

# VHLS

Value Series HARDMAX Longneck Square

## HARDMAX 2 Flutes Short Shank Long Neck Square End Mills

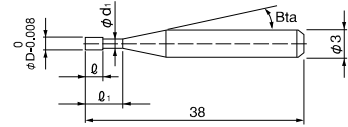
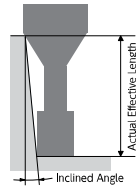
**NEW**

Super  
MG

HARD  
MAX



Shank Dia  
0/-0.003



The shank taper angle shown is not an exact value and to avoid contact with the work piece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the work piece.

Material Applications (★ Highly Recommended ● Recommended ○ Suggested)

CARBON STEELS S45C S55C	ALLOY STEELS SK1/SCM SUS	PREHARDENED STEELS NAK HPM	HARDENED STEELS					CAST IRON	ALUMINUM ALLOYS	GRAPHITE	COPPER	PLASTICS	GLASS FILLED PLASTICS	TITANIUM ALLOYS	HEAT RESISTANT ALLOYS	CEMENTED CARBIDE	HARD BRITTLE (NON-METALLIC) MATERIALS
			~50HRC	~55HRC	~60HRC	~65HRC	~70HRC										
○	○	●	●	●	○			○			○			○	○		

Total 30 models

Unit (mm)

Model Number	Outside Diameter $\phi$	Effective Length $\ell_1$	Length of Cut $\ell$	Neck Diameter $\phi d_1$	Shank Taper Angle $B\alpha$	Effective Length by Inclined Angles					Suggested Retail Price ¥
						30°	1°	1° 30'	2°	3°	
VHLS 2001-003	0.1	0.3	0.1	0.093	11°	0.35	0.37	0.39	0.42	0.48	5,580
VHLS 2002-005	0.2	0.5	0.3	0.18	16°	0.68	0.72	0.76	0.80	0.87	3,660
VHLS 2002-010	0.2	1	0.3	0.18	16°	1.21	1.27	1.32	1.37	1.48	3,960
VHLS 2003-010	0.3	1	0.4	0.28	16°	1.25	1.32	1.39	1.45	1.56	3,240
VHLS 2003-015	0.3	1.5	0.4	0.28	16°	1.77	1.86	1.94	2.02	2.17	3,240
VHLS 2003-020	0.3	2	0.4	0.28	16°	2.30	2.41	2.50	2.59	2.78	3,960
VHLS 2004-015	0.4	1.5	0.6	0.38	16°	1.85	1.97	2.07	2.17	2.34	2,340
VHLS 2004-020	0.4	2	0.6	0.38	16°	2.38	2.52	2.64	2.75	2.96	2,340
VHLS 2004-030	0.4	3	0.6	0.38	16°	3.44	3.61	3.75	3.88	4.18	2,340
VHLS 2004-040	0.4	4	0.6	0.38	16°	4.49	4.69	4.85	5.02	5.40	2,340
VHLS 2005-015	0.5	1.5	0.7	0.49	16°	1.92	2.06	2.19	2.30	2.51	1,800
VHLS 2005-020	0.5	2	0.7	0.49	16°	2.46	2.62	2.76	2.89	3.13	1,800
VHLS 2005-025	0.5	2.5	0.7	0.49	16°	2.99	3.18	3.33	3.47	3.74	1,800
VHLS 2005-030	0.5	3	0.7	0.49	16°	3.52	3.73	3.89	4.04	4.35	1,800
VHLS 2005-040	0.5	4	0.7	0.49	16°	4.58	4.82	5.01	5.18	5.57	1,800
VHLS 2005-060	0.5	6	0.7	0.49	16°	6.69	6.97	7.21	7.46	8.02	1,800
VHLS 2006-020	0.6	2	0.9	0.59	16°	2.52	2.71	2.88	3.03	3.30	1,800
VHLS 2006-030	0.6	3	0.9	0.59	16°	3.60	3.83	4.02	4.20	4.52	1,800
VHLS 2006-040	0.6	4	0.9	0.59	16°	4.67	4.93	5.15	5.34	5.75	1,800
VHLS 2006-060	0.6	6	0.9	0.59	16°	6.78	7.10	7.36	7.62	8.19	1,800
VHLS 2008-030	0.8	3	1.2	0.79	16°	3.60	3.83	4.02	4.20	4.52	1,980
VHLS 2008-040	0.8	4	1.2	0.79	16°	4.67	4.93	5.15	5.34	5.75	1,980
VHLS 2008-060	0.8	6	1.2	0.79	16°	6.78	7.10	7.36	7.62	8.19	1,980
VHLS 2010-030	1	3	1.5	0.96	16°	3.71	3.92	4.10	4.26	4.59	1,800
VHLS 2010-040	1	4	1.5	0.96	16°	4.77	5.01	5.22	5.40	5.81	1,800
VHLS 2010-050	1	5	1.5	0.96	16°	5.82	6.09	6.32	6.54	7.03	1,800
VHLS 2010-060	1	6	1.5	0.96	16°	6.87	7.17	7.42	7.68	8.26	1,800
VHLS 2015-040	1.5	4	2.3	1.46	16°	4.17	4.31	4.46	4.61	4.96	1,920
VHLS 2015-060	1.5	6	2.3	1.46	16°	6.24	6.44	6.66	6.89	7.41	1,920
VHLS 2020-060	2	6	3	1.93	16°	6.29	6.49	6.71	6.95	7.47	1,920

- φ3mm Shank V Series
- UDC-PCD Series
- CBN Series
- Square
- Long Neck Square
- Radius
- Long Neck Radius
- Taper Neck Radius
- Ball / Long Shank Ball
- Long Neck Ball
- Taper Neck Ball
- Taper
- Barrel
- Spiral V Cutter
- Drill
- Technical Data

## VHLS Milling Conditions

WORK MATERIAL			COPPER OFC / TPC				CARBON STEELS S45C / S50C (~225HB)				ALLOY STEELS SK / SCM / SUS (225~325HB)			
Model Number	Outside Diameter (mm)	Effective Length (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	a <sub>p</sub> Axial Depth (mm)	a <sub>e</sub> Radial Depth (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	a <sub>p</sub> Axial Depth (mm)	a <sub>e</sub> Radial Depth (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	a <sub>p</sub> Axial Depth (mm)	a <sub>e</sub> Radial Depth (mm)
2001-003	0.1	0.3	50,000	170	0.018	0.035	50,000	170	0.005	0.035	50,000	160	0.005	0.035
2002-005	0.2	0.5	50,000	340	0.027	0.13	50,000	340	0.009	0.13	50,000	310	0.008	0.13
2002-010	0.2	1	50,000	290	0.018	0.035	50,000	290	0.007	0.035	50,000	260	0.006	0.035
2003-010	0.3	1	50,000	560	0.045	0.101	50,000	560	0.015	0.101	50,000	500	0.013	0.101
2003-015	0.3	1.5	50,000	460	0.041	0.05	50,000	460	0.013	0.05	50,000	410	0.011	0.05
2003-020	0.3	2	41,500	350	0.032	0.023	41,500	350	0.01	0.023	41,500	320	0.009	0.023
2004-015	0.4	1.5	50,000	660	0.054	0.095	50,000	660	0.016	0.095	50,000	640	0.015	0.095
2004-020	0.4	2	50,000	610	0.045	0.052	50,000	610	0.014	0.052	50,000	580	0.013	0.052
2004-030	0.4	3	44,500	510	0.027	0.018	44,500	510	0.009	0.018	43,600	450	0.008	0.018
2004-040	0.4	4	41,000	440	0.018	0.008	41,000	440	0.006	0.008	38,000	360	0.005	0.008
2005-015	0.5	1.5	50,000	1,020	0.09	0.139	50,000	1,020	0.029	0.139	50,000	870	0.027	0.139
2005-020	0.5	2	50,000	900	0.081	0.098	50,000	900	0.025	0.098	50,000	760	0.023	0.098
2005-025	0.5	2.5	50,000	780	0.072	0.057	50,000	780	0.021	0.057	47,000	650	0.019	0.057
2005-030	0.5	3	44,200	660	0.05	0.037	44,200	660	0.016	0.037	39,900	530	0.015	0.037
2005-040	0.5	4	40,600	580	0.041	0.016	40,600	580	0.013	0.016	36,100	460	0.012	0.016
2005-060	0.5	6	33,400	420	0.023	0.005	33,400	420	0.007	0.005	28,500	320	0.006	0.005
2006-020	0.6	2	50,000	1,240	0.117	0.18	50,000	1,240	0.038	0.18	50,000	930	0.034	0.18
2006-030	0.6	3	50,000	990	0.09	0.075	50,000	990	0.03	0.075	44,000	740	0.026	0.075
2006-040	0.6	4	41,300	740	0.063	0.03	41,300	740	0.021	0.03	34,700	550	0.018	0.03
2006-060	0.6	6	32,100	520	0.036	0.01	32,100	520	0.012	0.01	27,000	390	0.01	0.01
2008-030	0.8	3	41,200	1,050	0.171	0.15	41,200	1,050	0.053	0.15	34,500	790	0.049	0.15
2008-040	0.8	4	37,100	930	0.14	0.08	37,100	930	0.044	0.08	31,100	700	0.04	0.08
2008-060	0.8	6	28,800	680	0.077	0.024	28,800	680	0.025	0.024	24,200	510	0.022	0.024
2010-030	1	3	37,900	1,340	0.257	0.263	37,900	1,340	0.067	0.263	31,500	990	0.072	0.263
2010-040	1	4	34,100	1,170	0.212	0.195	34,100	1,170	0.067	0.195	28,400	870	0.06	0.195
2010-050	1	5	30,300	1,000	0.167	0.127	30,300	1,000	0.053	0.127	25,300	750	0.048	0.127
2010-060	1	6	26,500	850	0.122	0.058	26,500	850	0.039	0.058	22,100	630	0.035	0.058
2015-040	1.5	4	26,600	1,340	0.378	0.462	26,600	1,340	0.12	0.462	22,100	1,000	0.109	0.462
2015-060	1.5	6	22,800	1,120	0.297	0.293	22,800	1,120	0.094	0.293	19,000	840	0.085	0.293
2020-060	2	6	20,300	1,350	0.338	0.926	20,300	1,350	0.107	0.926	17,400	1,030	0.097	0.926

2 Flutes

φ3mm Shank  
V Series

UDC-PCD  
Series

CBN  
Series

Square  
Long Neck  
Square

Radius

Long Neck  
Radius

Taper Neck  
Radius

Ball / Long  
Shank Ball

Long Neck  
Ball

Taper Neck  
Ball

Taper

Barrel

Spiral  
V Cutter

Drill

Technical Data

## VHLS Milling Conditions

WORK MATERIAL			PREHARDENED STEELS / HARDENED STEELS NAK / SKD (30~45HRC)				HARDENED STEELS SKD / SKT (45~55HRC)				HARDENED STEELS SKD / SKH (55~60HRC)			
Model Number	Outside Diameter (mm)	Effective Length (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	a <sub>p</sub> Axial Depth (mm)	a <sub>e</sub> Radial Depth (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	a <sub>p</sub> Axial Depth (mm)	a <sub>e</sub> Radial Depth (mm)	Spindle Speed (min <sup>-1</sup> )	Feed Rate (mm/min)	a <sub>p</sub> Axial Depth (mm)	a <sub>e</sub> Radial Depth (mm)
2001-003	0.1	0.3	50,000	140	0.004	0.035	50,000	90	0.002	0.035	30,000	10	0.002	0.08
2002-005	0.2	0.5	50,000	270	0.006	0.13	44,800	180	0.004	0.13	15,000	10	0.002	0.13
2002-010	0.2	1	50,000	230	0.004	0.035	40,800	160	0.002	0.035	15,000	10	0.002	0.035
2003-010	0.3	1	50,000	440	0.01	0.101	50,000	330	0.007	0.101	14,600	14	0.004	0.101
2003-015	0.3	1.5	50,000	360	0.009	0.05	42,700	260	0.006	0.05	14,600	13	0.004	0.05
2003-020	0.3	2	41,500	280	0.007	0.023	33,200	190	0.005	0.023	14,600	12	0.003	0.023
2004-015	0.4	1.5	48,100	470	0.012	0.095	38,500	320	0.008	0.095	14,300	17	0.004	0.095
2004-020	0.4	2	44,600	430	0.01	0.052	35,700	290	0.007	0.052	14,300	17	0.004	0.052
2004-030	0.4	3	37,500	340	0.006	0.018	30,000	230	0.005	0.018	14,300	16	0.003	0.018
2004-040	0.4	4	33,100	280	0.004	0.008	26,500	190	0.003	0.008	14,300	15	0.002	0.008
2005-015	0.5	1.5	46,500	610	0.02	0.139	37,300	410	0.015	0.139	14,000	20	0.008	0.139
2005-020	0.5	2	40,600	510	0.018	0.098	32,500	350	0.013	0.098	14,000	20	0.007	0.098
2005-025	0.5	2.5	34,700	410	0.016	0.057	27,700	290	0.011	0.057	14,000	20	0.006	0.057
2005-030	0.5	3	32,200	370	0.011	0.037	25,700	260	0.009	0.037	14,000	19	0.005	0.037
2005-040	0.5	4	29,700	330	0.009	0.016	23,700	230	0.007	0.016	14,000	18	0.004	0.016
2005-060	0.5	6	24,700	250	0.005	0.005	19,700	170	0.003	0.005	14,000	16	0.002	0.005
2006-020	0.6	2	39,100	600	0.026	0.18	31,300	410	0.019	0.18	12,000	23	0.01	0.18
2006-030	0.6	3	33,500	500	0.02	0.075	26,800	340	0.015	0.075	12,000	22	0.008	0.075
2006-040	0.6	4	27,900	390	0.014	0.03	22,300	270	0.01	0.03	12,000	21	0.005	0.03
2006-060	0.6	6	23,000	290	0.008	0.01	18,400	200	0.006	0.01	12,000	19	0.003	0.01
2008-030	0.8	3	26,200	530	0.038	0.15	21,000	370	0.027	0.15	8,000	21	0.016	0.15
2008-040	0.8	4	24,100	480	0.031	0.08	19,300	330	0.022	0.08	8,000	20	0.013	0.08
2008-060	0.8	6	19,800	370	0.017	0.024	15,800	250	0.012	0.024	8,000	18	0.007	0.024
2010-030	1	3	23,400	650	0.057	0.263	18,700	440	0.039	0.263	6,500	15	0.016	0.263
2010-040	1	4	21,500	580	0.047	0.195	17,200	400	0.033	0.195	6,500	15	0.015	0.195
2010-050	1	5	19,600	510	0.037	0.127	15,700	360	0.027	0.127	6,500	15	0.014	0.127
2010-060	1	6	17,600	440	0.027	0.058	14,100	310	0.02	0.058	6,500	14	0.012	0.058
2015-040	1.5	4	16,300	640	0.084	0.462	13,000	440	0.06	0.462	9,600	95	0.036	0.462
2015-060	1.5	6	14,400	550	0.066	0.293	11,500	380	0.047	0.293	9,600	60	0.028	0.293
2020-060	2	6	12,500	650	0.075	0.926	10,000	450	0.054	0.926	9,600	211	0.032	0.926

- φ3mm Shank V Series
- UDC-PCD Series
- CBN Series
- Square
- Long Neck Square
- Radius
- Long Neck Radius
- Taper Neck Radius
- Ball / Long Shank Ball
- Long Neck Ball
- Taper Neck Ball
- Taper
- Barrel
- Spiral V Cutter
- Drill
- Technical Data

**Note:**

- Recommend using a non-contact measuring device to avoid damaging the precision tip point.
- Decrease both spindle speed and feed rate proportionally when the milling parameters exceed the machine's maximum spindle speed.
- Every coolant offers stable milling.
- Recommend oil coolant for Stainless Steels and Heat Resistant Alloys.
- Recommend wet coolant for Copper.

**Side Milling**

