Size R0.05～R3

HSLB

Super MG | HARD MAX | Shank Dia 0/-0.005 | Back Taper Geometry

～Except for R0.45 ℓ1 / D≦10

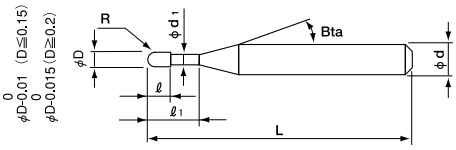
Additional 109 models

Material Applications（☆ Highly Recommended ◎ Recommended ○ Suggested）

Work Material														
Carbon Steels S45C S55C	Alloy Steels SK / SCM SUS	Prehardened Steels NAK HPM	Hardened Steels ～55HRC	Hardened Steels ～60HRC	Hardened Steels ～70HRC	Cast Iron	Aluminum Alloys	Graphite	Copper	Plastics	Glass Filled Plastics	Titanium Alloys	Heat Resistant Alloys	Cemented Carbide	Hard Brittle (Non-Metallic) Materials
○	○	◎	◎	◎	◎	○			○			○	○		

Features

Offers amazing efficiency that combines longer tool life with good surface finish on material 40HRC or harder.
The latest version of HARDMAX keeps the same hardness but improves resistance to oxidation at high temperatures.
Suitable for both dry and wet coolant.
Ball tip radius point is designed with a negative rake angle that minimizes wear and improves the target dimensions.
The negative rake design reduces as the radius transitions out to the periphery, enabling a good surface finish and reduced deflection.



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.

Radius of Ball Nose	Diameter Tolerance	Ballend Radius Tolerance	Helix Angle
R0.05 ～ R0.075	0/-0.01	R ±0.002	0°
R0.1 ～ R3	0/-0.015	R ±0.005	30°

Total 292 models

Unit（mm）

	Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Price（¥）	Effective Length by Inclined Angles 30′	1°	1°30′	2°	3°
	HSLB 2001-003	R0.05	0.3	0.08	0.095	11°	45	4	11,630	0.32	0.35	0.37	0.40	0.45
	HSLB 2001-005		0.5				45	4	12,540	0.54	0.57	0.61	0.64	0.72
	HSLB 20015-003	R0.075	0.3	0.12	0.135	11°	45	4	13,450	0.36	0.38	0.40	0.42	0.47
	HSLB 20015-005		0.5				45	4	14,250	0.57	0.60	0.63	0.67	0.75
※	HSLB 20015-010		1				45	4	14,820	1.10	1.15	1.21	1.27	1.43
	HSLB 2002-003	R0.1	0.3	0.16	0.19	16°	45	4	8,090	0.39	0.42	0.44	0.46	0.50
	HSLB 2002-005		0.5				45	4	8,090	0.61	0.64	0.66	0.69	0.74
※	HSLB 2002-005-6		0.5				50	6	11,290	0.61	0.64	0.66	0.69	0.74
	HSLB 2002-0075		0.75				45	4	8,090	0.87	0.91	0.95	0.98	1.05
	HSLB 2002-010		1				45	4	8,090	1.13	1.18	1.22	1.26	1.35
	HSLB 2002-010-6		1				50	6	11,290	1.13	1.18	1.22	1.26	1.35
	HSLB 2002-015		1.5				45	4	8,780	1.64	1.71	1.76	1.82	1.96
	HSLB 2002-020		2				45	4	9,690	2.16	2.24	2.31	2.39	2.57
	HSLB 2002-025		2.5				45	4	10,600	2.68	2.77	2.86	2.96	3.18
	HSLB 2002-030		3				45	4	11,400	3.20	3.30	3.41	3.53	3.79

※Additional model

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Unit (mm)

	Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Price (¥)	Effective Length by Inclined Angles				
										30′	1°	1°30′	2°	3°
	HSLB 2003-005	R0.15	0.5	0.24	0.29	16°	45	4	7,980	0.60	0.63	0.66	0.68	0.73
※	HSLB 2003-006		0.6				45	4	7,980	0.71	0.74	0.77	0.80	0.85
	HSLB 2003-0075		0.75				45	4	7,980	0.87	0.91	0.94	0.97	1.04
	HSLB 2003-010		1				45	4	7,980	1.13	1.18	1.22	1.26	1.34
※	HSLB 2003-010-6		1				50	6	10,830	1.13	1.18	1.22	1.26	1.34
	HSLB 2003-015		1.5				45	4	8,550	1.64	1.70	1.76	1.82	1.94
	HSLB 2003-015-6		1.5				50	6	11,860	1.64	1.70	1.76	1.82	1.94
	HSLB 2003-020		2				45	4	8,550	2.16	2.24	2.31	2.38	2.56
※	HSLB 2003-020-6		2				50	6	11,860	2.16	2.24	2.31	2.38	2.56
	HSLB 2003-025		2.5				45	4	8,780	2.68	2.77	2.86	2.95	3.17
	HSLB 2003-030		3				45	4	8,780	3.20	3.30	3.41	3.52	3.78
	HSLB 2003-040		4				45	4	9,120	4.23	4.37	4.51	4.66	5.00
※	HSLB 2003-050		5				45	4	10,260	5.26	5.43	5.61	5.80	6.23
	HSLB 2004-005	R0.2	0.5	0.32	0.39	16°	45	4	5,470	0.60	0.63	0.65	0.68	0.72
	HSLB 2004-0075		0.75				45	4	5,470	0.86	0.90	0.93	0.96	1.03
	HSLB 2004-010		1				45	4	5,470	1.13	1.17	1.21	1.25	1.33
	HSLB 2004-010-6		1				50	6	7,980	1.13	1.17	1.21	1.25	1.33
	HSLB 2004-015		1.5				45	4	5,590	1.64	1.70	1.75	1.81	1.93
※	HSLB 2004-015-6		1.5				50	6	8,090	1.64	1.70	1.75	1.81	1.93
	HSLB 2004-020		2				45	4	5,700	2.16	2.23	2.30	2.38	2.55
	HSLB 2004-020-6		2				50	6	8,320	2.16	2.23	2.30	2.38	2.55
	HSLB 2004-025		2.5				45	4	5,930	2.68	2.76	2.85	2.95	3.16
※	HSLB 2004-025-6		2.5				50	6	8,550	2.68	2.76	2.85	2.95	3.16
	HSLB 2004-030		3				45	4	6,270	3.20	3.30	3.40	3.52	3.77
※	HSLB 2004-030-6		3				50	6	9,120	3.20	3.30	3.40	3.52	3.77
※	HSLB 2004-035		3.5				45	4	6,840	3.71	3.83	3.95	4.09	4.38
	HSLB 2004-040		4				45	4	6,840	4.23	4.36	4.50	4.66	4.99
※	HSLB 2004-040-6		4				50	6	9,300	4.23	4.36	4.50	4.66	4.99
※	HSLB 2004-045		4.5				45	4	7,180	4.74	4.89	5.05	5.22	5.61
	HSLB 2004-050		5				45	4	7,180	5.26	5.43	5.60	5.79	6.22
	HSLB 2004-060		6				45	4	8,320	6.29	6.49	6.70	6.93	7.44
	HSLB 2005-010	R0.25	1	0.4	0.49	16°	45	4	5,470	1.12	1.17	1.21	1.24	1.32
	HSLB 2005-015		1.5				45	4	5,470	1.63	1.70	1.75	1.80	1.92
※	HSLB 2005-015-6		1.5				50	6	7,980	1.63	1.70	1.75	1.80	1.92
	HSLB 2005-020		2				45	4	5,470	2.16	2.23	2.30	2.37	2.54
※	HSLB 2005-020-6		2				50	6	7,980	2.16	2.23	2.30	2.37	2.54
	HSLB 2005-025		2.5				45	4	5,470	2.68	2.76	2.85	2.94	3.15
※	HSLB 2005-025-6		2.5				50	6	7,980	2.68	2.76	2.85	2.94	3.15
	HSLB 2005-030		3				45	4	5,470	3.20	3.29	3.40	3.51	3.76
※	HSLB 2005-030-6		3				50	6	7,980	3.20	3.29	3.40	3.51	3.76
※	HSLB 2005-035		3.5				45	4	5,470	3.71	3.83	3.95	4.08	4.37
	HSLB 2005-040		4				45	4	5,470	4.23	4.36	4.50	4.65	4.98
※	HSLB 2005-040-6		4				50	6	7,980	4.23	4.36	4.50	4.65	4.98
※	HSLB 2005-045		4.5				45	4	5,590	4.74	4.89	5.05	5.22	5.59
	HSLB 2005-050		5				45	4	5,590	5.26	5.42	5.60	5.79	6.21
※	HSLB 2005-055		5.5				45	4	5,700	5.77	5.96	6.15	6.36	6.82
	HSLB 2005-060		6				45	4	5,700	6.29	6.49	6.70	6.93	7.43
※	HSLB 2005-070		7				45	4	6,840	7.32	7.55	7.80	8.06	8.65
	HSLB 2005-080		8				45	4	6,840	8.35	8.62	8.90	9.20	9.88
※	HSLB 2005-090		9				45	4	7,980	9.38	9.68	10.00	10.34	11.10
	HSLB 2005-100		10				50	4	8,500	10.42	10.75	11.10	11.48	12.32

※Additional model

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Unit (mm)

	Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle βta	Overall Length L	Shank Diameter φd	Price (¥)	Effective Length by Inclined Angles				
										30′	1°	1°30′	2°	3°
	HSLB 2006-010	R0.3	1	0.48	0.59	16°	45	4	4,670	1.12	1.16	1.20	1.24	1.31
	HSLB 2006-015		1.5				45	4	4,220	1.63	1.69	1.74	1.80	1.91
※	HSLB 2006-015-6		1.5				50	6	6,380	1.63	1.69	1.74	1.80	1.91
	HSLB 2006-020		2				45	4	4,220	2.15	2.23	2.29	2.36	2.52
	HSLB 2006-020-6		2				50	6	6,380	2.15	2.23	2.29	2.36	2.52
	HSLB 2006-025		2.5				45	4	4,330	2.67	2.76	2.84	2.93	3.14
※	HSLB 2006-025-6		2.5				50	6	6,380	2.67	2.76	2.84	2.93	3.14
	HSLB 2006-030		3				45	4	4,330	3.19	3.29	3.39	3.50	3.75
	HSLB 2006-030-6		3				50	6	6,500	3.19	3.29	3.39	3.50	3.75
	HSLB 2006-035		3.5				45	4	4,450	3.71	3.82	3.94	4.07	4.36
	HSLB 2006-040		4				45	4	4,450	4.23	4.36	4.49	4.64	4.97
	HSLB 2006-040-6		4				50	6	6,730	4.23	4.36	4.49	4.64	4.97
	HSLB 2006-045		4.5				45	4	4,450	4.74	4.89	5.04	5.21	5.58
	HSLB 2006-050		5				45	4	4,450	5.26	5.42	5.59	5.78	6.20
※	HSLB 2006-050-6		5				50	6	6,730	5.26	5.42	5.59	5.78	6.20
※	HSLB 2006-055		5.5				45	4	4,450	5.77	5.95	6.14	6.35	6.81
	HSLB 2006-060		6				45	4	4,450	6.29	6.49	6.69	6.92	7.42
※	HSLB 2006-060-6		6				50	6	6,730	6.29	6.49	6.69	6.92	7.42
※	HSLB 2006-065		6.5				45	4	5,020	6.80	7.02	7.25	7.49	8.03
	HSLB 2006-070		7				45	4	5,020	7.32	7.55	7.80	8.06	8.64
	HSLB 2006-080		8				45	4	5,930	8.35	8.61	8.90	9.20	9.87
※	HSLB 2006-080-6		8				50	6	8,550	8.35	8.61	8.90	9.20	9.87
	HSLB 2006-090		9				45	4	6,270	9.38	9.68	10.00	10.34	11.09
	HSLB 2006-100		10				50	4	6,040	10.41	10.74	11.10	11.47	12.31
※	HSLB 2006-100-6		10				50	6	9,120	10.41	10.74	11.10	11.47	12.31
	HSLB 2006-120		12				50	4	6,840	12.48	12.87	13.30	13.75	14.76
※	HSLB 2007-020	R0.35	2	0.56	0.69	16°	45	4	4,220	2.15	2.22	2.29	2.36	2.51
※	HSLB 2007-040		4				45	4	4,450	4.22	4.35	4.49	4.63	4.96
※	HSLB 2007-060		6				45	4	4,450	6.29	6.48	6.69	6.91	7.41
※	HSLB 2007-080		8				45	4	4,450	8.35	8.61	8.89	9.19	9.86
	HSLB 2008-020	R0.4	2	0.64	0.79	16°	45	4	4,220	2.15	2.22	2.28	2.35	2.50
	HSLB 2008-020-6		2				50	6	6,380	2.15	2.22	2.28	2.35	2.50
	HSLB 2008-030		3				45	4	4,450	3.19	3.28	3.38	3.49	3.73
※	HSLB 2008-030-6		3				50	6	6,730	3.19	3.28	3.38	3.49	3.73
	HSLB 2008-040		4				45	4	4,450	4.22	4.35	4.48	4.63	4.95
※	HSLB 2008-040-6		4				50	6	6,730	4.22	4.35	4.48	4.63	4.95
	HSLB 2008-050		5				45	4	4,450	5.25	5.41	5.58	5.77	6.17
	HSLB 2008-060		6				45	4	4,450	6.29	6.48	6.68	6.91	7.40
※	HSLB 2008-060-6		6				50	6	6,730	6.29	6.48	6.68	6.91	7.40
	HSLB 2008-070		7				45	4	4,450	7.32	7.54	7.79	8.04	8.62
	HSLB 2008-080		8				45	4	4,450	8.35	8.61	8.89	9.18	9.84
※	HSLB 2008-080-6		8				50	6	6,730	8.35	8.61	8.89	9.18	9.84
※	HSLB 2008-090		9				45	4	5,930	9.38	9.67	9.99	10.32	11.07
	HSLB 2008-100		10				50	4	5,930	10.41	10.74	11.09	11.46	12.29
※	HSLB 2008-100-6		10				50	6	8,550	10.41	10.74	11.09	11.46	12.29
※	HSLB 2008-120		12				45	4	7,300	12.47	12.87	13.29	13.74	14.74

※Additional model

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Unit (mm)

	Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle βta	Overall Length L	Shank Diameter φd	Price (¥)	Effective Length by Inclined Angles				
										30′	1°	1°30′	2°	3°
	HSLB 2006-010	R0.3	1	0.48	0.59	16°	45	4	4,670	1.12	1.16	1.20	1.24	1.31
	HSLB 2006-015		1.5				45	4	4,220	1.63	1.69	1.74	1.80	1.91
※	HSLB 2006-015-6		1.5				50	6	6,380	1.63	1.69	1.74	1.80	1.91
	HSLB 2006-020		2				45	4	4,220	2.15	2.23	2.29	2.36	2.52
	HSLB 2006-020-6		2				50	6	6,380	2.15	2.23	2.29	2.36	2.52
	HSLB 2006-025		2.5				45	4	4,330	2.67	2.76	2.84	2.93	3.14
※	HSLB 2006-025-6		2.5				50	6	6,380	2.67	2.76	2.84	2.93	3.14
	HSLB 2006-030		3				45	4	4,330	3.19	3.29	3.39	3.50	3.75
	HSLB 2006-030-6		3				50	6	6,500	3.19	3.29	3.39	3.50	3.75
	HSLB 2006-035		3.5				45	4	4,450	3.71	3.82	3.94	4.07	4.36
	HSLB 2006-040		4				45	4	4,450	4.23	4.36	4.49	4.64	4.97
	HSLB 2006-040-6		4				50	6	6,730	4.23	4.36	4.49	4.64	4.97
	HSLB 2006-045		4.5				45	4	4,450	4.74	4.89	5.04	5.21	5.58
	HSLB 2006-050		5				45	4	4,450	5.26	5.42	5.59	5.78	6.20
※	HSLB 2006-050-6		5				50	6	6,730	5.26	5.42	5.59	5.78	6.20
※	HSLB 2006-055		5.5				45	4	4,450	5.77	5.95	6.14	6.35	6.81
	HSLB 2006-060		6				45	4	4,450	6.29	6.49	6.69	6.92	7.42
※	HSLB 2006-060-6		6				50	6	6,730	6.29	6.49	6.69	6.92	7.42
※	HSLB 2006-065		6.5				45	4	5,020	6.80	7.02	7.25	7.49	8.03
	HSLB 2006-070		7				45	4	5,020	7.32	7.55	7.80	8.06	8.64
	HSLB 2006-080		8				45	4	5,930	8.35	8.61	8.90	9.20	9.87
※	HSLB 2006-080-6		8				50	6	8,550	8.35	8.61	8.90	9.20	9.87
	HSLB 2006-090		9				45	4	6,270	9.38	9.68	10.00	10.34	11.09
	HSLB 2006-100		10				50	4	6,040	10.41	10.74	11.10	11.47	12.31
※	HSLB 2006-100-6		10				50	6	9,120	10.41	10.74	11.10	11.47	12.31
	HSLB 2006-120		12				50	4	6,840	12.48	12.87	13.30	13.75	14.76
※	HSLB 2007-020	R0.35	2	0.56	0.69	16°	45	4	4,220	2.15	2.22	2.29	2.36	2.51
※	HSLB 2007-040		4				45	4	4,450	4.22	4.35	4.49	4.63	4.96
※	HSLB 2007-060		6				45	4	4,450	6.29	6.48	6.69	6.91	7.41
※	HSLB 2007-080		8				45	4	4,450	8.35	8.61	8.89	9.19	9.86
	HSLB 2008-020	R0.4	2	0.64	0.79	16°	45	4	4,220	2.15	2.22	2.28	2.35	2.50
	HSLB 2008-020-6		2				50	6	6,380	2.15	2.22	2.28	2.35	2.50
	HSLB 2008-030		3				45	4	4,450	3.19	3.28	3.38	3.49	3.73
※	HSLB 2008-030-6		3				50	6	6,730	3.19	3.28	3.38	3.49	3.73
	HSLB 2008-040		4				45	4	4,450	4.22	4.35	4.48	4.63	4.95
※	HSLB 2008-040-6		4				50	6	6,730	4.22	4.35	4.48	4.63	4.95
	HSLB 2008-050		5				45	4	4,450	5.25	5.41	5.58	5.77	6.17
	HSLB 2008-060		6				45	4	4,450	6.29	6.48	6.68	6.91	7.40
※	HSLB 2008-060-6		6				50	6	6,730	6.29	6.48	6.68	6.91	7.40
	HSLB 2008-070		7				45	4	4,450	7.32	7.54	7.79	8.04	8.62
	HSLB 2008-080		8				45	4	4,450	8.35	8.61	8.89	9.18	9.84
※	HSLB 2008-080-6		8				50	6	6,730	8.35	8.61	8.89	9.18	9.84
※	HSLB 2008-090		9				45	4	5,930	9.38	9.67	9.99	10.32	11.07
	HSLB 2008-100		10				50	4	5,930	10.41	10.74	11.09	11.46	12.29
※	HSLB 2008-100-6		10				50	6	8,550	10.41	10.74	11.09	11.46	12.29
※	HSLB 2008-120		12				45	4	7,300	12.47	12.87	13.29	13.74	14.74

※Additional model

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Unit (mm)

	Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Price (¥)	Effective Length by Inclined Angles				
										30′	1°	1°30′	2°	3°
※	HSLB 2009-020	R0.45	2	0.72	0.89	16°	45	4	4,220	2.15	2.22	2.28	2.34	2.49
※	HSLB 2009-040		4				45	4	4,450	4.22	4.35	4.48	4.62	4.94
※	HSLB 2009-060		6				45	4	4,450	6.28	6.48	6.68	6.90	7.39
※	HSLB 2009-080		8				45	4	4,450	8.35	8.61	8.88	9.18	9.83
※	HSLB 2009-100		10				45	4	5,930	10.41	10.73	11.08	11.45	12.28
※	HSLB 2009-120		12				45	4	7,300	12.47	12.86	13.28	13.73	14.73
※	HSLB 2009-140		14				50	4	8,460	14.54	14.99	15.48	16.01	17.18
※	HSLB 2009-160		16				50	4	9,990	16.60	17.12	17.68	18.29	19.62
※	HSLB 2009-180		18				55	4	9,990	18.66	19.25	19.89	20.56	22.07
	HSLB 2010-020	R0.5	2	0.8	0.98	16°	45	4	3,530	2.16	2.22	2.28	2.35	2.49
	HSLB 2010-025		2.5				45	4	3,530	2.68	2.76	2.83	2.92	3.11
	HSLB 2010-030		3				45	4	3,530	3.20	3.29	3.38	3.49	3.72
	HSLB 2010-030-6		3				50	6	5,590	3.20	3.29	3.38	3.49	3.72
	HSLB 2010-040		4				45	4	3,990	4.23	4.35	4.49	4.63	4.94
	HSLB 2010-040-6		4				50	6	6,160	4.23	4.35	4.49	4.63	4.94
	HSLB 2010-050		5				45	4	3,990	5.26	5.42	5.59	5.77	6.16
	HSLB 2010-050-6		5				50	6	6,160	5.26	5.42	5.59	5.77	6.16
	HSLB 2010-060		6				45	4	4,330	6.29	6.48	6.69	6.90	7.39
	HSLB 2010-060-6		6				50	6	6,500	6.29	6.48	6.69	6.90	7.39
	HSLB 2010-070		7				45	4	4,330	7.32	7.55	7.79	8.04	8.61
	HSLB 2010-070-6		7				50	6	6,500	7.32	7.55	7.79	8.04	8.61
	HSLB 2010-080		8				45	4	4,330	8.36	8.61	8.89	9.18	9.84
	HSLB 2010-080-6		8				50	6	6,500	8.36	8.61	8.89	9.18	9.84
	HSLB 2010-090		9				45	4	4,330	9.39	9.68	9.99	10.32	11.06
	HSLB 2010-100		10				45	4	4,330	10.42	10.74	11.09	11.46	12.28
	HSLB 2010-100-6		10				50	6	6,500	10.42	10.74	11.09	11.46	12.28
	HSLB 2010-120		12				45	4	4,330	12.48	12.87	13.29	13.74	14.73
※	HSLB 2010-120-6		12				50	6	6,500	12.48	12.87	13.29	13.74	14.73
	HSLB 2010-140		14				50	4	5,020	14.54	15.00	15.49	16.01	17.18
※	HSLB 2010-140-6		14				60	6	7,070	14.54	15.00	15.49	16.01	17.18
	HSLB 2010-160		16				50	4	5,930	16.61	17.13	17.69	18.29	19.62
※	HSLB 2010-160-6		16				60	6	8,550	16.61	17.13	17.69	18.29	19.62
	HSLB 2010-180		18				55	4	5,930	18.67	19.26	19.89	20.57	22.07
	HSLB 2010-200		20				55	4	7,180	20.73	21.39	22.09	22.85	24.52
※	HSLB 2010-200-6		20				70	6	10,150	20.73	21.39	22.09	22.85	24.52
	HSLB 2010-220-6		22				70	6	10,600	22.80	23.52	24.29	25.12	26.97
※	HSLB 2012-025	R0.6	2.5	0.96	1.19	16°	45	4	5,360	2.54	2.60	2.67	2.74	2.91
	HSLB 2012-040		4				45	4	5,360	4.08	4.20	4.32	4.45	4.75
	HSLB 2012-060		6				45	4	5,810	6.15	6.33	6.52	6.73	7.19
※	HSLB 2012-060-6		6				50	6	8,270	6.15	6.33	6.52	6.73	7.19
	HSLB 2012-080		8				45	4	5,810	8.21	8.46	8.72	9.01	9.64
※	HSLB 2012-080-6		8				50	6	8,270	8.21	8.46	8.72	9.01	9.64
	HSLB 2012-100		10				45	4	5,810	10.27	10.59	10.92	11.28	12.09
※	HSLB 2012-100-6		10				50	6	8,270	10.27	10.59	10.92	11.28	12.09
	HSLB 2012-120		12				45	4	5,810	12.33	12.72	13.12	13.56	14.54
※	HSLB 2012-120-6		12				50	6	8,270	12.33	12.72	13.12	13.56	14.54
	HSLB 2012-140		14				50	4	6,270	14.40	14.85	15.33	15.84	16.98
	HSLB 2012-160		16				50	4	6,840	16.46	16.98	17.53	18.12	19.43
※	HSLB 2012-160-6		16				60	6	9,410	16.46	16.98	17.53	18.12	19.43
※	HSLB 2012-180		18				55	4	7,410	18.52	19.11	19.73	20.39	21.88
※	HSLB 2012-200		20				60	4	7,410	20.58	21.23	21.93	22.67	24.33

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Unit (mm)

	Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Price (¥)	Effective Length by Inclined Angles				
										30′	1°	1°30′	2°	3°
	HSLB 2014-060	R0.7	6	1.12	1.37	16°	45	4	5,020	6.18	6.36	6.55	6.76	7.22
	HSLB 2014-080		8				45	4	5,020	8.24	8.49	8.75	9.03	9.66
※	HSLB 2014-120		12				45	4	5,020	12.37	12.75	13.15	13.59	14.56
	HSLB 2014-160		16				50	4	5,020	16.49	17.01	17.56	18.14	19.45
	HSLB 2015-030	R0.75	3	1.2	1.47	16°	45	4	4,100	3.08	3.16	3.24	3.33	3.53
	HSLB 2015-040		4				45	4	4,100	4.11	4.23	4.34	4.47	4.76
	HSLB 2015-060		6				45	4	4,100	6.18	6.35	6.55	6.75	7.20
	HSLB 2015-060-6		6				50	6	6,610	6.18	6.35	6.55	6.75	7.20
	HSLB 2015-080		8				45	4	4,330	8.24	8.48	8.75	9.03	9.65
	HSLB 2015-080-6		8				50	6	6,610	8.24	8.48	8.75	9.03	9.65
	HSLB 2015-100		10				45	4	4,670	10.30	10.61	10.95	11.30	12.10
※	HSLB 2015-100-6		10				50	6	6,610	10.30	10.61	10.95	11.30	12.10
	HSLB 2015-120		12				45	4	5,020	12.37	12.74	13.15	13.58	14.55
※	HSLB 2015-120-6		12				50	6	7,520	12.37	12.74	13.15	13.58	14.55
	HSLB 2015-140		14				50	4	5,020	14.43	14.87	15.35	15.86	16.99
	HSLB 2015-160		16				50	4	5,020	16.49	17.00	17.55	18.14	19.44
※	HSLB 2015-160-6		16				60	6	7,520	16.49	17.00	17.55	18.14	19.44
	HSLB 2015-180		18				55	4	5,020	18.55	19.13	19.75	20.41	21.89
	HSLB 2015-200		20				55	4	5,020	20.62	21.26	21.95	22.69	24.34
※	HSLB 2015-200-6		20				60	6	7,520	20.62	21.26	21.95	22.69	24.34
	HSLB 2015-220		22				55	4	5,020	22.68	23.39	24.15	24.97	No Interference
※	HSLB 2015-250		25				65	4	7,000	25.77	26.59	27.45	28.38	No Interference
	HSLB 2015-300		30				70	4	8,210	30.93	31.91	32.96	34.08	No Interference
※	HSLB 2016-040	R0.8	4	1.28	1.58	16°	45	4	5,700	4.09	4.20	4.32	4.45	4.72
	HSLB 2016-080		8				45	4	5,810	8.22	8.46	8.72	9.00	9.62
	HSLB 2016-120		12				45	4	5,810	12.35	12.72	13.12	13.55	14.51
	HSLB 2016-160		16				50	4	5,810	16.47	16.98	17.53	18.11	19.41
	HSLB 2016-200		20				55	4	5,810	20.60	21.24	21.93	22.66	No Interference
※	HSLB 2018-040	R0.9	4	1.44	1.78	16°	45	4	4,750	4.09	4.20	4.31	4.43	4.70
※	HSLB 2018-060		6				45	4	4,750	6.15	6.33	6.51	6.71	7.15
※	HSLB 2018-080		8				45	4	5,020	8.22	8.46	8.71	8.99	9.60
※	HSLB 2018-100		10				45	4	5,020	10.28	10.59	10.91	11.26	12.04
※	HSLB 2018-120		12				45	4	5,020	12.34	12.72	13.11	13.54	14.49
※	HSLB 2018-160		16				50	4	5,020	16.47	16.97	17.52	18.10	19.39
※	HSLB 2018-180		18				55	4	5,020	18.53	19.10	19.72	20.37	21.83
※	HSLB 2018-200		20				55	4	5,020	20.59	21.23	21.92	22.65	No Interference
※	HSLB 2018-220		22				60	4	6,870	22.66	23.36	24.12	24.93	No Interference
※	HSLB 2018-250		25				65	4	7,000	25.75	26.56	27.42	28.34	No Interference
※	HSLB 2018-300		30				70	4	7,930	30.91	31.88	32.92	No Interference	No Interference

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Unit (mm)

	Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Price (¥)	Effective Length by Inclined Angles				
										30′	1°	1°30′	2°	3°
	HSLB 2020-030	R1	3	1.6	1.98	16°	45	4	3,530	3.06	3.13	3.20	3.28	3.46
	HSLB 2020-040		4				45	4	3,530	4.09	4.19	4.30	4.42	4.68
	HSLB 2020-040-6		4				50	6	5,590	4.09	4.19	4.30	4.42	4.68
	HSLB 2020-060		6				45	4	3,990	6.15	6.32	6.50	6.70	7.13
	HSLB 2020-060-6		6				50	6	6,040	6.15	6.32	6.50	6.70	7.13
	HSLB 2020-080		8				45	4	4,330	8.21	8.45	8.70	8.97	9.58
	HSLB 2020-080-6		8				50	6	6,500	8.21	8.45	8.70	8.97	9.58
	HSLB 2020-100		10				45	4	4,330	10.28	10.58	10.90	11.25	12.02
	HSLB 2020-100-6		10				50	6	6,500	10.28	10.58	10.90	11.25	12.02
	HSLB 2020-120		12				45	4	4,330	12.34	12.71	13.10	13.53	14.47
	HSLB 2020-120-6		12				50	6	6,500	12.34	12.71	13.10	13.53	14.47
※	HSLB 2020-130		13				45	4	4,330	13.37	13.77	14.20	14.67	15.69
	HSLB 2020-140		14				50	4	4,330	14.40	14.84	15.31	15.80	16.92
	HSLB 2020-160		16				50	4	4,330	16.46	16.97	17.51	18.08	19.36
	HSLB 2020-160-6		16				60	6	6,500	16.46	16.97	17.51	18.08	19.36
	HSLB 2020-180		18				55	4	4,330	18.53	19.10	19.71	20.36	No Interference
	HSLB 2020-200		20				55	4	4,330	20.59	21.23	21.91	22.64	No Interference
※	HSLB 2020-200-6		20				70	6	6,500	20.59	21.23	21.91	22.64	24.26
	HSLB 2020-220		22				60	4	5,930	22.65	23.36	24.11	24.91	No Interference
	HSLB 2020-250		25				65	4	6,040	25.75	26.55	27.41	28.33	No Interference
※	HSLB 2020-250-6		25				80	6	8,550	25.75	26.55	27.41	28.33	30.38
	HSLB 2020-300		30				70	4	6,840	30.90	31.88	32.91	No Interference	No Interference
※	HSLB 2020-300-6		30				80	6	9,690	30.90	31.88	32.91	34.02	36.50
	HSLB 2020-350		35				80	4	9,350	36.06	37.20	38.42	No Interference	No Interference
※	HSLB 2020-350-6		35				80	6	12,650	36.06	37.20	38.42	39.72	No Interference
	HSLB 2020-400		40				80	4	9,350	41.22	42.52	No Interference	No Interference	No Interference
※	HSLB 2020-400-6		40				90	6	12,650	41.22	42.52	43.92	45.41	No Interference
※	HSLB 2025-060	R1.25	6	2	2.45	16°	45	4	4,670	6.20	6.36	6.53	6.72	7.14
	HSLB 2025-080		8				45	4	4,700	8.26	8.49	8.74	9.00	9.59
※	HSLB 2025-100		10				45	4	4,900	10.32	10.62	10.94	11.28	12.03
	HSLB 2025-150		15				50	4	5,810	15.48	15.94	16.44	16.97	No Interference
	HSLB 2025-200		20				55	4	6,840	20.64	21.27	21.94	22.66	No Interference
	HSLB 2025-250		25				65	4	7,300	25.79	26.59	27.44	No Interference	No Interference
※	HSLB 2025-300		30				70	4	7,300	30.95	31.92	No Interference	No Interference	No Interference
※	HSLB 2025-350		35				70	4	8,440	36.11	37.24	No Interference	No Interference	No Interference
	HSLB 2030-060	R1.5	6	2.4	2.95	16°	60	6	4,330	6.19	6.34	6.51	6.68	7.08
	HSLB 2030-060-3		6			—	60	3	3,990	No Interference	No Interference	No Interference	No Interference	No Interference
	HSLB 2030-060-4		6			16°	60	4	3,990	6.19	6.34	6.51	6.68	7.08
	HSLB 2030-080		8				60	6	4,330	8.25	8.47	8.71	8.96	9.53
	HSLB 2030-100		10				60	6	5,020	10.31	10.60	10.91	11.24	11.98
	HSLB 2030-120		12				60	6	5,240	12.38	12.73	13.11	13.52	14.42
	HSLB 2030-140		14				60	6	5,810	14.44	14.86	15.31	15.79	16.87
※	HSLB 2030-150		15				60	6	5,700	15.47	15.93	16.41	16.93	18.09
	HSLB 2030-160		16				60	6	5,810	16.50	16.99	17.51	18.07	19.32
	HSLB 2030-200		20				70	6	5,590	20.63	21.25	21.91	22.63	24.21
	HSLB 2030-250		25				70	6	5,590	25.78	26.57	27.42	28.32	30.33
	HSLB 2030-300		30				70	6	6,380	30.94	31.90	32.92	34.01	No Interference
	HSLB 2030-350		35				80	6	8,090	36.10	37.22	38.42	39.71	No Interference
	HSLB 2030-400		40				80	6	10,030	41.25	42.55	43.92	No Interference	No Interference

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Unit (mm)

	Model Number	Radius of Ball Nose R	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Price (¥)	Effective Length by Inclined Angles				
										30′	1°	1°30′	2°	3°
※	HSLB 2035-100	R1.75	10	2.8	3.45	16°	60	6	6,380	10.31	10.59	10.88	11.21	11.92
※	HSLB 2035-150		15				60	6	6,380	15.46	15.91	16.39	16.90	18.04
※	HSLB 2035-200		20				65	6	6,840	20.62	21.23	21.89	22.59	24.16
※	HSLB 2035-250		25				70	6	6,840	25.78	26.56	27.39	28.29	No Interference
※	HSLB 2035-300		30				70	6	7,300	30.93	31.88	32.89	33.98	No Interference
※	HSLB 2035-400		40				90	6	9,690	41.25	42.53	43.90	No Interference	No Interference
※	HSLB 2035-450		45				90	6	10,600	46.40	47.85	49.40	No Interference	No Interference
	HSLB 2040-080	R2	8	3.2	3.95	16°	70	6	4,450	8.23	8.44	8.66	8.89	9.42
	HSLB 2040-080-4		8			—	70	4	4,180	No Interference	No Interference	No Interference	No Interference	No Interference
	HSLB 2040-100		10			16°	70	6	4,450	10.30	10.57	10.86	11.17	11.87
	HSLB 2040-120		12				70	6	5,810	12.36	12.70	13.06	13.45	14.31
	HSLB 2040-140		14				70	6	5,810	14.42	14.83	15.26	15.73	16.76
※	HSLB 2040-150		15				70	6	5,810	15.45	15.89	16.36	16.86	17.99
	HSLB 2040-160		16				70	6	5,810	16.49	16.96	17.46	18.00	19.21
	HSLB 2040-200		20				70	6	5,810	20.61	21.22	21.86	22.56	No Interference
	HSLB 2040-250		25				70	6	5,810	25.77	26.54	27.37	28.25	No Interference
	HSLB 2040-300		30				70	6	5,810	30.93	31.87	32.87	No Interference	No Interference
	HSLB 2040-350		35				80	6	6,730	36.08	37.19	38.37	No Interference	No Interference
	HSLB 2040-400		40				90	6	7,520	41.24	42.51	No Interference	No Interference	No Interference
	HSLB 2040-450		45				90	6	9,690	46.40	47.84	No Interference	No Interference	No Interference
※	HSLB 2040-500		50				100	6	10,370	51.55	53.16	No Interference	No Interference	No Interference
※	HSLB 2040-600		60				120	6	10,580	61.87	No Interference	No Interference	No Interference	No Interference
	HSLB 2050-100	R2.5	10	4	4.95	16°	70	6	6,840	10.28	10.54	10.81	11.10	11.76
※	HSLB 2050-150		15				70	6	9,690	15.44	15.86	16.31	16.80	No Interference
	HSLB 2050-200		20				70	6	9,690	20.60	21.19	21.82	No Interference	No Interference
	HSLB 2050-250		25				70	6	9,690	25.75	26.51	No Interference	No Interference	No Interference
	HSLB 2050-300		30				80	6	10,370	30.91	31.83	No Interference	No Interference	No Interference
※	HSLB 2050-350		35				80	6	10,370	36.07	No Interference	No Interference	No Interference	No Interference
	HSLB 2050-400		40				90	6	13,110	41.22	No Interference	No Interference	No Interference	No Interference
※	HSLB 2050-450		45				100	6	13,680	46.38	No Interference	No Interference	No Interference	No Interference
※	HSLB 2050-500		50				100	6	14,820	51.54	No Interference	No Interference	No Interference	No Interference
	HSLB 2060-100	R3	10	4.8	5.95	—	80	6	7,300	No Interference	No Interference	No Interference	No Interference	No Interference
※	HSLB 2060-150		15				80	6	7,300	No Interference	No Interference	No Interference	No Interference	No Interference
	HSLB 2060-200		20				80	6	7,300	No Interference	No Interference	No Interference	No Interference	No Interference
※	HSLB 2060-250		25				80	6	7,300	No Interference	No Interference	No Interference	No Interference	No Interference
	HSLB 2060-300		30				80	6	7,520	No Interference	No Interference	No Interference	No Interference	No Interference
※	HSLB 2060-350		35				80	6	7,750	No Interference	No Interference	No Interference	No Interference	No Interference
	HSLB 2060-400		40				90	6	8,210	No Interference	No Interference	No Interference	No Interference	No Interference
※	HSLB 2060-450		45				100	6	8,780	No Interference	No Interference	No Interference	No Interference	No Interference
	HSLB 2060-500		50				120	6	8,890	No Interference	No Interference	No Interference	No Interference	No Interference
	HSLB 2060-600		60				120	6	9,420	No Interference	No Interference	No Interference	No Interference	No Interference

※Additional model

Milling Conditions for HSLB

WORK MATERIAL			PREHARDENED STEELS HARDENED STEELS NAK / STAVAX(~55HRC)				HARDENED STEELS SKD11(55~62HRC)				HARDENED STEELS HAP10(62~66HRC)				HARDENED STEELS HAP72(66~70HRC)			
Model Number	Radius of Ball Nose (mm)	Effective Length (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2001	R0.05	0.3	48,000	55	0.002	0.002	48,000	45	0.002	0.002	48,000	45	0.002	0.002	36,000	22	0.002	0.002
		0.5	48,000	35	0.002	0.002	48,000	35	0.002	0.002	48,000	35	0.002	0.002	36,000	17	0.002	0.002
20015	R0.075	0.3	48,000	90	0.004	0.004	48,000	70	0.004	0.004	48,000	70	0.004	0.004	36,000	35	0.004	0.004
		0.5	48,000	60	0.004	0.004	48,000	50	0.004	0.004	48,000	50	0.004	0.004	36,000	25	0.004	0.004
		1	48,000	60	0.001	0.002	48,000	20	0.001	0.002	48,000	20	0.001	0.002	36,000	10	0.001	0.002
2002	R0.1	0.3	60,000	200	0.003	0.005	60,000	200	0.002	0.003	60,000	130	0.002	0.003	45,000	65	0.002	0.003
		0.5	60,000	200	0.003	0.005	60,000	200	0.002	0.003	60,000	130	0.002	0.003	45,000	65	0.002	0.003
		0.75	60,000	200	0.003	0.005	60,000	200	0.002	0.003	60,000	130	0.002	0.003	45,000	65	0.002	0.003
		1	60,000	200	0.003	0.005	60,000	200	0.002	0.003	60,000	130	0.002	0.003	45,000	65	0.002	0.003
		1.5	60,000	130	0.002	0.003	48,000	80	0.001	0.002	48,000	65	0.001	0.002	36,000	30	0.001	0.002
		2	60,000	90	0.001	0.002	48,000	50	0.001	0.001	48,000	40	0.001	0.001	36,000	20	0.001	0.001
		2.5	46,850	60	0.001	0.001	40,450	30	0.001	0.001	40,450	20	0.001	0.001	30,350	10	0.001	0.001
		3	33,750	30	0.001	0.001	33,600	20	0.001	0.001	33,600	15	0.001	0.001	25,200	7	0.001	0.001
2003	R0.15	0.5	60,000	350	0.006	0.008	45,000	310	0.004	0.007	43,500	180	0.003	0.005	32,500	90	0.003	0.005
		0.6	60,000	350	0.006	0.008	45,000	310	0.004	0.007	43,500	180	0.003	0.005	32,500	90	0.003	0.005
		0.75	60,000	350	0.006	0.008	45,000	310	0.004	0.007	43,500	180	0.003	0.005	32,500	90	0.003	0.005
		1	60,000	350	0.006	0.008	45,000	310	0.004	0.007	43,500	180	0.003	0.005	32,500	90	0.003	0.005
		1.5	60,000	350	0.006	0.008	45,000	310	0.004	0.007	43,500	180	0.003	0.005	32,500	90	0.003	0.005
		2	60,000	210	0.004	0.007	45,000	190	0.003	0.005	43,500	110	0.002	0.004	32,500	55	0.002	0.004
		2.5	51,250	175	0.003	0.005	38,500	135	0.002	0.004	37,750	85	0.001	0.003	28,300	40	0.001	0.003
		3	42,500	140	0.002	0.004	32,000	80	0.002	0.004	32,000	65	0.001	0.002	24,000	30	0.001	0.002
		4	23,900	45	0.001	0.001	22,550	30	0.001	0.001	22,300	20	0.001	0.001	16,720	10	0.001	0.001
		5	21,000	30	0.001	0.001	20,000	20	0.001	0.001	19,500	10	0.001	0.001	14,600	5	0.001	0.001
2004	R0.2	0.5	50,000	500	0.010	0.020	37,500	420	0.007	0.012	35,000	240	0.005	0.008	26,250	120	0.005	0.008
		0.75	50,000	500	0.010	0.020	37,500	420	0.007	0.012	35,000	240	0.005	0.008	26,250	120	0.005	0.008
		1	50,000	500	0.010	0.020	37,500	420	0.007	0.012	35,000	240	0.005	0.008	26,250	120	0.005	0.008
		1.5	50,000	500	0.010	0.020	37,500	420	0.007	0.012	35,000	240	0.005	0.008	26,250	120	0.005	0.008
		2	50,000	500	0.010	0.020	37,500	420	0.007	0.012	35,000	240	0.005	0.008	26,250	120	0.005	0.008
		2.5	45,000	360	0.007	0.012	34,500	300	0.005	0.008	32,500	190	0.004	0.007	24,300	95	0.004	0.007
		3	40,000	250	0.005	0.008	31,900	210	0.004	0.008	30,500	160	0.003	0.005	22,800	80	0.003	0.005
		3.5	36,000	210	0.004	0.007	28,700	180	0.003	0.006	27,400	140	0.002	0.004	20,550	70	0.002	0.004
		4	32,000	180	0.003	0.005	25,500	150	0.002	0.004	24,300	120	0.002	0.004	18,200	60	0.002	0.004
		4.5	28,500	150	0.002	0.004	23,500	125	0.002	0.003	22,400	100	0.001	0.003	16,800	50	0.001	0.003
		5	25,000	120	0.002	0.003	21,500	100	0.001	0.002	20,500	80	0.001	0.002	15,350	40	0.001	0.002
		6	18,000	60	0.001	0.002	18,000	60	0.001	0.002	17,000	45	0.001	0.002	12,750	20	0.001	0.002
2005	R0.25	1	44,000	650	0.015	0.040	33,000	530	0.010	0.020	30,000	300	0.007	0.010	22,500	150	0.007	0.010
		1.5	44,000	650	0.015	0.040	33,000	530	0.010	0.020	30,000	300	0.007	0.010	22,500	150	0.007	0.010
		2	44,000	650	0.015	0.040	33,000	530	0.010	0.020	30,000	300	0.007	0.010	22,500	150	0.007	0.010
		2.5	44,000	650	0.015	0.040	33,000	530	0.010	0.020	30,000	300	0.007	0.010	22,500	150	0.007	0.010
		3	40,000	500	0.010	0.020	31,000	400	0.007	0.010	28,550	230	0.005	0.008	21,400	115	0.005	0.008
		3.5	36,350	340	0.007	0.017	29,000	270	0.005	0.008	27,100	160	0.003	0.006	20,300	80	0.003	0.006
		4	32,700	180	0.005	0.015	27,150	150	0.003	0.008	25,650	100	0.002	0.005	19,900	50	0.002	0.005
		4.5	29,900	150	0.004	0.010	25,700	130	0.002	0.007	24,500	85	0.002	0.004	18,350	43	0.002	0.004
		5	27,000	135	0.003	0.008	24,200	110	0.002	0.005	23,500	75	0.002	0.004	17,600	35	0.002	0.004
		5.5	24,150	110	0.002	0.006	22,750	90	0.001	0.004	22,400	60	0.001	0.003	16,800	30	0.001	0.003
		6	21,350	90	0.002	0.005	21,300	75	0.001	0.003	21,300	50	0.001	0.002	16,000	25	0.001	0.002
		7	18,600	75	0.001	0.004	18,600	55	0.001	0.002	18,600	35	0.001	0.002	13,950	17	0.001	0.002
		8	15,900	60	0.001	0.003	15,900	40	0.001	0.002	15,900	25	0.001	0.002	11,950	12	0.001	0.002
		9	15,400	55	0.001	0.002	14,750	30	0.001	0.001	14,750	20	0.001	0.001	11,050	10	0.001	0.001
		10	14,900	50	0.001	0.002	13,600	20	0.001	0.001	13,600	15	0.001	0.001	10,200	7	0.001	0.001

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Milling Conditions for HSLB

WORK MATERIAL			PREHARDENED STEELS HARDENED STEELS NAK / STAVAX(~55HRC)				HARDENED STEELS SKD11(55~62HRC)				HARDENED STEELS HAP10(62~66HRC)				HARDENED STEELS HAP72(66~70HRC)			
Model Number	Radius of Ball Nose (mm)	Effective Length (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2006	R0.3	1	40,000	1,400	0.045	0.150	30,000	1,500	0.030	0.130	26,500	1,000	0.015	0.090	20,000	500	0.015	0.090
		1.5	40,000	1,100	0.030	0.130	30,000	1,200	0.020	0.100	26,500	800	0.010	0.075	20,000	400	0.010	0.075
		2	40,000	1,100	0.030	0.130	30,000	1,200	0.020	0.100	26,500	800	0.010	0.075	20,000	400	0.010	0.075
		2.5	40,000	800	0.020	0.100	30,000	800	0.015	0.090	26,500	520	0.008	0.065	20,000	260	0.008	0.065
		3	40,000	800	0.020	0.100	30,000	800	0.015	0.090	26,500	520	0.008	0.065	20,000	260	0.008	0.065
		3.5	40,000	500	0.015	0.090	30,000	500	0.010	0.075	26,500	340	0.006	0.050	20,000	170	0.006	0.050
		4	40,000	500	0.015	0.090	30,000	500	0.010	0.075	26,500	340	0.006	0.050	20,000	170	0.006	0.050
		4.5	32,000	400	0.010	0.075	25,000	390	0.007	0.050	23,000	260	0.005	0.040	18,000	130	0.005	0.040
		5	32,000	400	0.010	0.075	25,000	390	0.007	0.050	23,000	260	0.005	0.040	18,000	130	0.005	0.040
		5.5	28,000	350	0.008	0.065	23,000	350	0.006	0.050	21,000	230	0.004	0.040	15,750	115	0.004	0.040
		6	24,000	300	0.007	0.060	21,000	320	0.005	0.040	19,500	210	0.004	0.030	15,000	105	0.004	0.030
		6.5	22,000	270	0.006	0.060	19,500	300	0.004	0.040	18,500	190	0.003	0.030	13,900	95	0.003	0.030
		7	20,000	250	0.006	0.050	18,500	280	0.004	0.030	17,500	180	0.003	0.020	13,100	90	0.003	0.020
		8	16,000	200	0.005	0.050	16,000	240	0.003	0.020	16,000	160	0.003	0.020	12,000	80	0.003	0.020
		9	15,450	185	0.004	0.035	15,450	200	0.002	0.017	15,450	135	0.002	0.017	11,580	65	0.002	0.017
		10	14,900	175	0.003	0.020	14,900	175	0.002	0.015	14,900	115	0.002	0.015	11,100	55	0.002	0.015
		12	13,800	150	0.002	0.015	13,800	110	0.001	0.010	13,800	70	0.001	0.010	10,350	35	0.001	0.010
2007	R0.35	2	37,000	1,350	0.045	0.170	28,500	1,400	0.030	0.135	25,000	900	0.015	0.100	18,750	450	0.015	0.100
		4	31,250	920	0.035	0.150	25,750	975	0.025	0.120	23,750	650	0.012	0.090	17,800	325	0.012	0.090
		6	25,500	500	0.025	0.130	23,000	550	0.020	0.110	22,500	400	0.010	0.080	16,850	200	0.010	0.080
		8	19,000	270	0.007	0.060	17,000	320	0.005	0.040	16,500	220	0.004	0.025	12,350	110	0.004	0.025
2008	R0.4	2	35,000	1,600	0.060	0.210	27,000	1,600	0.040	0.170	23,500	1,000	0.020	0.120	17,500	500	0.020	0.120
		3	35,000	1,400	0.050	0.190	27,000	1,400	0.030	0.150	23,500	900	0.015	0.100	17,500	450	0.015	0.100
		4	35,000	1,200	0.040	0.170	27,000	1,200	0.025	0.135	23,500	600	0.012	0.095	17,500	300	0.012	0.095
		5	31,500	900	0.030	0.150	25,000	900	0.020	0.120	22,000	500	0.010	0.085	16,500	250	0.010	0.085
		6	28,000	600	0.020	0.120	23,000	600	0.012	0.095	20,500	400	0.006	0.065	15,500	200	0.006	0.065
		7	23,750	460	0.016	0.105	20,500	480	0.009	0.080	18,750	340	0.005	0.062	14,000	170	0.005	0.062
		8	19,500	330	0.012	0.095	18,000	375	0.007	0.070	17,000	285	0.005	0.060	12,750	140	0.005	0.060
		9	17,500	290	0.011	0.090	16,000	350	0.006	0.060	15,700	250	0.005	0.050	11,800	125	0.005	0.050
		10	15,000	260	0.010	0.085	14,700	340	0.005	0.060	14,650	225	0.004	0.050	11,000	110	0.004	0.050
		12	14,000	220	0.005	0.060	13,700	290	0.003	0.040	13,650	140	0.002	0.030	10,250	70	0.002	0.030
2009	R0.45	2	32,500	1,650	0.100	0.280	25,500	1,800	0.055	0.210	22,000	1,300	0.025	0.140	16,500	650	0.025	0.140
		4	32,500	1,650	0.080	0.250	25,500	1,800	0.040	0.180	22,000	1,300	0.020	0.130	16,500	650	0.020	0.130
		6	29,000	800	0.035	0.170	22,000	800	0.020	0.130	20,000	620	0.015	0.110	15,000	310	0.015	0.110
		8	25,500	700	0.015	0.110	18,500	500	0.010	0.090	18,500	420	0.010	0.090	13,850	210	0.010	0.090
		10	20,000	400	0.012	0.100	15,700	400	0.008	0.080	15,700	300	0.008	0.080	11,800	150	0.008	0.080
		12	15,000	280	0.010	0.090	13,300	300	0.006	0.070	13,300	220	0.006	0.070	10,000	110	0.006	0.070
		14	14,000	240	0.007	0.070	12,000	250	0.004	0.035	12,000	160	0.004	0.035	9,000	80	0.004	0.035
		16	13,700	220	0.005	0.050	10,800	200	0.003	0.030	10,800	130	0.003	0.030	8,100	65	0.003	0.030
		18	13,000	200	0.004	0.025	9,750	150	0.002	0.015	9,750	100	0.002	0.015	7,300	50	0.002	0.015

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Milling Conditions for HSLB

WORK MATERIAL			PREHARDENED STEELS HARDENED STEELS NAK / STAVAX(~55HRC)				HARDENED STEELS SKD11(55~62HRC)				HARDENED STEELS HAP10(62~66HRC)				HARDENED STEELS HAP72(66~70HRC)			
Model Number	Radius of Ball Nose (mm)	Effective Length (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2010	R0.5	2	30,000	1,750	0.200	0.400	24,000	2,000	0.100	0.300	21,000	1,750	0.050	0.200	16,000	875	0.050	0.200
		2.5	30,000	1,750	0.200	0.400	24,000	2,000	0.100	0.300	21,000	1,750	0.050	0.200	16,000	875	0.050	0.200
		3	30,000	1,750	0.100	0.300	24,000	2,000	0.050	0.200	21,000	1,750	0.030	0.170	16,000	875	0.030	0.170
		4	30,000	1,750	0.100	0.300	24,000	2,000	0.050	0.200	21,000	1,750	0.030	0.170	16,000	875	0.030	0.170
		5	30,000	1,750	0.100	0.300	24,000	2,000	0.050	0.200	21,000	1,750	0.030	0.170	16,000	875	0.030	0.170
		6	30,000	1,150	0.060	0.230	21,500	1,250	0.030	0.170	19,700	1,050	0.025	0.150	14,500	525	0.025	0.150
		7	24,250	800	0.040	0.190	20,000	900	0.020	0.140	19,000	750	0.020	0.140	14,250	375	0.020	0.140
		8	24,000	800	0.025	0.155	18,500	580	0.015	0.120	18,400	480	0.015	0.120	13,800	240	0.015	0.120
		9	23,000	700	0.021	0.140	16,650	500	0.012	0.100	16,550	420	0.012	0.100	12,400	210	0.012	0.100
		10	22,000	600	0.018	0.130	14,800	430	0.010	0.090	14,700	360	0.010	0.090	11,100	180	0.010	0.090
		12	14,150	320	0.015	0.120	13,400	380	0.008	0.080	13,300	290	0.008	0.080	9,950	145	0.008	0.080
		14	13,500	280	0.012	0.100	12,000	350	0.007	0.080	12,000	220	0.007	0.080	9,000	110	0.007	0.080
		16	12,750	240	0.008	0.080	10,500	250	0.005	0.045	10,500	160	0.005	0.045	7,850	80	0.005	0.045
		18	12,350	220	0.006	0.065	9,750	200	0.004	0.035	9,750	130	0.004	0.035	7,300	65	0.004	0.035
		20	12,000	200	0.005	0.030	9,000	150	0.003	0.020	9,000	100	0.003	0.020	6,750	50	0.003	0.020
		22	12,000	150	0.003	0.020	9,000	110	0.002	0.012	9,000	75	0.002	0.012	6,750	35	0.002	0.012
2012	R0.6	2.5	30,000	2,000	0.220	0.460	20,500	2,000	0.110	0.340	17,800	1,750	0.050	0.230	13,350	875	0.050	0.230
		4	30,000	2,000	0.120	0.360	20,000	2,000	0.060	0.240	17,500	1,750	0.036	0.200	13,100	875	0.036	0.200
		6	30,000	2,000	0.120	0.360	20,000	2,000	0.060	0.240	17,500	1,750	0.036	0.200	13,100	875	0.036	0.200
		8	20,200	800	0.050	0.230	16,600	900	0.025	0.170	15,850	750	0.025	0.170	11,900	375	0.025	0.170
		10	15,500	480	0.030	0.180	15,500	580	0.015	0.130	15,350	480	0.015	0.130	11,500	240	0.015	0.130
		12	12,400	360	0.020	0.150	12,400	430	0.010	0.095	12,250	360	0.010	0.095	9,200	180	0.010	0.095
		14	11,850	320	0.018	0.140	11,200	380	0.008	0.085	11,100	290	0.008	0.085	8,300	145	0.008	0.085
		16	11,300	280	0.014	0.120	10,000	360	0.007	0.080	10,000	230	0.007	0.080	7,500	115	0.007	0.080
		18	10,900	260	0.011	0.100	9,400	300	0.006	0.070	9,400	190	0.006	0.070	7,050	95	0.006	0.070
		20	10,500	240	0.009	0.090	8,800	250	0.006	0.050	8,800	160	0.006	0.050	6,600	80	0.006	0.050
2014	R0.7	6	25,200	2,000	0.130	0.420	17,150	2,000	0.065	0.270	15,000	1,750	0.036	0.230	11,250	875	0.036	0.230
		8	25,200	1,300	0.080	0.320	15,350	1,250	0.040	0.230	14,050	1,050	0.030	0.200	10,550	525	0.030	0.200
		12	13,500	450	0.035	0.210	12,500	460	0.025	0.180	12,000	300	0.020	0.160	9,000	150	0.020	0.160
		16	10,000	320	0.016	0.145	9,050	390	0.010	0.120	8,850	230	0.012	0.120	6,650	115	0.012	0.120
2015	R0.75	3	30,000	2,450	0.250	0.550	17,000	2,000	0.120	0.400	15,000	1,750	0.060	0.290	11,250	875	0.060	0.290
		4	30,000	2,450	0.250	0.550	17,000	2,000	0.120	0.400	15,000	1,750	0.060	0.290	11,250	875	0.060	0.290
		6	30,000	2,450	0.150	0.450	17,000	2,000	0.070	0.310	15,000	1,750	0.040	0.240	11,250	875	0.040	0.240
		8	23,500	1,300	0.100	0.370	15,000	1,250	0.045	0.250	14,000	1,050	0.030	0.210	10,500	525	0.030	0.210
		10	23,500	1,300	0.100	0.370	15,000	1,250	0.045	0.250	14,000	1,050	0.030	0.210	10,500	525	0.030	0.210
		12	13,100	480	0.030	0.210	13,000	580	0.020	0.170	13,000	480	0.020	0.170	9,750	240	0.020	0.170
		14	11,200	400	0.025	0.190	10,900	485	0.015	0.145	10,900	385	0.015	0.145	8,200	190	0.015	0.145
		16	9,350	320	0.020	0.170	8,850	390	0.012	0.130	8,800	290	0.012	0.130	6,600	145	0.012	0.130
		18	9,150	300	0.019	0.165	8,400	370	0.011	0.125	8,400	255	0.011	0.125	6,300	125	0.011	0.125
		20	9,000	280	0.018	0.160	8,000	350	0.010	0.120	8,000	220	0.010	0.120	6,000	110	0.010	0.120
		22	8,580	245	0.014	0.130	7,150	320	0.008	0.120	7,150	165	0.008	0.120	5,350	80	0.008	0.120
		25	8,100	210	0.010	0.110	6,250	220	0.006	0.090	6,250	120	0.005	0.080	4,700	60	0.005	0.080
		30	7,600	175	0.006	0.040	5,370	135	0.004	0.030	5,370	75	0.003	0.030	4,000	35	0.003	0.030
2016	R0.8	4	30,000	2,500	0.250	0.580	17,500	2,100	0.120	0.400	15,300	1,800	0.060	0.300	11,500	900	0.060	0.300
		8	30,000	2,500	0.160	0.480	17,500	2,100	0.080	0.320	15,300	1,800	0.050	0.275	11,500	900	0.050	0.275
		12	13,500	500	0.040	0.245	13,500	600	0.024	0.190	13,400	490	0.024	0.190	10,050	245	0.024	0.190
		16	10,800	375	0.030	0.210	10,800	450	0.016	0.150	10,700	370	0.016	0.150	8,000	185	0.016	0.150
		20	10,300	330	0.025	0.190	9,750	400	0.013	0.130	9,650	230	0.013	0.130	8,000	115	0.013	0.130

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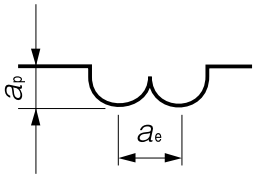
Milling Conditions for HSLB

WORK MATERIAL			PREHARDENED STEELS HARDENED STEELS NAK / STAVAX(~55HRC)				HARDENED STEELS SKD11(55~62HRC)				HARDENED STEELS HAP10(62~66HRC)				HARDENED STEELS HAP72(66~70HRC)			
Model Number	Radius of Ball Nose (mm)	Effective Length (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2018	R0.9	4	30,000	2,700	0.280	0.650	15,000	2,000	0.140	0.480	13,000	1,750	0.070	0.340	9,750	875	0.070	0.340
		6	30,000	2,700	0.180	0.540	15,000	2,000	0.070	0.340	13,000	1,750	0.040	0.260	9,750	875	0.040	0.260
		8	30,000	2,700	0.180	0.540	15,000	2,000	0.070	0.340	13,000	1,750	0.040	0.260	9,750	875	0.040	0.260
		10	25,750	2,000	0.140	0.480	14,400	1,650	0.060	0.320	12,900	1,425	0.035	0.240	9,700	713	0.035	0.240
		12	21,500	1,350	0.100	0.410	13,800	1,350	0.050	0.290	12,800	1,100	0.030	0.230	9,600	550	0.030	0.230
		16	15,550	860	0.065	0.330	11,700	900	0.030	0.220	11,150	730	0.020	0.180	8,400	365	0.020	0.180
		18	9,600	375	0.030	0.230	9,600	450	0.015	0.160	9,500	370	0.010	0.130	7,150	185	0.010	0.130
		20	9,300	350	0.027	0.210	9,050	420	0.014	0.150	9,000	330	0.009	0.120	6,750	165	0.009	0.120
		22	9,000	320	0.025	0.200	8,500	400	0.012	0.140	8,500	290	0.008	0.150	6,400	145	0.008	0.150
		25	8,500	280	0.020	0.180	7,750	320	0.010	0.100	7,750	220	0.007	0.090	5,800	110	0.007	0.090
		30	8,000	240	0.015	0.150	7,000	250	0.009	0.070	7,000	160	0.006	0.060	5,250	80	0.006	0.060
2020	R1	3	28,000	2,900	0.300	0.700	14,000	2,100	0.150	0.500	12,250	1,800	0.080	0.350	9,200	900	0.080	0.350
		4	28,000	2,900	0.300	0.700	14,000	2,100	0.150	0.500	12,250	1,800	0.080	0.350	9,200	900	0.080	0.350
		6	28,000	2,900	0.200	0.600	14,000	2,100	0.100	0.400	12,250	1,800	0.060	0.300	9,200	900	0.060	0.300
		8	28,000	2,900	0.200	0.600	14,000	2,100	0.100	0.400	12,250	1,800	0.060	0.300	9,200	900	0.060	0.300
		10	28,000	2,900	0.200	0.600	14,000	2,100	0.100	0.400	12,250	1,800	0.060	0.300	9,200	900	0.060	0.300
		12	19,500	1,350	0.120	0.450	12,400	1,350	0.060	0.340	11,500	1,100	0.045	0.270	8,650	550	0.045	0.270
		13	19,500	1,350	0.120	0.450	12,400	1,350	0.060	0.340	11,500	1,100	0.045	0.270	8,650	550	0.045	0.270
		14	19,500	1,350	0.120	0.450	12,400	1,350	0.060	0.340	11,500	1,100	0.045	0.270	8,650	550	0.045	0.270
		16	10,800	500	0.050	0.300	10,800	600	0.030	0.240	10,700	490	0.030	0.240	8,000	245	0.030	0.240
		18	9,700	435	0.040	0.280	9,700	520	0.025	0.220	9,650	430	0.025	0.220	7,250	215	0.025	0.220
		20	8,650	375	0.035	0.250	8,650	450	0.020	0.190	8,560	370	0.020	0.190	6,400	185	0.020	0.190
		22	8,450	350	0.032	0.245	8,200	440	0.018	0.180	8,200	330	0.018	0.180	6,150	165	0.018	0.180
		25	8,250	320	0.030	0.240	7,800	440	0.016	0.160	7,800	290	0.016	0.160	5,850	145	0.016	0.160
		30	7,850	280	0.024	0.200	7,000	350	0.014	0.160	7,000	220	0.014	0.160	5,250	110	0.014	0.160
		35	7,450	240	0.016	0.160	6,150	250	0.010	0.090	6,150	160	0.010	0.090	4,600	80	0.010	0.090
		40	7,000	200	0.010	0.060	5,250	150	0.006	0.040	5,250	100	0.006	0.040	3,950	50	0.006	0.040
2025	R1.25	6	25,000	3,000	0.350	0.850	12,400	2,200	0.170	0.600	11,000	1,850	0.100	0.450	8,250	920	0.100	0.450
		8	25,000	3,000	0.240	0.760	12,400	2,200	0.130	0.510	11,000	1,850	0.080	0.380	8,250	920	0.080	0.380
		10	25,000	3,000	0.240	0.760	12,400	2,200	0.130	0.510	11,000	1,850	0.080	0.380	8,250	920	0.080	0.380
		15	17,300	1,400	0.145	0.570	11,000	1,400	0.080	0.440	10,300	1,140	0.060	0.350	7,700	570	0.060	0.350
		20	9,600	520	0.060	0.380	9,600	630	0.040	0.310	9,600	510	0.040	0.310	7,200	255	0.040	0.310
		25	6,900	375	0.042	0.320	6,900	450	0.024	0.235	6,840	370	0.024	0.235	5,150	185	0.024	0.235
		30	6,500	320	0.025	0.240	6,200	400	0.020	0.220	6,200	280	0.020	0.220	4,650	140	0.020	0.220
		35	6,200	280	0.017	0.200	5,500	350	0.014	0.180	5,500	220	0.014	0.180	4,150	110	0.014	0.180
2030	R1.5	6	21,000	3,000	0.400	1.000	10,500	2,200	0.200	0.700	9,200	1,900	0.120	0.550	6,900	950	0.120	0.550
		8	21,000	3,000	0.400	1.000	10,500	2,200	0.200	0.700	9,200	1,900	0.120	0.550	6,900	950	0.120	0.550
		10	21,000	3,000	0.300	0.900	10,500	2,200	0.150	0.650	9,200	1,900	0.100	0.500	6,900	950	0.100	0.500
		12	21,000	3,000	0.300	0.900	10,500	2,200	0.150	0.650	9,200	1,900	0.100	0.500	6,900	950	0.100	0.500
		14	21,000	3,000	0.300	0.900	10,500	2,200	0.150	0.650	9,200	1,900	0.100	0.500	6,900	950	0.100	0.500
		15	21,000	3,000	0.300	0.900	10,500	2,200	0.150	0.650	9,200	1,900	0.100	0.500	6,900	950	0.100	0.500
		16	21,000	3,000	0.300	0.900	10,500	2,200	0.150	0.650	9,200	1,900	0.100	0.500	6,900	950	0.100	0.500
		20	14,500	1,360	0.180	0.700	9,250	1,400	0.100	0.500	8,600	1,150	0.075	0.450	6,450	575	0.075	0.450
		25	8,000	520	0.070	0.450	8,000	630	0.050	0.380	8,000	510	0.050	0.380	6,000	255	0.050	0.380
		30	5,750	375	0.050	0.380	5,750	450	0.030	0.290	5,700	370	0.030	0.290	4,275	185	0.030	0.290
		35	5,550	335	0.045	0.360	5,350	440	0.025	0.270	5,350	310	0.025	0.270	4,000	155	0.025	0.270
		40	5,350	300	0.040	0.340	4,900	390	0.020	0.240	4,850	250	0.020	0.240	3,650	125	0.020	0.240

Milling Conditions for HSLB

WORK MATERIAL			PREHARDENED STEELS HARDENED STEELS NAK / STAVAX(～55HRC)				HARDENED STEELS SKD11(55～62HRC)				HARDENED STEELS HAP10(62～66HRC)				HARDENED STEELS HAP72(66～70HRC)			
Model Number	Radius of Ball Nose (mm)	Effective Length (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2035	**R1.75**	10	19,000	3,000	0.350	1.050	10,000	2,200	0.170	0.750	8,400	1,900	0.110	0.610	6,300	950	0.110	0.610
		15	19,000	3,000	0.350	1.050	10,000	2,200	0.170	0.750	8,400	1,900	0.110	0.610	6,300	950	0.110	0.610
		20	19,000	3,000	0.350	1.050	10,000	2,200	0.170	0.750	8,400	1,900	0.110	0.610	6,300	950	0.110	0.610
		25	13,000	1,750	0.210	0.830	8,450	1,400	0.110	0.610	7,650	1,200	0.080	0.520	5,750	600	0.080	0.520
		30	6,900	520	0.080	0.520	6,900	630	0.060	0.450	6,900	510	0.060	0.450	5,200	255	0.060	0.450
		40	5,750	410	0.060	0.450	5,550	510	0.040	0.370	5,500	380	0.040	0.370	4,150	190	0.040	0.370
		45	4,600	300	0.045	0.390	4,200	390	0.025	0.290	4,100	250	0.025	0.290	3,100	125	0.025	0.290
2040	**R2**	8	18,000	3,200	0.500	1.300	9,000	2,300	0.250	0.950	7,900	2,000	0.150	0.750	5,900	1,000	0.150	0.750
		10	18,000	3,200	0.500	1.300	9,000	2,300	0.250	0.950	7,900	2,000	0.150	0.750	5,900	1,000	0.150	0.750
		12	18,000	3,200	0.400	1.200	9,000	2,300	0.200	0.850	7,900	2,000	0.130	0.700	5,900	1,000	0.130	0.700
		14	18,000	3,200	0.400	1.200	9,000	2,300	0.200	0.850	7,900	2,000	0.130	0.700	5,900	1,000	0.130	0.700
		15	18,000	3,200	0.400	1.200	9,000	2,300	0.200	0.850	7,900	2,000	0.130	0.700	5,900	1,000	0.130	0.700
		16	18,000	3,200	0.400	1.200	9,000	2,300	0.200	0.850	7,900	2,000	0.130	0.700	5,900	1,000	0.130	0.700
		20	18,000	3,200	0.400	1.200	9,000	2,300	0.200	0.850	7,900	2,000	0.130	0.700	5,900	1,000	0.130	0.700
		25	12,500	1,500	0.250	0.950	8,000	1,450	0.130	0.700	7,450	1,250	0.090	0.550	5,600	625	0.090	0.550
		30	7,000	550	0.100	0.600	7,000	660	0.060	0.450	7,000	540	0.060	0.450	5,250	270	0.060	0.450
		35	6,000	520	0.090	0.590	6,000	630	0.055	0.430	6,000	510	0.055	0.430	4,500	255	0.055	0.430
		40	4,300	375	0.065	0.500	4,300	450	0.040	0.390	4,300	370	0.040	0.390	3,200	185	0.040	0.390
		45	4,150	330	0.058	0.470	4,000	440	0.033	0.360	4,000	300	0.033	0.360	3,000	150	0.033	0.360
		50	4,000	300	0.053	0.440	3,750	400	0.030	0.330	3,750	260	0.030	0.330	2,800	130	0.030	0.330
		60	3,900	280	0.048	0.400	3,500	350	0.028	0.300	3,500	220	0.028	0.300	2,600	110	0.028	0.300
2050	**R2.5**	10	14,400	3,200	0.500	1.500	7,200	2,300	0.250	1.050	6,350	2,000	0.160	0.880	4,750	1,000	0.160	0.880
		15	14,400	3,200	0.500	1.500	7,200	2,300	0.250	1.050	6,350	2,000	0.160	0.880	4,750	1,000	0.160	0.880
		20	14,400	3,200	0.500	1.500	7,200	2,300	0.250	1.050	6,350	2,000	0.160	0.880	4,750	1,000	0.160	0.880
		25	12,200	2,350	0.405	1.350	6,800	1,850	0.205	0.950	6,250	1,600	0.135	0.805	4,650	800	0.135	0.805
		30	10,000	1,500	0.310	1.200	6,400	1,450	0.160	0.880	6,200	1,250	0.110	0.730	4,650	625	0.110	0.730
		35	8,000	1,050	0.210	1.000	6,200	1,070	0.120	0.760	6,100	900	0.095	0.680	4,600	450	0.095	0.680
		40	6,000	570	0.125	0.780	6,000	690	0.080	0.625	6,000	570	0.080	0.625	4,500	285	0.080	0.625
		45	5,150	500	0.110	0.720	5,150	600	0.070	0.400	5,100	500	0.070	0.400	3,800	250	0.070	0.400
		50	4,300	430	0.090	0.650	4,300	510	0.060	0.180	4,200	435	0.060	0.180	3,150	215	0.060	0.180
2060	**R3**	10	13,000	3,500	0.600	1.800	6,500	2,500	0.300	1.300	5,700	2,200	0.200	1.000	4,300	1,100	0.200	1.000
		15	13,000	3,500	0.600	1.800	6,500	2,500	0.300	1.300	5,700	2,200	0.200	1.000	4,300	1,100	0.200	1.000
		20	13,000	3,500	0.600	1.800	6,500	2,500	0.300	1.300	5,700	2,200	0.200	1.000	4,300	1,100	0.200	1.000
		25	13,000	3,500	0.600	1.800	6,500	2,500	0.300	1.300	5,700	2,200	0.200	1.000	4,300	1,100	0.200	1.000
		30	13,000	3,500	0.600	1.800	6,500	2,500	0.300	1.300	5,700	2,200	0.200	1.000	4,300	1,100	0.200	1.000
		35	11,000	2,750	0.480	1.600	6,100	2,050	0.250	1.050	5,500	1,800	0.175	0.800	4,150	900	0.175	0.800
		40	9,000	2,050	0.375	1.350	5,750	1,600	0.200	0.800	5,350	1,400	0.150	0.650	4,000	700	0.150	0.650
		45	7,000	1,300	0.260	1.100	5,350	1,150	0.150	0.550	5,150	1,000	0.125	0.450	3,850	500	0.125	0.450
		50	5,000	600	0.150	0.900	5,000	720	0.100	0.300	5,000	600	0.100	0.300	3,750	300	0.100	0.300
		60	3,600	430	0.105	0.750	3,600	510	0.080	0.220	3,550	435	0.080	0.220	2,650	215	0.080	0.220

a_p : Axial Depth (mm)
a_e : Radial Depth (mm) = P_f

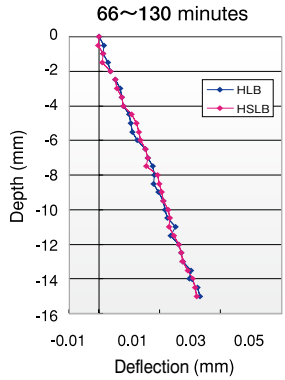


Note:
- Decrease both spindle speed and feed rate proportionally when the milling parameters exceed the machine's maximum spindle speed.
- Decrease the feed rate more than 50% from the milling parameters when slot milling.
- Decrease both spindle speed and feed rate proportionally when the milling parameters exceed the machine's maximum spindle speed, or when burr and red-hot occur.
- Every coolant offers stable milling.

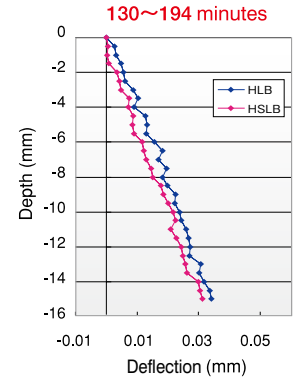
Copper Electrode Milling Comparison : HSLB generates less side force to reduce work piece deflection

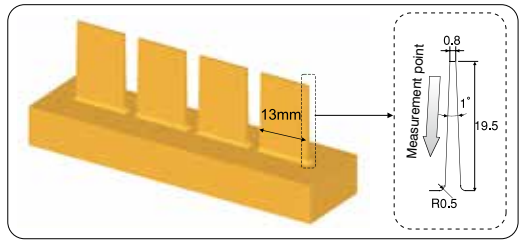
Variable rake cutting edge reduces tool deflection!
Better wear resistance than conventional +Rake.
After extended milling time, new HSLB makes less diflection than conventional HLB!

66～130 minutes



130～194 minutes



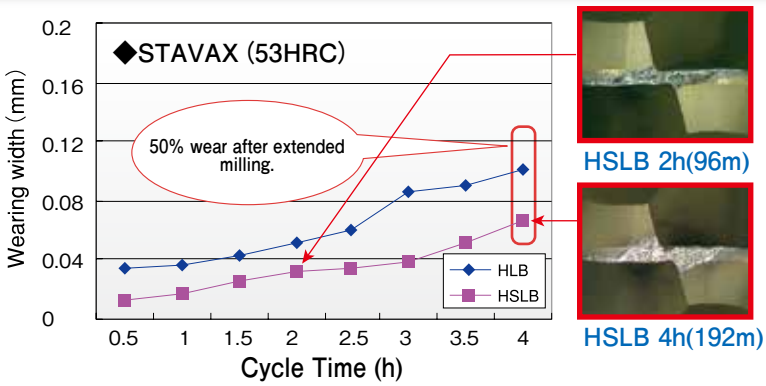


* Refer to page 378 for tool shape.

Size: R0.5 x 20mm Effective Length

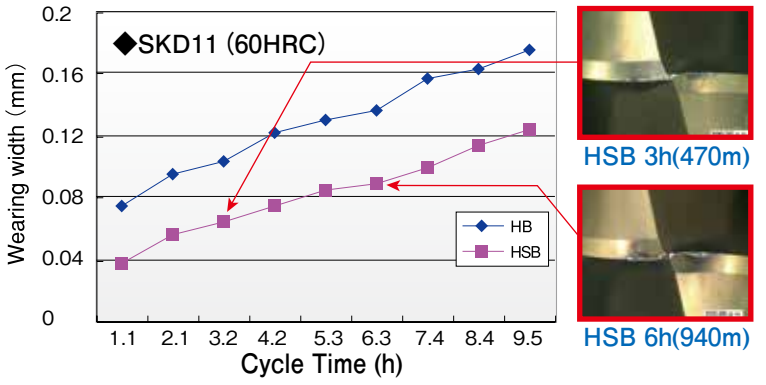
Work Material	Copper (C1100)
Spindle Speed	9,350min^{-1}
Feed Rate	540mm/min
Velocity	29.4m/min
Feed per tooth	0.029mm/tooth
Axial Depth a_p	0.017mm
Radial Depth a_e	0.01mm
Overhang Length	30mm
Cycle Time	66min/pocket
Coolant	Water Soluble
Milling Method	Contouring

Wear Comparison: HSB applies a wide range of materials with excellent performance.



Size: R0.5 x 6mm Effective Length

Work Material	STAVAX (53HRC)
Spindle Speed	24,000min^{-1}
Feed Rate	800mm/min
Velocity	75.4m/min
Feed per tooth	0.017mm/tooth
Axial Depth a_p	0.024mm
Radial Depth a_e	0.057mm
Overhang Length	20mm
Coolant	Air Blow
Milling Method	Pocket Miling



Size: R3 x 9mm Length of Cut

Work Material	SKD11 (60HRC)
Spindle Speed	10,000min^{-1}
Feed Rate	3,000mm/min
Velocity	188m/min
Feed per tooth	0.15mm/tooth
Axial Depth a_p	0.1mm
Radial Depth a_e	0.15mm
Overhang Length	20mm
Coolant	Air Blow
Milling Method	Surface Finish (both way)