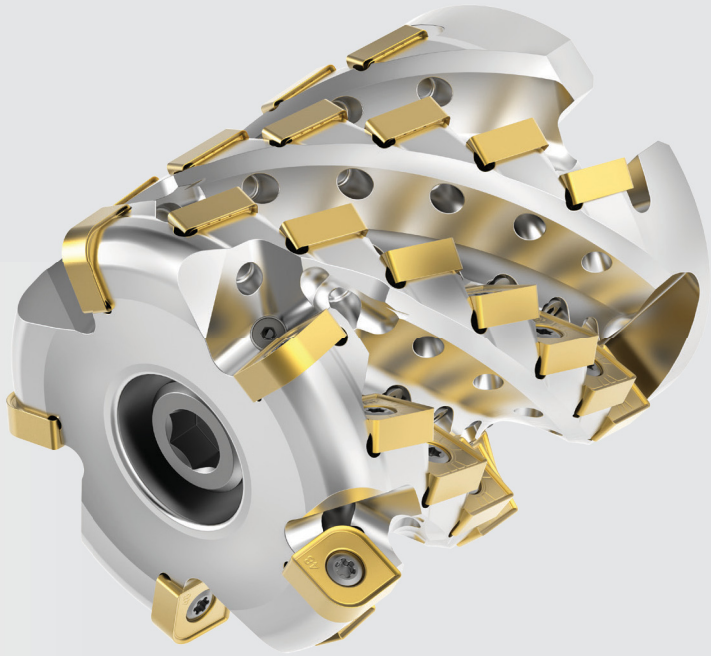
POWERED BY NOVO

HARVI™ Ultra 8X

with Flange Mount Adapters



Materials

P M S

Applications

- Shoulder Milling
- Shoulder/Slot Milling
- Chamfer Milling
- Pocketing
- Profile Milling

kennametal.com/Harvi-Ultra-8X

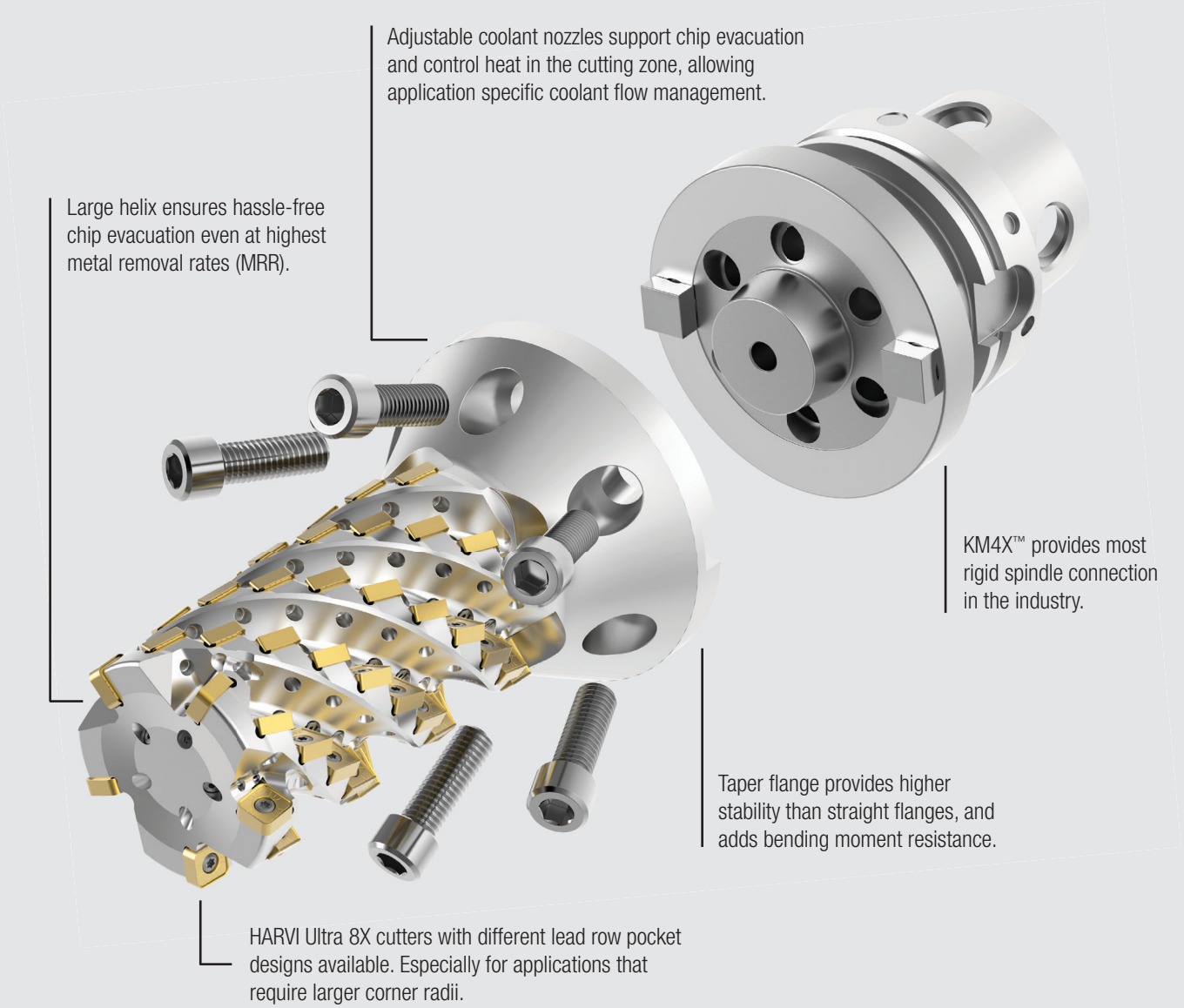
Up to 8 cutting edges per insert. That's helical milling at the lowest possible cost-per-edge.

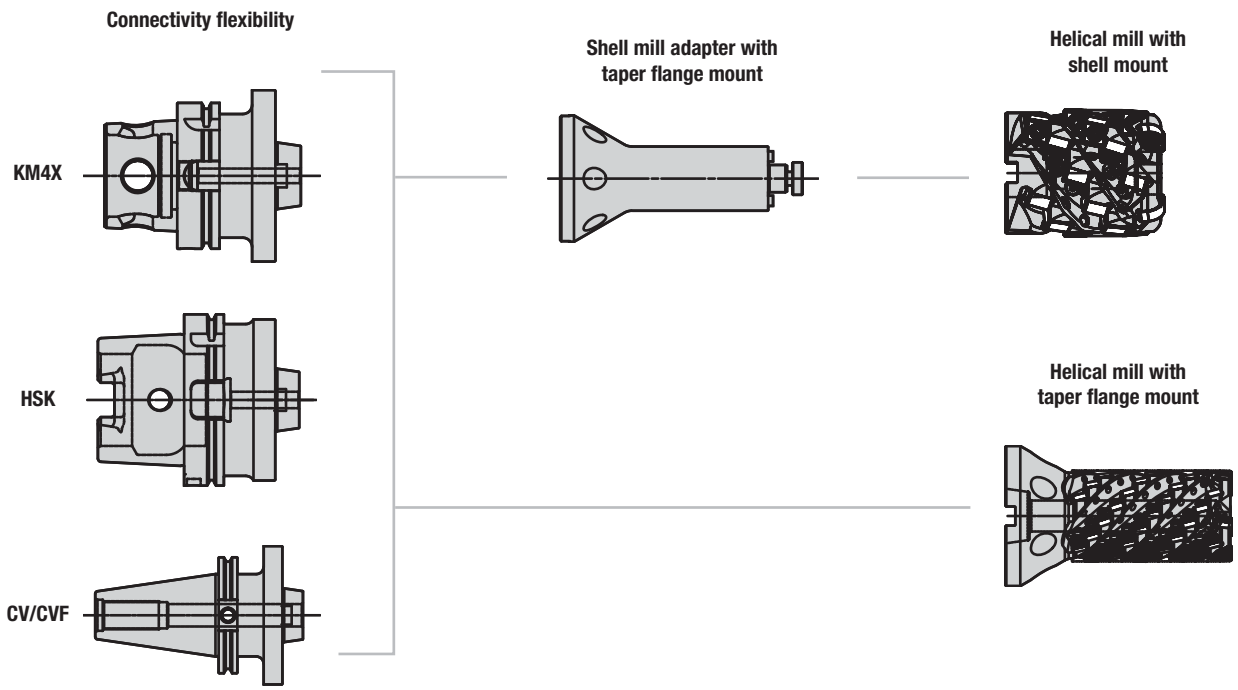
HARVI Ultra 8X helical milling cutters are designed to deliver the highest metal removal rates (MRR), especially in high-temperature alloys.

Lead inserts in various corner radii available, matching the needs of the aerospace industry.

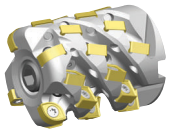
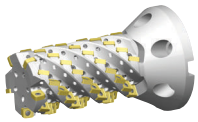
HARVI Ultra 8x Taper Flange Adapters achieve maximum tool stiffness and maximum tool life.

Ideal for machines specifically designed to produce airframe structural parts.


Adjustable coolant nozzles support chip evacuation and control heat in the cutting zone, allowing application specific coolant flow management.
Large helix ensures hassle-free chip evacuation even at highest metal removal rates (MRR).
KM4X™ provides most rigid spindle connection in the industry.
Taper flange provides higher stability than straight flanges, and adds bending moment resistance.
HARVI Ultra 8X cutters with different lead row pocket designs available. Especially for applications that require larger corner radii.


Connectivity flexibility
KM4X
HSK
CV/CVF
Shell mill adapter with taper flange mount
Helical mill with shell mount
Helical mill with taper flange mount

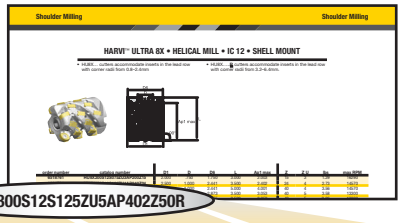
HARVI™ ULTRA 8X • TOOL SELECTION GUIDE

	HARVI Ultra 8X			
	SHELL MOUNT		TAPER FLANGE MOUNT	
				
Page	54		54	
Main operation				
Cutter diameter [D1]	2–3"		3"	
Maximum cutting depth [Ap1 max]	2.0–4.0"		5.3–9.3"	
Insert size IC	12mm		12mm	
Number of inserts per cutter [Z]	15–50		65–115	
Number of flutes per cutter [ZU]	3–5		5	
Internal coolant	✔		✔	
Additional operations				
Connection Style Machine Side (CSMS)				
Fits regular shell mill adapters	✔		—	
Pilot diameter flange mount extension	3/4–1-1/2"		—	
Flange mount size	BTF46		BTF46	
Cutting edges	8	4	8	4
Corner radius for inserts on 1st row	.031–.094"	.125–.250"	.031–.094"	.125–.250"
Corner radius of inserts after 1st row	.031"		.031"	
Workpiece materials	P M S		P M S	

NOTE: For accessories, spare parts, and technical information, visit **kennametal.com** or **kennametal.com/novo**.

HARVI™ ULTRA 8X • CATALOG NUMBERING SYSTEM • CUTTERS

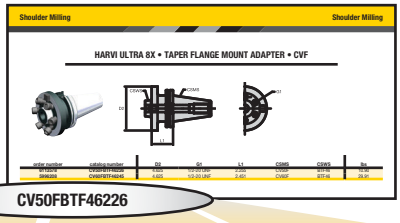
Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



HU8X300S12S125ZU5AP402Z50R

HU8X	300	S12	S125	ZU5	AP402	Z50	R
HARVI Ultra 8X	Cutter Diameter	Insert Style and IC	Connection Style Machine Side (CSMS)	Number of Flutes	Maximum DoC	Number of Inserts	Large Radii
			S = Shell Mill **F** = Flange BTF46 *Back end or Monoblock supplied as custom solution: KM4X™, HSK, CV, DV, etc.				*Cutters with an 'R' at the end have a 1st row that accepts larger corner radii: .125" (3,2mm) .158" (4,0mm) .188" (4,8mm) .250" (6,4mm)

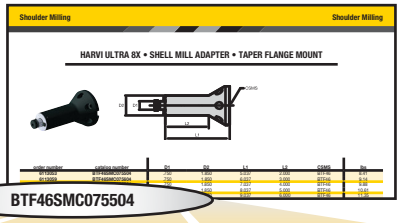
TAPER FLANGE MOUNTING ADAPTERS • CATALOG NUMBERING SYSTEM



CV50FBTF46226

CV	50	F	BTF	46	226
Connection Style Machine Side (CSMS)	Connection Size	Special Feature	Connection Style Workpiece Side (CSWS)	Connection Size	Tool Length
CV = CAT Shank Style ANSI B5.50 **HSK** = HSK Shank Style DIN 69893-1 **KM4X**™ = KM4X Shank Style	40 = 40 50 = 50 100 = 100 125 = 125	**F** = Face Contact—Face Contact (Not Interchangeable with CVKV Tooling)	**BTF** = Bolt Taper Flange	46 = 46mm	Gage Line of Toolholder

SHELL MILL ADAPTERS • TAPER FLANGE MOUNT • CATALOG NUMBERING SYSTEM

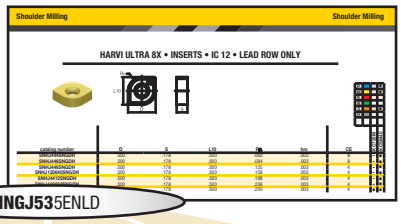


BTF46SMC075504

BTF	46	SMC	075	504
Connection Style Workpiece Side (CSWS)	Connection Size	Mounting Style	Pilot Size (D1)	Tool Length
BTF = Bolt Taper Flange	46 = 46mm	**SMC** = Shell Mill Adapter with Coolant **SM2C** = Shell Mill Adapter with Coolant and Reduced D2 Dimension **SM3C** = Shell Mill Adapter with Coolant and Reduced D2 Dimension — Bolt-On Keys	075 = .075" 100 = 1.00" 125 = 1.25" 150 = 1.50"	Gage Line of Adapter

HARVI™ ULTRA 8X • 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.



HNGJ535ENLD

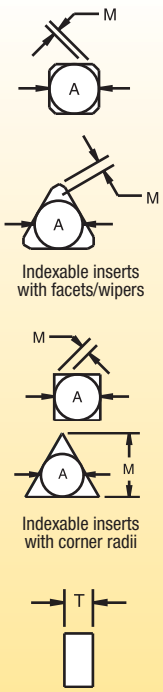
H — Insert Shape

A	Parallelogram 85°	
C	Rhomboid 80°	
E	75°	
H	Hexagon 120°	
L	Rectangular 90°	
O	Octagon 135°	
R	Round —	
S	Square 90°	
T	Triangular 60°	
X	Kennametal Standard Form	

N — Insert Clearance Angle

A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

G — Tolerance Class



J — Geometry and Clamping Type

5 — Size

A	symbol
1.000	8
.750	6
.625	5
.500	4
.375	3
.250	2

inscribed circle "A"

For shapes A, L, and X, see position #1; use length of leading cutting edge in increments of 1/4".

3 — Thickness

insert thickness

T	in 1/16"
.0938	1.5
.125	2
.1562	2.5
.1875	3
.2188	3.5
.2500	4
.3125	5

tolerance class	tolerance on "A"	tolerance on "M"	tolerance on "T"	tolerance class	tolerance on "A"	tolerance on "M"	tolerance on "T"
A	.001	.0002	.001	J	.002–.005*	.0002	.001
B	.001	.0002	.005	K	.002–.005*	.0005	.001
C	.001	.0005	.001	L	.002–.005*	.001	.001
D	.001	.0005	.005	M	.002–.005*	.003–.008*	.005
E	.001	.001	.001	N	.002–.005*	.003–.008*	.001
F	.0005	.0002	.001	P**	.0015	.0015	.0015
G	.001	.001	.005	U	.003–.010*	.005–.015*	.005
H	.0005	.0005	.001	—	—	—	—

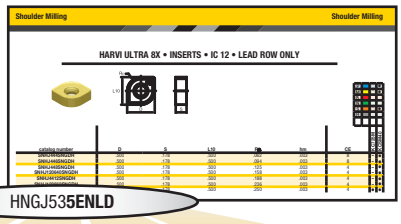
*See table below for tolerances according to insert size and class.
**Kennametal standard only.

A	tolerances on "A"		tolerances on "M"	
	classes J, K, L, M, N	class U	classes M & N	class U
.1875–.3937	.002	.003	.003	.005
.4375–.5625	.003	.005	.005	.008
.5906–.8125	.004	.007	.006	.011
.8661–1.188	.005	.010	.007	.015
1.250–1.378	.006	.010	.008	.015

symbol	hole	shape of hole	chipbreaker	shape of insert's section
N	without		without	
R			single sided	
F			double sided	
A	with	cylindrical hole	without	
M			single sided	
G			double sided	
W		partly cylindrical hole, 40–60° countersink	without	
T			single sided	
Q		partly cylindrical hole, 40–60° double countersink	without	
U			double sided	
B		partly cylindrical hole, 70–90° countersink	without	
H			single sided	
C		partly cylindrical hole, 70–90° double countersink	without	
J			double sided	
X	special design			

HARVI™ ULTRA 8X • CATALOG NUMBERING SYSTEM • INSERTS

(continued)



HNGJ535ENLD

5 — Corner Configuration

E — Cutting Edge Form

F — Sharp

E — Honed

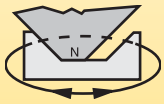
T — T-land

S — Honed T-land

N — Insert Hand

direction of cutter rotation

direction of cutter rotation



direction of cutter rotation

– Facet Width

.0312	2
.0469	3
.0625	4
.0938	6

Facet width is number of 1/64" increments (1/32" for old styles).

L — Edge Prep Size

L = Light — sharp or lightly honed and/or T-land

G = General — medium hone and/or T-land

H = Heavy — large hone and/or T-land

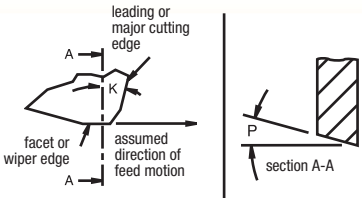
D — Rake Face Angle

Added Info

J = Polished rake face

P = Partial T-land

W = Wiper/radiused facet



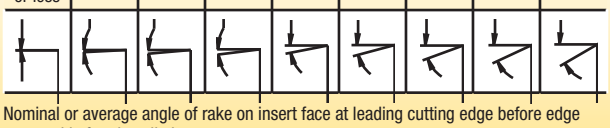
radius	r
0	.004
0.5	.008
1	1/64
2	1/32
3	3/64
4	1/16
5	5/64
6	3/32
7	7/64
8	1/8

If letter is replaced by number(s), refer to table for radius "r".

lead angle K	
A	45°
D	handed 30°
K	neutral 30°
E	handed 15°
L	neutral 15°
P	0°

wiper edge clearance P	
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

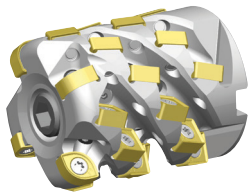
N	A	B	C	P	D	E	F	G
0° or less	3°	5°	7°	11°	15°	20°	25°	30°

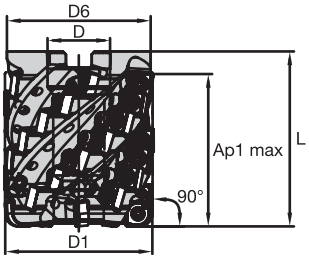


Nominal or average angle of rake on insert face at leading cutting edge before edge prep and before installation.

HARVI™ ULTRA 8X • HELICAL MILL • IC 12 • SHELL MOUNT

- HU8X… cutters accommodate inserts in the lead row with corner radii from .031–.094" (0,8–2,4mm).
- HU8X…..**R** cutters accommodate inserts in the lead row with corner radii from .125–.250" (3,2–6,4mm).





order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	lbs	max RPM
6518761	HU8X200S12S075ZU3AP200Z15	2.000	.750	1.750	3.000	2.003	15	3	1.29	16290
6521701	HU8X250S12S100ZU4AP240Z24	2.500	1.000	2.441	3.500	2.402	24	4	2.73	14570
6521702	HU8X250S12S100ZU4AP400Z40	2.500	1.000	2.441	5.000	4.001	40	4	3.56	14570
6366487	HU8X300S12S125ZU5AP305Z40	3.000	1.250	2.873	3.500	3.053	40	5	3.58	13300
6366488	HU8X300S12S125ZU5AP305Z40R	3.000	1.250	2.875	3.500	3.052	40	5	3.26	13300
6366489	HU8X300S12S125ZU5AP402Z50	3.000	1.250	2.859	4.500	4.024	50	5	5.47	13300
6366490	HU8X300S12S125ZU5AP402Z50R	3.000	1.250	2.875	4.500	4.023	50	5	4.65	13300

HARVI ULTRA 8X • HELICAL MILL • IC 12 • TAPER FLANGE MOUNT

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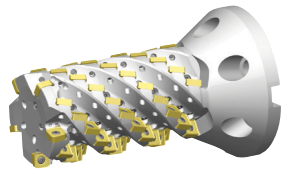
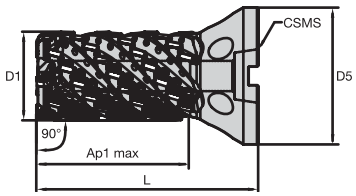
- HU8X…..**R** cutters accommodate inserts in the lead row with corner radii from .125–.250" (3,2–6,4mm).

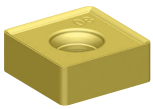


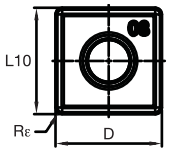


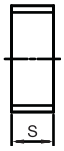
order number	catalog number	D1	D5	CSMS	L	Ap1 max	Z	Z U	lbs	max RPM
6366541	HU8X300S12F462ZU5AP526Z65	3.000	4.625	BTF46	7.500	5.262	65	5	10.52	13300
6366543	HU8X300S12F462ZU5AP526Z65R	3.000	4.625	BTF46	7.500	5.294	65	5	10.63	13300
6366544	HU8X300S12F462ZU5AP728Z90	3.000	4.625	BTF46	9.500	7.278	90	5	14.25	13300
6366545	HU8X300S12F462ZU5AP728Z90R	3.000	4.625	BTF46	9.500	7.278	90	5	12.34	13300
6366547	HU8X300S12F462ZU5AP929Z115	3.000	4.625	BTF46	11.500	9.294	115	5	14.13	13300
6366548	HU8X300S12F462ZU5AP929Z115R	3.000	4.625	BTF46	11.500	9.294	115	5	14.13	13300

80 81 49 48 84

HARVI™ ULTRA 8X • INSERTS • IC 12





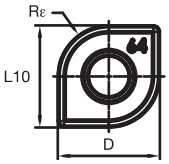


● first choice
○ alternate choice

P		○	●
M		○	●
K			
N			
S		○	●
H			

catalog number	D	S	L10	Rε	hm	CE	KC725M	KCSM40
SNHJ442SNGDH	.500	.178	.500	.031	.003	8	●	●

HARVI ULTRA 8X • INSERTS • IC 12 • LEAD ROW ONLY



P		○	●
M		○	●
K			
N			
S		○	●
H			

catalog number	D	S	L10	Rε	hm	CE	KC725M	KCSM40
SNHJ444SNGDH	.500	.178	.500	.062	.003	8	–	●
SNHJ446SNGDH	.500	.178	.500	.094	.003	8	–	●
SNHJ448SNGDH	.500	.178	.500	.125	.003	4	–	●
SNHJ120640SNGDH	.500	.178	.500	.158	.003	4	–	●
SNHJ4412SNGDH	.500	.178	.500	.188	.003	4	–	●
SNHJ120660SNGDH	.500	.178	.500	.236	.003	4	–	●
SNHJ4416SNGDH	.500	.178	.500	.250	.003	4	●	●

80 81 49 48 84

HARVI™ ULTRA 8X • INSERT SELECTION GUIDE

Material Group	Light Machining (Light geometry)		General Purpose		Heavy Machining (Strong geometry)	
	wear resistance		←	→	toughness	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	–	–	**–**	**–**	–	–
P3–P4	–	–	**–**	**–**	–	–
P5–P6	.S..GDH	KCSM40	**.S..GDH**	**KCSM40**	.S..GDH	KCSM40
M1–M2	.S..GDH	KCSM40	**.S..GDH**	**KCSM40**	.S..GDH	KCSM40
M3	.S..GDH	KCSM40	**.S..GDH**	**KCSM40**	.S..GDH	KCSM40
K1–K2	–	–	**–**	**–**	–	–
K3	–	–	**–**	**–**	–	–
N1–N2	–	–	**–**	**–**	–	–
N3	–	–	**–**	**–**	–	–
S1–S2	.S..GDH	KCSM40	**.S..GDH**	**KCSM40**	.S..GDH	KCSM40
S3	.S..GDH	KCSM40	**.S..GDH**	**KCSM40**	.S..GDH	KCSM40
S4	.S..GDH	KCSM40	**.S..GDH**	**KCSM40**	.S..GDH	KCSM40
H1	**–**	**–**	**–**	**–**	–	–

HARVI ULTRA 8X • RECOMMENDED STARTING FEEDS [IPT]

Light Machining	General Purpose	Heavy Machining

Material	Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
		5%			10%			20%			30%			40–100%			
P5	.S..GDH	–	**–**	–	.007	**.012**	.018	.006	**.010**	.016	.005	**.008**	.013	.003	**.005**	.007	.S..GDH
P6	.S..GDH	–	**–**	–	.007	**.010**	.015	.006	**.009**	.013	.005	**.007**	.011	.003	**.004**	.006	.S..GDH
M1	.S..GDH	–	**–**	–	.007	**.011**	.017	.006	**.010**	.015	.005	**.008**	.012	.003	**.004**	.007	.S..GDH
M2	.S..GDH	–	**–**	–	.007	**.011**	.017	.006	**.010**	.015	.005	**.008**	.012	.003	**.004**	.007	.S..GDH
M3	.S..GDH	–	**–**	–	.007	**.010**	.015	.006	**.009**	.013	.005	**.007**	.011	.003	**.004**	.006	.S..GDH
S1	.S..GDH	–	**–**	–	.007	**.008**	.012	.006	**.007**	.011	.005	**.006**	.009	.003	**.003**	.005	.S..GDH
S2	.S..GDH	–	**–**	–	.007	**.008**	.012	.006	**.007**	.011	.005	**.006**	.009	.003	**.003**	.005	.S..GDH
S3	.S..GDH	–	**–**	–	.007	**.009**	.014	.006	**.008**	.012	.005	**.007**	.010	.003	**.004**	.006	.S..GDH
S4	.S..GDH	–	**–**	–	.007	**.011**	.017	.006	**.010**	.015	.005	**.008**	.012	.003	**.004**	.007	.S..GDH

NOTE: Use "General Purpose" values as starting feed rate (ae = radial depth of cut, Dc = cutting diameter).

HARVI ULTRA 8X • RECOMMENDED STARTING SPEEDS [SFM]

Material Group		KC725M			KCSM40		
P	1	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–
	4	–	**–**	–	–	**–**	–
	5	390	**355**	315	820	**450**	410
	6	340	**265**	210	740	**415**	375
M	1	450	**390**	355	885	**415**	375
	2	410	**340**	290	885	**415**	375
	3	300	**265**	210	655	**290**	260
K	1	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–
N	1	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–
S	1	90	**80**	65	195	**90**	75
	2	90	**80**	65	165	**90**	70
	3	120	**90**	65	180	**105**	80
	4	145	**120**	80	260	**150**	115
H	1	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–

NOTE: FIRST choice starting speeds are in **bold** type.
Do not exceed max RPM. Reduce speed if necessary.

Assembly Station

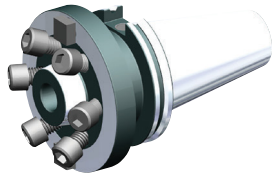
Available adapters

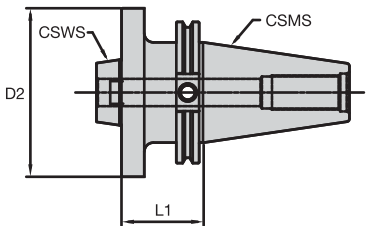
PSC | KM4X™ | KM™ | HSK | Steep Taper

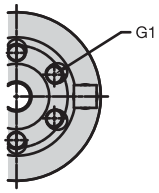
KENNAMETAL

kennametal.com

HARVI™ ULTRA 8X • TAPER FLANGE MOUNT ADAPTER • CV

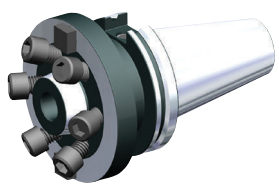


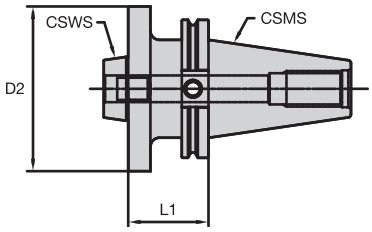


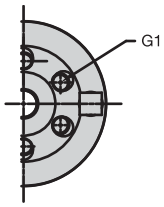


order number	catalog number	D2	G1	L1	CSMS	CSWS	lbs
6113577	CV50BTF46226	4.625	1/2-20 UNF	2.255	CV50	BTF46	10.74

HARVI ULTRA 8X • TAPER FLANGE MOUNT ADAPTER • CVF

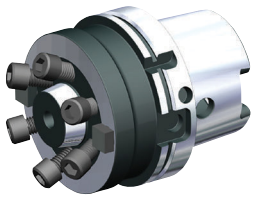


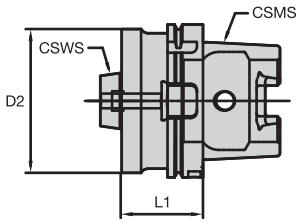


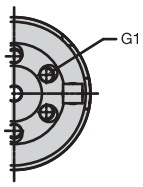


order number	catalog number	D2	G1	L1	CSMS	CSWS	lbs
6113578	CV50FBTF46226	4.625	1/2-20 UNF	2.255	CV50F	BTF46	10.90
5996208	CV60FBTF46245	4.625	1/2-20 UNF	2.451	CV60F	BTF46	29.91

HARVI ULTRA 8X • TAPER FLANGE MOUNT ADAPTER • HSK A



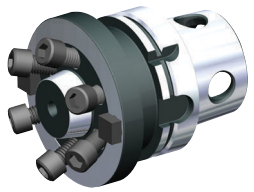


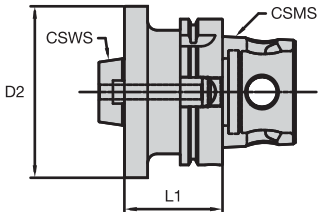


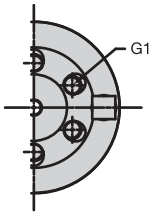
order number	catalog number	D2	G1	L1	CSMS	CSWS	lbs
6113477	HSK100ABTF46265	4.625	1/2-20 UNF	2.647	HSK100A	BTF46	10.61
6113478	HSK125ABTF46262	4.625	1/2-20 UNF	2.615	HSK125A	BTF46	14.67

81	50	48	84

HARVI™ ULTRA 8X • TAPER FLANGE MOUNT ADAPTER • KM4X™

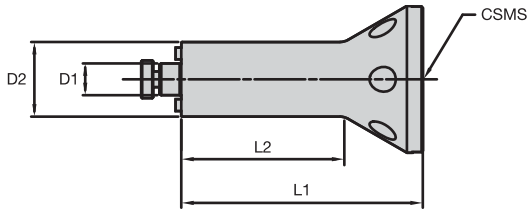






order number	catalog number	D2	G1	L1	CSMS	CSWS	lbs
6285330	KM4X100BTF46265	4.625	1/2-20 UNF	2.647	KM4X100	BTF46	11.06

HARVI ULTRA 8X • SHELL MILL ADAPTER • TAPER FLANGE MOUNT



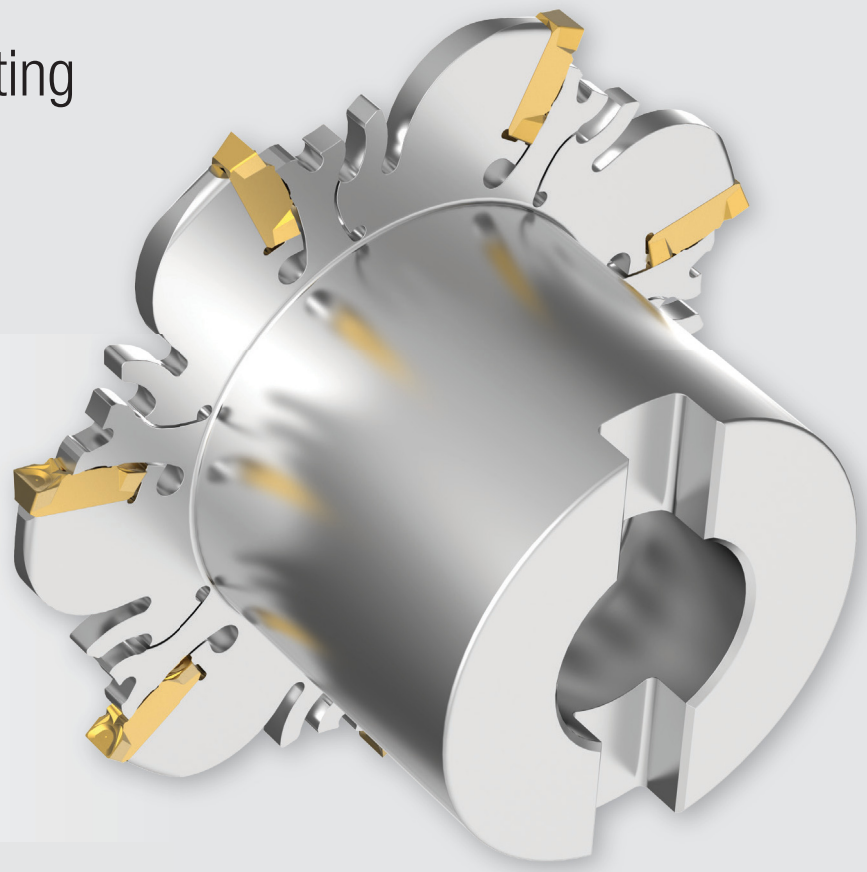
order number	catalog number	D1	D2	L1	L2	CSMS	lbs
6113053	BTF46SM2C075504	.750	1.850	5.037	2.000	BTF46	8.41
6113059	BTF46SM2C075604	.750	1.850	6.037	3.000	BTF46	9.14
6113092	BTF46SM2C075704	.750	1.850	7.037	4.000	BTF46	9.88
6113144	BTF46SM2C075804	.750	1.850	8.037	5.000	BTF46	10.61
6113146	BTF46SM2C075904	.750	1.850	9.037	6.000	BTF46	11.35
6289284	BTF46SMC0751147	.750	1.930	11.468	8.500	BTF46	13.72
6113150	BTF46SMC100460	1.000	2.350	4.604	2.000	BTF46	9.03
6153013	BTF46SM3C100497	1.000	1.930	4.968	2.000	BTF46	8.53
6113221	BTF46SMC100560	1.000	2.350	5.604	3.000	BTF46	10.21
6153015	BTF46SM3C100597	1.000	1.930	5.968	3.000	BTF46	9.31
6113223	BTF46SMC100660	1.000	2.350	6.604	4.000	BTF46	11.39
6153019	BTF46SM3C100697	1.000	1.930	6.968	4.000	BTF46	10.10
6113226	BTF46SMC100760	1.000	2.350	7.604	5.000	BTF46	12.57
6153020	BTF46SM3C100797	1.000	1.930	7.968	5.000	BTF46	10.88
6113227	BTF46SMC100860	1.000	2.350	8.604	6.000	BTF46	13.75
6153072	BTF46SM3C100897	1.000	1.930	8.968	6.000	BTF46	11.66
6101579	BTF46SM3C1001047	1.000	1.930	10.468	7.500	BTF46	12.82
6113228	BTF46SMC125426	1.250	2.750	4.258	2.000	BTF46	9.65
6113300	BTF46SMC125526	1.250	2.750	5.258	3.000	BTF46	11.26
6113332	BTF46SMC125626	1.250	2.750	6.258	4.000	BTF46	12.87
6113333	BTF46SMC125726	1.250	2.750	7.258	5.000	BTF46	14.47
6113334	BTF46SMC125826	1.250	2.750	8.258	6.000	BTF46	16.08
6113335	BTF46SMC150334	1.500	3.813	3.337	2.000	BTF46	10.94
6113385	BTF46SMC150434	1.500	3.813	4.337	3.000	BTF46	14.06
6113386	BTF46SMC150534	1.500	3.813	5.337	4.000	BTF46	17.19
6113387	BTF46SMC150634	1.500	3.813	6.337	5.000	BTF46	20.31
6113388	BTF46SMC150734	1.500	3.813	7.337	6.000	BTF46	23.44

81 50 48 84

POWERED BY NOVO

KNS®

Kennametal Narrow Slotting



Materials

P M K N S

Applications

- Slotting
- Side/Shoulder Milling
- Slotting: Full Radius
- Cut-Off
- Slotting: Gang Milling

kennametal.com/KNS

The Double-V Design of the insert and the insert pocket securely holds the insert in place and minimizes radial runout.

As a result, these stable cutting conditions lead to high slot width accuracy and high repeatability.

A unique self-clamping mechanism ensures easy insert exchange.

From light to heavy machining, the positive SGP chipbreaker geometry ensures smooth cutting action, and efficient chip evacuation.

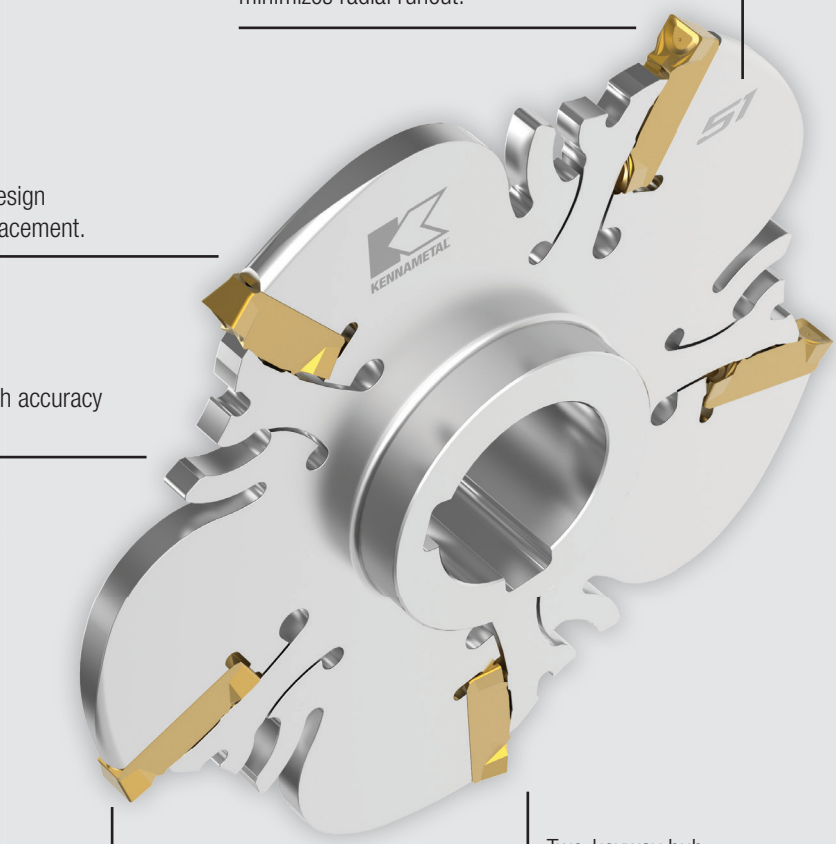
Seat size “W1” coded on cutter body.

Easy matching of cutter and insert.

Double-V insert design minimizes radial runout.

Double-V pocket design for secure insert placement.

Integral hub for high accuracy and repeatability.



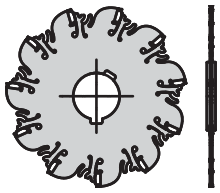
The Easy-X-Wrench comes with the cutter, reduces setup time, and minimizes spindle downtime.

Please visit kennametal.com to download detailed assembly instructions.

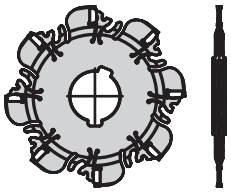
Self-clamping mechanism. No screws, no wedges, no hassle.

Two-keyway hub design for gang slotting applications.

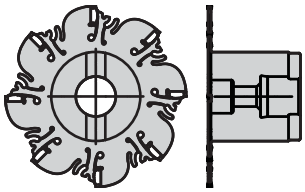
Cutter styles



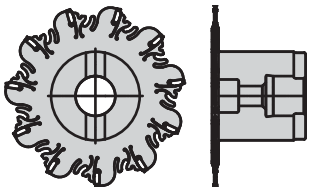
Arbor mount style.



Arbor mount style, reinforced cutter body.



Shell mount style.



Shell mount style, reinforced cutter body.

Insert Styles

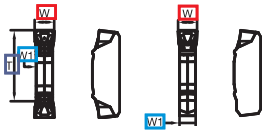
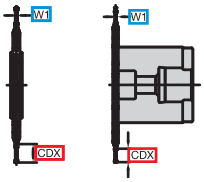
Double-ended insert style for slots with flat bottom.

Single-ended insert style for deep slots with flat bottom.

Full radius, single-ended insert style for slots with radius at the bottom.

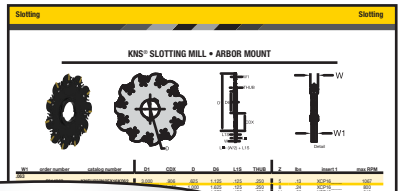
KNS® • TOOL SELECTION GUIDE

SELECTION STEPS

	KNS KENNAMETAL NARROW SLOTTING MILLS			
	ARBOR MOUNT	ARBOR MOUNT • REINFORCED BODY	SHELL MOUNT	SHELL MOUNT • REINFORCED BODY
Page	64	64	65	65
Choose your slot width "W"				
"W1" is the seat size. *"W1" on insert = "W1" on cutter body.* *"W"= cutting edge length.* 	.087–.250"	.063"	.087–.250"	.063"
Choose your slotting depth "CDX"				
CDX is the cutter's maximum depth of cut. *For double-sided insert dimension "T" = limit of slotting depth.* *If there is no "T", then your max. slot depth = CDX of cutter.* *W1 is the pocket seat size.* 	.906–3.594"	.375"	.875–1.094"	.375"
Choose your insert style				
Flat Bottom or Full Radius				
Single Ended or Double Ended				
Cutting Edges	2 1 1	2	2 1 1	2

NOTE: For accessories, spare parts, and technical information, visit **kennametal.com** or **kennametal.com/novo**.

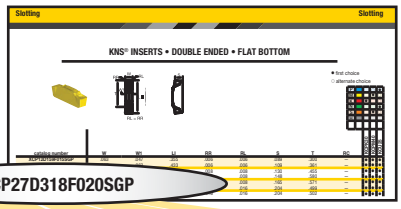
KNS® • CATALOG NUMBERING SYSTEM • CUTTERS



KNSU040N06X27K100

KNS	U	040	N	06	X	27	K	100
Kennametal Narrow Slotter	Units	Cutting Diameter	Cutting Direction	Effective Teeth (z)	Insert Shape	Seat Size W1	Connection Style Machine Side (CSMS)	Connection Size
	U = Inch (US) **M** = mm (Metric)	**Inch** 025 = 2.5" 030 = 3" 040 = 4" 050 = 5" 060 = 6" 080 = 8" 100 = 10" **Metric** 063 = 63mm 080 = 80mm 100 = 100mm 125 = 125mm 160 = 160mm 200 = 200mm 250 = 250mm	**N** = Neutral			12 = 1,2mm 16 = 1,6mm 21 = 2,1mm 27 = 2,7mm 34 = 3,4mm 42 = 4,2mm 51 = 5,1mm	**K** = Arbor Mount **S** = Shell Mount	**Inch** 062 = .625" 075 = .75" 100 = 1" 125 = 1.25" 150 = 1.5" 200 = 2" **Metric** 16 = 16mm 22 = 22mm 27 = 27mm 32 = 32mm 40 = 40mm 50 = 50mm

KNS • CATALOG NUMBERING SYSTEM • INSERTS



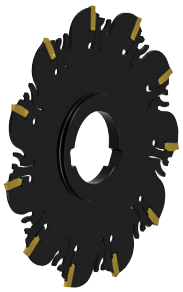
XCP27D318F020SGP

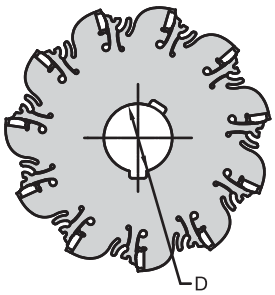
X	C	P	27	D	318	F	020	S	G	P
Insert Shape	Insert Clearance Angle	Tolerance Class	Seat Size W1	Indexability	Groove Width "W"	Groove Bottom Shape	Corner Radius	Edge Prep	Edge Prep/ Application	Rake Angle
			12 = 1,2mm 16 = 1,6mm 21 = 2,1mm 27 = 2,7mm 34 = 3,4mm 42 = 4,2mm 51 = 5,1mm	**S** = Single-Ended **D** = Double-Ended		**F** = Flat Bottom **R** = Full Radius		**S** = Land and Hone	**G** = General	**P** = 11°

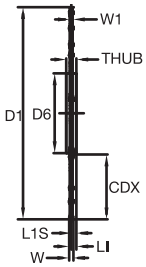
symbol	in	mm
159	.0625	1,588
220	.0866	2,200
250	.0984	2,500
300	.1181	3,000
318	.1250	3,175
400	.1575	4,000
500	.1969	5,000
600	.2362	6,000
635	.2500	6,350

symbol	in	mm
015	.0059	0,150
020	.0079	0,200
030	.0118	0,300
040	.0157	0,400

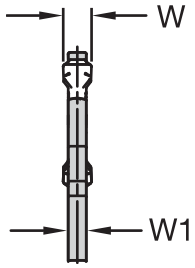
KNS® SLOTTING MILL • ARBOR MOUNT







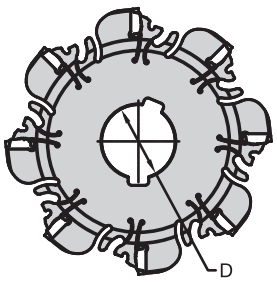
LI = (W/2) + L1S

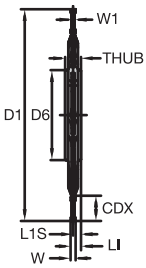


Detail

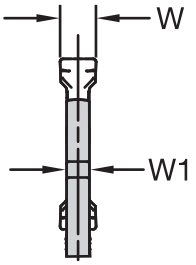
W1	order number	catalog number	D1	CDX	D	D6	L1S	THUB	Z	lbs	max RPM
.063											
	5614862	KNSU030N05X16K062	3.000	.906	.625	1.125	.125	.250	5	.13	1067
	5614863	KNSU040N08X16K100	4.000	1.156	1.000	1.625	.125	.250	8	.24	800
	5614864	KNSU050N11X16K125	5.000	1.531	1.250	1.875	.125	.250	11	.36	640
.083											
	5614865	KNSU040N07X21K100	4.000	1.156	1.000	1.625	.188	.375	7	.34	800
	5614866	KNSU050N10X21K125	5.000	1.531	1.250	1.875	.188	.375	10	.49	640
	5614867	KNSU060N12X21K150	6.000	1.906	1.500	2.125	.188	.375	12	.69	533
	5614868	KNSU080N17X21K200	8.000	2.594	2.000	2.750	.188	.375	17	1.22	400
.106											
	5614869	KNSU040N06X27K100	4.000	1.156	1.000	1.625	.250	.500	6	.91	800
	5614870	KNSU050N08X27K125	5.000	1.531	1.250	1.875	.250	.500	8	.64	640
	5614871	KNSU060N11X27K150	6.000	1.906	1.500	2.125	.250	.500	11	.89	533
	5614872	KNSU080N15X27K200	8.000	2.594	2.000	2.750	.250	.500	15	1.57	400
.134											
	5614873	KNSU040N05X34K100	4.000	1.156	1.000	1.625	.312	.625	5	.53	800
	5614875	KNSU050N07X34K125	5.000	1.531	1.250	1.875	.312	.625	7	.79	640
	5614876	KNSU060N09X34K150	6.000	1.906	1.500	2.125	.312	.625	9	1.09	533
	5614877	KNSU080N13X34K200	8.000	2.594	2.000	2.750	.312	.625	13	1.93	400
	5614878	KNSU100N17X34K200	10.000	3.594	2.000	2.750	.312	.625	17	2.96	320
.165											
	5614879	KNSU040N05X42K100	4.000	1.156	1.000	1.625	.375	.750	5	.66	800
	5614880	KNSU050N07X42K125	5.000	1.531	1.250	1.875	.375	.750	7	.96	640
	5614881	KNSU060N09X42K150	6.000	1.906	1.500	2.125	.375	.750	9	1.34	533
	5614882	KNSU080N13X42K200	8.000	2.594	2.000	2.750	.375	.750	13	2.39	400
	5614885	KNSU100N17X42K200	10.000	3.594	2.000	2.750	.375	.750	17	3.64	320
.201											
	5614896	KNSU040N05X51K100	4.000	1.156	1.000	1.625	.437	.875	5	1.65	800
	5614904	KNSU050N07X51K125	5.000	1.531	1.250	1.875	.438	.875	7	1.01	640
	5614905	KNSU060N08X51K150	6.000	1.906	1.500	2.125	.438	.875	8	1.45	533
	5614906	KNSU080N12X51K200	8.000	2.594	2.000	2.750	.438	.875	12	2.61	400
	5614907	KNSU100N15X51K200	10.000	3.594	2.000	2.750	.438	.875	15	4.07	320

KNS SLOTTING MILL • REINFORCED BODY • ARBOR MOUNT





LI = (W/2) + L1S

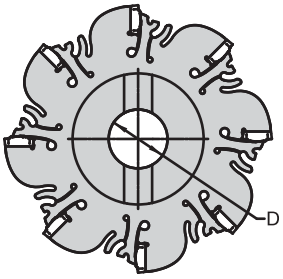


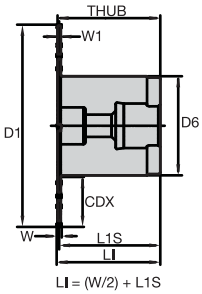
Detail

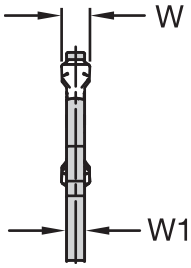
W1	order number	catalog number	D1	CDX	D	D6	L1S	THUB	Z	lbs	max RPM
.047											
	5614858	KNSU025N06X12K062	2.500	.375	.630	1.120	.125	.250	6	.12	1280
	5614859	KNSU030N08X12K100	3.000	.375	1.000	1.620	.125	.250	8	.17	1067
	5614860	KNSU040N11X12K100	4.000	.375	1.000	1.620	.125	.250	11	.35	800
	5614861	KNSU050N14X12K125	5.000	.375	1.250	1.880	.125	.250	14	.57	640

80	81	63	62	84

KNS® SLOTTING MILL • SHELL MOUNT

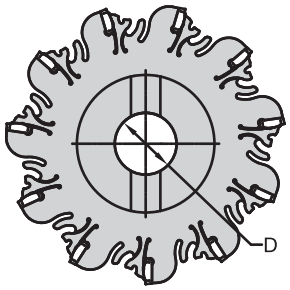


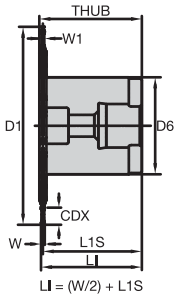


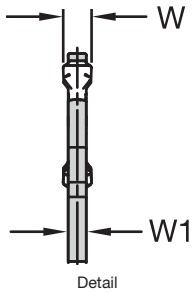


W1	order number	catalog number	D1	CDX	D	D6	L1S	THUB	Z	lbs	max RPM
.063	5614909	KNSU040R08X16S100	4.000	.875	1.000	2.188	1.750	1.781	8	1.82	800
.083	5614910	KNSU040R07X21S100	4.000	.875	1.000	2.188	1.750	1.791	7	1.87	800
.106	5614911	KNSU050R08X27S125	5.000	1.094	1.250	2.750	2.000	2.053	8	3.45	640
.134	5614912	KNSU050R07X34S125	5.000	1.094	1.250	2.750	2.000	2.067	7	3.55	640
.165	5614913	KNSU050R07X42S125	5.000	1.094	1.250	2.750	2.000	2.083	7	3.67	640
.201	5614914	KNSU050R07X51S125	5.000	1.094	1.250	2.750	2.000	2.100	7	3.66	640

KNS SLOTTING MILL • REINFORCED BODY • SHELL MOUNT



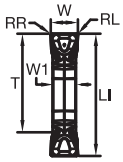




W1	order number	catalog number	D1	CDX	D	D6	L1S	THUB	Z	lbs	max RPM
.047	5614908	KNSU040R11X12S100	4.000	.375	1.000	2.190	1.750	1.821	11	1.93	800

80	81	63	62	84

KNS® INSERTS • DOUBLE ENDED • FLAT BOTTOM



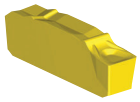
RL = RR

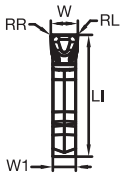
● first choice
○ alternate choice

	KCPK30	KCPM40	KCU25
P		○	●
M		●	○
K	●		○
N			●
S			●
H			

catalog number	W1	W	LI	RR	RL	S	T	RC	hm	CE	KCPK30	KCPM40	KCU25
XCP12D159F015SGP	.047	.063	.355	.006	.006	.089	.300	–	.002	2	●	●	●
XCP16D220F015SGP	.063	.087	.433	.006	.006	.109	.361	–	.002	2	●	●	●
XCP21D300F020SGP	.083	.119	.551	.008	.008	.130	.455	–	.002	2	●	●	●
XCP27D318F020SGP	.106	.125	.709	.008	.008	.148	.580	–	.002	2	●	●	●
XCP34D400F020SGP	.134	.158	.709	.008	.008	.165	.571	–	.002	2	●	●	●
XCP51D600F040SGP	.201	.236	.709	.016	.016	.204	.499	–	.002	2	●	●	●
XCP51D635F040SGP	.201	.250	.709	.016	.016	.204	.502	–	.002	2	●	●	●

KNS INSERTS • SINGLE ENDED • FLAT BOTTOM



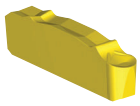


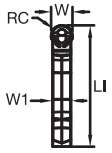
RL = RR

	KCPK30	KCPM40	KCU25
P		○	●
M		●	○
K	●		○
N			●
S			●
H			

catalog number	W1	W	LI	RR	RL	S	T	RC	hm	CE	KCPK30	KCPM40	KCU25
XCP16S220F015SGP	.063	.087	.433	.006	.006	.109	–	–	.002	1	●	●	●
XCP21S250F020SGP	.083	.099	.551	.008	.008	.130	–	–	.002	1	●	●	●
XCP21S300F020SGP	.083	.119	.551	.008	.008	.130	–	–	.002	1	●	●	●
XCP27S318F020SGP	.106	.125	.709	.008	.008	.148	–	–	.002	1	●	●	●
XCP34S400F020SGP	.134	.158	.709	.008	.008	.165	–	–	.002	1	●	●	●
XCP42S500F030SGP	.165	.197	.709	.012	.012	.183	–	–	.002	1	●	●	●
XCP51S600F040SGP	.201	.236	.709	.016	.016	.204	–	–	.002	1	●	●	●
XCP51S635F040SGP	.201	.250	.709	.016	.016	.204	–	–	.002	1	●	●	●

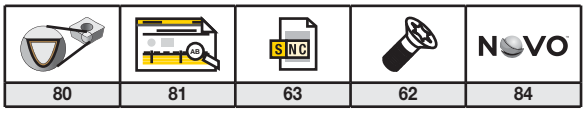
KNS INSERTS • SINGLE ENDED • FULL RADIUS





	KCPK30	KCPM40	KCU25
P		○	●
M		●	○
K	●		○
N			●
S			●
H			

catalog number	W1	W	LI	RR	RL	S	T	RC	hm	CE	KCPK30	KCPM40	KCU25
XCP21S300R150SGP	.083	.118	.551	–	–	.130	–	.059	.002	1	●	–	●
XCP27S318R159SGP	.106	.125	.709	–	–	.148	–	.062	.002	1	●	●	●
XCP34S400R200SGP	.134	.157	.709	–	–	.165	–	.079	.002	1	●	–	●



80	81	63	62	84

KNS® • INSERT SELECTION GUIDE

Material Group	Light Machining (Light geometry)		General Purpose		Heavy Machining (Strong geometry)	
	wear resistance		←	→	toughness	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	.S..GP	KCU25	**.S..GP**	**KCU25**	.S..GP	KCPM40
P3–P4	.S..GP	KCU25	**.S..GP**	**KCU25**	.S..GP	KCPM40
P5–P6	.S..GP	KCU25	**.S..GP**	**KCU25**	.S..GP	KCPM40
M1–M2	.S..GP	KCU25	**.S..GP**	**KCPM40**	.S..GP	KCPM40
M3	.S..GP	KCU25	**.S..GP**	**KCPM40**	.S..GP	KCPM40
K1–K2	.S..GP	KCU25	**.S..GP**	**KCPK30**	.S..GP	KCPK30
K3	.S..GP	KCU25	**.S..GP**	**KCPK30**	.S..GP	KCPK30
N1–N2	–	–	**.S..GP**	**KCU25**	–	–
N3	–	–	**.S..GP**	**KCU25**	–	–
S1–S2	.S..GP	KCU25	**.S..GP**	**KCU25**	.S..GP	KCU25
S3	.S..GP	KCU25	**.S..GP**	**KCU25**	.S..GP	KCU25
S4	.S..GP	KCU25	**.S..GP**	**KCU25**	.S..GP	KCU25

KNS • RECOMMENDED STARTING FEEDS [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)												Insert Geometry
	5%			10%			20%			30%			
.S..GP	.005	**.011**	.027	.004	**.008**	.020	.003	**.006**	.015	.002	**.005**	.012	.S..GP

NOTE: Use "Light Machining" values as starting feed rate.
% = ae/Dc * 100 (ae = radial depth of cut, Dc = cutting diameter)

KNS • RECOMMENDED STARTING SPEEDS [SFM]

Material Group		KCPK30			KCPM40			KCU25		
P	1	1200	**1050**	890	660	**620**	500	860	**750**	700
	2	920	**835**	755	620	**580**	460	720	**630**	530
	3	835	**755**	675	550	**480**	390	660	**560**	460
	4	625	**575**	525	490	**420**	300	590	**490**	390
	5	855	**755**	690	350	**250**	200	490	**440**	390
	6	525	**445**	400	250	**200**	160	430	**330**	260
M	1	–	**–**	–	560	**490**	450	690	**560**	450
	2	–	**–**	–	510	**430**	360	560	**500**	360
	3	–	**–**	–	380	**330**	260	430	**400**	280
K	1	850	**760**	665	–	**–**	–	890	**720**	560
	2	770	**690**	630	–	**–**	–	760	**630**	530
	3	645	**575**	530	–	**–**	–	690	**530**	460
N	1	–	**–**	–	–	**–**	–	2500	**2230**	1310
	2	–	**–**	–	–	**–**	–	2330	**1800**	1150
	3	–	**–**	–	–	**–**	–	2030	**1600**	1050
S	1	–	**–**	–	–	**–**	–	100	**85**	60
	2	–	**–**	–	–	**–**	–	100	**85**	60
	3	–	**–**	–	–	**–**	–	125	**100**	60
	4	–	**–**	–	–	**–**	–	175	**125**	85

NOTE: FIRST choice starting speeds are in **bold** type.
Do not exceed max RPM. Reduce speed if necessary.

POWERED BY NOVO

Duo-Lock™

3-Flute, Short-Length-Design Tips

Materials

P M K S H

Applications

FGDF tips

- Plunge Milling
- Ramping
- Slotting
- Side Milling/ Shoulder Milling

RFDD tips

- Ramping
- Slotting
- Side Milling/ Shoulder Milling

kennametal.com/Duo-Lock

FGDF Tips — Roughing and finishing with just one tool.

RFDD Tips — High-performance roughing solution with excellent chip evacuation, especially in stainless steel.

The short design and corner radii provide stability and reduce deflection forces.

Ideally suited to perform long-reach applications on mill-turn machines, and driven tooling on lathes.

The unique cutting geometry results in low cutting forces, requiring low power consumption.

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.

42°/45°/48° variable helix technology minimizes chatter and harmonics.

Chipbreaker profile for perfect chip evacuation.

Unequal flute spacing reduces vibrations and improves surface finish.

FGDF

Profiling corner radii increases tool life. Center cutting for plunging, ramping, slotting, and side milling.

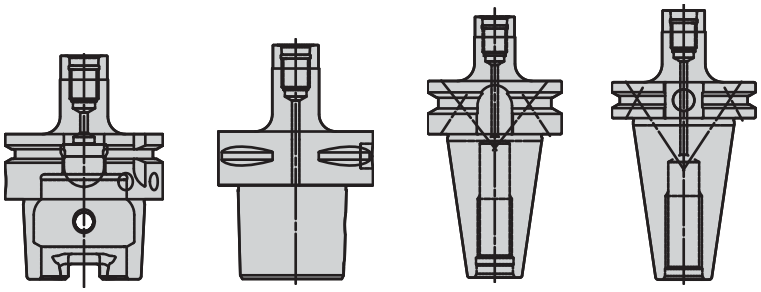
Double cone eliminates expensive presetting processes by providing an axial .0004" (10µm) repeatability. Length repeatability from insert tip-to-tip within .002" (50µm).

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

RFDD

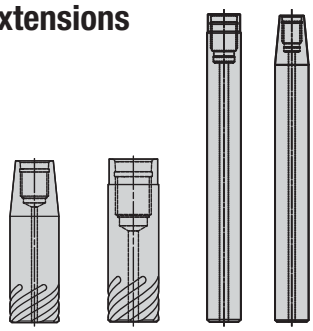
3rd contact surface delivers high stiffness and highest accuracy below .0002" (5µm) runout.

Adapters



HSK PSC BT CV

Extensions



SAFE-LOCK® by HAIMER®

Cut-to-size

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
	NEW!					
Series	FGDF	UKDV	ULDV	UCDV	UDDV	UJDV
Page	75	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.

● Primary

○ Secondary

NOTE: For accessories, spare parts, and technical information, visit **kennametal.com** or **kennametal.com/novo**.

Modular Solid Carbide End Mills

DUO-LOCK™ • TOOL SELECTION GUIDE

	HP ROUGHING & FINISHING *(CONTINUED)*		HP PROFILING	
	MaxiMet™	MaxiMet	HARVI™ Ball Nose	HARVI III Ball Nose
Series	ABDF	ABDE	UKBV	UJBV
Page	O28*	O29*	O18*	O19*
Tool type				
Rougher	●	●	●	
Finisher	○	●	○	●
Chamfering				
Main operation				
Workpiece material				
Primary	N	N	P M	S
Secondary			K S H	P M K H
Corner style				
Corner radius [Rε]	—	.015–.250"	—	—
Corner chamfer width [BCH]	—	—	—	—
Cutter diameter [D1]	3/8–3/4"	3/8–1"	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
Maximum cutting depth [Ap1 max]	9/16–1-1/8"	9/16–1-1/2"	9/16–1-1/2"	9/16–1-1/2"
Flute helix angle	45°	38°	37°/39°	37°/39°
Number of flutes [ZU]	2	3	4	6
Center cutting	✔	✔	✔	✔
Additional operations				

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

● Primary

○ Secondary

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Modular Solid Carbide End Mills

DUO-LOCK™ • TOOL SELECTION GUIDE

	HP ROUGHING			
	—	—	—	—
	NEW!			
Series	**RFDD**	**RQDB**	**RKDF**	**RQBB**
Page	75	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 [Re]	.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.

● Primary

○ Secondary

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Modular Solid Carbide End Mills

DUO-LOCK™ • TOOL SELECTION GUIDE

	HP FINISHING		CHAMFERING	
	—	RSM II™	—	—
Series	FMDF	FSDE	XADA	XRDA
Page	O42*	O43*	O48*	O49*
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"
Length of cut	1.5 x D	1.5 x D	.075–.178"	.030–.120"
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.

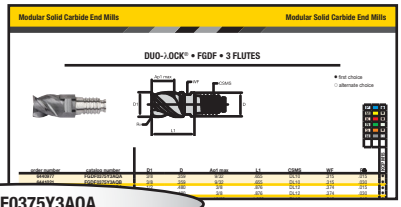
● Primary

○ Secondary

NOTE: For accessories, spare parts, and technical information, visit **kennametal.com** or **kennametal.com/novo**.

Modular Solid Carbide End Mills

DUO-LOCK™ • CATALOG NUMBERING SYSTEM

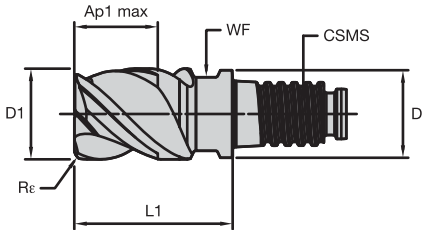


FGDF0375Y3AQA

FG	D	F	0375	Y	3	A	Q	A
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™ • FGDF • 3 FLUTES

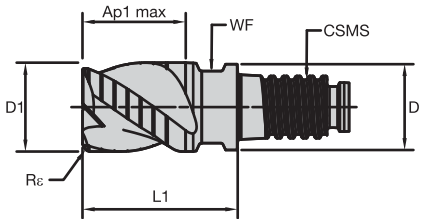


● first choice
○ alternate choice

P	●
M	●
K	●
N	
S	●
H	○

order number	catalog number	D1	D	Ap1 max	L1	CSMS	WF	Rε	KCPM15
6440977	FGDF0375Y3AQA	3/8	.359	9/32	.655	DL10	.315	.015	●
6441021	FGDF0375Y3AQB	3/8	.359	9/32	.655	DL10	.315	.030	●
6440978	FGDF0500Y3AQA	1/2	.480	3/8	.876	DL12	.374	.015	●
6441022	FGDF0500Y3AQB	1/2	.480	3/8	.876	DL12	.374	.030	●
6440979	FGDF0625Y3AQA	5/8	.605	15/32	1.093	DL16	.512	.015	●
6441023	FGDF0625Y3AQB	5/8	.605	15/32	1.093	DL16	.512	.030	●
6440980	FGDF0750Y3AQA	3/4	.730	9/16	1.314	DL20	.630	.015	●
6441024	FGDF0750Y3AQB	3/4	.730	9/16	1.314	DL20	.630	.030	●

DUO-LOCK™ • RFDD • 3 FLUTES



P	●
M	●
K	●
N	
S	
H	○

order number	catalog number	D1	D	Ap1 max	L1	CSMS	WF	Rε	KCPM15
6441025	RFDD0375Y3AQA	3/8	.359	9/32	.655	DL10	.315	.015	●
6441026	RFDD0500Y3AQA	1/2	.480	3/8	.876	DL12	.374	.015	●
6441027	RFDD0625Y3AQA	5/8	.605	15/32	1.093	DL16	.512	.015	●
6441028	RFDD0750Y3AQA	3/4	.730	9/16	1.314	DL20	.630	.015	●

80	81	74	70	84

Modular Solid Carbide End Mills

DUO-LOCK™ • FGDF • 3 FLUTES • APPLICATION DATA

Material Group		Side Milling (A) and Slotting (B)			straight short			conical medium			conical long			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.				
		A		B	KCPM15 Cutting Speed — vc SFM			KCPM15 Cutting Speed — vc SFM			KCPM15 Cutting Speed — vc SFM			D1 — Diameter				
		ap	ae	ap	min		max	min		max	min		max	frac.	3/8	1/2	5/8	3/4
														dec.	0.3750	0.5000	0.6250	0.7500
P	0	0.75 x D	0.5 x D	0.5 x D	490	–	660	441	–	594	441	–	594	IPT	0.0023	0.0029	0.0034	0.0037
	1	0.75 x D	0.5 x D	0.5 x D	490	–	660	441	–	594	441	–	594	IPT	0.0023	0.0029	0.0034	0.0037
	2	0.75 x D	0.5 x D	0.5 x D	460	–	620	414	–	558	414	–	558	IPT	0.0023	0.0029	0.0034	0.0037
	3	0.75 x D	0.4 x D	0.5 x D	390	–	520	351	–	468	351	–	468	IPT	0.0019	0.0025	0.0029	0.0033
	4	0.75 x D	0.3 x D	0.5 x D	300	–	490	270	–	441	270	–	441	IPT	0.0017	0.0022	0.0026	0.0029
	5	0.75 x D	0.4 x D	0.5 x D	200	–	330	170	–	281	160	–	264	IPT	0.0016	0.0020	0.0023	0.0026
	6	0.75 x D	0.3 x D	0.5 x D	160	–	250	136	–	213	128	–	200	IPT	0.0013	0.0016	0.0019	0.0021
M	1	0.75 x D	0.4 x D	0.5 x D	300	–	380	240	–	304	210	–	266	IPT	0.0019	0.0025	0.0029	0.0033
	2	0.75 x D	0.4 x D	0.5 x D	200	–	260	160	–	208	140	–	182	IPT	0.0016	0.0020	0.0023	0.0026
	3	0.75 x D	0.4 x D	0.5 x D	200	–	230	160	–	184	140	–	161	IPT	0.0013	0.0016	0.0019	0.0021
K	1	0.75 x D	0.5 x D	0.5 x D	390	–	490	351	–	441	351	–	441	IPT	0.0023	0.0029	0.0034	0.0037
	2	0.75 x D	0.5 x D	0.5 x D	360	–	460	324	–	414	324	–	414	IPT	0.0019	0.0025	0.0029	0.0033
	3	0.75 x D	0.4 x D	0.5 x D	360	–	430	324	–	387	324	–	387	IPT	0.0016	0.0020	0.0023	0.0026
S	1	0.3 x D	0.3 x D	0.5 x D	160	–	300	128	–	240	96	–	180	IPT	0.0019	0.0025	0.0029	0.0033
	2	0.3 x D	0.3 x D	0.5 x D	80	–	130	64	–	104	48	–	78	IPT	0.0010	0.0013	0.0015	0.0018
	3	0.75 x D	0.3 x D	0.5 x D	80	–	130	64	–	104	48	–	78	IPT	0.0010	0.0013	0.0015	0.0018
	4	0.75 x D	0.3 x D	0.5 x D	160	–	200	128	–	160	96	–	120	IPT	0.0014	0.0018	0.0021	0.0024
H	1	0.75 x D	0.2 x D	0.3 x D	260	–	460	208	–	368	156	–	276	IPT	0.0017	0.0022	0.0026	0.0029

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 >1/2".
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%.

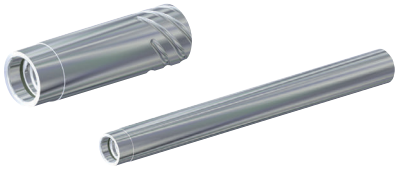
DUO-LOCK™ • RFDD • 3 FLUTES • APPLICATION DATA

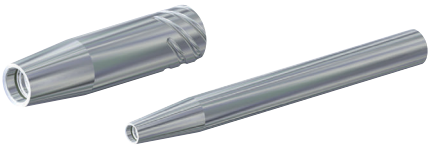
Material Group		Side Milling (A) and Slotting (B)			straight short			conical medium			conical long			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.				
		A		B	KCPM15 Cutting Speed — vc SFM			KCPM15 Cutting Speed — vc SFM			KCPM15 Cutting Speed — vc SFM			D1 — Diameter				
		ap	ae	ap	min		max	min		max	min		max	frac.	3/8	1/2	5/8	3/4
														dec.	0.3750	0.5000	0.6250	0.7500
P	0	0.75 x D	0.5 x D	0.5 x D	490	–	660	441	–	594	441	–	594	IPT	0.0023	0.0029	0.0034	0.0037
	1	0.75 x D	0.5 x D	0.5 x D	490	–	660	441	–	594	441	–	594	IPT	0.0023	0.0029	0.0034	0.0037
	2	0.75 x D	0.5 x D	0.5 x D	460	–	620	414	–	558	414	–	558	IPT	0.0023	0.0029	0.0034	0.0037
	3	0.75 x D	0.5 x D	0.5 x D	390	–	520	351	–	468	351	–	468	IPT	0.0019	0.0025	0.0029	0.0033
	4	0.75 x D	0.4 x D	0.5 x D	300	–	490	270	–	441	270	–	441	IPT	0.0017	0.0022	0.0026	0.0029
	5	0.75 x D	0.5 x D	0.5 x D	200	–	330	170	–	281	160	–	264	IPT	0.0016	0.0020	0.0023	0.0026
	6	0.75 x D	0.4 x D	0.5 x D	160	–	250	136	–	213	128	–	200	IPT	0.0013	0.0016	0.0019	0.0021
M	1	0.75 x D	0.4 x D	0.5 x D	300	–	380	240	–	304	210	–	266	IPT	0.0019	0.0025	0.0029	0.0033
	2	0.75 x D	0.4 x D	0.5 x D	200	–	260	160	–	208	140	–	182	IPT	0.0016	0.0020	0.0023	0.0026
	3	0.75 x D	0.4 x D	0.5 x D	200	–	230	160	–	184	140	–	161	IPT	0.0013	0.0016	0.0019	0.0021
K	1	0.75 x D	0.5 x D	0.5 x D	390	–	490	351	–	441	351	–	441	IPT	0.0023	0.0029	0.0034	0.0037
	2	0.75 x D	0.5 x D	0.5 x D	360	–	460	324	–	414	324	–	414	IPT	0.0019	0.0025	0.0029	0.0033
	3	0.75 x D	0.4 x D	0.5 x D	360	–	430	324	–	387	324	–	387	IPT	0.0016	0.0020	0.0023	0.0026
H	1	0.75 x D	0.2 x D	0.3 x D	260	–	460	208	–	368	156	–	276	IPT	0.0017	0.0022	0.0026	0.0029

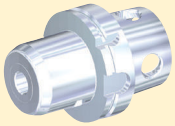
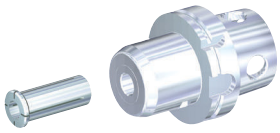
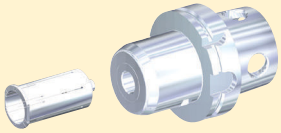
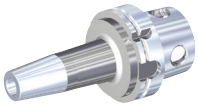
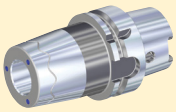
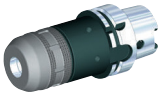
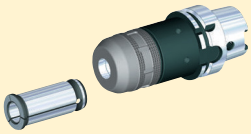
NOTE: These guidelines may require variations to achieve optimum results.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability)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





Duo-Lock™ Extension Shank Diameter (D2)	3/8	1/2	5/8	3/4	1	1 1/4	1/2	5/8	3/4	1	1 1/4	1 1/2	2
HydroForce™ 	–	–	–	●	–	●	–	–	●	–	●	–	●
HydroForce with Sleeve 	●	●	●	●	●	–	●	●	●	●	–	●	–
HydroForce with Safe-Lock™ Sleeve * 	–	●	●	●	●	–	●	●	●	●	–	–	–
Shrink Fit 	●	●	●	●	●	●	●	●	●	●	●	●	●
Safe-Lock™ Shrink Fit * 	–	●	●	●	●	●	●	●	●	●	●	●	●
Milling Chuck 	–	–	–	●	●	●	–	–	●	●	●	–	–
Milling Chuck with Sleeve 	●	●	●	●	●	–	●	●	●	●	–	–	–
ER Collet Chuck	■	■	○	○	○	–	■	■	○	○	–	–	–
TG Collet Chuck	■	■	■	○	○	–	■	■	■	○	–	–	–

* Features Safe-Lock™ pullout protection.

● Recommended
■ Suitable with limitations
○ Not recommended
– Not available

NOTE: Duo-Lock™ steel extensions require high power shrinking units greater than 10kW.
All Safe-Lock™ extensions can be clamped in a cylindrical shank adapter.

Modular Solid Carbide End Mills

DUO-LOCK™ • SINGLE-HANDED TORQUE WRENCH

order number	catalog number	description		Duo-Lock™ Size	torque (Nm)	torque (ft. lbs.)
6411155	TWDLSH9X12	D-L SINGLE HAND TORQUE WRENCH	1	–	–	–
6410950	TWSH9X12INSERTDL10	D-L TORQUE WRENCH SH INSERT	2	DL10	20	15
6411151	TWSH9X12INSERTDL12	D-L TORQUE WRENCH SH INSERT		DL12	30	22
6411152	TWSH9X12INSERTDL16	D-L TORQUE WRENCH SH INSERT		DL16	60	44
6411153	TWSH9X12INSERTDL20	D-L TORQUE WRENCH SH INSERT		DL20	80	59
6411154	TWDL9X12CA14X18	D-L ADAPTER 9X12 TO 14X18	3	–	–	–

DUO-LOCK™ • DOUBLE-HANDED WRENCH KIT

1 ERICKSON™ Torque Master Wrench

2 Insert

3 Extension Handle

Order this

Get that

order number	catalog number	kit description		Duo-Lock™ Size	torque (Nm)	torque (ft. lbs.)
6342967	TWDL10TM	D-L WRENCH WITH DL10 INSERT AND HANDLES	1+2+3	DL 10	20	15
6342968	TWDL12TM	D-L WRENCH WITH DL12 INSERT AND HANDLES		DL 12	30	22
6342969	TWDL16TM	D-L WRENCH WITH DL16 INSERT AND HANDLES		DL 16	60	44
6342970	TWDL20TM	D-L WRENCH WITH DL20 INSERT AND HANDLES		DL 20	80	59
6343061	TWDL25TM	D-L WRENCH WITH DL25 INSERT AND HANDLES		DL 25	100	74
6343062	TWDL32TM	D-L WRENCH WITH DL32 INSERT AND HANDLES		DL 32	130	96

80	81	74	70	84

Modular Solid Carbide End Mills

DUO-LOCK™ • INTELLIGENT THREAD

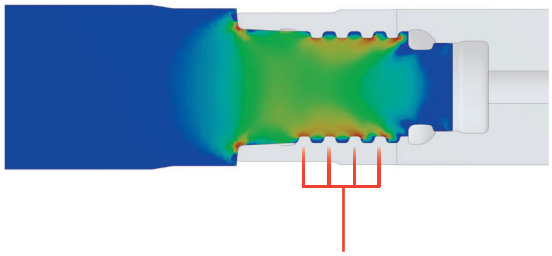
The Duo-Lock™ Intelligent Thread eliminates the force peaks all regular threads have in the first groove.

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

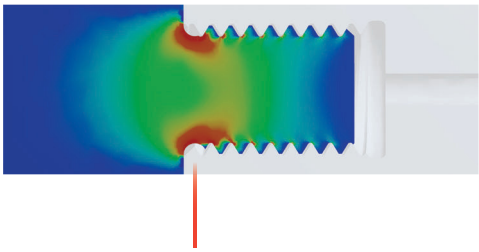
Duo-Lock™ Intelligent Thread



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



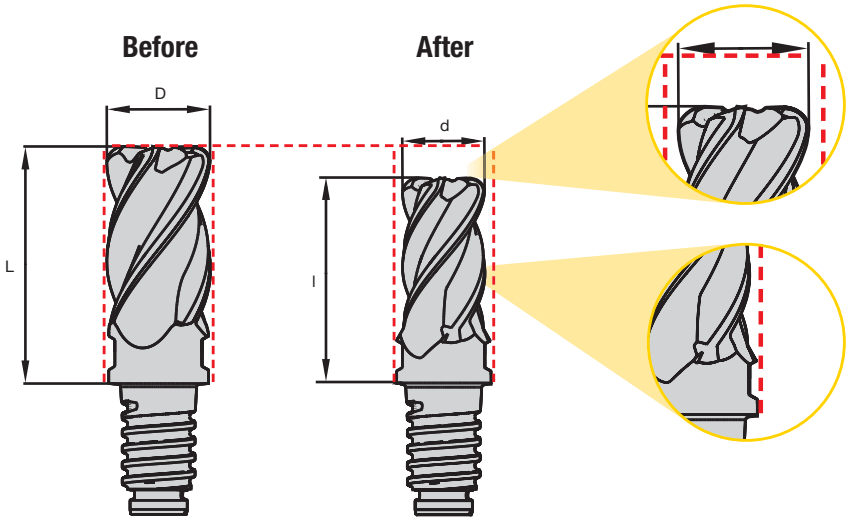
Typical for any regular thread at maximum load.

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.

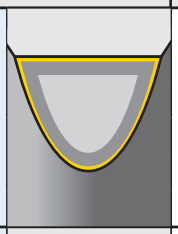
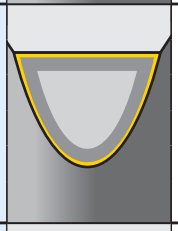
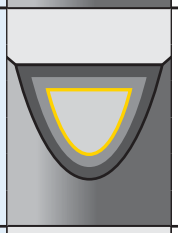
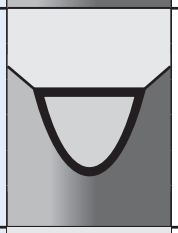
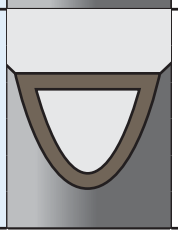
NOTE: The cutting diameter of reconditioned Duo-Lock™ tips might be smaller than the neck diameter, and therefore may not have a clearance anymore. To prevent collisions, precautions need to be taken.



Grade Descriptions

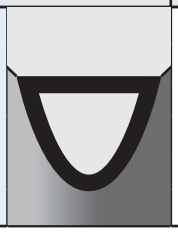
INDEXABLE MILLING

wear resistance ⟷ toughness

Coating	Grade Description		05	10	15	20	25	30	35	40	45
KC725M 	Coated carbide grade with an advanced PVD TiAlN coating. KC725M is a high-performance grade for milling steel, stainless steel, and ductile cast iron. The good thermal shock resistance of the substrate makes this grade ideal for both wet and dry machining. Primarily for use in general and heavy machining.	P									
		M									
		S									
KCSM40 	Coated carbide grade with an advanced PVD TiAlN/TiN coating. Premium substrate with newly developed binder composition. KCSM40 is a high-performance grade for titanium, super alloys, and stainless steel. High thermal shock resistance of the substrate makes this grade ideal for wet machining. First choice for roughing and unsuitable cutting conditions.										
		M									
		S									
KCPK30 	Coated carbide grade with CVD multilayer (TiN/TiCN/Al_2O_3) and advanced Beyond™ post-coat treatment. Substrate is very tough. KCPK30 has a wide application area in general and roughing milling of steels and cast irons. Performs best dry, but can also be used wet.	P									
		K									
KCPM40 	Coated carbide grade with an advanced PVD TiAlN/AlCrN coating. Tough substrate with excellent capability at higher temperatures. KCPM40™ is the first choice for milling steel and stainless steel. Good thermal shock resistance makes this grade ideal for both wet and dry machining. Primarily for use in general and heavy machining.	P									
		M									
KCU25 	Fine-grained substrate coated with PVD TiN/TiAlN multilayer. First choice for applications with thin to medium chip thickness. This grade works on many workpiece materials, dry and wet.	P									
		M									
		K									
		N									
		S									

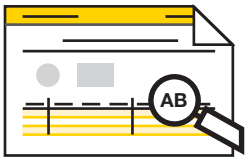
SOLID CARBIDE END MILLING

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									

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
NEW	NEW product
Ap1 max	Maximum Cutting Depth
CDX	Maximum Depth of Cut
CE	Cutting Edges
CSMS	Connection Style Machine Side
CSWS	Connection Style Workpiece Side
D	Insert: Insert IC Size
D	Milling: Mounting Diameter
D	Toolholder: Shank/Bore Diameter
D1	Milling: Cutter Diameter
D1	Toolholder: Clamping Diameter
D2	Body Diameter 1 Workpiece Side
D21	Body Diameter 2 Workpiece Side
D22	Max Diameter Taper Angle
D5	Body Diameter Machine Side
D6	Hub Diameter
G1	Bolt Circle Thread Size
G2	Stop Screw Thread Size
G3X	Connection Thread Size External
GPL	General Projection Length
hm	Average Chip Thickness
kg	Weight Kilograms
L	Overall Length
L1	Gage Length
L1	Sleeve: Flange Length
L10	Insert Cutting Edge Length
L1FC	Gage Length Face Contact
L1S	Secondary Gage Length
L2	Usable Length
L21	Usable Length 2
L9	Clamping Length
lbs	Weight Pounds
LI	Insert Length
LS	Shank Length
max RPM	Maximum RPM
RC	Full Radius
RL	Corner Radius Left Hand
RR	Corner Radius Right Hand
Rε	Corner Radius
S	Insert Thickness
T	Limit of Slotting Depth
THUB	Hub Thickness
V	Adjustment Range
W	Cutting Edge Length or Slot Width
W1	Seat Size
WF	Distance Across Flats
Z	Number of Inserts
Z U	Number of Flutes

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	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	–	–
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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