

WH Limits

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WIDIN applies a unique WH limits system in order to fulfill the degree of an internal screw and provides users the best tools for suitable working and operating conditions.

1. $\{p \leq 0.6 (T.P.I \geq 40)\}$

Upper Limits : $0.010 + 0.015 \times n$

Lower Limits : Upper Limits - 0.015

Unit :mm (n=WH)

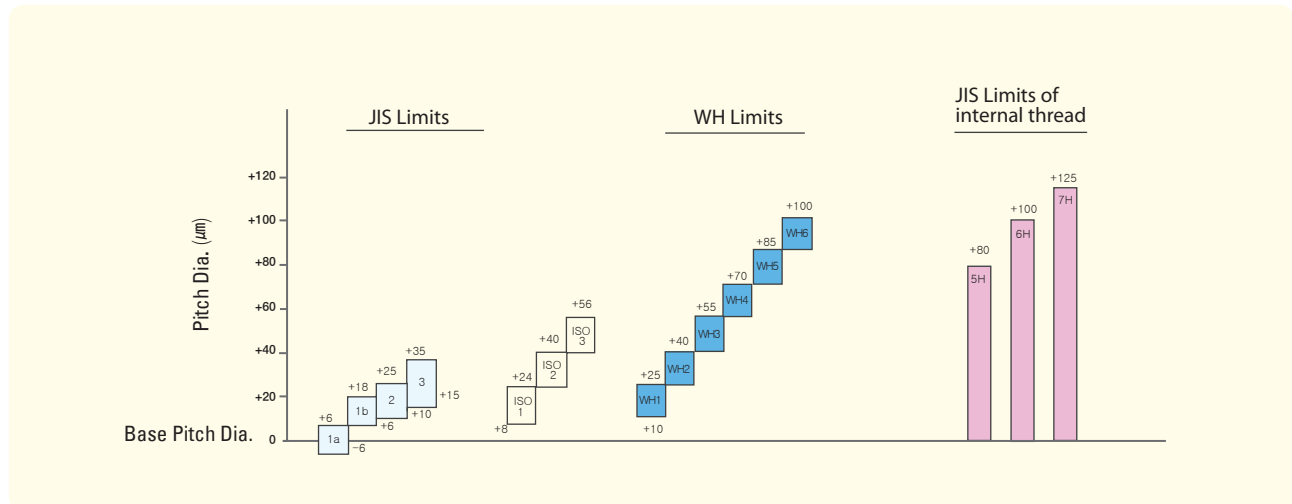
2. $\{p \leq 0.7 (T.P.I \leq 36)\}$

Upper Limits : $0.020 \times n$

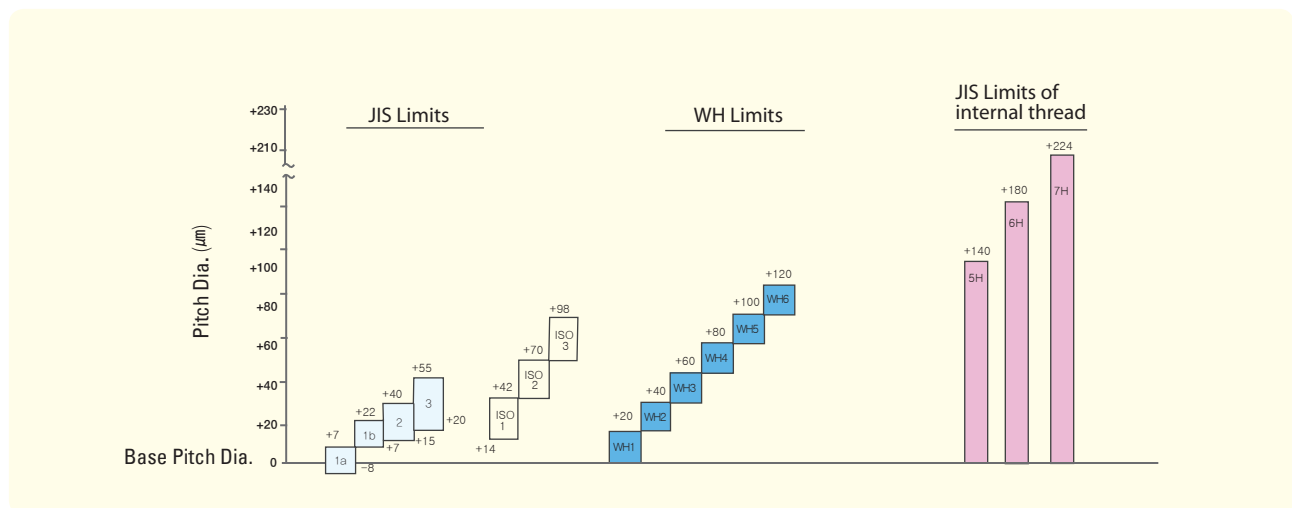
Lower Limits : Upper Limits - 0.020

Unit:mm (n=WH)

Example M3×0.5



Example M10×1.5



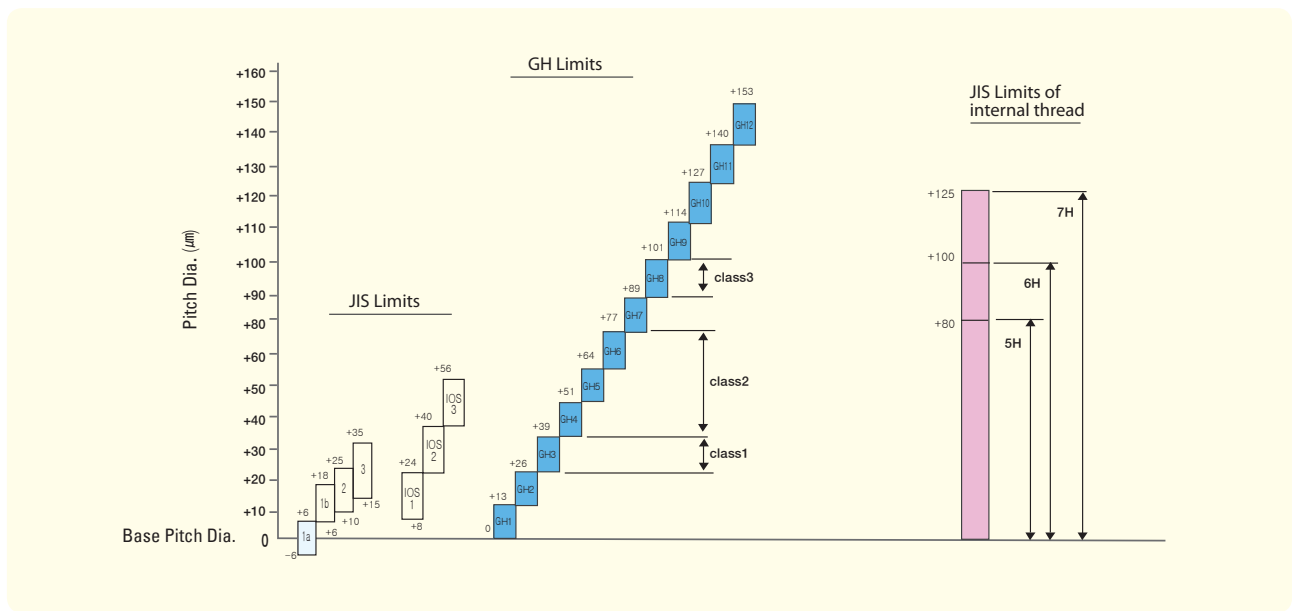
GH Limits

GH Limits

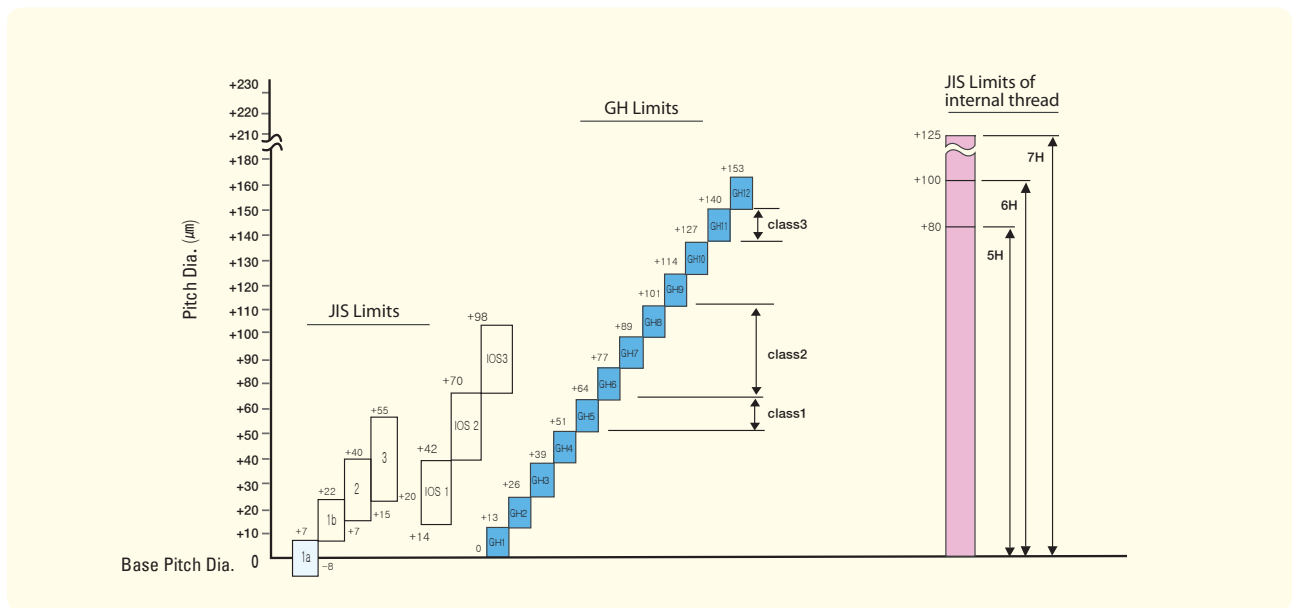
WIDIN applies the strict tap pitch diameter limits because Fluteless taps need to be managed by the rigid diameter of a bottom hole (unlike other normal taps) for it to be able to make precise tapping process of an internal screw by Plastic working.

WIDIN adopts the limits tolerance of $12.7\mu\text{m}$ (0.0005) increments.

Example M3×0.5



Example M10×1.5



Recommended tapping speeds and lubricants

Tapping speeds depend on very important factors such as material and type of tap, chamfer length, dimension of holes, work materials and fluids.

Users need to check every aspect before applying it.

Moreover, lubricant, cooling and abrasion resistance are three important factors affecting cutting fluids.

Therefore, users should provide enough fluids during the tapping process.

Recommended tapping speeds and lubricants

Work Material		Speed(m/min)							Lubricants			
		Straight Fluted Tap	Spiral Fluted Tap	Spiral Pointed Tap	Tungsten Carbide Tap	Fluteless Tap	HighSpeed Synchro Tap	Pipe Thread Tap	Non Water-soluble	Water-soluble	Semi-dry	Dry
Low Carbon Steels	C ~0.25%	8~13	8~13	15~25	-	8~13	27~32	3~6	◎	○	△	△
Medium Carbon Steels	C0.25% ~0.45%	7~12	7~12	10~15	-	7~10	27~32	3~6	◎	○	△	△
High Carbon Steels	C 0.45%~	6~9	6~9	8~13	-	5~8	22~27	2~5	◎	○	△	△
Alloy Steels	SCM	7~12	7~12	10~15	-	5~8	22~27	2~5	◎	△	△	△
Hardened Steels	25~45 HRC	3~5 (4~8)	3~5 (4~8)	4~6 (6~10)	-	-	15~20	2~5	◎	△	-	-
Stainless Steels	SUS	4~7	5~8	8~13	-	5~10	-	3~6	◎	○	-	-
Precipitation Hardened Steels	SUS630 SUS631	3~5	3~5	4~6	-	-	-	2~5	◎	-	-	-
Tool Steels	SKD	6~9	6~9	7~10	-	-	-	2~5	◎	-	-	-
Cast Steels	SC	6~11	6~11	10~15	-	-	17~22	2~5	◎	○	-	-
Cast Iron	FC	10~15	-	-	10~20	-	-	2~5	◎	○	○	○
Ductile Cast Iron	FCD	7~12	7~12	10~20	10~20	-	-	4~8	◎	○	○	-
Copper	Cu	6~9	6~11	7~12	10~20	7~12	27~32	2~5	○	○	-	-
Brass, Brass Casting	Bs, Bsc	10~15	10~20	15~25	15~25	7~12	27~32	5~10	○	○	○	○
Bronze, Bronze Casting	PB, PBC	6~11	6~11	10~20	10~20	7~12	-	6~11	○	○	-	-
Aluminum Rolled	AL	10~20	10~20	15~25	-	10~20	100~300	5~10	◎	○	△	-
Aluminum Alloy Casting	AC, ADC	10~15	10~15	15~20	10~20	10~25	80~300	10~15	◎	○	△	-
Magnesium Alloy Casting	MC	7~12	7~12	10~15	10~20	-	-	10~15	◎	○	○	-
Zinc Alloy Casting	ZDC	1~12	7~12	10~15	10~20	7~12	27~100	10~15	◎	○	△	-
Thermo Setting Plastic	Bakelite, Phenol Epoxy	10~20	-	-	15~25	-	-	5~10	-	○	○	○
Thermo Plastic	Vinyl Chloride Nylon	10~20	10~15	10~20	10~20	-	27~32	5~10	-	○	○	○

◎: Ideal / ○: Good / △: Applicable / -: Not Applicable

Drill hole Size for Metric Screw Threads in Accordance with 2nd Class of Limits

□ Straight Tap, Spiral tap

Thread Size	Drill Size(mm)	mm	
		Min	Max
M3 X 0.5	2.50	2.459	2.599
M4 X 0.7	3.30	3.242	3.422
M5 X 0.8	4.20	4.134	4.334
M6 X 1.0	5.00	4.917	5.153
M8 X 1.25	6.80	6.647	6.912
M10 X 1.25	8.80	8.647	8.912
M10 X 1.5	8.50	8.376	8.676
M12 X 1.0	11.00	10.917	11.153
M12 X 1.25	10.80	10.647	10.912
M12 X 1.5	10.50	10.376	10.676
M12 X 1.75	10.30	10.106	10.441
M14 X 1.5	12.50	12.376	12.676
M14 X 2.0	12.00	11.835	12.21
M16 X 1.5	14.50	14.376	14.676
M16 X 2.0	14.00	13.835	14.21
M18 X 1.5	16.50	16.376	16.676
M18 X 2.5	15.50	15.294	15.744
M20 X 1.5	18.50	18.376	18.676
M20 X 2.5	17.50	17.294	17.744

□ Roll tap

Thread Size	Drill Size(mm)	mm	
		Min	Max
M3 X 0.5	2.80	2.76	2.81
M4 X 0.7	3.70	3.65	3.7
M5 X 0.8	4.60	4.59	4.66
M6 X 1.0	5.50	5.48	5.57
M8 X 1.25	7.40	7.34	7.41
M10 X 1.25	9.40	9.34	9.41
M10 X 1.5	9.20	9.18	9.28
M12 X 1.0	11.50	11.48	11.57
M12 X 1.25	11.40	11.34	11.41
M12 X 1.5	11.20	11.18	11.28
M12 X 1.75	11.10	11.05	11.15

Hardness Conversion Table

Rockwell C	HRC	HRA	HRC	Rockwell C	HRC	HRA	HRC
20	78	71		60	38	33	28
25	82	75		65	42	37	32
30	86	79		70	46	41	36
35	90	83		75	50	45	40
40	94	87		80	54	49	44
45	98	91		85	58	53	48
50	102	95		90	62	57	52
55	106	99		95	66	61	56
60	110	103		100	70	65	60
65	114	107		105	74	69	64
70	118	111		110	78	73	68
75	122	115		115	82	77	72
80	126	119		120	86	81	76
85	130	123		125	90	85	80
90	134	127		130	94	89	84
95	138	131		135	98	93	88
100	142	135		140	102	97	92
105	146	139		145	106	101	96
110	150	143		150	110	105	100
115	154	147		155	114	109	104
120	158	151		160	118	113	108
125	162	155		165	122	117	112
130	166	159		170	126	121	116
135	170	163		175	130	125	120
140	174	167		180	134	129	124
145	178	171		185	138	133	128
150	182	175		190	142	137	132
155	186	179		195	146	141	136
160	190	183		200	150	145	140
165	194	187		205	154	149	144
170	198	191		210	158	153	148
175	202	195		215	162	157	152
180	206	199		220	166	161	156
185	210	203		225	170	165	160
190	214	207		230	174	169	164
195	218	211		235	178	173	168
200	222	215		240	182	177	172
205	226	219		245	186	181	176
210	230	223		250	190	185	180
215	234	227		255	194	189	184
220	238	231		260	198	193	188
225	242	235		265	202	197	192
230	246	239		270	206	201	196
235	250	243		275	210	205	200
240	254	247		280	214	209	204
245	258	251		285	218	213	208
250	262	255		290	222	217	212
255	266	259		295	226	221	216
260	270	263		300	230	225	220
265	274	267		305	234	229	224
270	278	271		310	238	233	228
275	282	275		315	242	237	232
280	286	279		320	246	241	236
285	290	283		325	250	245	240
290	294	287		330	254	249	244
295	298	291		335	258	253	248
300	302	295		340	262	257	252
305	306	299		345	266	261	256
310	310	303		350	270	265	260
315	314	307		355	274	269	264
320	318	311		360	278	273	268
325	322	315		365	282	277	272
330	326	319		370	286	281	276
335	330	323		375	290	285	280
340	334	327		380	294	289	284
345	338	331		385	298	293	288
350	342	335		390	302	297	292
355	346	339		395	306	301	296
360	350	343		400	310	305	300
365	354	347		405	314	309	304
370	358	351		410	318	313	308
375	362	355		415	322	317	312
380	366	359		420	326	321	316
385	370	363		425	330	325	320
390	374	367		430	334	329	324
395	378	371		435	338	333	328
400	382	375		440	342	337	332
405	386	379		445	346	341	336
410	390	383		450	350	345	340
415	394	387		455	354	349	344
420	398	391		460	358	353	348
425	402	395		465	362	357	352
430	406	399		470	366	361	356
435	410	403		475	370	365	360
440	414	407		480	374	369	364
445	418	411		485	378	373	368
450	422	415		490	382	377	372
455	426	419		495	386	381	376
460	430	423		500	390	385	380
465	434	427		505	394	389	384
470	438	431		510	398	393	388
475	442	435		515	402	397	392
480	446	439		520	406	401	396
485	450	443		525	410	405	400
490	454	447		530	414	409	404
495	458	451		535	418	413	408
500	462	455		540	422	417	412
505	466	459		545	426	421	416
510	470	463		550	430	425	420
515	474	467		555	434	429	424
520	478	471		560	438	433	428
525	482	475		565	442	437	432
530	486	479		570	446	441	436
535	490	483		575	450	445	440
540	494	487		580	454	449	444
545	498	491		585	458	453	448
550	502	495		590	462	457	452
555	506	499		595	466	461	456
560	510	503		600	470	465	460
565	514	507		605	474	469	464
570	518	511		610	478	473	468
575	522	515		615	482	477	472
580	526	519		620	486	481	476
585	530	523		625	490	485	480
590	534	527		630	494	489	484
595	538	531		635	498	493	488
600	542	535		640	502	497	492
605	546	539		645	506	501	496
610	550	543		650	510	505	500
615	554	547		655	514	509	504
620	558	551		660	518	513	508
625	562	555		665	522	517	512
630	566	559		670	526	521	516
635	570	563		675	530	525	520
640	574	567		680	534	529	524
645	578	571		685	538	533	528
650	582	575		690	542	537	532
655	586	579		695	546	541	536
660	590	583		700	550	545	540
665	594	587		705	554	549	544
670	598	591		710	558	553	548
675	602	595		715	562	557	552
680	606	599		720	566	561	556
685	610	603		725	570	565	560
690	614	607		730	574	569	564
695	618	611		735	578	573	568
700	622	615		740	582	577	572
705	626	619		745	586	581	576
710	630	623		750	590	585	580
715	634	627		755	594	589	584
720	638	631		760	598	593	588
725	642	635		765	602	597	592
730	646	639		770	606	601	596
735	650	643		775	610	605	600
740	654	647		780	614	609	604
745	658	651		785	618	613	608
750	662	655		790	622	617	612
755	666	659		795	626	621	616
760	670	663		800	630	625	620
765	674	667		805	634	629	624
770	678	671		810	638	633	628
775	682	675		815	642	637	632
780	686	679		820	646	641	636
785	690	683		825	650	645	640
790	694	687		830	654	649	644
795	698	691		835	658	653	648
800	702	695		840	662	657	652
805	706	699		845	666	661	656
810	710	703		850	670	665	660
815	714	707		855	674	669	664
820	718	711		860	678	673	668
825	722	715		865	682	677	672
830	726	719		870	686	681	676
835	730	723		875	690	685	680
840	734	727		880	694	689	684
845	738	731		885	698	693	688
850	742	735		890	702	697	692
855	746	739		895	706	701	696
860	750	743		900	710	705	700
865	754	747		905	714	709	704
870	758	751		910	718	713	708
875	762	755		915	722	717	712
880	766	759		920	726	721	716
885	770	763		925	730	725	720
890	774	767		930	734	729	724
895	778	771		935	738	733	728
900	782	775		940	742	737	732
905	786	779		945	746	741	736
910	790	783		950	750	745	740
915	794	787		955	754	749	744
920	798	791		960	758	753	748
925	802	795		965	762	757	752
930	806	799		970	766	761	756
935	810	803		975	770	765	760
940	814	807		980	774	769	764
945	818	811		985	778	773	768
950	822	815		990	782	777	772
955	826	819		995	786	781	776
960	830	823		1000	790	785	780