

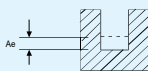
Recommended Cutting Condition

Technical Data

[ZSLNS20, ZSLNS40 series]

WORKPIECE	ALLOY STEELS, HEAT RESISTANT STEELS			HARDENED STEELS			HARDENED STEELS			Copper, Copper alloy		
HARDNESS	HRC30 ~ HRC45			HRC45 ~ HRC55			HRC55 ~ HRC65					
DIAMETER(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)	RPM	FEED	Ae(mm)
0.4	34,100-50,000	350-590	0.005-0.028	30,500-35,200	295-340	0.003-0.020	18,300-24,800	120-200	0.002-0.012	48,000-50,000	790-920	0.008-0.048
0.5	25,650-33,000	370-470	0.006-0.035	23,750-26,000	285-315	0.004-0.025	14,200-18,000	115-130	0.003-0.015	44,000-50,000	800-1,150	0.010-0.080
0.6	20,900-35,200	330-590	0.007-0.030	19,900-22,000	260-290	0.005-0.021	11,900-15,500	100-120	0.003-0.013	37,500-50,000	770-1,250	0.011-0.051
0.8	16,150-26,400	360-590	0.009-0.040	15,200-16,700	280-310	0.006-0.028	9,000-11,700	110-125	0.004-0.017	28,500-47,000	770-1,300	0.015-0.068
1.0	12,300-18,700	350-540	0.011-0.028	10,500-11,500	250-280	0.008-0.020	6,300-8,650	100-115	0.005-0.012	22,500-34,000	810-1,300	0.018-0.048
1.2	10,450-17,800	350-590	0.025-0.070	9,100-10,000	250-280	0.015-0.042	5,400-7,000	100-115	0.008-0.026	22,500-31,500	950-1,350	0.036-0.101
1.5	9,100-12,600	430-830	0.017-0.077	7,000-8,000	250-280	0.012-0.055	4,300-5,500	100-115	0.007-0.033	14,500-25,000	770-1,320	0.028-0.132
2.0	6,350-10,550	340-570	0.021-0.140	6,100-6,700	270-300	0.015-0.100	3,600-4,700	100-120	0.009-0.060	11,500-18,500	770-1,250	0.036-0.240
3.0	4,300-7,650	550-900	0.056-0.210	3,980-4,800	445-515	0.040-0.150	2,400-3,200	105-310	0.024-0.080	9,000-13,000	1,400-2,110	0.096-0.380
4.0	3,200-5,300	400-675	0.074-0.280	3,008-3,400	335-380	0.053-0.200	1,800-2,400	75-230	0.032-0.120	6,750-9,750	1,050-1,575	0.128-0.480

RPM = rev. / min.
FEED = mm / min.



[ZSLNR series]

WORKPIECE				CARBON STEELS, ALLOY STEELS (180-250HB)		PREHARDENED STEELS (HRC35-45)		HARDENED STEELS (HRC45-55)		HARDENED STEELS (HRC55-65)	
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)
0.2	0.05	0.5	0.020	50,000	258	50,000	205	50,000	180	50,000	160
		1	0.014	50,000	258	50,000	205	50,000	180	50,000	160
		1.5	0.008	50,000	240	45,900	202	45,900	170	45,900	153
0.3	0.05	2	0.008	42,000	202	36,700	176	36,700	162	36,700	147
		1	0.021	50,000	585	50,000	456	50,000	336	50,000	320
		1.5	0.016	50,000	585	45,000	456	45,000	336	45,000	320
0.4	0.05	2	0.012	45,000	530	45,000	420	45,000	300	45,000	290
		2.5	0.010	40,000	471	40,000	373	40,000	267	40,000	258
		3	0.008	35,000	412	35,000	326	30,000	200	30,000	194
0.5	0.05	1	0.025	50,000	580	50,000	461	40,000	320	36,000	270
		1.5	0.020	50,000	580	50,000	461	40,000	320	36,000	270
		2	0.016	45,000	520	45,000	410	36,000	290	34,000	240
0.6	0.05	2.5	0.015	40,500	480	40,500	370	33,400	270	30,600	220
		3	0.014	40,000	410	40,000	330	32,800	240	25,600	200
		3.5	0.012	36,000	380	36,000	300	29,400	200	22,920	180
0.7	0.05	4	0.008	30,000	320	30,000	250	21,600	160	19,200	150
		2	0.028	45,000	520	45,000	410	36,000	290	34,000	240
		3	0.016	40,000	410	40,000	330	32,800	240	25,600	200
0.8	0.05	4	0.010	30,000	320	30,000	250	21,600	160	19,200	150
		1	0.030	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.023	50,000	898	40,000	464	30,000	378	28,000	315
0.9	0.05	3	0.017	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.017	40,000	820	32,000	378	24,000	279	20,000	234
		5	0.011	28,800	540	19,400	280	18,000	250	15,000	200
1.0	0.05	6	0.008	28,800	480	19,400	260	18,000	250	15,000	200
		1	0.035	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.030	50,000	898	40,000	464	30,000	378	28,000	315
1.1	0.05	3	0.020	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.020	40,000	720	32,000	378	24,000	279	20,000	234
		5	0.013	28,800	540	19,400	280	18,000	250	15,000	200
1.2	0.05	6	0.013	28,800	480	19,400	260	18,000	250	15,000	200
		2	0.035	50,000	1,159	37,830	600	28,200	390	23,000	320
		4	0.024	40,000	830	27,800	440	23,600	280	21,000	230
1.3	0.05	6	0.015	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.013	24,000	466	18,000	285	17,800	228	15,000	200
		10	0.009	24,000	451	18,000	276	17,800	221	15,000	193

Recommended Cutting Condition

Technical Data

[ZSLNR series]

WORKPIECE				CARBON STEELS, ALLOY STEELS (180-250HB)		PREHARDENED STEELS (HRC35-45)		HARDENED STEELS (HRC45-55)		HARDENED STEELS (HRC55-65)	
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)
0.8	0.1	4	0.032	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.019	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.015	29,025	600	20,000	369	16,200	259	16,200	230
		12	0.012	29,025	570	20,000	350	16,200	246	16,200	219
	0.2	4	0.056	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.032	38,700	800	25,000	461	18,000	288	18,000	256
1	0.1	4	0.038	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.024	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.024	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.015	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.015	18,144	609	15,422	453	13,608	399	12,701	320
		16	0.009	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.006	13,608	399	11,567	315	10,206	257	9,526	200
	0.2	4	0.070	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.040	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.040	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.025	18,144	609	15,422	453	13,608	399	12,701	320
		16	0.015	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.010	13,608	399	11,567	315	10,206	257	9,526	200
	0.3	6	0.040	26,244	990	22,307	842	19,683	660	18,371	539
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		16	0.015	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.010	13,608	399	11,567	315	10,206	257	9,526	200
	0.1	4	0.042	24,930	1,130	20,956	868	18,711	678	17,364	556
		8	0.036	22,680	1,027	19,278	873	17,010	685	15,876	559
		12	0.036	18,144	822	15,422	698	13,608	548	12,701	447
		15	0.023	14,112	568	11,995	423	10,584	373	9,878	298
	0.2	4	0.078	24,930	1,130	20,956	868	18,711	678	17,364	556
		8	0.060	22,680	1,027	19,278	873	17,010	685	15,876	559
		12	0.060	18,144	822	15,422	698	13,608	548	12,701	447
		15	0.038	14,112	568	11,995	423	10,584	373	9,878	298
	0.3	20	0.030	14,112	568	11,995	423	10,584	373	9,878	298
		8	0.060	22,680	1,027	19,278	873	17,010	685	15,876	559
		15	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.030	14,112	568	11,995	423	10,584	373	9,878	298

[ZSLNR series]

WORKPIECE				CARBON STEELS, ALLOY STEELS (180-250HB)		PREHARDENED STEELS (HRC35-45)		HARDENED STEELS (HRC45-55)		HARDENED STEELS (HRC55-65)	
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)	n (min ⁻¹)	Vf (mm/min)
2	0.2	6	0.080	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.070	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		12	0.040	15,309	1,083	13,013	921	11,482	722	10,716	590
		16	0.040	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.035	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.025	11,907	843	10,121	716	8,930	562	8,335	459
		30	0.017	11,312	800	9,615	680	8,484	534	7,918	436
		8	0.090	18,900	1,651	16,065	1,403	14,175	991	13,230	809
	0.3	16	0.060	13,608	1,070	11,567	909	10,206	713	9,526	583
		20	0.037	11,907	936	10,121	796	8,930	624	8,335	510
		6	0.017	20,709	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.014	18,900	1,651	16,065	1,403	14,175	991	13,230	809
	0.5	12	0.080	15,309	1,204	13,013	1,023	11,482	802	10,716	655
		16	0.080	13,608	1,070	11,567	909	10,206	713	9,526	583
		20	0.050	11,907	936	10,121	796	8,930	624	8,335	510
		25	0.050	11,907	936	10,121	796	8,930	624	8,335	510
		30	0.030	11,312	889	9,615	756	8,484	593	7,918	484
		8	0.200	18,900	1,651	16,065	1,403	14,175	991	13,230	809
	0.8	16	0.100	13,608	1,070	11,567	909	10,206	713	9,526	583
		20	0.060	11,907	936	10,121	796	8,930	624	8,335	510
		8	0.090	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.070	14,400	1,415	12,240	1,203	10,800	849	10,080	693
3	0.2	16	0.050	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.050	11,664	1,146	9,914	974	8,748	764	8,165	624
		30	0.040	9,072	1,146	7,711	974	6,804	764	6,350	624
		35	0.035	9,072	1,146	7,711	974	6,804	764	6,350	624
	0.3	8	0.130	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		16	0.075	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		20	0.075	11,664	1,274	9,914	1,083	8,748	849	8,165	693
		30	0.060	9,072	1,274	7,711	1,083	6,804	849	6,350	693
	0.5	8	0.180	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		12	0.130	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		16	0.100	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		20	0.100	11,664	1,274	9,914	1,083	8,748	849	8,165	693
		30	0.080	9,072	1,274	7,711	1,083	6,804	849	6,350	693
		35	0.085	9,072	1,274	7,711	1,083	6,804	849	6,350	693

※ Please adjust the cutting depth index according to the cutting depth factors of above table.

※ In actual machining, the condition should be adjusted according to the machining shape, purpose and machine type.

※ If RPM of the machine is low, the feed rate should be low in the same ratio as RPM.